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Reductions in experiential avoidance as a mediator of change in symptom outcome and quality of life in acceptance-based behavior therapy and applied relaxation for generalized anxiety disorder

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Abstract

As a field, we lack information about specific mechanisms that are responsible for changes that occur over the course of treatments for anxiety disorders (Kazdin, 2007). Identifying these mechanisms would help streamline evidence-based approaches, increase treatment response rates, and aid in the dissemination and implementation of evidence-based approaches in diverse contexts. The current study examined reductions in experiential avoidance (EA; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996), attempts to control or eliminate distressing internal experiences, regardless of behavioral consequences, as a potential mechanism of change in participants with a principal diagnosis of Generalized Anxiety Disorder (GAD) receiving either Acceptance-based Behavior Therapy (ABBT) or Applied Relaxation (AR). Participants' EA scores across treatment on the Acceptance and Action Questionnaire (AAQ) were used to calculate slopes, which were used as predictors in a series of linear regressions. Greater change in EA across treatment significantly predicted change in worry (PSWQ) and quality of life (QOLI) across both treatments. These results contribute to the body of literature on common mechanisms of change across traditional CBTs and mindfulness and acceptance-based approaches.

Keywords

experiential avoidance; acceptance; mechanisms of change; generalized anxiety disorder; acceptance-based behavior therapy; applied relaxation

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Introduction

As a field, we have a wealth of information about the efficacy of various treatments for anxiety disorders; however, we lack information about specific mechanisms that are responsible for the changes that occur over the course of treatment (Kazdin, 2007; Levin, Luoma, & Haeger, 2015). Identifying mechanisms of change can illuminate which components of treatment actually produce change. This knowledge has the potential to increase treatment response rates, streamline evidence-based treatments, and facilitate dissemination efforts.

There is a particular need to better understand mechanisms of change in the treatment of Generalized Anxiety Disorder (GAD), a chronic disorder unlikely to remit without treatment. GAD is thought to affect between 4–7% of the population over their lifetime (Kessler, Keller, & Wittchen, 2001). While efficacious CBTs have been developed for GAD, treatment response rates are lower than other anxiety disorders (Waters & Craske, 2005), highlighting the need for further research on mechanisms of change, which might help improve treatment packages and outcomes.

CBTs and Mindfulness and Acceptance-based Approaches

Both Cognitive Behavioral (CBT) and Acceptance-based behavior therapies (ABBTs) have been found to be effective treatments for GAD (Borkovec & Ruscio, 2001; Covin, Ouimet, Seeds, & Dozois, 2008; Hayes-Skelton, Roemer, & Orsillo, 2013; Roemer, Orsillo, & Salters-Pedneault, 2008). Some researchers propose that various treatments within the broad CBT family are fundamentally different in the ways they produce change (e.g., Forman, Herbert, Moitra, Yeomans, & Geller, 2007; Forman et al., 2012). Yet, others suggest that while certain treatments use different techniques, they ultimately activate the same mechanisms of change (e.g., Arch & Craske, 2008; Hayes-Skelton, Usmani, Lee, Roemer, & Orsillo, 2012). Questions about distinct versus potential common mechanisms of change have particularly arisen when comparing traditional CBTs with ABBTs. Acceptance-Based Behavior Therapy refers to a variety of approaches including but not limited to, acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 2011), mindfulness-based cognitive therapy (MBCT; Segal, Williams, & Teasdale, 2013), and dialectical behavior therapy (DBT; Linehan, 1993), that are rooted in behaviorism but incorporate a focus on acceptance and the cultivation of mindfulness skills. More research is needed to determine whether traditional CBTs and ABBTs share the same mechanisms of change.

Decentering

One mechanism of change that has received attention is the ability to observe experiences as they are, as mental events that come and go instead of as inherently self-defining truths, a construct called decentering or cognitive defusion (Bieling et al., 2012; Fresco, Segal, Buis, & Kennedy, 2007a). A recent secondary data analysis from the same RCT as the current study, comparing ABBT and Applied Relaxation (AR) in a sample with GAD found decentering to be a common mechanism of change across both treatment conditions (Hayes-Skelton, Calloway, Roemer, & Orsillo, 2015). Results indicated that decentering significantly increased across both treatment conditions, that this increase was significantly

associated with symptom outcomes, and bivariate latent difference score models indicated that changes in decentering preceded changes in outcomes.

Another recent RCT that compared ACT and CBT for mixed anxiety disorders found empirical support for cognitive defusion as a common mechanism of change across both treatment conditions. Arch, Wolitzky-Taylor, Eifert, & Craske (2012a) found that cognitive defusion improved significantly across the two treatment conditions with a large effect size. In addition, the slope of change in cognitive defusion for each participant was entered into linear regressions, which indicated that changes in cognitive defusion mediated changes in worry, behavioral avoidance, and quality of life outcomes across both conditions.

