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Facets of Mindfulness in Adults with Generalized Anxiety Disorder and Impact of Co-occurring Depression

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Abstract

Anxiety and depressive symptoms are associated with lower levels of mindfulness, yet few studies to date have examined facets of mindfulness in adults with Generalized Anxiety Disorder (GAD). In this study, we examined differences in mindfulness between individuals with GAD with and without concurrent Major Depressive Disorder (MDD) and/or Dysthymic Disorder (DD). We also examined the associations of anxiety and depressive symptoms with facets (subscales) of mindfulness. We hypothesized that individuals with primary GAD and co-occurring MDD/DD would exhibit lower mindfulness than those without a concurrent depressive disorder. We also hypothesized that mindfulness would be negatively correlated with worry and depressive symptom severity. Subjects were 140 adults (M (SD) age = 33.4 (12.9); 73% female) with a primary diagnosis of GAD; 30.8% (n = 43) also met criteria for current MDD/DD as determined by a structured clinical interview for DSM-IV. Current worry and depressive symptoms were assessed using self-report measures at baseline of a 12-week treatment study. Individuals with GAD and co-occurring MDD/DD exhibited significantly lower mindfulness than those without a depressive

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Author contributions:

AWB: assisted with the data analyses and wrote the paper. MRF: assisted in analyses and writing of the paper. SSH: analyzed the data and wrote part of the results. NJL: conducted assessments, collaborated in the writing and editing of the manuscript. EB: conducted assessments, assisted in the study design and collaborated in the editing of the manuscript. SGH and NMS designed the study and collaborated in the writing and editing of the manuscript.

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All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committees and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

This study was approved by the IRB at both Massachusetts General Hospital and Boston University.

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

disorder diagnosis and specifically lower scores on the Awareness sub-scale compared to individuals with primary GAD and no comorbid depression. In terms of the dimensional impact of worry and depression ratings, depression symptoms independently predicted lower Awareness scores and worry independently predicted lower levels of Nonreacting and Nonjudging sub-scales. This may have direct treatment implications.

Keywords

Mindfulness; Generalized Anxiety Disorder; Major Depressive Disorder; Dysthymia

Mindfulness refers to the ability to focus one's awareness on the present moment without judging the sensations, thoughts, feelings, or other characteristics of the experience (Bishop et al., 2004). Adapted from the meditative practice of ancient Buddhism, mindfulness practices also include non-judgmental awareness of everyday experiences outside the context of meditation. Mindfulness practices have gained popularity as a therapeutic tool and are integrated into several treatments, including acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999), dialectical behavior therapy (DBT; Linehan, 1993), mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1982, 1990), and mindfulness-based cognitive therapy (MBCT; Segal, Williams, & Teasdale, 2002). Such mindfulness-based interventions appear efficacious for reducing acute symptoms of anxiety and depression in a variety of populations (Hofmann, Sawyer, Witt, & Oh, 2010).

For example, researchers have found preliminary evidence for the efficacy of MBCT and Acceptance-Based Behavior Therapy (AABT; Roemer & Orsillo, 2005) for the treatment of generalized anxiety disorder (GAD; Craigie, Rees, Marsh, & Nathan, 2008; Evans et al., 2008; Treanor, Erisman, Salters-Pedneault, Roemer, & Orsillo, 2011). However, initial trials of mindfulness-based interventions for GAD utilized small samples and lacked active control conditions (Craigie et al., 2008; Evans et al., 2008; Treanor et al., 2011). In a large randomized control trial of MBSR compared to an attention control for GAD, Hoge et al. (2013) found no significant differences in clinician-rated anxiety symptom severity reductions between groups; however, those in the MBSR group did report greater reductions in self-reported anxiety and in stress reactivity to a laboratory task. Thus, a deeper understanding of mindfulness deficits in those with GAD could help to improve mindfulness-based interventions for the disorder.

Mindfulness deficits are of particular interest in anxiety and depression because the patterns of worry and rumination that characterize these disorders are indicative of an inability to focus on the present moment (Desrosiers, Vine, Klemanski, & Nolen-Hoeksema, 2013). With regard to GAD, researchers have found that low mindfulness is associated with GAD symptom severity, above and beyond the variance accounted for by depressive and anxious distress (Roemer et al., 2009). Furthermore, researchers have found lower levels of mindfulness in individuals diagnosed with GAD, when compared to a non-anxious controls (Roemer et al., 2009). Roemer et al. (2009) posited a bidirectional relationship between GAD and mindfulness, such that worry reduces present-moment awareness and acceptance, which further worsens GAD symptoms. They noted that future studies could further

characterize the relationship between GAD and mindfulness by examining mindfulness as a multidimensional variable (Roemer et al., 2009).

