

The Relation Between the Five Facets of Mindfulness and Worry in a Non-clinical Sample

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Abstract Recent studies have provided initial support for the effectiveness of mindfulness-based interventions in the treatment of generalized anxiety disorder (GAD). Although this line of research is promising, surprisingly few studies have examined the underlying theoretical assumptions of these interventions, including the degree to which mindfulness is associated with symptoms of GAD. Consequently, the purpose of this study was to examine the association between the five facets of mindfulness, established by previous research, and symptoms of GAD. A non-clinical sample of 400 adults completed the Five Facet Mindfulness Questionnaire and the Penn State Worry Questionnaire. A simultaneous multiple regression analysis was conducted, and three of the five facets of mindfulness, *nonreactivity to inner experience*, *nonjudgement of inner experience*, and *acting with awareness*, were found to be significant and unique predictors of worry symptoms, with the model predicting 34% of the variance in worry symptoms. In contrast, two facets, *observe* and *describe*, were not found to be associated with worry symptoms. Overall, these findings provide support for the association between mindfulness and worry. The results have the potential to inform treatment outcome research focused on improving mindfulness-based interventions for GAD or assessing potential mechanisms of change during these interventions.

Keywords Worry · Mindfulness · Anxiety · Five Facet Mindfulness Questionnaire · Generalized Anxiety Disorder

Introduction

Generalized anxiety disorder (GAD) is characterized by persistent and uncontrollable worry, and for those with GAD, the worry is often associated with cognitive and physical symptoms including difficulty concentrating, fatigue, restlessness, and irritability (Andrews et al. 2010; American Psychiatric Association 2000). The lifetime prevalence of GAD is approximately 5%, and two thirds of the cases are females (American Psychiatric Association 2000). Generalized anxiety disorder has a chronic course and a negative impact on daily functioning and quality of life (Kessler et al. 2005; Hoffman et al. 2008; Wittchen and Hoyer 2001). Further, economic costs of GAD due to lost productivity and use of medical resources is substantial (Hoffman et al. 2008). For example, GAD diagnosis is associated with increased visits to both family physicians and specialists (Greenberg et al. 1999). Despite the negative impact of GAD, recovery rates from traditional cognitive and behavioral approaches have been found to range from approximately 35–50%; recovery rates for other anxiety disorders have been found to exceed 70% (Barlow 2007; Fisher 2006). These findings suggest that additional research is needed to develop more effective intervention strategies and to explore the underlying cognitive processes related to the development and maintenance of GAD. In response to this need, an emerging line of research has focused on the use of mindfulness-based models to treat GAD and pathological worry. Roemer and Orsillo (2002) were among the first to discuss mindfulness-based approaches in the conceptualization and treatment of GAD. Since this publication, a number of studies have provided initial support for the effectiveness of these interventions in the treatment of GAD. In particular, Roemer and Orsillo (2002) have developed a model labeled acceptance-based behavior therapy (ABBT), and initial

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treatment outcome studies have yielded promising results (Roemer and Orsillo 2007; Roemer et al. 2008). For example, Roemer et al. (2008) found ABBT to yield a 78% response rate, with treatment gains maintained at follow-up. Other researchers have utilized mindfulness-based cognitive therapy, which was originally developed by Segal et al. (2002) to prevent relapse in depression, to treat GAD. In particular, Evans et al. (2008) found significant improvement in patients with GAD using this model, and in a similar study, Craigie et al. (2008) found modest gains at post-intervention and follow-up.

Although these initial studies provide evidence for the effectiveness of mindfulness-based interventions in treating GAD symptoms, surprisingly few studies have systematically examined the underlying theoretical assumptions of this model, including the association between mindfulness as a construct and GAD symptoms (Roemer et al. 2009). Research in this area may improve the understanding of mindfulness as a potential protective factor in the development of GAD symptoms and may provide direction for researchers interested in mechanisms of change during the course of intervention. In particular, it is possible that changes in specific facets of mindfulness precede and/or mediate reduction in symptoms during the course of mindfulness-based interventions for GAD.