Experiential Avoidance

Experiential avoidance (EA; although some have begun to refer to it as psychological flexibility), which refers to rigid attempts to control or avoid distressing internal experiences despite behavioral consequences (Hayes et al., 1996), is another construct that deserves investigation as a potential mechanism of change in treatment for GAD given its proposed central role in a range of psychological disorders (Hayes et al.), and in GAD specifically (Roemer & Orsillo, 2002). Borkovec and colleagues proposed that worry, the hallmark of GAD, serves an avoidant function that serves to maintain the disorder (Borkovec, 1994; Borkovec, Alcaine, & Behar, 2004). Building from this work, other researchers (Roemer & Orsillo, 2002) have discussed worry as a particular form of EA that is likely to be associated with GAD. The central role of EA in the development and maintenance of GAD continues to be highlighted in other recent theories of GAD (Mennin, Heimberg, Turk, & Fresco, 2005; Mennin, Holaway, Fresco, Moore, & Heimberg, 2007; Roemer & Orsillo, 2002). Moreover, there is evidence that EA is uniquely associated with GAD symptoms (Lee, Orsillo, Roemer, & Allen, 2010; Roemer, Salters, Raffa, & Orsillo, 2005).

While EA may appear to be effective in the short term, it can greatly interfere with psychosocial functioning in the long term. Avoidance efforts can both paradoxically increase distress and also restrict lives (Hayes et al., 1996; Lee et al., 2010; Wegner, 2011). EA is thought to be prevalent for numerous reasons, including that avoidance of dangerous situations is adaptive and functional, and this learning can be overgeneralized to avoidance of internal experiences (Hayes et al., 1996). In addition, humans are socialized in a world that often models suppression of emotions, and the bi-directionality of language allows humans to label various situations as aversive, or “bad”, which can extend to internal experiences. If anxiety is labeled as “bad,” then even thinking about it can be distressing; therefore people can learn to avoid these thoughts in an attempt to eliminate the aversive experience (Hayes et al., 1996; Hayes, Luoma, Bond, Masuda, & Lillis, 2006).

EA in Mindfulness and Acceptance-based Behavior Therapies

Although research with clinical and non-clinical samples demonstrates that EA is reduced from pre to post-treatment (or that experiential acceptance, that opposite of EA, increases) over the course of acceptance-based treatments for anxiety (Ciarrochi, Bilich, & Godsell, 2010; Roemer et al., 2008), that does not speak to whether or not they are mechanisms of change, and few studies have examined the temporal course of change, or compared the

course of change across different treatments. Exceptions are a small number of studies that have demonstrated that changes in EA, or psychological flexibility, earlier in treatment predicted changes on symptom measures later in treatment (Dalrymple & Hebert, 2007; Kocovski, Fleming, & Rector, 2009). While these exploratory analyses identifying EA as a potential mechanism of change are promising, they come from open trial designs. Moreover, comparing early change to late change does not take into account the course of change (i.e., the slope) over the entire period of treatment. In order to understand mechanisms of change, or how change occurs throughout the course of treatment, mechanism variables need to be measured throughout treatment, not only with outcome variables at pre- and post-treatment (Kazdin, 2007; Kraemer, Wilson, Fairburn, & Agras, 2002). Further, findings to date are inconsistent regarding whether EA is a distinct or common mechanism of change in mindfulness and acceptance-based behavioral therapies.

Reductions in EA as a distinct mechanism of change—Two studies have found reductions in EA to be a distinct mechanism of change in acceptance-based conditions versus CBT conditions (Forman et al., 2007; Forman et al., 2012). Despite reporting significant improvements in EA across CT and ACT conditions, and a non-significant interaction of time and treatment condition, Forman and colleagues (2007) found that EA and acceptance were more strongly associated with outcomes in the ACT condition. However, hypothesized mechanisms and outcomes were measured at the same time points in this study and mechanism analyses were exploratory. In a subsequent RCT, Forman and colleagues (2012) found acceptance of thoughts and emotions (versus “cognitive and affective change strategies”) was associated with improvements in outcomes in the ACT, but not the CT, condition; however acceptance was measured via two items on a brief session-by-session measure developed for the purpose of the study. In addition, causal interpretations are limited, as models controlled for change over time in outcomes, but results were based on measurements of mediators and outcomes at the same session. Despite these methodological limitations, these studies suggest the potential for EA to be a distinct mechanism in ABBTs and not traditional CBTs.