Mindfulness is a construct that is difficult to define and quantify. When measures of mindfulness were first developed in the early 2000's, the initial focus was on mindfulness as a single-factor construct (Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007; Warren Brown & Ryan, 2004). However, several authors have argued that the single-factor approach to complex constructs does not allow for a clear interpretation of the relationships between the construct and other variables of interest (Schneider, Hough, & Dunnette, 1996; Smith & McCarthy, 1995). In order clarify what mindfulness is and how it relates to other variables, Baer and colleagues (2006) developed the Five Facet Mindfulness Questionnaire (FFMQ) based largely on the set of interrelated skills used to improve mindfulness in DBT (Dimidjian & Linehan, 2003). In contrast to single-factor measures of mindfulness, the FFMQ provides sub-scale scores for each of five mindfulness skills: Acting with Awareness, Nonjudgment of Inner Experience, Nonreactivity to Inner Experience, Observing, and Describing. *Acting with Awareness (Awareness)* of the present moment is a core component of mindfulness to combat frequent states of distracted thinking, or being on "automatic pilot" (Linehan, 1993; Segal et al., 2002). *Nonjudging of Inner Experience (Nonjudging)* reflects trait tendencies to assume a non-evaluative, impartial stance towards one's own experience (Kabat-Zinn, 1990). *Nonreactivity to Inner Experience (Nonreacting)* involves detaching from one's thoughts and emotions, thereby limiting reactivity. *Describing* is intended to help individuals stay in the present moment by labeling or noting thoughts and feelings as they occur (Segal et al., 2002). *Observing* reflects attention to present experiences. Notably, Baer and colleagues (2006) found that the Observing facet of the FFMQ did not load onto the other facets and was unexpectedly positively correlated with dissociation, absentmindedness, thought suppression, and psychological symptoms in a nonclinical sample. Curtiss and Klemanski (2014) found a similar relationship in a clinical sample; that is, the Observing facet exhibited a positive relationship with anxious arousal.

This multi-faceted approach to mindfulness has helped to clarify the relationship between specific mindfulness skills and anxiety and depressive symptoms. For instance, Awareness, Nonjudging, and Nonreacting have shown significant negative relationships with measures of anxiety and depression in nonclinical samples (Barnes & Lynn, 2010; Fisak & Von Lehe, 2012). In a sample of adults with mild to moderate depressive symptoms and possible co-occurring anxiety symptoms, an additional significant relationship was found between depressive symptoms and Describing (Bohlmeijer, ten Klooster, Fledderus, Veehof, & Baer, 2011).

Researchers have also examined FFMQ facets in treatment-seeking samples. For example, Desrosiers, Klemanski, and Nolen-Hoeksema (2013) used path analysis to examine the associations between FFMQ facets and symptoms of anxiety and depression in a mixed-diagnosis, treatment-seeking sample (42.9% with primary GAD, 20.1% with primary major depressive disorder (MDD)). In the final path model, they found that Nonreacting negatively predicted general distress – anxiety; Describing and Nonreacting negatively predicted anxious arousal and Observing positively predicted anxious arousal; Nonreacting and Nonjudging negatively predicted anhedonic depression; and Nonreacting and Nonjudging

negatively predicted general distress – depression (Desrosiers, Klemanski, et al., 2013). In another study with a mixed-diagnosis, treatment seeking sample (42.4% with primary GAD and 24.5% with primary MDD), Curtiss and Klemanski (2014) examined the bivariate associations between FFMQ facets and worry symptoms and found that Awareness, Nonjudging, and Nonreacting were each negatively associated with worry. Finally, in a treatment-seeking sample of individuals with GAD, Hoge et al. (2015) found that improvements in Awareness and Nonreacting specifically mediated reductions in worry following MBSR.

Given that both anxiety and depression are associated with low mindfulness, we hypothesized that individuals with primary GAD and co-occurring MDD/DD would exhibit lower mindfulness than those without concurrent MDD/DD. Second, we hypothesized that mindfulness would be negatively correlated with worry and depressive symptom severity. Based on the previous literature, we hypothesized that Awareness (*e.g.*: attending to the present moment), Nonjudging (*e.g.*: allowing thoughts and emotions without judgment), and Nonreacting (*e.g.*: decentering) would be the only facets to demonstrate significant negative relationships with worry. We also hypothesized a negative relationship between depressive symptoms and Describing (*e.g.*: perceived ability to express thoughts and emotions). Third, based on previous findings, we hypothesized that the Observing facet would not be significantly correlated with depressive or anxiety symptoms, or that it may exhibit a positive relationship with symptom severity. We were also interested in better understanding whether the presence of depressive symptoms might impact the relationship between mindfulness and worry, and hypothesized that depression and worry would each contribute significantly to explain the variance in the FFMQ total and sub-scale scores.