In what appears to be the only previous study in this area, Roemer et al. (2009) examined the association between two dimensions of mindfulness and GAD symptoms. The first dimension of mindfulness assessed by the authors was *present moment awareness*, measured by the Mindful Attention and Awareness Scale (MAAS; Brown and Ryan 2003), and the second dimension was an attitude of *acceptance, non-judgment, and openness to experience*, measured by the Self-Compassion Scale (SCS; Neff 2003). Generalized anxiety disorder symptoms were associated with the MAAS ($r=-.48$) and the SCS ($r=-.46$). Overall, although Roemer et al. (2009) provide preliminary evidence for the association between mindfulness and worry symptoms, the above results have yet to be replicated. Further, Roemer et al. (2009) noted that their study assessed only two components of mindfulness, and since the completion of their study, Baer and colleagues have developed the Five Facet Mindfulness Questionnaire (FFMQ). The FFMQ assesses five components of mindfulness, which are *acting with awareness, nonreactivity, nonjudging, observe, and describe* (FFMQ; Roemer et al. 2009). Overall, although the use of the FFMQ may provide additional insight into the association between mindfulness and GAD, this association has yet to be examined.

Although little is known about the association between mindfulness and worry, several studies have examined the association between mindfulness and similar constructs, including neuroticism, depression, and trait negative affect.

In particular, based on a meta-analysis, Giluk (2009) found a strong association between mindfulness and neuroticism ($r=-.45$) and negative affect ($r=-.39$). Further, other studies have found an association between mindfulness and depression (Barnes and Lynn 2010; Brown and Ryan 2003; Kohls et al. 2009; Michalak et al. 2011). Despite the research in this area, relatively few studies have focused on the association between the FFMQ and negative affect. In the initial psychometric study of the FFMQ, Baer et al. (2006) found that, with the exception of *observe*, all facets of mindfulness were associated with neuroticism. In contrast, Hollis-Walker and Colosimo (2011) found neuroticism to be associated with all five facets of mindfulness on the FFMQ. Finally, Barnes and Lynn (2010) utilized longitudinal methodology to examine the relation between mindfulness and depression. The authors found that three of the five facets of the FFMQ (i.e., *acting with awareness, nonreactivity, and nonjudging*) were the most consistent and robust predictors of depression. In contrast, *observing* and *describing* were less consistently related to depressive symptoms. Overall, the initial research on the relation between the FFMQ and negative affect suggests that *acting with awareness, nonreactivity, and nonjudging* are significant and unique predictors of negative affect.

Overall, the purpose of this study was to replicate and extend the work by Roemer et al. (2009) by examining the association between worry and the facets of mindfulness measured by the FFMQ. This line of research has the potential to facilitate the development and improvement of mindfulness-based interventions to treat GAD. In particular, researchers may be able to prioritize mindfulness-based intervention strategies based on the facets of mindfulness that exhibit the strongest association with worry. Further, this research may provide guidance for researchers interested in assessing the specific facets of mindfulness most likely to mediate change during intervention.

Method

Participants

Participants were 400 undergraduate students recruited from psychology courses in a medium-sized university in the southeastern USA. The sample was comprised of 275 females (68.8%) and 125 males (31.2%). The mean age of the sample was 21.67 years ($SD=4.95$), and the ethnic background of participants was as follows: Caucasian/White (68.2%), African-American/Black (12.0%), Hispanic (9.0%), Asian or Pacific Islander (6.5%), and Other (3.0%). Participants were asked to volunteer in exchange for course extra credit, and alternative assignments were provided for students who were not interested in participating in the

study. Participants reported varied household incomes; however, the most commonly reported household income was less than \$20,000 (37%). Response rate was not formally recorded; however, informal observation indicated that approximately 90–95% of students who in participating courses chose to participate in the study. No students who consented dropped out.

A series of bivariate correlations were conducted to examine the association between key demographic variables (i.e., age, gender, income, and ethnicity) and the study variables. Weak but significant associations were found between gender and the Penn State Worry Questionnaire (PSWQ) and FFMQ, suggesting the need to enter gender as a covariate in subsequent analyses. In contrast, the association between all other demographic variables and study variables was non-significant. Means and standard deviations for study variables are provided in Table 1.