Reductions in EA as a common mechanism of change—On the other hand, there is some evidence that traditional CBT is as effective as ABBT in reducing EA (Arch et al., 2012b; Twohig et al., 2010), which suggests that EA could be considered as a common mechanism. Two studies examined whether CBT and ABBT both reduced EA. Twohig and colleagues (2010) conducted an RCT comparing ACT versus 8 weeks of progressive relaxation training (PRT) in individuals with a diagnosis of OCD. ACT participants reported significantly greater reductions in EA from pre-treatment to post-treatment compared with PRT participants, however the two groups were equivalent when examining reductions in EA from pre-treatment to 3-month follow-up. Within-condition reductions in EA were significant in both groups from both pre-treatment to post-treatment, and pre-treatment to follow-up.¹ Arch and colleagues (2012b) conducted an RCT comparing CBT with ACT in a

¹The PRT condition in this study consisted of learning to tense and relax muscle groups, learning relaxation through recall and counting, and reviewing events from the previous week and homework assignments. The authors note that individuals engaged in recall in which they remembered previous experiences of being relaxed to try to relax in the present moment, but it is unclear if this was explicitly applied to anxiety provoking situations, which is an important aspect of Applied Relaxation, used in the current study.

sample with mixed anxiety disorders. Significant reductions in EA from pre-post, measured by the AAQ, were reported in both conditions, with no significant differences between conditions. However, at 12-month follow-up, treatment differences approached significance, with those in the ACT condition reporting less experiential avoidance than the CBT condition. Unfortunately, neither of these studies looked at potential differences across treatments in the extent to which change in EA may have been associated with outcome.

We were only able to identify one study that examined change in EA as a potential mechanism of change in both an ABBT and a traditional CBT for anxiety. Kocovski, Fleming, Hawley, Ho, and Antony (2015) examined three potential mechanisms, one of which was acceptance, in an RCT comparing cognitive behavioral group therapy (CBGT) and mindfulness and acceptance-based group therapy (MAGT) in participants with social anxiety disorder. Results indicated a bidirectional model was the best fit for acceptance, measured by the social anxiety- acceptance and action questionnaire, and social anxiety symptoms, indicating changes in acceptance predicted subsequent changes in social anxiety symptoms and vice versa. However, the model comparing acceptance across the treatment conditions did not converge, and therefore results were not reported and it is unknown whether or not there were differences across these group treatments.

No RCT studies have examined changes in EA specifically within applied relaxation (AR), the CBT treatment used in the current study. AR is an empirically supported CBT for GAD that teaches clients: 1) progressive muscle relaxation exercises, 2) early cue detection of early signs of anxiety, and 3) to apply a relaxation response instead of an anxiety response (Siev & Chambless, 2007). The predominant hypothesized mechanism of change in AR has historically been decreases in muscle tension, which is hypothesized to lead to decreases in other activation systems in the body. However, the findings are mixed on whether or not improvements in AR are actually due to decreases in muscle tension (for a review, see Conrad & Roth, 2007). The current study did not measure muscle tension, and therefore cannot contribute to this debate, but rather explores the potential role of EA as another possible mechanism of change in AR (not mutually exclusive from others). While it may seem like AR could encourage EA, it can actually promote non-avoidance through cue detection, which requires participants to turn toward their experiences and notice them, instead of turning away from them or engaging in EA. For example, when participants notice they are experiencing muscle tension and beginning to worry, they are noticing how they are feeling in their bodies and what they are thinking in place of previous attempts to rigidly avoid the same experiences (Hayes-Skelton et al., 2012). A case series of participants from the trial analyzed here supported this model with decreases in EA noted in AR across clients presented (Hayes-Skelton et al., 2012).

The current study addresses previous limitations related to the timing and measurement of EA, study design and methodology, and statistical analyses. We examined reductions in EA over the course of treatment as a common mechanism of change in both ABBT and AR for GAD in relation to both symptom and quality of life outcomes.

Goals and Hypotheses

The goal of this study was to examine reductions in EA in relation to receipt of either ABBT or AR among participants with a principal diagnosis of GAD. The first aim of this study was to examine changes in EA in both ABBT and AR across the course of treatment. It was hypothesized that self-reported EA would decrease significantly during treatment in both conditions. However, it was hypothesized that the magnitude of change would be significantly greater in the ABBT condition. The second aim of this study was to examine reductions in EA as a mediator of change in symptom outcome and quality of life, in both ABBT and AR. It was hypothesized that reductions in EA would mediate change in symptom outcome and quality of life in both conditions. Finally, we ran post-hoc analyses controlling for decentering, given that it has been found to be a common mechanism of change in the current sample (Hayes-Skelton et al., 2015), to determine unique contributions of EA to outcome.

Method

Procedure

The data analyzed were part of an RCT comparing the efficacy of ABBT and AR for individuals with a principal diagnosis of GAD (Hayes-Skelton et al., 2013). The current sample included individuals randomly assigned to either treatment condition who completed at least 8 of the 16 total treatment sessions and completed the AAQ during pre-treatment and at least one of the following time points: mid-treatment (week 4, week 8, week 12), and/or post-treatment. Participants were enrolled, screened, and treated at the Center for Anxiety and Related Disorders, in Boston, MA. All potential participants were screened using the Anxiety Disorders Interview Schedule for DSM-IV-TR—Lifetime Version (ADIS-IV-L; Di Nardo, Brown, & Barlow, 1994). Participants were admitted to the study if they were at least 18 years of age, had a principal diagnosis of GAD, denied current suicidal intent, and did not meet criteria for substance dependence, bipolar disorder, autism spectrum disorder, or present with evidence of psychosis.