Method

Participants

Participants were $N=140$ adults enrolled in a two site 12-week randomized treatment study comparing group yoga, cognitive behavioral therapy, and stress education for GAD. Of note, all three interventions including yoga were listed as a potential intervention in advertisements, and participants were required to be willing to participate in any of the three treatment arms. Inclusion criteria also included a primary diagnosis of GAD, as determined by trained raters using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-IV; First, Spitzer, Gibbon, & Williams, 2002) or the Anxiety Disorders Interview Schedule-5 (ADIS-5; Brown & Barlow, 2013), and a severity of at least “Moderately ill” on the Clinical Global Impression Scale (CGI; Berk et al., 2008). Exclusion criteria included more than 5 yoga or CBT classes in the last 3 years, current practice of mind-body techniques or CBT, lifetime psychotic, bipolar, or developmental disorder, and posttraumatic stress disorder, substance use disorder, eating disorder, or organic mental disorder within the past 6 months (see Hofmann et al., 2015 for full study design). All data were collected at baseline before participants began their interventions.

Procedure

Participant recruitment occurred at the Center for Anxiety and Traumatic Stress Disorders (CATSD) at Massachusetts General Hospital (MGH) and the Center for Anxiety and Related Disorders at Boston University (CARD). Following informed consent, all clinician-rated assessments were undertaken by independent evaluators (IEs) who were M.D., Ph.D., or experienced Masters level diagnosticians experienced in the administration of structured clinical interviews certified for this study under the direction of an IE trainer. Following the clinician rated assessments, participants completed self-report measures on site.

Measures

Mindfulness.—Mindfulness in daily life was assessed using the 39-item Five Factor Mindfulness Questionnaire (FFMQ; Baer et al., 2006). Items are self-rated by participants on a 5-point Likert-type scale from 1 (never or very rarely true) to 5 (very often or always true). As discussed above, the FFMQ generates five sub-scale totals for the five facets: Observing - attention to both internal (*i.e.*, “*I pay attention to how my emotions affect my thoughts and behavior*”) and external (*i.e.*, “*I notice the smells and aromas of things*”) emotions; Describing - perceived ability to apply words to internal experiences (*i.e.*, “*I can easily put my beliefs, opinions and expectations into words*”); Awareness - the extent to which individuals tend to focus their attention elsewhere or engage in experiential avoidance (*i.e.*, “*I don’t pay attention to what I’m doing because I’m daydreaming, worrying, or otherwise distracted*”); Nonjudging - the extent to which individuals struggle to be impartial towards thoughts and emotions (*i.e.*, “*I tell myself I shouldn’t be thinking the way I’m thinking*”; “*I think some of my emotions are bad or inappropriate and I shouldn’t feel them*”), and Nonreacting – the extent to which individuals engage with thoughts and feelings (*i.e.*, “*I watch my feelings without getting lost in them*”; “*When I have distressing thoughts or images I am able to just notice them without reacting*”). These facets of mindfulness can be summed to yield an overall mindfulness score; higher scores indicate higher levels of mindfulness. Analyses of psychometric properties have found acceptable convergent and discriminant validity, internal consistency, and incremental validity in predicting psychological symptoms and well-being across samples of students, community members, and adults with mood and anxiety symptoms (Baer et al., 2006; Baer et al., 2008; Bohlmeijer et al., 2011). Reliability of the FFMQ in the current sample was good (Cronbach’s $\alpha = .87$). Consistent with previous studies (*i.e.*, Curtiss & Klemanski, 2014), we adopted a four factor total score for the FFMQ, omitting the Observing facet. Our study sample was drawn from a population of anxious individuals not experienced in meditation and thus likely to show very little association between the Observing facet and other aspects of mindfulness (Baer et al., 2006).

Worry.—The Penn State Worry Questionnaire – Past Week (PSWQ-PW; Stoeber & Bittencourt, 1998) was used to assess self-reported severity of worry over the last 7 days. Participants rated 15 items on a 7-point Likert-type scale from 0 (never typical of me) to 6 (always typical of me). Amongst clinical GAD subjects, the PSWQ and PSWQ-PW have demonstrated high internal consistency and good test-retest reliability (Meyer, Miller, Metzger, & Borkovec, 1990; Stoeber & Bittencourt, 1998). Reliability of the PSWQ-PW in the current sample was excellent (Cronbach’s $\alpha = .90$).

Depressive symptoms.—The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) was used to assess depressive symptoms over the past week. For each of 21 items, participants were presented with 4 statements and asked to choose the one that best describes the way they have been feeling during the past week. Each item is scored from 0 to 3, with 3 indicating the highest symptom severity, and total depression scores range from 0-63. Reliability in the current sample was excellent (Cronbach's $\alpha = .92$).

Clinical severity.—The Clinical Global Impression - Severity (CGI-S) scale, a one-item, clinician rated, widely used measure of severity of psychopathology. CGI-S is rated on a 7-point scale (Guy, 1976).