Design and Procedures

Participants completed a survey packet in a classroom setting. Researchers were present throughout administration to ensure confidentiality and independent reporting, as well as to provide assistance when needed. After providing written informed consent, participants were administered self-report survey packets, which took approximately 15 min to complete. Based on researcher monitoring of the administration of the surveys, all completed surveys independently, and no significant events were observed during the completion of the surveys.

Measures

In addition to a demographics form, the below measures were also administered to participants. The below measures were part of a larger study that included measures of cognition and were not reported as they are outside the scope of the current study.

The Five Facet Mindfulness Questionnaire The FFMQ is a self-report instrument that assesses an individual's tendency

to be mindful in everyday life (Baer et al. 2006, 2009). The measure is comprised of five subscales which are as follows: *nonreactivity to inner experience* (nonreactivity), noticing thoughts without responding to them; *nonjudging of inner experiencing* (nonjudging), taking a non-evaluative or nonjudgmental stance toward thoughts and feelings; *observing*, the tendency to notice inner experiences; *describe*, the tendency to be able to label one's inner experiences; and *acting with awareness* (acting), attending to activities and experiences in the moment (Baer et al. 2008, p. 330). Items on the FFMQ are scored on a five-point Likert scale, ranging from 1 (*never or rarely true*) to 5 (*very often or always true*). Further, the FFMQ exhibits excellent psychometric properties (see Baer et al. 2009). Regarding validity, the FFMQ has been found to be related to similar constructs including thought suppression and openness to experience. Further, experienced meditators have been found to score higher on the FFMQ, and scores have been found to increase following mindfulness-based interventions. Regarding reliability, Chronbach's alphas for the subscales has been found to range from .75–.91 in previous research (Baer et al. 2006), and in the current study, Cronbach's alphas ranged from .82–.91. The FFMQ has been found to be reliable and valid in non-clinical student samples (Baer et al. 2006).

The Penn State Worry Questionnaire The PSWQ is a 16-item self-report measure that assesses intensity and excessiveness of worry, which is a defining feature of GAD (Meyer et al. 1990). Further, the PSWQ is considered a primary outcome variable in the GAD research literature (Covin et al. 2008). Items are measured on a five-point Likert scale, ranging from 1 (*not at all typical for me*) to 5 (*very typical of me*). The PSWQ has well-established psychometric properties (Davey 1993; Meyer et al. 1990; Startup and Erickson, 2006). Regarding validity, the PSWQ has been found to be correlated with other measures of worry, including the Worry Domains Questionnaire, and non-specific anxiety symptoms, including the State Trait Anxiety Inventory. Regarding reliability, Cronbach's alphas have been found to range from .88 to .95, and in the current

Table 1 Means and standard deviations for study variables by gender and combined

	Female	Male	Combined
Nonreactivity	19.41 (4.86)**	23.03 (4.79)	22.16 (5.04)
Nonjudging	21.18 (7.07)	27.35 (7.34)	25.83 (7.72)
Act with awareness	22.93 (5.67)	26.98 (5.97)	25.98 (6.12)
Observe	27.66 (5.95)	28.08 (5.97)	27.99 (5.94)
Describe	26.56 (7.04)	27.46 (6.30)	27.22 (6.46)
FFMQ—total	100.90 (14.85)*	105.00 (15.93)	102.15 (15.28)
PSWQ	50.74 (14.79)**	43.52 (15.07)	48.52 (15.23)

* $p < .05$; ** $p < .001$

sample, Cronbach's alpha was .95. The PSWQ has been found to be reliable and valid in student samples (see Molina and Borkovec 1994).

Results

Descriptive Statistics and Data Screening

A series of bivariate correlations were conducted to examine the association between key demographic variables (i.e., age, gender, income, and ethnicity) and study variables. Weak but significant associations were found between gender and the PSWQ and FFMQ, suggesting the need to enter gender as a covariate in subsequent analyses. In contrast, the association between all other demographic variables and study variables were non-significant. Means and standard deviations for study variables are provided in Table 1. Inspection of the data suggested no robust violations of normality. Missing data were infrequent, with 99% of participants completing the PSWQ and 94% completing the FFMQ. For subsequent analyses, missing data were managed by deleting cases listwise.

