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An acceptance-based behavioral therapy for GAD: Effects on outcomes from three theoretical models

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Abstract

Although cognitive-behavioral therapy (CBT) is efficacious in the treatment of generalized anxiety disorder (GAD), many individuals remain symptomatic following treatment, indicating a need for further treatment development. As a result, many researchers have developed unique cognitive-behavioral therapies that highlight specific targets for intervention. The current study examined the effect of an acceptance-based behavioral therapy for GAD on the proposed targets for intervention highlighted in several of these theoretical models: emotion regulation difficulties, intolerance of uncertainty, and low perceptions of control. Clients were randomly assigned to immediate ($n = 15$) or delayed ($n = 16$) treatment. Individuals treated with the acceptance-based behavioral therapy reported significantly fewer difficulties in emotion regulation and fear of emotional responses, as well as greater tolerance of uncertainty and perceived control over anxiety than individuals in the waitlist control condition. In addition, these effects were maintained at 3- and 9-month follow-up assessments.

Keywords

generalized anxiety disorder; mindfulness; worry; emotion regulation; perceived control

Generalized anxiety disorder (GAD; American Psychiatric Association, 1994) is centrally defined by chronic, excessive worry. While the content of these worries varies, it tends to be broad and pervasive and can include a range of domains such as interpersonal relationships, physical health, school/work, finances, world events, minor matters (e.g., punctuality), and even worry itself (Roemer, Orsillo, & Barlow, 2002). Although cognitive-behavioral therapy (CBT) remains the “gold standard” treatment for GAD, there is some indication that a large percentage of individuals remain symptomatic following treatment (see Waters & Craske, 2005 for a review). Given this, many researchers have sought to refine and further develop

cognitive and behavioral theoretical models of GAD in an attempt both to increase our understanding of the underlying mechanisms of this disorder and to guide treatment development and evaluation. Along these lines, we have outlined a theoretical model and corresponding behavioral treatment for GAD (detailed below; see also Roemer & Orsillo, 2005). Although our acceptance-based behavioral therapy (ABBT) has demonstrated promising preliminary results (Roemer & Orsillo, 2007; Roemer, Orsillo, & Salters-Pedneault, 2008), it remains to be determined whether it is efficacious solely through the proposed mechanisms identified in our theoretical model or whether it also targets important components highlighted in other theoretical models of GAD. The present study sought to examine the effects of this acceptance-based behavioral therapy on the proposed targets for intervention highlighted in several of these current models, specifically those that emphasize emotion regulation difficulties, intolerance of uncertainty, and low perceptions of control in the genesis and maintenance of GAD.

The acceptance-based behavioral therapy provided in this study stems from our model of GAD (Roemer & Orsillo, 2005; 2009), which draws from Hayes, Strosahl, and Wilson's (1999) experiential avoidance model of psychopathology, Borkovec's avoidance model of GAD (Borkovec, Alcaine, & Behar, 2004), and mindfulness-based models such as Segal, Williams, and Teasdale (2002). This model emphasizes an individual's tendency to narrow her/his focus toward threatening or future oriented information, to respond negatively to and attempt to avoid her/his internal experiences (such as anxious thoughts and emotions), and to avoid or restrict her/his engagement in important areas of her/his life. Thus, one core area of difficulty is a problematic relationship with internal experiences, characterized by distress, judgment, fusion and reactivity, which intensifies emotional responding (see Roemer and Orsillo, 2009 for a more in-depth review). This in turn leads to chronic, rigid attempts to control and avoid internal experiences, which further increases distress and impairs quality of life (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996), while also increasing reactivity to one's internal experiences. For example, research and theory suggest that worry is a form of cognitive avoidance that may interfere with successful emotional processing (Borkovec et al., 2004), and that attempts to rigidly control one's internal experiences often paradoxically amplify distress (Eifert & Heffner, 2003; Purdon, 1999). These patterns of avoidance often extend to other areas of an individual's life as well. It is not uncommon for individuals with GAD to restrict their participation in meaningful activities (e.g., interpersonal relationships, employment opportunities) in an attempt to avoid unwanted negative internal experiences (Butler, Gelder, Hibbert, Cullington, & Klimes, 1987). When they do engage in these activities, individuals with GAD often report not being fully "present" as their focus on worry and future oriented threat occupies their attention (Roemer & Orsillo, 2005).

In order to address these difficulties, our ABBT (Roemer & Orsillo, 2005) uses a variety of mindfulness exercises to help alter one's relationship to his/her internal experiences and to promote acceptance rather than efforts to control or avoid internal experiences. In addition, given the non-accepting stance towards internal emotional experiences noted earlier, clients are encouraged to notice the adaptive and functional nature of emotional responses. Finally, clients are encouraged to engage in specific activities that they evaluate as important to them, regardless of any discomfort they might feel (drawing from valued action in Acceptance and Commitment Therapy [ACT]; Wilson & Murrell, 2004).

In a model that has informed and shares many elements with ours, Mennin and colleagues (cf. Mennin, Heimberg, Turk, & Fresco, 2005; Mennin, Holaway, Fresco, Moore, & Heimberg, 2007) draw on literatures that emphasize the adaptive nature of emotional experiences, and conceptualize generalized anxiety disorder as primarily a disorder of maladaptive emotion regulation. In this model, individuals may employ worry as a coping

strategy due to heightened emotional intensity, negative reactions to emotions, and difficulty understanding their emotional experiences (Mennin et al., 2005). Indeed, evidence seems to suggest that both clinical and non-clinical samples of individuals with GAD symptoms report greater affective intensity and distress about emotional reactions, as well as a decreased ability to accurately identify emotions, when compared to controls (Mennin et al., 2005). Using self-report data, Mennin and colleagues (2007) found that several of these emotional difficulties are uniquely related to GAD, above and beyond the contributions of other comorbid diagnoses. Other researchers have found similar evidence of difficulties in a variety of emotion regulation domains among individuals with GAD or chronic worry (e.g., Salters-Pedneault, Roemer, Tull, Rucker, & Mennin, 2006; Roemer et al., 2009). Mennin et al.'s model (2005) is also consistent with other theoretical explanations of GAD. For example, Borkovec and colleagues have posited that worry is negatively reinforced through the reduction in autonomic arousal that it engenders (Borkovec et al., 2004; Borkovec & Hu, 1990). Given this, individuals with intense emotions and difficulty regulating them may find worry particularly negatively reinforcing.