Data Analyses

Data analyses were performed using SAS (Version 9.4 of the SAS System for Windows). Differences in demographic and clinical characteristics between patients with and without current MDD/DD were examined using t-tests for continuous variables and Chi-square tests for categorical variables. Next, we conducted zero-order correlations for all continuous measures, including FFMQ sub-scales and clinical variables. Review of skewness (all values below ± 0.35) and kurtosis (all values below 3.5) suggested that normality was a reasonable assumption. We then conducted one-way analysis of variance analyses (ANOVA) to assess whether 4-factor FFMQ total scores and sub-scale scores differed between those with and without a concurrent depressive disorder, while adjusting for fixed site effects. In a series of sub-group analyses among only participants without a concurrent MDD/DD diagnosis, we also examined whether FFMQ scores differed between participants with or without a lifetime history of MDD/DD. We calculated Cohen's d (Cohen, 1988) to estimate effect sizes for group differences using raw means (i.e., unadjusted for site-effects). In order to examine the relative contributions of worry and depressive symptoms to mindfulness, we conducted a series of multiple regression analyses with PSWQ-PW and BDI-II as predictors and FFMQ 4-factor total or sub-scale scores as outcome variables, adjusting each model for site effects. The p-values reported for effects in both the ANOVA and multiple regression sets of models were adjusted to control the family-wise error rate among the 6 outcomes (FFMQ 4-factor total and 5 sub-scales) using the Hochberg procedure (Hochberg, 1988). Finally, age and gender were added to the multiple regression of FFMQ-4 scores to test whether either variable moderated the effects of PSWQ-PW scores or BDI-II scores. For the purpose of this analysis, age was modeled as a dichotomous variable (median split: ≤ 29 vs. > 29). Significance was set at 0.05 (two-tailed) for all analyses and means are presented as raw means with standard deviation ($M \pm SD$).

Results

The sample was primarily female ($n = 102$, 73%) and Caucasian ($n = 112$, 80%) with a mean age of 33.4 ($SD = 12.9$). At the time of assessment, 30.8% ($n = 43$) participants met criteria for current MDD ($n = 31$) and/or DD ($n = 17$). As can be seen in Table 1, participants with concurrent MDD/DD did not differ from those without a current depressive disorder in gender, age, ethnicity, or race. However, participants with concurrent MDD/DD did demonstrate more severe worry symptoms on the PSWQ-PW ($d = 0.80$), more severe

depression symptoms ($d=1.35$), and greater clinical severity ($d=0.81$) than participants without concurrent MDD/DD (Table 1). Mean scores and intercorrelations of FFMQ and other clinical variables are reported in Table 2.

Relationship between mindfulness and depression diagnosis

Contrary to our hypothesis, individuals with GAD and a current diagnosis of MDD/DD did not score significantly lower on overall mindfulness (FFMQ-4 factor total: 84.5 ± 16.4) than those without a current depressive disorder diagnosis after adjustment for multiple comparisons (92.3 ± 16.3 ; $F(1,137) = 4.45$, $d = .48$, $p = .04$, adj. $p = .18$). Amongst the mindfulness subscales, however, the Awareness sub-scale differed by presence of co-occurring depression, with those with a current depressive disorder scoring significantly lower (20.9 ± 5.7) than those without (24.5 ± 5.8 ; $F(1,137) = 10.20$, $d = .63$, $p = .0017$, adj. $p = .01$). There was no significant difference between those with and without MDD/DD on the Observing (25.3 ± 6.4 vs. 24.0 ± 5.7 ; $F(1,137) = 1.24$, $d = .22$, $p = .27$, adj. $p = .80$), Describing (25.0 ± 7.3 vs. 25.9 ± 6.7 ; $F(1,137) < 0.01$, $d = .13$, $p = .96$, adj. $p = .96$), Nonjudging (22.1 ± 7.8 vs. 24.8 ± 7.6 ; $F(1,137) = 2.78$, $d = .13$, $p = .10$, adj. $p = .39$) or Nonreacting (16.5 ± 4.2 vs. 17.1 ± 4.7 ; $F(1,137) = 0.26$, $d = .12$, $p = .61$, adj. $p = .96$) sub-scales.