Eighty-one individuals consented to the study and were randomized, forty to ABBT and forty-one to AR. The ABBT and AR provided in this RCT were adherent and competent, and there were no procedural breaks (Hayes-Skelton et al., 2013). Sixty-four individuals completed at least 8 out of 16 treatment sessions, as well as the AAQ, during pre-treatment and at least one of the mid-treatment or post treatment time points. We only included individuals who completed at least half of the treatment since we were interested in examining changes that occur over the course of treatment, and this inclusion criterion has been used in other recent work examining similar questions (Arch et al., 2012a; Hayes-Skelton, et al., 2015). Data from these sixty-four participants were used in the analyses described below.

The individuals who were dropped due to completing fewer than eight sessions on average attended only two sessions. Four individuals completed 5–7 sessions before dropping out, but none of them showed meaningful change on the weekly measure of GAD symptoms, distress, and interference. Chi-square tests indicated that there was not a significant

difference across treatment conditions in drop out before session 8 ($X^2(1) = 0.11, p = .74$), nor a significant difference in GAD severity at pre-treatment in participants who dropped out before session 8 or completed 8 or more sessions (dropped before session 8 mean GAD pre CSR = 5.47, completed session 8 or more mean GAD pre CSR = 5.48, $X^2(3) = 3.42, p = .33$). There are four missing AAQ data points among participants included in these analyses; one participant is missing week 4, another participant is missing week 12, and one participant is missing weeks 8 and 12.

Participants

Full study demographics have been reported previously (Hayes-Skelton et al., 2013). Of the current sample ($N = 64$), 65.6% identified their biological sex as female. The average age of participants was 34.41 ($SD = 12.14$) years old. Fifty-two participants (81.3%) identified their race as white, four (6.3%) as Latinx, four (6.3%) as Asian, three (4.7%) as Black, and one (1.6%) as Asian and White. Sixty participants (93.8%) identified as heterosexual, 2 (3.1%) as gay/lesbian, 1 (1.6%) as bisexual, and sexual orientation data is missing for 1 participant (1.6%).

Overall, the participants who withdrew before session eight did not differ significantly from the participants who completed at least 8 sessions demographically. However, participants who withdrew before session eight reported significantly lower levels of education ($X^2(6) = 17.88, p = .007$), and proportionally more self-identified racially as Latinx compared with the current sample ($X^2(1) = 4.75, p = .03$).

Measures

Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004)—The AAQ is a self-report questionnaire that has historically been used to measure EA (Hayes et al., 2004). There are multiple versions of the initial version of the AAQ including a single factor 16-item version, a two factor 16-item version, and a single-factor 9-item version, and a second version, the AAQ-2 (Hayes et al., 2004; Bond et al., 2011)². Higher scores indicate higher levels of EA. Participants completed a 22-item version of the AAQ, which can be used to score all validated versions of the AAQ (single factor 16-item, single factor 9-item, or two-factor 16-item). The single-factor 16-item version was used for analyses, as it is more sensitive to change across time, and is common in the treatment outcome literature, allowing direct comparison to other studies (Hayes et al., 2004). The single-factor 16-item version is highly correlated with the 9-item version (Hayes et al., 2004). The 9-item version has demonstrated adequate internal consistency ($\alpha = .70$), and test-retest reliability ($r = .64$ in an undergraduate sample over 4 months; Hayes et al., 2004). Internal consistency for the current sample with the 16-item single factor version was .75 at pre-, .72 at week 4, .78 at week 8, .76 at week 12, and .84 at post-treatment.

²Some in the field have recently begun to refer to the AAQ as a measure of psychological flexibility, which is an extremely broad construct, typically referring to the six key processes in ACT (Gámez, Chmielewski, Kotov, Ruggero, & Watson 2011; Hayes et al., 2006). A second version of the AAQ, the AAQ-2 was developed (Bond et al., 2011), however, the AAQ-2 appears to lack discriminant validity, and may be more a measure of general distress versus of EA/acceptance (Wolgast, 2014).

Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990)—The PSWQ is a reliable 16-item self-report measure used to examine trait levels of worry. Higher scores indicate higher levels of worry. The measure has demonstrated good to very good internal consistency (α 's from .86 to .93), as well as adequate to good test-retest reliability (r 's ranging from .74 to .93 across periods of time from 2–10 months; Molina & Borkovec, 1994). Internal reliability in the current sample was .78 at pre, and .90 at post-treatment.

Quality of Life Inventory (QOLI; Frisch, Cornwell, Villanueva, & Retzlaff, 1992)—The QOLI is a 32-item self-report measure that examines the importance and level of satisfaction across sixteen areas of life. It has demonstrated good test-retest and internal validity (Frisch et al., 2005). Internal reliability in the current sample was .80 at pre and .86 at post-treatment.