Other theoretical models highlight distress in response to uncertainty and low perceived control as important facets of generalized anxiety disorder. For instance, Dugas, Gagnon, Ladouceur, and Freeston (1998) propose that intolerance of uncertainty, defined as negative reactions to uncertain or ambiguous circumstances, is an important cognitive component of GAD. Indeed, several empirical investigations in the last decade have indicated a strong relationship between GAD and intolerance of uncertainty. Intolerance of uncertainty has been found to distinguish GAD patients from non-clinical controls (Dugas et al., 1998) and GAD patients from patients with other anxiety disorders (Ladouceur et al., 1999). In addition, intolerance of uncertainty and negative problem orientation (another construct in their model) significantly differentiated individuals with moderate and severe GAD from those in the mild range (Dugas et al., 2007). A cognitive-behavioral treatment based on this model has been developed and has shown promising results (Dugas & Koerner, 2005).

Intolerance of uncertainty is conceptually tied to the construct of low perceptions of control that has long been associated with anxiety disorders. In his extensive writing on the subject, Barlow (cf. 2002) has argued that perceptions of uncontrollability are an important predisposing factor for the development of pathological anxiety. In addition, these perceptions are thought to help maintain anxiety through activation of certain fear networks, as well as through the development of anxious cognitive schemas (see Barlow, 2002 for a book length review of these and associated topics). Therefore, low perceptions of control are thought to play a role in the genesis and maintenance of GAD (Barlow, 2002; Craske, Rapee, Jackel, & Barlow, 1989; Frala, Leen-Feldner, Blumenthal, Barreto, 2010). Many cognitive-behavioral therapies for anxiety disorders, such as GAD, attempt to target these perceptions of uncontrollability by providing clients with skills and opportunities for mastery over their symptoms (e.g., worry and tension in GAD).

As can be seen from the discussion above, there are several evidence based models of GAD, including the central role of emotion dysregulation discussed by Mennin and colleagues (2005), intolerance of uncertainty as outlined by Dugas et al. (1998), and the perceived lack of control in Barlow's (2002) theory of anxiety. In addition, many of these models have spawned unique cognitive-behavioral treatments in an attempt to target the specific correlates of GAD highlighted in each model. However, to our knowledge there are no studies that have examined the effect of one of these approaches on constructs and outcomes highlighted in other theoretical models.

A small randomized controlled trial comparing an ABBT for GAD to a waiting list control condition revealed significant effects of treatment on clinical assessor ratings of GAD, as

well as reports of anxious and depressive symptoms, quality of life, mindfulness, and experiential avoidance (Roemer et al., 2008). This provides preliminary evidence of the efficacy of this intervention and its impact on mechanisms of change identified in the model on which it is based. The goal of the secondary analyses presented here was to examine the effects of the acceptance-based behavioral treatment provided in this trial on constructs from other models of GAD. This will not only add to the literature examining these models and specific outcomes in clinical populations, but may also provide important information regarding various treatments for this disorder.

Specifically, when compared to waiting list control participants, we hypothesized that individuals randomly assigned to receive ABBT, which includes an emphasis on the function of emotions, as well as mindfulness, acceptance, and willingness, rather than judgment and avoidance of emotional responses, would report decreases in emotion dysregulation and distress about emotions, consistent with Mennin et al.'s (2005) model. In addition, we hypothesized that the focus that mindfulness places on reducing attempts at affective control would lead to greater tolerance of uncertainty for individuals in the ABBT condition compared to controls. Even though ABBT promotes acceptance of internal experiences and relinquishing of rigid attempts at control, some have suggested that these acceptance-based approaches may in fact, paradoxically, enhance individual's perceptions of control (given that futile efforts to control internal experiences lead to experiences of uncontrollable distress; Arch & Craske, 2008; Craske & Hazlett-Stevens, 2002). Therefore, our investigation of the differences between treatment and wait-list participants on perceived control was considered exploratory.

Method

The study was conducted in compliance with the University of Massachusetts at Boston, Boston University, Suffolk University, and Boston VA Healthcare System Institutional Review Boards. No adverse events were reported throughout the duration of the study. Main findings from the study (regarding symptom, quality of life, and mindfulness and experiential avoidance outcomes) have been presented in Roemer et al. (2008).

Participants

Thirty-one participants consented to participate in this trial and were randomly assigned to either treatment (ABBT, $n = 15$) or a wait list control ($n = 16$). Although small, this sample size enabled detection of large effect sizes. Two treatment participants withdrew during the course of therapy (one due to time constraints, after session 10, and one due to an interest in a more exploratory therapy, after session five), while four waiting list clients withdrew prior to the post-waiting list assessment (to pursue treatment). All waiting list participants received treatment following the waiting list period except those who had withdrawn and one additional participant whose GAD symptoms were no longer clinically significant (clinical severity rating of 2.0). One waiting list participant dropped out during treatment due to a move.

In order to maximize the clinical applicability and external validity of any findings, inclusion criteria were broad and included the following: A) a principal diagnosis of GAD (as assessed by the Anxiety Disorders Interview Schedule for DSM-IV-Lifetime Version; ADIS; DiNardo, Brown, & Barlow, 1994), B) no current suicidal ideation, C) did not meet criteria for current bipolar, substance dependence, or psychotic disorders, and D) were 18 years of age or older.

Of the original thirty-one participants, 22 (71%) were female and 27 self-identified as White (87%). One woman self-identified as Asian, one woman as Black, and one woman and one

man as Latino/a. Chi-square analyses and independent *t*-tests revealed no significant differences between conditions in gender, racial self-identification, or age. Participants ranged in age from 20 to 66 ($M = 33.59$, $SD = 11.74$).