Given that depression is an episodic syndrome with high rates of recurrence (Richards, 2011) it is possible that individuals with GAD and a lifetime history of MDD/DD may demonstrate lower mindfulness than those with no prior history. Sub-group analyses among participants with no current MDD/DD were thus examined to explore differences in mindfulness between participants with no lifetime history of MDD/DD ($n=71$) and those with past but not current MDD/DD ($n=26$). These two groups of participants with current GAD but no current MDD/DD did not differ from each other in any aspect of mindfulness: FFMQ 4-factor total scores (no depression: 91.0 ± 15.7 vs. lifetime history of depression: 95.7 ± 17.6 ; $F(1,94) = 0.41$, $d = .12$, $p = .53$, adj. $p = .95$), Observing (no depression: 23.7 ± 5.2 vs. lifetime history of depression: 24.6 ± 7.1 ; $F(1,94) = 2.06$, $d = .14$, $p = .16$, adj. $p = .80$), Describing (no depression: 25.0 ± 6.6 vs. lifetime history of depression: 28.2 ± 6.6 ; $F(1,94) = 2.01$, $d = .48$, $p = .16$, adj. $p = .80$), Awareness (no depression: 24.6 ± 5.9 vs. lifetime history of depression: 24.2 ± 5.7 ; $F(1,94) = 0.18$, $d = .08$, $p = .67$, adj. $p = .95$), Nonjudging (no depression: 24.3 ± 7.2 vs. lifetime history of depression: 26.1 ± 8.5 ; $F(1,94) = 0.24$, $d = .23$, $p = .62$, adj. $p = .95$), or Nonreacting (no depression: 17.0 ± 4.6 vs. lifetime history of depression: 17.2 ± 4.9 ; $F(1,94) < 0.01$, $d = .04$, $p = .95$, adj. $p = .95$).

Relationships between Mindfulness and Clinical Variables

FFMQ 4-factor total scores were weakly negatively correlated ($r = -.16$) with overall clinical severity, as measured by the CGI, and moderately negatively correlated ($-.35 \leq r < -.45$) with the severity of worry symptoms, as measured by the PSWQ, and depression severity, as measured by the BDI-II (see Table 2). As hypothesized, PSWQ scores were negatively correlated with the Awareness, Nonjudging, and Nonreacting sub-scales of the FFMQ, though the correlations were relatively weak ($r = -.27$ to $-.35$), and there was no significant correlation between PSWQ scores and the Describing sub-scale of the FFMQ (see Table 2). BDI-II scores were weakly to moderately negatively correlated ($r = -.25$ to $-.42$) with the

Awareness, Nonjudging, and Describing sub-scales, as hypothesized. However, contrary to our hypothesis, BDI-II scores were not significantly correlated with the Nonreacting subscale (see Table 2). Consistent with previous findings (Baer et al., 2006; Curtiss & Klemanski, 2014), the Observing sub-scale was not significantly correlated with symptoms of anxiety or depression in our sample of non-meditators, nor was it significantly correlated with any other facets of mindfulness apart from Nonreacting ($r = .17, p < .05$).

Regression Analyses Examining Worry and Depression as Predictors of Mindfulness

In order to better understand the independent contribution of anxiety and depression symptoms to mindfulness, we conducted a multiple regression analysis of FFMQ 4-factor total scores predicted by both PSWQ and BDI-II and adjusting for site differences. The results of the regression indicated a significant overall model accounting for 25% of the variance (adjusted $R^2 = .24, F(3, 136) = 16.36, p < .0001$). Higher BDI-II ($\beta = -.31, p = .0003, \text{adj. } p = .001$) and PSWQ scores ($\beta = -.24, p = .0041, \text{adj. } p = .02$) were each associated with lower mindfulness, even after adjustment for each other in the same model.

We next examined whether demographic variables (age and gender) moderated the effect of worry symptoms (i.e. PSWQ scores) or depression symptoms (i.e., BDI-II scores) on FFMQ 4-factor total scores. The overall model remained significant, and both main predictors, worry and depression severity, remained significant predictors of FFMQ 4-factor total scores (PSWQ-PW: $F(1,130) = 5.07, p = .03$; BDI-II: $F(1,130) = 5.83, p = .03$). However, neither age ($F(1,130) = 1.54, p = .22$) nor gender ($F(1,130) = 0.14, p = .70$) were significant covariates in the model or moderated the effects of PSWQ-PW or BDI-II (all $p > .23$). Thus, the associations between worry and mindfulness and between depression severity and mindfulness appear to be relatively uniform in our sample.

Finally, we conducted a series of multiple regression models to examine the association of PSWQ and BDI-II scores with each FFMQ sub-scale. The regression models for 4 of the 5 mindfulness sub-scales were significant and accounted for 17% of the variance in Awareness, 13% of the variance in Nonjudging, 10% of the variance in Nonreacting, and 9% of the variance in Describing, respectively (Table 3). The multiple regression model for Observing was nonsignificant ($p = .89, \text{adj. } p = .89$). Depression severity (BDI-II), but not worry severity (PSWQ-PW) was associated with lower scores on the Awareness sub-scale, while worry severity but not depression was associated with lower scores on the Nonjudging and Nonreacting sub-scales. Neither worry nor depression severity were significantly associated with lower scores on the Describing sub-scale after adjustment to preserve the family-wise error rate (Table 3).