Mindfulness and Worry

Researchers used a hierarchical regression analysis to test the hypothesis that mindfulness is significantly associated with pathological worry. The sum of total scores on the PSWQ was the designated criterion variable. Gender was entered as a covariate in the first step of the regression equation, and the five subscales of the FFMQ were entered as predictor variables in the second step of the equation. All subscales of the FFMQ were entered in the same step, as there was no theoretical basis for entering FFMQ variables in different steps or levels of the regression equation. Inspection of the data suggested no robust violations of the assumptions of multiple regression, and tolerance and variance inflation factor values suggested that collinearity was in the acceptable range.

The addition of the FFMQ subscales to the second step of the equation led to a significant improvement in the model, $F(5,366)=36.44$, $p<.001$, $\Delta R^2=.32$, indicating that FFMQ subscales predicted 32% of the variance in PSWQ scores (see Table 2). The nonreactivity, nonjudging, and acting with awareness subscales of the FFMQ were significantly and negatively associated with PSWQ scores, suggesting that higher levels of these facets of mindfulness were associated with lower scores on the PSWQ. Examination of the beta weights indicated that nonreactivity and nonjudging were the most robust predictors of mindfulness. In contrast, the observe and

describe subscales were not associated with PSWQ scores. The regression analysis was repeated, with the exclusion of observe and describe (the non-significant facets), to isolate the variance in the PSWQ explained by non-reactivity, nonjudging, and acting with awareness. The reduced model was significant, $F(3, 375)=60.30$, $p<.001$, $\Delta R^2=.31$, predicting 31% of the variance in PSWQ scores. Further, all beta weights were significant at the .001 level. Note that bivariate correlations between FFMQ scores and the PSWQ are provided in Table 2.

A score of 62 on the PSWQ has been found to be the optimal cutoff score for discriminating between individuals with GAD and controls in student sample (Behar et al. 2003). This cutoff was utilized to categorize individuals into either a high-worry group ($n=97$) and a low-worry group ($n=299$). A series of ANCOVAs were then conducted to examine potential group differences in mean FFMQ scores, and gender was entered as a covariate. The high-worry group scored significantly lower on the following subscales of the FFMQ: nonreactivity, $F(1,387)=32.90$, $p<.001$, partial $\eta^2=.08$; acting with awareness, $F(1,387)=32.65$, $p<.001$, partial $\eta^2=.08$; and nonjudging, $F(1,388)=54.53$, $p<.001$, partial $\eta^2=.12$. In contrast, no group differences were found for describe, $F(1,390)=.74$, $p = ns$, and observe, $F(1,385)=.14$, $p = ns$. Means are provided in Table 3.

Discussion

The purpose of this study was to examine the association between the five facets of mindfulness measured by the FFMQ and GAD symptoms. Collectively, mindfulness was found to predict 32% of the variance in worry, and three of the five facets identified by the FFMQ were found to be associated with worry. In particular, nonreactivity, nonjudging, and acting with awareness were associated with worry, and nonreactivity and nonjudging were the most robust predictors of worry.

As an interpretation of the association between nonjudging and nonreactivity, it is noteworthy that these facets involve an accepting, non-responsive, and non-evaluative perspective in relation to internal experiences, including both cognitive and emotional experiences. This perspective may transfer to worry-related content, as individuals who tend to exhibit high levels of nonjudging and nonreactivity may tend to notice worry without feeling compelled to respond and may be less likely to attempt to suppress worry. Further, they may be less likely to experience autonomic arousal in response to worry, appraise worry as harmful, and engage in negative self-appraisal when worry occurs. Finally, it is noteworthy that these findings are generally consistent with the Roemer et al. (2009) study, in

Table 2 Regression variables predicting scores on the PSWQ

	FFMQ subscales	β	Partial r	Zero-order correlations
	Step 1			
Nonreactivity, nonjudging, act with awareness, observe, and describe are subscales of the FFMQ. Observe ($\beta=-.04$) and describe ($\beta=-.03$) were not significantly associated with the PSWQ <i>*p</i> <.01; <i>**p</i> <.001	Gender	-.23**	-.23	-.23
	Step 2			
	Gender	-.15*	-.18	-.23
	Nonreactivity to inner experience	-.29**	-.31	-.45
	Acting with awareness	-.17**	-.19	-.37
	Nonjudging of inner experience	-.31**	-.33	-.43

which acceptance, measured by the SCS, was found to be associated with GAD symptoms.