As assessed using the ADIS, participants received an average pre-treatment clinical severity rating of 5.56 ($SD = 0.97$) on a 0 – 8 scale, with 4 indicating sufficient severity to meet diagnostic criteria (and study inclusion). In addition, participants received an average of 0.93 ($SD = 1.03$) additional diagnoses. These included major depressive disorder ($n = 9$), social anxiety disorder ($n = 5$), obsessive-compulsive disorder ($n = 4$), and panic disorder, with or without agoraphobia ($n = 4$). Nine of the participants (five of whom were in the ABBT condition) reported taking psychotropic medication (anxiolytics, antidepressants or both) but had remained on a stable dose for at least three months and agreed to not alter their dosage during treatment. Although nineteen of the participants reported having received prior psychotherapy, only seven participants (4 in the treatment condition) reported receiving a previous trial of CBT at some time before enrolling in the current study (2 for “anxiety”, one for depression, one for panic disorder with agoraphobia, one for GAD and OCD, one for OCD, and one for unspecified reasons).

Measures

The measures for the present study were completed at pre- and post-treatment, and at 3-and 9-month follow-up.

The *Affective Control Scale* (ACS; Williams, Chambless, & Ahrens, 1997) is a 48-item scale that measures fear of, or distress about, emotions and concern about losing control of internal experiences or behavioral reactions to emotional experiences. In addition to a total score, the ACS consists of four subscales that are rated on a 7-point scale: 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 and subscale scores have demonstrated good internal consistency (total = 0.94, anger = .072, positive affect = 0.84, depression = 0.91, and anxiety = 0.89), discriminant and convergent validity, as well as acceptable 2-week test-retest reliability, $r = 0.78$ (Berg, Shapiro, Chambless, & Ahrens, 1998; Williams et al., 1997). Internal consistency in this sample was .94 (total score), .84 (anger), .87 (positive affect), .87 (depression), and .87 (anxiety).

The *Difficulties in Emotion Regulation Scale* (DERS; Gratz & Roemer, 2004) is a 36-item measure that assesses a variety of difficulties with emotion regulation across several domains. These include non-acceptance of emotional responses, difficulties engaging in goal-directed behavior when distressed, impulse control difficulties when distressed, lack of emotional awareness, limited access to effective emotion regulation strategies, and lack of emotional clarity. The DERS yields both a total score, which indicates broad difficulties in emotion regulation, and scores for each of the six subscales mentioned previously (although for the present study only the total score was used). Participants indicate how often each item applies to themselves on a 5-point Likert-type scale, with 1 as *almost never* (0-10%) and 5 as *almost always* (91-100%) with higher scores indicating greater difficulties in emotion regulation. The DERS has demonstrated good internal consistency and test-retest reliability in an undergraduate sample, and has been significantly associated with GAD symptomology (Salters-Pedneault et al., 2006). The internal consistency in this sample was .95.

Both Roemer and Orsillo's (2005) and Mennin et al.'s (e.g., 2005) models of GAD highlight the importance of negative reactions to one's internal experiences, and Mennin et al.'s model

specifically focuses on a broad range of emotion regulation difficulties. The above measures were used to assess the impact of an ABBT on these processes.

The *Intolerance of Uncertainty Scale-English Version* (IUS; Buhr & Dugas, 2002). The English version of the IUS is a 27-item measure that assesses an individual's difficulty with uncertain or ambiguous circumstances. Examples of items include "Uncertainty makes me vulnerable, unhappy, or sad" and "Unforeseen events upset me greatly." Participants rate items on a five-point Likert-type scale and respond by indicating how characteristic each item is of them (e.g., 1 = "not at all characteristic of me"). The English version of the IUS has demonstrated excellent internal consistency (Cronbach's $\alpha = .94$) and good test-retest reliability ($r = .74$). Moreover, the IUS demonstrated significant positive correlations with measures of psychopathology, including worry (Buhr & Dugas, 2002). Internal consistency in this sample was .95.

The *Anxiety Control Questionnaire-Revised* (ACQ-R; Brown et al., 2004) is a 15-item measure of one's perceived control over anxiety related events. Items reflect perceived control over internal emotional states (e.g., "I am able to control my level of anxiety"), external threats ("threat control," e.g., "There is little I can do to change frightening events"), as well as stress control (e.g., "I usually find it hard to deal with difficult problems"). Participants are asked to rate how strongly they agree or disagree with each item on a Likert-type scale that ranges from zero (strongly disagree) to five (strongly agree). Lower scores indicate less perceived control.

Factor analysis indicates the presence of three factors, representative of the domains mentioned above, as well as a higher order factor of perceived control in both clinical and non-clinical samples. Scale reliabilities were acceptable for stress control ($r = .71$), emotion control ($r = .73$), threat control ($r = .73$), and the higher order factor of perceived control ($r = .85$). Internal consistency in this sample was .85 (total score), .67 (emotion control), .85 (threat control), and .76 (stress control).

Procedures

All participants were treated and assessed at Boston University's Center for Anxiety and Related Disorders (CARD). The 31 participants who consented to take part in the study were randomly assigned to either a treatment or wait-list condition in a randomized block fashion. The PI (L. Roemer) assigned condition using a coin flip; subsequent clients who matched an enrolled client in gender, racial minority status, and GAD severity (moderate versus severe) were automatically assigned to the opposite condition in order to ensure balance in these variables across conditions in this small sample.

Clients in the wait-list condition received a post wait-list assessment prior to beginning treatment. Following treatment, these clients were also given post and follow up assessments. Treatment consisted of sixteen sessions of ABBT for GAD.

Treatment

Although aspects of the treatment will be highlighted for the purpose of the present study, it is beyond the scope of this article to present it in detail. The reader is directed to Roemer and Orsillo (2005, 2009) for an in depth discussion of the treatment and its implementation. In addition to the empirical research highlighted earlier, this treatment draws from existing cognitive behavioral treatments for GAD (particularly Borkovec, Newman, Lytle, & Pincus, 2002), ACT (Hayes et al., 1999), Mindfulness-based Cognitive Therapy (MBCT; Segal et al., 2002), and Dialectical Behavior Therapy (DBT; Linehan, 1993a; 1993b).