Discussion

The aim of the present study was to replicate and extend findings from prior studies that have examined mindfulness abilities in individuals with clinical anxiety (e.g., Curtiss & Klemanski, 2014; Desrosiers, Klemanski, et al., 2013). Specifically, we explored clinical correlates of mindfulness skills in a large, treatment-seeking sample of participants with primary GAD. First, we examined the effect of comorbid MDD/DD on FFMQ total and sub-scale scores. These analyses were important for characterizing mindfulness deficits in those

with GAD, as over half of individuals with GAD experience a comorbid mood disorder in their lifetimes (Wittchen, Zhao, Kessler, & Eaton, 1994). Our findings indicate that individuals with primary GAD and current, comorbid MDD/DD demonstrate lower scores on the Awareness sub-scale compared to individuals with primary GAD and no comorbid depression. Other comparisons between participants with and without comorbid MDD/DD were nonsignificant. We also explored the effect of past MDD/DD on mindfulness abilities among those without current MDD/DD. These analyses indicated no differences in FFMQ total or sub-scale scores between participants with and without a lifetime history of clinical depression. Taken together, these results suggest that the presence of *current* depression may be particularly detrimental to the ability to act with awareness in those with GAD. This finding was somewhat surprising, as prior studies in clinical samples have demonstrated an independent association between depression symptoms and Nonreacting as well as Nonjudging, but not Awareness (e.g., Desrosiers, Klemanski, et al., 2013). However, it appears that for individuals with primary GAD, the presence of co-occurring depression is specifically associated with difficulty acting with awareness. The items that make up this facet include “*I find it difficult to stay focused on what’s happening in the present*” and “*I don’t pay attention to what I’m doing because I’m daydreaming, worrying, or otherwise distracted.*” Thus, these items appear to measure inattentiveness, distraction, and concentration impairments. Notably, concentration impairment is a symptom of both GAD and MDD and is likely perpetuated by the cognitive avoidance strategies that characterize these disorders (i.e. worry and rumination). Furthermore, both GAD and MDD are associated with sleep interference, which likely also affects concentration abilities. Thus, the cognitive load associated with co-occurring GAD and MDD symptoms may be particularly detrimental to Awareness.

Another possibility is that mood-dependent changes in emotional awareness among those with comorbid MDD/DD may explain lower scores on the Awareness sub-scale. For example, alexithymia (*cf* low emotional awareness) is a state-dependent feature of current depression (Marchesi, Bertoni, Cantoni, & Maggini, 2008) that could impair awareness of inner experiences. Future research is needed to further explore the mechanisms underlying deficits in mindful awareness among individuals with primary GAD and comorbid MDD/DD. In addition, longitudinal studies are needed to determine whether the onset of depression prospectively predicts decreases in Awareness among individuals with GAD, and/or whether deficits in Awareness prospectively predict the onset of depression.

Finally, these findings indicate that individuals with comorbid GAD and MDD may benefit from mindfulness-based interventions directly aimed at improving Awareness. This hypothesis is further supported by data showing that improvements in worry following MBSR are mediated by improvements in Awareness (Hoge et al., 2015). Interventions focused on increasing awareness might include mindfulness practice in the context of valued activities (e.g., while working or engaging in social interactions). Increased awareness in these contexts could lead to objective improvements in performance as well enhanced experience of positive emotions. More research is therefore needed to develop and test treatment techniques that specifically target the Awareness facet.

We also explored the dimensional impact of clinical symptoms (i.e. depression and worry symptoms) on mindfulness abilities in our sample. Specifically, we used multiple regression analyses to examine BDI-II and PSWQ as independent predictors of FFMQ total and sub-scale scores among those with primary GAD. First, we found that both depression and worry symptoms emerged as independent predictors of the FFMQ 4-factor total score, and that neither age nor gender moderated these predictions. Second, consistent with the findings from our categorical analyses, we observed that depression symptoms independently predicted lower scores on the Awareness sub-scale. Finally, we found that PSWQ scores independently predicted lower levels of Nonreacting and Nonjudging. These final results largely replicate findings from prior studies that have demonstrated significant associations between worry, Nonreacting, and Nonjudging in clinical samples (see Curtiss & Klemanski, 2014; Hoge et al., 2015). Nevertheless, the fact that we observed these associations in a large, treatment-seeking sample of individuals with primary GAD provides further evidence that reactivity towards inner experiences and judgment of inner experiences may be relevant to the etiology and maintenance of the disorder. Both Nonreactivity and Nonjudging have been shown to be associated with self-compassion (Baer et al., 2006), and interventions targeting self-compassion (e.g., Attachment-Based Compassion Therapy) have shown efficacy for increasing Nonreacting and Nonjudging in healthy populations (Navarro-Gil et al., 2018). Thus, treatment strategies that directly target Nonreactivity and Nonjudging via self-compassion could be explored as tools to enhance the efficacy of mindfulness-based interventions for GAD.