Regarding acting with awareness, those who score low on this facet tend to be inattentive to current activities, on autopilot, and distracted by their current thoughts. In relation to worry, it is possible that those who exhibit low levels of acting with awareness may be distracted by intrusive worry-related thought content at the cost of being in the present moment. Interestingly, this research is also consistent with Roemer et al. (2009), in which present moment awareness, measured by the MAAS, was found to be associated with GAD symptoms.

The finding that observe and describe were not associated with worry symptoms suggests that one's response to worry, including reacting to and judging worry-related content, may be more relevant to worry-related symptoms than one's tendency to notice and describe worry. Consequently, worriers and non-worriers may be similar in their ability to observe and describe worry-related content, and the distinction between the groups may be based on the way one responds to worry. In particular, worriers may be more likely to experience high levels of judgment and reactivity in response to worry. From a clinical perspective, these results suggest that fostering describing and observing in isolation (i.e., without fostering nonreactivity and nonjudging) may not reduce worry symptoms.

Table 3 Mean comparisons of high- and low-worry groups for scores on the FFMQ

	High-worry group	Low-worry group
Nonreactivity	19.42 (4.86)*	23.03 (4.79)
Observe	27.66 (5.95)	28.08 (5.97)
Acting with awareness	22.93 (5.67)*	26.98 (5.97)
Describe	26.56 (7.04)	27.46 (6.30)
Nonjudging	21.19 (7.07)*	27.35 (7.34)

High and low scorers were based on a cutoff score on the PSWQ of 62. Nonreactivity, nonjudging, act with awareness, observe, and describe are subscales of the FFMQ

**p*<.001

The above findings provide a number of directions for future research. First, these findings may facilitate research related to mechanisms of change during mindfulness-based interventions. In one of the only studies conducted in this area, Hayes et al. (2010) examined mechanisms of change during ABBT and found that increases in acceptance of thoughts and feelings and engagement in valued activities during the course of treatment were associated with successful treatment outcome. Related to this line of research, the current findings suggest that one direction for future research would be to utilize the FFMQ during the course of mindfulness-based interventions to determine the degree to which each of the facets of mindfulness mediate clinical response to intervention. Based on the current findings, nonreactivity, nonjudging, and acting with awareness may be potential mediators of clinical change. Second, when developing and implementing mindfulness-based interventions for GAD, it may be beneficial to consider the degree to which nonreactivity, nonjudging, and acting with awareness are addressed as part of the intervention.

The current study also has a number of noteworthy limitations that should be addressed in future studies. First, this study is based on a non-clinical sample of college students. As a result, a recommended direction for future research would be to examine the degree to which the current findings generalize to clinical samples. Further, the current sample was a relatively homogenous group in terms of socioeconomic status and ethnicity. Consequently, more research is needed to determine the degree to which the findings generalize to other groups, including non-college students and individuals from other ethnic backgrounds. Further, the results need to be replicated, as this is the first study to examine the association between the FFMQ and GAD symptoms. A final limitation is potential self-report bias. Consequently, follow-up studies using additional methodological approaches, including the use of multiple informants, to assess participant worry symptoms are recommended.

In summary, the current findings suggest that nonreactivity, nonjudging, and acting with awareness are related to worry symptoms and that modification of these

processes may lead to clinical improvement in those who suffer from GAD. The current study is among the first to formally examine the association between mindfulness and worry symptoms and extends the previous literature by focusing on specific facets of mindfulness that may be associated with worry. In addition to providing potential insight into the mechanisms related to the development and maintenance of worry symptoms, results from the current study provide direction for future research in this area and have the potential to facilitate the improvement of mindfulness-based interventions for GAD.

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