Early sessions focus on psychoeducation and aim to develop a collaborative understanding of the client's difficulties. In particular, this focus is on the habitual nature of anxious responding (Borkovec et al., 2004), the function of emotional responses (Linehan, 1993b), and the role of judgment and experiential avoidance of internal experiences in increasing distress and interfering with functioning (Hayes et al., 1999). The treatment is presented as a way for the client to a) alter his/her relationship to her/his internal experiences (towards a more aware, open, and less judgmental relationship), b) reduce efforts at avoidance (behavioral and experiential), and c) increase her/his engagement in valued domains of her/his life.

In order to accomplish these goals, clients are taught a variety of mindfulness exercises throughout treatment. Versions of diaphragmatic breathing and progressive muscle relaxation that have been adapted from cognitive-behavioral protocols (Bernstein, Borkovec, & Hazlett-Stevens, 2000) are also taught, although the emphasis is on awareness and acceptance rather than change efforts. Both formal (planned exercise) and informal (during daily activities) practice is encouraged, and various applications of mindfulness (decentered perspective, awareness and acceptance versus change efforts, self-compassion, etc.) are practiced in sessions throughout the treatment.

Clients are also encouraged to engage in efforts they find meaningful regardless of the discomfort they may feel. That is, clients are taught to shift their efforts from altering internal experiences (such as worry) to engaging in their lives in ways that are important to them. Several exercises are drawn from the valued action component of ACT (Hayes et al. 1999; Wilson & Murrell, 2004). Lastly, the client and therapist discuss relapse prevention strategies.

Results

The aim of the present analyses was to examine the effect of ABBT on the outcome measures already noted (ACS, DERS, ACQ-R, IUS), as well as to investigate the maintenance of specific treatment effects (i.e., at the 3 month and 9 month follow up assessments). In order to examine our hypotheses, multi-level regression analyses were conducted using the Hierarchical Linear and Nonlinear Modeling software program (HLM 6; Raudenbush, Bryk, & Congdon, 2005). The advantages of this approach include allowances for missing data in the overall and intent-to-treat samples, as well as the ability to account for correlated repeated measures and individual variability in change (Raudenbush, 2001). Cohen's d was calculated based on the between-groups t -test value ($d = 2t / (df)$), and is reported as an estimate of effect size.

Analyses of treatment effects were first conducted on an intention-to-treat (ITT) sample examining pre to post differences between treatment and wait-list participants. Next, analyses were conducted on maintenance of specific treatment gains in a sample of all participants who began treatment (i.e., treatment and waiting list control conditions combined). As with clients in the treatment condition, clients in the wait-list condition who began treatment received pre, post, 3 and 9 month follow up assessments. The post-waiting list period assessments were used as pre-treatment assessments for the analysis of maintenance of treatment gains. As mentioned previously, four participants dropped out of the study during the waiting list period. The sample (15 treatment and 16 waiting list participants in the ITT sample; 13 treatment and 12 waiting list participant in the completer sample) is sufficient to detect large between group effects in the ITT ($\alpha = .05$; power = .99), and completer ($\alpha = .05$; power = .99) controlled analyses.

Preliminary Analyses

Means and standard errors for the measures in question, at both pre- and post-treatment are reported in Table 1. No significant group differences were present at pretreatment. Correlations among all study measures are presented in Table 2.

Group Differences in the Intention-to-Treat Sample

Results of multi-level regression analyses of the controlled trial data are presented in Table 3. Significant condition by time interactions emerged for both the total and subscale scores (anger, positive emotion, depression and anxiety) on the ACS and total scores on the DERS. The results indicate that participants in the treatment condition evidenced a significantly greater decrease in fear of emotions (ACS total and subscale scores) and difficulties in emotion regulation (DERS), from pre- to post-treatment as compared to wait list controls. Participants in the treatment condition also reported significantly greater increases in tolerance of uncertainty and perceived control over anxiety in general, as well significantly greater increases in perceived control in regard to anxious emotions and perceptions of threat over the course of treatment compared to controls. For all of the above analyses, effect sizes were in the medium to large range. In regard to the stress control subscale of the ACQ-R, there was a trend ($p = .07$) towards individuals in the ABBT condition reporting greater increases in perceived control over stress over the course of treatment when compared to waiting list participants, with a medium effect size (Cohen's $d = .53$).

Maintenance of Gains

In order to examine whether treatment gains were maintained in the months following treatment, growth curve analyses were conducted for each of the variables of interest across post-treatment, 3-month, and 9-month follow up on the full treatment sample (i.e., all clients who received treatment, including those initially on the wait-list). The results of these analyses are presented in Table 5. Means and standard errors of all the study variables at pre- and post-treatment, and 3-month and 9-month follow-up, as well as effect sizes, for this sample are presented in Table 4.

Growth curve analyses revealed a non-significant effect of Time, meaning that the initial gains reported by clients during their post-assessment were maintained several months following the end of treatment. However, fear of anger (as measured by ACS-anger) continued to significantly decrease in the months following treatment. In fact, most measures continued to improve, nonsignificantly, with small to medium effect sizes (d s between .22 and .42), except DERS and ACS-anxiety scores, which remained stable.

Discussion

The present study provides promising evidence that an acceptance-based behavioral therapy for GAD has significant effects on the unique targets of intervention highlighted in several prominent theoretical models of GAD. In particular, this study demonstrated that individuals treated with an ABBT reported reduced difficulties in emotion regulation and distress about emotional responses, as well as increased tolerance of uncertainty and perceived control over anxiety than controls. In short, it appears that this ABBT affects several of the components addressed in current models of GAD, while growth curve analyses indicate that these changes appear to be stable over time.

These results are interesting, given that all of the theoretical models highlighted have broad empirical support for their unique conceptualizations of GAD. The findings suggest that it will be important for studies of treatments based in particular conceptual models to also assess mechanisms and targets posited by other models, in order to gain a more

comprehensive picture of the impact of a given treatment approach. The acceptance-based behavioral principles that underlie ABBT provide one potential theoretical model from which to draw together disparate models; alternatively an emotion regulation, intolerance of uncertainty, or perceived control model may provide an integrative theory, or an additional model not addressed here may offer the most precise identification of important targets for treatment.