Experiences Questionnaire—Decentering Subscale (EQ-Decentering; Fresco et al., 2007b)—The EQ is a 20-item self-report measure that measures decentering and rumination. In the current study, we used the 11-item Decentering subscale. The Decentering subscale has demonstrated good internal consistency in non-clinical and clinical samples ($\alpha = .83$, $\alpha = .84$; Fresco et al., 2007a; Fresco et al., 2007b). Internal reliability in the current sample was .85 at pre, .85 at week 4, .88 at week 8, .92 at week 12, and .93 at post-treatment.

Analyses

We examined rate of change on the AAQ over the course of treatment in each treatment condition using growth curve modeling in Mplus to obtain the slope of change on the AAQ across the following five time points: pre-treatment, mid-treatment (week 4, week 8, & week 12), and post-treatment, in addition to intercepts for each participant (Muthen & Muthen, 1998–2011). Intercepts were set as pre-treatment level of AAQ. All modeled slopes were linear. AAQ slope and intercept values for all participants were then merged back into SPSS for the analyses.

Next we examined whether or not there were significant reductions in EA within each treatment condition using two one sample t -tests of the slope values, and then whether or not there was a significant difference in the slopes between the two treatment conditions using an independent samples t -test. With support for our hypothesis that there were significant reductions in EA across both treatment conditions, but a significantly larger slope in the ABBT condition, we then examined reductions in EA as a mediator. To examine reductions in EA as a mediator we used the MacArthur Guidelines stated in Kraemer and colleagues (2002), recently used by Arch and colleagues (2012a). According to these guidelines a variable must meet the following three criteria to be considered a mediator: a) The variable must be measured during treatment, b) the rate of change during treatment must be correlated with treatment group, and c) the variable has either a direct relationship with the outcome variable or interacts with the treatment group in its relation to the outcome (i.e., a main effect or interaction effect). Criterion a is already met in this study since EA was

measured via the AAQ during treatment. Criterion b was tested in the first specific aim. Because criterion b was satisfied, we then tested criterion c.

To test criterion c we took the slope of change on the AAQ for each participant and used it in a series of hierarchical regressions to predict to residualized gain scores on the PSWQ and QOLI (pre scores were regressed onto post scores), thus allowing us to examine outcome while controlling for pre-treatment scores. In each of these regressions, AAQ intercept was entered in the first block, AAQ slope (centered) in the second block, treatment condition (1 = ABBT, 0 = AR) in the third block, and an interaction term of slope x treatment in the fourth block. To examine whether there was a significant association between AAQ slope and outcome within each treatment condition, we obtained simple effects of the slope variable for each treatment condition in the fourth block. Since treatment condition was dummy coded, the first regression for each outcome gave us the simple effect of slope for AR. We then re-ran each hierarchical regression with treatment re-coded in the opposite direction (AR = 1, ABBT = 0) to obtain the simple effect of slope for the ABBT condition.

Results

Please see Table 1 for correlations and descriptive statistics of study variables. One outlier was identified on the AAQ at pre and week 4 (pre z -score = -3.19 , m4 z -score = -3.06). Subsequent analyses were run with and without this participant; because results did not differ, we report analyses with the participant included. The model to calculate slopes and intercepts ran in Mplus and terminated normally. No demographic variables were significantly related to change in AAQ scores (centered AAQ slope); therefore no demographic covariates were controlled for in subsequent analyses.

To test criterion b we first confirmed that the AAQ slope was significant across the sample (mean = -4.01 , $p < .001$), and within each treatment condition with one sample t -tests [ABBT mean = -4.68 (SD = 2.02), $t(30) = -12.90$, $p < .001$; AR mean = -3.39 (SD = 1.99), $t(32) = -9.79$, $p < .001$], indicating that there was significant change in EA across treatment in both treatment conditions and in each treatment separately. Next we used an independent samples t -test to examine if the rate of change was significantly different across treatment condition. Results indicated that there was a significant difference in AAQ slope, with individuals in the ABBT condition having a significantly steeper decrease in EA across treatment than those in the AR condition [$t(62) = 2.57$, $p = .013$]. This finding satisfies the requirement for criterion b, that the rate of change is correlated with treatment condition, therefore we moved on to test criterion c with hierarchical regressions.

The first AAQ regression examined residualized gain scores on the PSWQ as the dependent variable. Please see Table 2 for results. Results indicated that AAQ slope and AAQ intercept were both significant predictors of change in worry, and that there was no main effect of treatment nor interaction with treatment condition. These results indicate that more rapid reductions in EA or steeper slope were associated with decreases in worry across treatment. Simple effects of AAQ slope indicated that this association between AAQ slope and change in worry was significant when each treatment was examined separately. These results fulfill

the criterion c requirement for mediation, and AAQ slope emerged as a mediator of the impact of treatment on the worry outcome.