Finally, the present findings offer further support for omitting the Observing facet from the FFMQ total score. The Observing facet was not significantly correlated with most other facets of mindfulness or any clinical variables. Previous studies have found that the Observing facet exhibits a positive relationship with anxiety-related variables in non-meditators, and that this relationship may be exacerbated in clinical samples (Curtiss & Klemanski, 2014; de Bruin, Topper, Muskens, Bögels, & Kamphuis, 2012). These findings have been interpreted as indicating that the Observing facet measures behavior that might be beneficial within the context of meditation, but might also be detrimental if not accompanied by a noncritical stance. Indeed, Eisenlohr-Moul, Walsh, Charnigo, Lynam, and Baer (2012) demonstrated that the association between Observing and psychopathology is moderated by Nonreacting, such that Observing predicts reduced psychopathology at high levels of Nonreacting and increased psychopathology at low levels of Nonreacting. Thus, in the context of anxiety, the Observing scale may be detecting hypervigilance to emotional experience rather than mindfulness, as heightened interoceptive sensitivity is a common clinical feature of anxiety disorders (Domschke, Stevens, Pfleiderer, & Gerlach, 2010). In the present study, we found that the Observing facet did not exhibit significant relationships with any clinical variables, perhaps due to complex interactions between Observing and other mindfulness facets. Our findings therefore support the exclusion of this facet from evaluations of mindfulness in anxious individuals.

Limitations and Future Research Directions

Limitations of the study include the cross-sectional design, which precludes us from drawing conclusions regarding whether low mindfulness may lead to increased clinical symptoms or

whether increased clinical symptoms lead to reduced mindfulness. Furthermore, our sample was drawn from a population of treatment-seeking people with GAD with specific exclusion criteria and thus is not representative of the full diversity of psychiatric symptoms in people with GAD or people with lower severity of anxiety symptoms. Participants were also required to be willing to participate in all three conditions including the yoga condition; however, we cannot rule out that our sample had greater interest in yoga specifically and thus in mindfulness practices in general compared to other treatment-seeking samples. Limiting this potential generalizability concern, however, the study also excluded individuals who had participated in mind-body activities (e.g. yoga, meditation, tai-chi) more than five times in the past three years. While this allowed us to provide further support for Baer et. al (2008)'s hypothesis that samples of non-meditators do not respond as expected to the Observing facet, findings may vary in clinical samples with mixed backgrounds in mind-body techniques. Future research will benefit from examining mindfulness in larger, more diverse clinical samples.

Another limitation of our study is that we selected a transdiagnostic measure of worry, rather than anxiety symptom severity. While this measure was the most relevant to our GAD sample, the PSWQ likely does not capture rumination or other forms of repetitive negative thinking. Future research on mindfulness deficits in anxiety and depression may benefit from examining the differential relationships between mindfulness facets and worry vs. rumination, or perseverative thought on a continuum from past- to future-focused. Finally, our study lacked a comparison group of individuals with MDD/DD but without comorbid GAD. Such a comparison group would have informed our ability to interpret the findings regarding the unique role of anxiety and depression in predicting mindfulness deficits. Future studies should include such a comparison group.

In summary, the present study extends prior research by examining the relationship between clinical features and mindfulness facets in treatment-seeking adults with primary GAD. Of the mindfulness facets examined, only acting with awareness differed between participants with and without comorbid MDD/DD, which provides support for routinely examining the role of depressive symptoms in the relationship between mindfulness and anxiety in both clinical care and future studies. Clinically, those with GAD and comorbid depression may benefit from enhanced or additional practice of acting with awareness skills. This personalization of treatment should be examined in dismantling studies to see if by targeting these skills directly in individuals with comorbid depression, outcomes are improved. In addition, worry emerged as an independent, negative predictor of Nonreactivity and Nonjudging in our sample. Future research should examine the use of treatment modules that directly target these skills as augmentation strategies for mindfulness-based interventions for GAD.

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Figure 1.
Lower Mean 4-Factor Mindfulness Scores in Individuals with Current Depression and/or Dysthymia. Error bars denote one standard error around the mean.

Table 1:

Demographics among individuals with Generalized Anxiety Disorder (GAD) without co-occurring depression and/or dysthymia (MDD/DD) vs. individuals with GAD and co-occurring MDD/DD.