Consistent with the results from this study, there is theoretical overlap between an acceptance-based behavioral approach and the mechanisms of action suggested by other models. For example, both Roemer and Orsillo (2005, 2009) and Mennin and colleagues (2005, 2007) highlight the difficulties that stem from maladaptive attempts at emotion regulation, as well as intense distress about and avoidance of emotional experiences. In fact, a recent correlational study illustrated the shared variance in chronic worry that difficulties in emotion regulation and mindfulness account for, although both also account for unique variance, indicating some distinction between the two constructs (Roemer et al., 2009).

In addition, Dugas and Koerner (2005) highlight the similarities between mindfulness, which is one of the main components of this ABBT, and their focus on increasing an individual's tolerance of uncertainty. They note that the emphasis in mindfulness on acceptance, as opposed to change, overlaps considerably with the emphasis that their CBT for GAD places on accepting the inevitability of uncertainty. Others have argued that cognitive-behavioral therapies, such as the ones derived from the theoretical models highlighted in this study, and mindfulness-based approaches target other shared mechanisms of action. For example, Teasdale and colleagues demonstrated that a common mechanism underlying both cognitive therapy and mindfulness-based cognitive therapy for depression was the ability to view thoughts from a decentered perspective (Teasdale et al., 2002). In short, there may be shared mechanisms of action underlying many traditional cognitive-behavioral and acceptance-based behavioral treatments (Arch & Craske, 2008). Exploring the process of change underlying these mechanisms of action remains an important avenue for future research.

Given the emphasis that mindfulness and acceptance-based procedures place on relinquishing attempts at rigid control, it is interesting that participants reported greater perceived control over a variety of anxiety-related emotions and events following treatment than controls. At first glance, these findings support the proposal that, given the decrease in distress that sometimes accompanies mindfulness and acceptance-based interventions, engagement in these strategies is just another form of control (Arch & Craske, 2008; Craske & Hazlett-Stevens, 2002). However, it may be useful to consider alternative explanations. The construct of control may be much more multifaceted than its conceptualization in many current measures. In operationalizing the construct of perceived control, it may be important to distinguish between perceptions of rigid control (e.g., I must prevent myself from becoming anxious in this situation) and the ability to influence outcomes by degree (If I am compassionate and allowing towards my anxiety, I am less likely to be overwhelmed by it). For example, in the ACQ-R (Brown et al., 2004) items such as "I am unconcerned if I become anxious in a situation, because I am confident in my ability to cope with my symptoms" may be assessing influence rather than rigid control. Further, it is important to distinguish between rigid control and efficacy. Inasmuch as attempts at suppression, avoidance and control increase negative thoughts and emotional discomfort (Eifert & Heffner, 2003), relinquishing control, and therefore reducing this struggle, is likely associated with an increased sense of efficacy. Like many traditional forms of CBT, mindfulness and acceptance-based approaches may increase one's sense of agency or mastery in regard to their anxiety (Arch & Craske, 2008). To assert that this is akin to a feeling of control, however, may be a mistake. Although ABBTs may encourage behaviors

that engender a sense of efficacy, they place considerable emphasis on reducing one's *desire* for rigid control. Thus, mindfulness may increase a sense of influence or ability to influence experience, without engendering beliefs about the ability (or need) to control internal experience.

Relatedly, ABBTs may alter clients' expectations about the possibility and necessity of gaining control over certain situations (such as internal reactions to an event, the behavior of other people, or the future), which may affect their reports on measures of perceived control. For example, clients often present to therapy with a focus on trying to change their internal experiences in order to change their lives, and interpret their inability to control their anxiety and other emotions as a sign of their own weakness. In ABBTs, therapists help clients to see how this is a difficult, but universal, struggle, in that emotions and other reactions naturally occur as we engage in our lives and we do not have total control over others, or our environments. Clients are encouraged to recognize this reality and reduce futile efforts at control, focusing instead on actions more likely under their own control, such as clearly stating their needs or choosing their own actions. Thus, in ABBT the goal is to both accept the limits of control and to take control over personal actions. Current measures of control may not be sensitive to these subtleties or the change in expectancies about control that likely occur as a function of ABBT. Future research will be needed in order to examine these possibilities regarding the impact of acceptance-based behavioral therapies on different aspects of beliefs and expectancies about control.

There are several limitations to the present study. As the correlations in Table 2 indicate, several of the dependent variables were significantly related to one another, suggesting possible shared or overlapping variance. However, given the moderate size of the correlations these measures are likely capturing unique variance as well. Nonetheless, future studies with larger sample sizes should examine whether ABBTs and other treatments account for changes in unique variance in each of these measures. We also did not assess all of the available cognitive-behavioral theories of GAD, such as the interpersonal processes highlighted by Borkovec, Newman, and Castonguay (2003), and the cognitive model outlined by Wells (1999). In addition, the measures used in the current may not represent a complete assessment of the various models, and there may be other important contributing and maintaining factors in these models that may have gone unassessed. Further, assessments were only conducted pre- and post-treatment, so we cannot determine the course of change, which is necessary for determining mechanisms of action. In addition, the sample size and minimal racial diversity of the sample limits the ability to generalize from the current findings. Finally, the present study employed a wait-list control as a comparison condition which limits our ability to state that the unique facets of this treatment were responsible for client change. Members from our team are currently conducting research comparing this ABBT to another evidence-based treatment for GAD.

Thus, the current study simply represents a modest first step in examining the impact of an acceptance-based therapy on important constructs highlighted in several theoretical models of GAD. Future research will need to examine the course of change, the interrelationships among variables, the potential role of additional factors associated with clinical change, the mechanisms of change, and the potential moderating role of contextual and demographic factors in this ABBT and other treatments for GAD.