The second AAQ regression examined residualized gain scores on the QOLI as the dependent variable. Please see Table 3 for results. Results indicated that AAQ slope and AAQ intercept were both significant predictors of change in quality of life. No other predictors were significant. Findings suggest that more rapid reductions in EA or steeper slope were associated with increases in quality of life across treatment. Simple effects of AAQ slope indicated that this association between AAQ slope and change in quality of life was significant when each treatment was examined separately. These results fulfill the criterion c requirement for mediation, and AAQ slope emerged as a mediator of the impact of treatment on the quality of life outcome.

Decentering and EA Results

Since previous research has demonstrated that decentering (measured via the Experiences Questionnaire- Decentering Subscale; Fresco et al., 2007b) is a common mechanism of change in this sample (Hayes-Skelton et al., 2015), post-hoc analyses were run to examine whether or not reductions in EA contributed unique variance above and beyond decentering. A hierarchical regression was run for each outcome (residualized gain scores of PSWQ; QOLI) that included the AAQ intercept, EQ intercept, and the centered EQ slope (decentering) in the first block, AAQ slope (centered) in the second block, treatment condition in the third block, and an interaction term of AAQ slope by treatment in the fourth block. Please see Tables 4–5 for results. Results indicated that AAQ slope accounted for significant unique variance in both regressions, indicating that EA is uniquely related to changes in these outcomes above and beyond decentering.

Discussion

This study adds to the literature indicating that different treatments within the broad umbrella of CBTs including mindfulness and acceptance-based approaches, as well as more traditional CBTs, may target common mechanisms (e.g., Arch & Craske, 2008; Arch et al., 2012a; Arch et al., 2012b; Hayes-Skelton et al., 2012). This study addressed two questions in regard to change in EA across ABBT and AR. First, consistent with our hypotheses, we demonstrated that self-reported EA as measured by the AAQ decreased significantly during both treatment conditions, and that the magnitude of change was significantly greater in the ABBT condition. Second, reductions in EA, measured by rate of change (slope) on the AAQ were found to mediate both symptom and quality of life outcomes across treatment in both treatment conditions, indicating a main effect of AAQ slope. There was neither a significant main effect of treatment condition nor a significant interaction effect of AAQ slope by treatment in any analyses. In other words, there was no evidence of moderation or moderated mediation. Analyses also indicated that reductions in EA uniquely predicted change in outcomes, even accounting for reductions in decentering, suggesting that EA is a specific mechanism of change, distinct from decentering, across these treatments.

We hypothesized that reductions in EA would mediate changes in symptom and quality of life outcomes across both treatment conditions. Our results were consistent with this

hypothesis, and reductions in EA emerged as a common mechanism across both treatment conditions, which has implications for both treatments, but particularly for AR.

As previously mentioned, Hayes-Skelton and colleagues (2012) note that AR may target EA in multiple ways, including through imaginal in session exercises that require the recall and re-experiencing of anxiety provoking situations, and the self-monitoring and approaching that is required to notice early cues of anxiety, a central focus in AR. Although teaching clients a strategy that they can use to move from an anxious state to a relaxed one could seem like promoting EA, in this trial, therapists were able to cultivate relaxation in a way that decreased EA for participants, and these reductions were related to positive outcomes. It is important to note that this study employed AR in a particular context as study therapists were also trained in ABBT, and therefore may have been careful not to promote EA when teaching relaxation skills. However, as previously mentioned, the AR provided in this trial was adherent and competent, and there were no procedural breaks (Hayes-Skelton et al., 2013), and in the current study AR targeted experiential acceptance that was related to both symptom and quality of life outcomes. In terms of dissemination of AR, it may be helpful to have therapists talk about targeting EA in AR with clients, and to encourage clients to stay with their internal experiences during relaxation exercises and application in their lives instead of attempting to control or avoid them.

Limitations

Despite these findings, there are limitations to this study. While the current study examines reductions in EA longitudinally, which gets closer to temporal precedence, it does not fully achieve temporal precedence since outcomes are examined at post treatment while accounting for pre-treatment scores, but they do not take into account the rate of change over time as some other approaches do (e.g., Hayes-Skelton et al., 2015). We also did not look at the effects of EA on follow up outcomes, and used self-report measures only.

Additionally, measurement of EA is challenging given the complexity of the construct and the various instruments currently available to assess the construct. EA has been measured as both a single-factor (Hayes et al., 1996; Hayes et al., 2004) and a multidimensional construct (e.g., Bond & Bunce, 2003; Gámez et al., 2011; 2014). The commonly used 22-item AAQ yields both a total EA/acceptance score and two subscale scores proposed to tap into two sub-factors of EA (or acceptance): willingness (willingness to tolerate and experience distressing internal experiences) and action (ability to take action in the face of distress). In the current study we used an established version of the AAQ (single-factor 16-item) that is frequently used in mechanism research. Internal consistency for this version of the AAQ fell in the acceptable (4 time-points) to good (1 time-point) range in our sample. However, we were unable to look at the subscales in this sample because the internal consistency was too low. This is a common problem with several versions of the AAQ (Bond et al., 2011; Gámez et al., 2011; 2014). Some researchers have highlighted the need for more psychometric research on the AAQ to better understand the relationship between willingness and action items, and the higher order variable of acceptance (Bond & Bunce, 2003). Given the ongoing debate over the definition of EA in the field, and challenges with the existing

measures, future research should examine how to best conceptualize and assess this important construct.