	GAD without MDD/DD (n=97)	GAD with MDD/DD (n=43)	χ^2	<i>P</i>
<i>Gender, % (n)</i>				
Male	28% (n = 27)	26% (n = 11)	.08	.78
Female	72% (n = 70)	74% (n = 32)		
<i>Age</i>				
Mean (<i>SD</i>)	33.3 (12.9)	33.5 (12.9)	-.08	.94
Range	18-80	18-62		
<i>Race, % (n)</i>				
White	78% (n = 76)	84% (n = 36)	1.71	.79
Black or African American	7% (n = 7)	2% (n = 1)		
Asian	5% (n = 5)	7% (n = 3)		
Other	6% (n = 6)	5% (n = 2)		
More than one	3% (n = 3)	2% (n = 1)		
<i>Ethnicity, % (n)</i>				
Not Hispanic or Latino	81% (n = 79)	86% (n = 37)	.44	.51
Hispanic or Latino	19% (n = 18)	14% (n = 6)		
<i>Clinical characteristics, M(SD)</i>				
PSWQ-PW total score	62.2(11.4)	71.3 (11.5)	-4.35	<.0001
BDI-II total score	12.7(9.1)	25.1 (9.4)	-7.41	<.0001
CGI severity rating	4.6 (0.6)	5.1 (0.7)	-4.52	<.0001

Note: PSWQ-PW = Penn State Worry Questionnaire – Past Week; BDI-II = Beck Depression Inventory-II; CGI-S = Clinical Global Impression Scale

Table 2:

Correlations among FFMQ subscales and clinical variables in a sample of 140 people with generalized anxiety disorder.

Variable	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.
1.FFMQ Observe	24.4	6.0								
2.FFMQ Describe	25.6	6.9	.10							
3.FFMQ Awareness	23.4	6.0	-.08	.31 **						
4.FFMQ Nonjudge	24.0	7.7	-.14	.14	.31 **					
5.FFMQ Nonreact	16.9	4.5	.17 *	.22 *	.17 *	.29 **				
6.FFMQ 4-factor	89.9	16.7	-.003	.65 **	.68 **	.72 **	.56 **			
7.PSWQ-PW	65.0	12.1	.04	-.12	-.27 **	-.34 **	-.35 **	-.40 **		
8.BDI-II	16.5	10.8	.02	-.25 **	-.42 **	-.32 **	-.16	-.45 **	.46 **	
9.CGI-S	4.8	0.7	.06	-.06	-.19 *	-.12	-.06	-.16	.33 **	.45 **

*
p<.05;

**
p<.01

Note: FFMQ = Five Factor Mindfulness Questionnaire, with 5 sub-scale scores (Observing, Describing, Acting with Awareness, Nonjudging, and Nonreacting) and a 4-factor total score that excludes the observing sub-scale; PSWQ-PW = Penn State Worry Questionnaire – Past Week; BDI-II = Beck Depression Inventory-II; CGI-S = Clinical Global Impression Scale.

Table 3:

Facets of Mindfulness predicted by depression severity (BDI-II) and worry (PSWQ-PW).

	Predictor Variable	Adj. R ²	F (3, 136)	b	SE(b)	β	t	P	adj. p
FFMQ 4-Factor		.25	16.36					<.0001	.0004
Total	BDI-II			−0.48	0.13	−.31	−3.72	.0003	.0015
	PSWQ-PW			−0.33	0.11	−.24	−2.92	.0041	.0205
	Site			4.50	2.49	.13	1.81	.07	.37
FFMQ Observe		−.02	0.21					.89	.89
	BDI-II			−0.00	0.05	−0.00	−0.04	.96	.99
	PSWQ-PW			0.02	0.05	0.04	0.37	.72	.91
	Site			−0.67	1.04	−0.06	−0.65	.52	.85
FFMQ Describe		.09	5.64					.0011	.0022
	BDI-II			−0.13	0.06	−0.21	−2.24	.0266	.09
	PSWQ-PW			−0.01	0.05	−0.01	−0.11	.91	.91
	Site			3.04	1.13	0.22	2.68	.0083	.0498
FFMQ Awareness		.17	10.39					<.0001	.0004
	BDI-II			−0.21	0.05	−0.37	−4.22	<.0001	.0006
	PSWQ-PW			−0.04	0.04	−0.09	−1.03	.31	.91
	Site			0.50	0.95	0.04	0.53	.60	.85
FFMQ Nonjudge		.13	7.90					<.0001	.0004
	BDI-II			−0.14	0.06	−0.20	−2.18	.0312	.09
	PSWQ-PW			−0.15	0.06	−0.24	−2.68	.0082	.0328
	Site			0.81	1.24	0.05	0.65	.51	.85
FFMQ Nonreact		.10	6.26					.0005	.0015
	BDI-II			−0.00	0.04	−0.00	−0.01	.99	.99
	PSWQ-PW			−0.13	0.03	−0.35	−3.82	.0002	.0012
	Site			0.14	0.74	0.02	0.19	.85	.85

Notes: b = unstandardized regression coefficients; SE(b) = standard error of the unstandardized regression coefficients; β = standardized regression coefficients; adj. p = p-value after familywise error adjustment; FFMQ = Five Factor Mindfulness Questionnaire, with 5 sub-scale scores (Observing, Describing, Acting with Awareness, Nonjudging, and Nonreacting) and a 4-factor total score that excludes the observing sub-scale; BDI-II = Beck Depression Inventory-II; PSWQ-PW = Penn State Worry Questionnaire – Past Week.