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References

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed.. Author; Washington, DC: 1994.
- Arch JJ, Craske MG. Acceptance and commitment therapy and cognitive behavioral therapy for anxiety disorders: Different treatments, similar mechanisms? *Clinical Psychology: Science and Practice*. 2008; 15:263–279.
- Barlow, DH. Anxiety and its disorders: The nature and treatment of anxiety and panic. The Guilford Press; New York: 2002.
- Bernstein, DA.; Borkovec, TD.; Hazlett-Stevens, H. New directions in progressive relaxation training: A guidebook for helping professionals. Praeger Publishers; Westport, CT: 2000.
- Borkovec, TD.; Alcaine, OM.; Behar, E. Avoidance theory of worry and generalized anxiety disorder.. In: Heimberg, RG.; Turk, CL.; Mennin, DS., editors. Generalized anxiety disorders: Advances in research and practice. Guilford; New York: 2004. p. 77-108.
- Borkovec TD, Hu S. The effect of worry on cardiovascular response to phobic imagery. *Behaviour Research and Therapy*. 1990; 28(1):69–73. doi: 10.1016/0005-7967(90)90056-O. [PubMed: 2302151]
- Borkovec TD, Newman MG, Castonguay LG. Cognitive-behavioral therapy for generalized anxiety disorder with integrations from experiential and existential therapies. *CNS Spectrums*. 2003; 8:382–389. [PubMed: 12766694]
- Borkovec TD, Newman MG, Lytle R, Pincus A. A component analysis of cognitive behavioral therapy for generalized anxiety disorder and the role of interpersonal problems. *Journal of Consulting and Clinical Psychology*. 2002; 70:288–298. doi: 10.1037/0022-006X.70.2.288. [PubMed: 11952187]
- Brown TA, White KS, Forsyth JP, Barlow DH. The structure of perceived emotional control: Psychometric properties of a revised Anxiety Control Questionnaire. *Behavior Therapy*. 2004; 35:75–99. doi: 10.1016/S0005-7894(04)80005-4.
- Buhr K, Dugas MJ. The intolerance of uncertainty scale: Psychometric properties of the English version. *Behaviour Research and Therapy*. 2002; 40:931–945. doi: 10.1016/S0005-7967(01)00092-4. [PubMed: 12186356]
- Butler G, Gelder M, Hibbert G, Cullington A, Klimes I. Anxiety management: Developing effective strategies. *Behaviour Research and Therapy*. 1987; 25:517–522. doi: 10.1016/0005-7967(87)90059-3. [PubMed: 3426512]
- Craske MG, Hazlett-Stevens H. Facilitating symptom reduction and behavior change in GAD: The issue of control. *Clinical Psychology: Science and Practice*. 2002; 91:69–75. doi: 10.1093/clipsy/9.1.69.
- Craske MG, Rapee RM, Jackel L, Barlow DH. Qualitative dimensions of worry in DSM-III-R generalized anxiety disorder subjects and nonanxious controls. *Behavior Research and Therapy*. 1989; 27:397–402. doi: 10.1016/0005-7967(89)90010-7.
- DiNardo, PA.; Brown, TA.; Barlow, DH. Anxiety Disorders Interview Schedule for DSM-IV. Graywind Publications; Albany NY: 1994.
- Dugas MJ, Koerner N. Cognitive-behavioral treatment for generalized anxiety disorder: Current status and future directions. *Journal of Cognitive Psychotherapy: An International Quarterly*. 2005; 19:61–81. doi: 10.1891/jcop.19.1.61.66326.
- Dugas MJ, Gagnon F, Ladouceur R, Freeston MH. Generalized anxiety disorder: A preliminary test of a conceptual model. *Behaviour Research And Therapy*. 1998; 36:215–226. doi: 10.1016/S0005-7967(97)00070-3. [PubMed: 9613027]

- Dugas MJ, Savard P, Gaudet A, Turcotte J, Laugesen N, Robichaud M, et al. Can the components of a cognitive model predict the severity of generalized anxiety disorder? *Behavior Therapy*. 2007; 38:169–178. doi: 10.1016/j.beth.2006.07.002. [PubMed: 17499083]
- Eifert GH, Heffner M. The effects of acceptance versus control contexts on avoidance of panic-related symptoms. *Journal of Behavior Therapy and Experimental Psychiatry*. 2003; 34(3-4):293–312. doi: 10.1016/j.jbtep.2003.11.001. [PubMed: 14972675]
- Frala JL, Leen-Feldner EW, Blumenthal H, Barreto CC. Relations among perceived control over anxiety-related events, worry, and generalized anxiety disorder in a sample of adolescents. *Journal of Abnormal Child Psychology*. 2010; 38:237–247. doi: 10.1007/s10802-009-9365-6. [PubMed: 19842029]
- Gratz KL, Roemer L. 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*. 2004; 26:41–55. doi: 10.1023/B:JOBA.0000007455.08539.94.
- Hayes, SC.; Strosahl, KD.; Wilson, KG. *Acceptance and commitment therapy: An experiential approach to behavior change*. Guilford; New York: 1999.
- Hayes SC, Wilson KG, Gifford EV, Follette VM, Strosahl K. Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*. 1996; 64:1152–1168. doi: 10.1037/0022-006X.64.6.1152. [PubMed: 8991302]
- Ladouceur R, Dugas MJ, Freeston MH, Rhéaume J, Blais F, Boisvert JM, et al. Specificity of generalized anxiety disorder symptoms and processes. *Behavior Therapy*. 1999; 30:191–207. doi: 10.1016/S0005-7894(99)80003-3.
- Linehan, MM. *Cognitive-behavioral treatment of borderline personality disorder*. Guilford; New York: 1993a.
- Linehan, MM. *Skills training manual for cognitive behavioral treatment of borderline personality disorder*. Guilford; New York: 1993b.
- Mennin DS, Heimberg RG, Turk CL, Fresco DM. Preliminary evidence for an emotion dysregulation model of generalized anxiety disorder. *Behaviour Research and Therapy*. 2005; 43:1281–1310. doi: 10.1016/j.brat.2004.08.008. [PubMed: 16086981]
- Mennin DS, Holaway RM, Fresco DM, Moore MT, Heimberg RG. Delineating components of emotion and its dysregulation in anxiety and mood psychopathology. *Behavior Therapy*. 2007; 38:284–302. doi: 10.1016/j.beth.2006.09.001. [PubMed: 17697853]
- Purdon C. Thought suppression and psychopathology. *Behaviour Research and Therapy*. 1999; 35:35–47. doi: 10.1016/S0005-7967(98)00200-9.
- Raudenbush, SW.; Bryk, A.; Congdon, R. *HLM 6: Hierarchical linear and nonlinear modeling* [Computer software and manual].. Scientific Software International; Lincolnwood, IL: 2005.
- Raudenbush, SW. Toward a coherent framework for comparing trajectories of individual change.. In: Collins, L.; Sayer, A., editors. *Best methods for studying change*. American Psychological Association; Washington, DC: 2001. p. 33-64.
- Roemer L, Lee JK, Salters-Pedneault K, Erisman SM, Orsillo SM, Mennin DS. Mindfulness and emotion regulation difficulties in generalized anxiety disorder: Preliminary evidence for independent and overlapping contributions. *Behavior Therapy*. 2009; 40:142–154. doi: 10.1016/j.beth.2008.04.001. [PubMed: 19433145]
- Roemer, L.; Orsillo, SM. An acceptance based behavior therapy for generalized anxiety disorder.. In: Orsillo, SM.; Roemer, L., editors. *Acceptance and mindfulness-based approaches to anxiety: Conceptualization and treatment*. Springer; New York: 2005. p. 213-240.
- Roemer L, Orsillo SM. An open trial of an acceptance-based behavior therapy for generalized anxiety disorder. *Behavior Therapy*. 2007; 38:72–85. doi: 10.1016/j.beth.2006.04.004. [PubMed: 17292696]
- Roemer, L.; Orsillo, SM. *Mindfulness & acceptance-based behavioral therapies in practice*. The Guilford Press; New York: 2009.