Recent work by Niles and colleagues (2014) examined the course of change in EA and negative cognitions in a sample of individuals with social anxiety disorder receiving either ACT or CBT. Results demonstrated that the “curvature” or non-linear change in EA was a significant mediator of post-treatment social anxiety symptoms and anhedonic depression in the ACT group, but not the CBT group. The current study examined linear change in EA, and did not consider non-linear change, due to the limited sample size. It will be important for future work to explore linear and non-linear models to see which provide the best fit for change in EA and other mediators over time, and whether or not these shapes of change differ across various treatments.

Future Directions

Future research should continue to explore the course of change with sophisticated modeling programs to better understand how various mechanisms change over the course of treatment. The current study examined the single-factor 16-item AAQ. Future research should look at the AAQ action and willingness sub-factors and their course of change over time. In addition, future research should examine changes in acceptance and decentering over time to better understand the relationship between these two mechanisms. For example, it is possible that change in decentering occurs first, and that once individuals are able to notice their internal experiences, then change in acceptance occurs, or vice versa.

In addition, in initial studies of the AAQ, women scored higher than men in clinical samples, and individuals who did not identify as white in terms of their race scored higher than individuals who identified as white (Hayes et al., 2004). Hayes and colleagues (2004) indicate that higher levels of EA may be seen in individuals with marginalized identities, as they are more likely to be exposed to discrimination and therefore more challenging emotional content, and we know avoidance is a common coping strategy across the general population. Further research is needed to determine whether or not the AAQ performs similarly or differently with individuals from various racial and ethnic backgrounds. Messages about emotions can vary greatly by culture, and we need to better understand these differences and be careful not to pathologize differences that are likely to be contextually based (Hayes et al., 2004).

Given the wealth of research supporting that EA is related to various clinical symptoms and distress, and that reductions in EA appear to be a common mediator of symptom and quality of life outcomes across treatment, further exploration into how to disseminate and implement EA as a main treatment target, as well as various CBT and acceptance-based approaches that target EA, specifically for anxiety and depressive disorders, will be important. Effectiveness data is needed to determine if reductions in EA appear to be related to symptom and quality of life outcomes in more diverse samples and contexts. Reductions in EA may be one of a group of mechanisms of change that would facilitate the dissemination and implementation of flexible evidence-based approaches in diverse community contexts.

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Highlights

- Examines changes in experiential avoidance across two behavioral treatments for GAD.
- Greater change in EA significantly predicted change in worry across both treatments.
- Greater change in EA significantly predicted quality of life across both treatments.
- Results contribute to the literature on common mechanisms of change.

Table 1

Correlations and Descriptive Statistics of Study Variables

Variable	AAQ-pre	AAQ-4	AAQ-8	AAQ-12	AAQ-post	PSWQ-pre	PSWQ-post	QOLI-pre	QOLI-post
AAQ-pre	--								
AAQ-4	.75**	--							
AAQ-8	.56**	.79**	--						
AAQ-12	.43**	.68**	.82**	--					
AAQ-post	.51**	.70**	.77**	.82**	--				
PSWQ-pre	-.08	-.10	-.09	-.02	-.12	--			
PSWQ-post	.10	.26*	.44**	.54**	.62**	.07	--		
QOLI-pre	-.46**	-.56**	-.47**	-.40**	-.51**	.13	-.26*	--	
QOLI-post	-.39**	-.61**	-.59**	-.56**	-.70**	.23	-.45**	.70**	--
<i>M</i>	73.06	68.20	64.94	61.15	56.60	69.32	51.80	0.63	1.74
<i>SD</i>	11.60	11.18	11.73	10.85	13.40	6.45	9.61	1.71	1.67

Note. AAQ = Acceptance and Action Questionnaire; PSWQ = Penn State Worry Questionnaire; QOLI = Quality of Life Inventory;

* $p < .05$;

** $p < .01$

Table 2

Hierarchical Regression of AAQ Slope predicting PSWQ

Variable	B	SE(B)	beta	p value	R ² change
Step 1					.05
Intercept	0.23	0.13	.22	.08	
Step 2					.41***
Intercept	0.34	0.10	.33	.001	
Slope	2.97	0.44	.65	<.001	
Step 3					.02
Intercept	0.32	0.10	.31	.002	
Slope	3.17	0.46	.70	<.001	
Tx	2.69	1.90	.14	.16	
Condition					
Step 4					.01
Intercept	0.32	0.10	.31	.002	
Slope (AR) ^a	3.48	0.63	.77	<.001	
Slope (ABBT) ^a	2.82	0.66	.62	<.001	
Tx	2.65	1.91	.14	.17	
Condition					
SlopeXtx	−0.66	0.91	−.10	.47	

Note. Tx = Treatment; SlopeXtx = The interaction of Slope by Treatment Condition;

* $p < .05$;

** $p < .01$;

*** $p < .001$;

^a The analysis was run twice, reversing the reference group, to obtain simple slopes for each treatment condition.

Table 3

Hierarchical Regression of AAQ Slope predicting QOLI

Variable	B	SE(B)	beta	p value	R ² change
Step 1					.04
Intercept	-.02	-.02	-.19	.14	
Step 2					.20***
Intercept	-.03	0.02	-.26	.03	
Slope	-.26	0.07	-.46	<.001	
Step 3					.01
Intercept	-.03	0.02	-.25	.03	
Slope	-.28	0.07	-.48	<.001	
Tx	-.20	0.29	-.08	.50	
Condition					
Step 4					.01
Intercept	-.03	0.02	-.25	.04	
Slope (AR) ^a	-.32	0.10	-.55	.002	
Slope (ABBT) ^a	-.23	0.10	-.41	.02	
Tx	-.19	0.29	-.08	.51	
Condition					
SlopeXtx	0.08	0.14	.10	.55	

Note. Tx = Treatment; SlopeXtx = The interaction of Slope by Treatment Condition;

* $p < .05$;

** $p < .01$;

*** $p < .001$;

^a The analysis was run twice, reversing the reference group, to obtain simple slopes for each treatment condition.

Table 4

Hierarchical Regression of AAQ Slope predicting PSWQ controlling for EQ

Variable	B	SE(B)	beta	p value	R ² change
Step 1					.43***
AAQ Intercept	0.13	0.12	.12	.30	
EQ Intercept	-0.26	0.25	-.12	.30	
EQ Slope	-4.61	0.74	-.62	<.001	
Step 2					.09**
AAQ Intercept	0.24	0.12	.23	.045	
EQ Intercept	-0.15	0.23	-.07	.52	
EQ Slope	-2.50	0.93	-.34	.01	
AAQ Slope	1.90	0.58	.42	.002	
Step 3					.01
AAQ Intercept	0.24	0.12	.23	.049	
EQ Intercept	-0.14	0.23	-.07	.55	
EQ Slope	-2.37	0.94	-.32	.02	
AAQ Slope	2.11	0.61	.46	.001	
Tx Condition	2.08	1.85	.11	.26	
Step 4					.004
AAQ Intercept	0.23	0.12	.22	.06	
EQ Intercept	-0.15	0.23	-.07	.51	
EQ Slope	-2.35	0.94	-.32	.02	
AAQ Slope	2.42	0.74	.53	.002	
Tx Condition	2.04	1.86	.11	.28	
AAQSlopeXtx	-0.64	0.89	-.10	.47	

Note. Tx = Treatment; SlopeXtx = The interaction of Slope by Treatment Condition;

* $p < .05$;** $p < .01$;*** $p < .001$;

AAQ= Acceptance and Action Questionnaire; EQ= Experiences Questionnaire

Table 5

Hierarchical Regression of AAQ Slope predicting QOLI controlling for EQ

Variable	B	SE(B)	beta	p value	R ² change
Step 1					.23 ***
AAQ Intercept	−0.03	0.02	−.23	.10	
EQ Intercept	−0.03	0.04	−.12	.38	
EQ Slope	0.40	0.11	.43	<.001	
Step 2					.06 *
AAQ Intercept	−0.04	0.02	−.32	.03	
EQ Intercept	−0.04	0.04	−.16	.24	
EQ Slope	0.19	0.14	.21	.18	
AAQ Slope	−0.19	0.09	−.33	.04	
Step 3					.004
AAQ Intercept	−0.04	0.02	−.31	.03	
EQ Intercept	−0.04	0.04	−.16	.23	
EQ Slope	0.18	0.14	.19	.21	
AAQ Slope	−0.20	0.09	−.36	.03	
Tx Condition	−0.16	0.29	−.07	.57	
Step 4					.003
AAQ Intercept	−0.04	0.02	−.31	.04	
EQ Intercept	−0.04	0.04	−.16	.25	
EQ Slope	0.18	0.15	.19	.22	
AAQ Slope	−0.23	0.12	−.41	.048	
Tx Condition	−0.16	0.29	−.07	.58	
AAQSlopeXtx	0.06	0.14	.07	.66	

Note. Tx = Treatment; SlopeXtx = The interaction of Slope by Treatment Condition;

* $p < .05$;** $p < .01$;*** $p < .001$;

AAQ= Acceptance and Action Questionnaire; EQ= Experiences Questionnaire