- Roemer, L.; Orsillo, SM.; Barlow, DH. Generalized anxiety disorder.. In: Barlow, DH., editor. *Anxiety and its disorders: The nature and treatment of anxiety and panic*. The Guilford Press; New York: 2002. p. 477-515.
- Roemer L, Orsillo SM, Salters-Pedneault K. Efficacy of an acceptance-based behavior therapy for generalized anxiety disorder: Evaluation in a randomized controlled trial. *Journal of Consulting and Clinical Psychology*. 2008; 76:1083–1089. doi: 10.1037/a0012720. [PubMed: 19045976]
- Salters-Pedneault K, Roemer L, Tull MT, Rucker L, Mennin DS. Evidence of broad deficits in emotion regulation associated with chronic worry and generalized anxiety disorder. *Cognitive Therapy and Research*. 2006; 30:469–480. doi: 10.1007/s10608-006-9055-4.
- Segal, ZV.; Williams, JMG.; Teasdale, JD. *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. Guilford; New York: 2002.
- Teasdale JD, Moore RG, Hayhurst H, Pope M, Williams S, Segal ZV. Metacognitive awareness and prevention of relapse in depression: Empirical evidence. *Journal of Consulting and Clinical Psychology*. 2002; 70:275–287. doi: 10.1037/0022-006X.70.2.275. [PubMed: 11952186]
- Waters, AM.; Craske, MG. Generalized anxiety disorder.. In: Antony, MM.; Ledley, DR.; Heimberg, RG., editors. *Improving outcomes and preventing relapse in cognitive behavioral therapy*. Guilford Press; New York: 2005.
- Wells A. A metacognitive model and therapy for generalized anxiety disorder. *Clinical Psychology and Psychotherapy*. 1999; 6:86–95.
- Williams KE, Chambless DL, Ahrens A. Are emotions frightening? An extension of the fear of fear construct. *Behaviour Research and Therapy*. 1997; 35:239–248. doi: 10.1016/S0005-7967(96)00098-8. [PubMed: 9125104]
- Wilson, KG.; Murrell, AR. Values work in acceptance and commitment therapy: setting a course for behavioral treatment.. In: Hayes, SC.; Follette, VM.; Linehan, MM., editors. *Mindfulness and acceptance: Expanding the cognitive-behavioral tradition*. Guilford; New York: 2004. p. 120-151.

Table 1

Means (and Standard Errors) of all key study variables as a function of condition and time of measurement for the randomized controlled trial: Intent to treat sample (n = 31)

	Treatment (n = 15)		Waiting list control (n = 16)	
	Pre	Post	Pre	Post
DERS	94.2 (4.95)	77.01 (5.37)	101.25 (4.56)	103.04 (7.53)
IUS	76.47 (5.88)	55.70 (5.02)	83.25 (4.19)	82.10 (6.31)
ACS total	160.93 (9.32)	131.18 (10.01)	167.69 (5.31)	176.09 (6.00)
ACS-Anger	29.2 (2.27)	27.07 (2.13)	29.75 (1.48)	31.44 (1.84)
ACS-Positive	39.4 (3.02)	33.68 (3.05)	41.81 (2.37)	47.46 (2.67)
ACS-Depression	33.2 (2.54)	25.38 (2.75)	34.81 (1.59)	35.19 (1.46)
ACS-Anxiety	59.13 (3.06)	44.89 (3.36)	61.31 (2.08)	62.16 (1.70)
ACQ-R-Total	30.14 (2.95)	43.40 (3.56)	31.88 (3.01)	30.63 (2.89)
ACQ-R-Emotion	5.88 (1.02)	12.52 (1.47)	4.54 (0.64)	5.66 (0.92)
ACQ-R-Threat	15.27 (1.41)	20.11 (1.55)	17.27 (1.52)	16.57 (1.83)
ACQ-R-Stress	8.93 (1.21)	10.79 (1.17)	10.01 (1.07)	8.53 (0.97)

Note: DERS = Difficulties in Emotion Regulation Scale, IUS = Intolerance of Uncertainty Scale, ACS = Affective Control Scale, ACQ-R = Anxiety Control Scale-Revised.

Table 2

Correlations among main study variables.

Variables	1	2	3	4	5	6	7	8	9	10	11
1. DERS	--	.63**	.64**	.59**	.55**	.56**	.45*	-.58**	-.45*	-.45*	-.45*
2. IUS		--	.66**	.50**	.52**	.46*	.70**	-.58*	-.51*	-.46*	-.39
3. ACS total			--	.90**	.84**	.82**	.79**	-.64**	-.57**	-.43*	-.53**
4. ACS-Anger				--	.79**	.67**	.55**	-.56**	-.38*	-.41*	-.52**
5. ACS-Positive					--	.48*	.44*	-.52**	-.37*	-.37*	-.48*
6. ACS-Depression						--	.67**	-.46*	-.43*	-.30	-.38
7. ACS-Anxiety							--	-.58**	-.71**	-.34	-.39
8. ACQ-R-Total								--	.56**	.86**	.85**
9. ACQ-R-Emotion									--	.17	.31
10. ACQ-R-Threat										--	.63**
11. ACQ-R-Stress											--

Note: DERS = Difficulties in Emotion Regulation Scale, IUS = Intolerance of Uncertainty Scale, ACS = Affective Control Scale, ACQ-R = Anxiety Control Scale-Revised.

**
 $p < .01$

*
 $p < .05$

Table 3Multi-level regression effects of Time and Condition by Time^a for outcomes variables

	B	t	pr	d
<i>Primary Outcomes</i>				
DERS				
Time	1.79	0.37	0.99	0.10
Condition X Time	-18.97	-2.67 [*]	1.03	0.75
IUS				
Time	-1.14	-0.30	1.01	0.08
Condition X Time	-19.65	-3.10 ^{**}	1.04	0.87
ACS-Total				
Time	8.40	2.23 [*]	.93	0.63
Condition X Time	-38.16	-4.45 ^{**}	1.03	1.25
ACS-Anger				
Time	1.69	1.5	0.68	0.42
Condition X Time	-3.82	-2.04 [*]	1.55	0.57
ACS-Positive				
Time	5.65	3.32 ^{**}	0.68	0.93
Condition X Time	-11.37	-3.27 ^{**}	1.17	0.92
ACS-Depression				
Time	0.37	0.23	0.96	0.06
Condition X Time	-8.20	-3.17 ^{**}	1.38	0.89
ACS-Anxiety				
Time	0.85	0.45	0.94	0.13
Condition X Time	-15.10	-4.63 ^{**}	1.33	1.30
ACQ-R-Total				
Time	-1.24	-.50	1.04	0.14
Condition X Time	14.50	3.10 ^{**}	0.94	0.88
ACQ-R-Emotion				
Time	1.11	1.26	0.62	0.36
Condition X Time	5.52	3.35 ^{**}	0.69	0.95
ACQ-R-Threat				
Time	-0.70	-0.62	1.38	0.17
Condition X Time	5.54	2.71 ^{**}	0.78	0.77
ACQ-R-Stress				
Time	-1.48	-1.47	1.50	0.42
Condition X Time	3.34	1.88 [†]	0.79	0.53

Note: DERS = Difficulties in Emotion Regulation Scale, IUS = Intolerance of Uncertainty Scale, ACS = Affective Control Scale, ACQ-R = Anxiety Control Scale-Revised.

^aWaiting list control is the reference condition.

^{**}
 $p < .01$

^{*}
 $p < .05$

[†]
 $p < .10$

Table 4

Means (and Standard Errors) of all variables at Pre-, Post-, and 3-month and 9-month Follow-up, and effect sizes, for full sample of participants who began treatment (n = 26)

	Pre	Post	3-Month	9-Month	d	
					Post	3-month
DERS	94.38 (3.81)	85.14 (3.30)	75.90 (3.62)	66.67 (4.61)	1.42	1.52
IUS	75.50 (3.94)	66.44 (3.40)	57.38 (3.18)	48.32 (3.33)	1.83	2.43
ACS total	161.43 (5.96)	145.89 (5.60)	130.36 (5.78)	114.82 (6.46)	1.62	2.78
ACS-Anger	30.32 (1.47)	27.62 (1.28)	24.91 (1.22)	22.20 (1.33)	.81	1.78
ACS-Positive	41.45 (2.10)	38.23 (1.96)	35.01 (2.0)	31.80 (2.21)	1.03	1.41
ACS-Depression	32.53 (1.58)	28.84 (1.45)	25.15 (1.48)	21.47 (1.66)	1.71	2.45
ACS-Anxiety	57.09 (1.94)	51.06 (1.76)	45.04 (1.84)	39.02 (2.16)	2.12	2.79
ACQ-R-Total	32.94 (1.92)	39.26 (1.78)	45.58 (1.94)	51.90 (2.35)	1.60	2.07
ACQ-R-Emotion	7.18 (0.78)	10.25 (0.70)	13.32 (0.76)	16.39 (0.94)	2.00	2.84
ACQ-R-Threat	16.46 (1.10)	18.36 (0.90)	20.25 (0.93)	22.14 (1.17)	1.15	1.16
ACQ-R-Stress	9.30 (0.69)	10.70 (0.58)	12.09 (0.58)	13.49 (0.69)	.87	1.21

Note: DERS = Difficulties in Emotion Regulation Scale, IUS = Intolerance of Uncertainty Scale, ACS = Affective Control Scale, ACQ-R = Anxiety Control Scale-Revised.

Table 5

Results of growth curve analyses of treatment maintenance for full sample of treated participants (n = 26)

	B	t	pr	d
DERS	0.18	0.12	0.97	0.03
IUS	-1.05	-0.88	1.60	0.24
ACS total	-3.60	-1.44	1.14	0.39
ACS-Anger	-1.81	-2.89**	0.40	0.79
ACS-Positive	-0.68	-0.79	3.92	0.22
ACS-Depression	-0.68	-1.31	0.50	0.36
ACS-Anxiety	-0.41	-0.47	1.65	0.13
ACQ-R-Total	1.27	1.54	0.55	0.42
ACQ-R-Emotion	0.39	0.81	0.47	0.22
ACQ-R-Threat	0.42	1.25	0.29	0.34
ACQ-R-Stress	0.53	1.46	0.29	0.40

Note: DERS = Difficulties in Emotion Regulation Scale, IUS = Intolerance of Uncertainty Scale, ACS = Affective Control Scale, ACQ-R = Anxiety Control Scale-Revised.

**
p < .01