



## Longitudinal treatment mediation of traditional cognitive behavioral therapy and acceptance and commitment therapy for anxiety disorders

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### ABSTRACT

**Objective:** To assess the relationship between session-by-session putative mediators and treatment outcomes in traditional cognitive behavioral therapy (CBT) and acceptance and commitment therapy (ACT) for mixed anxiety disorders.

**Method:** Session-by-session changes in anxiety sensitivity and cognitive defusion were assessed in 67 adult outpatients randomized to CBT ( $n = 35$ ) or ACT ( $n = 32$ ) for a DSM-IV anxiety disorder.

**Results:** Multilevel mediation analyses revealed significant changes in the proposed mediators during both treatments ( $p < .001$ ,  $d = .90$ – $1.93$ ), with ACT showing borderline greater improvements than CBT in cognitive defusion ( $p = .05$ ,  $d = .82$ ). Anxiety sensitivity and cognitive defusion both significantly mediated post-treatment worry; cognitive defusion more strongly predicted worry reductions in CBT than in ACT. In addition, cognitive defusion significantly mediated quality of life, behavioral avoidance, and (secondary) depression outcomes across both CBT and ACT ( $p < .05$ ,  $R^2$  change =  $.06$ – $.13$ ), whereas anxiety sensitivity did not significantly mediate other outcomes.

**Conclusions:** Cognitive defusion represents an important source of therapeutic change across both CBT and ACT. The data offered little evidence for substantially distinct treatment-related mediation pathways.

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Determining if and how psychotherapies work is a central task of clinical science. Thus far, the field has succeeded greatly at demonstrating that specific therapies are effective for specific disorders, but we are still working to demonstrate “how.” Addressing how therapies work requires identifying the specific variables that drive change within specific treatments, or treatment mediators.

Anxiety disorders, the most common class of psychiatric disorders (Kessler, Berglund, Demler, Jin, & Walters, 2005), are characterized by fear, anxiety, and behavioral avoidance. Over the past few decades, cognitive behavioral therapy (CBT) has become the most empirically supported psychotherapy for anxiety disorders (see Craske, 2010). Meta-analyses confirm the efficacy of CBT for the treatment of anxiety disorders relative to wait-list, expectancy and attention control conditions (Butler, Chapman, Forman, & Beck, 2006; Hofmann & Smits, 2008) and psychodynamic therapy (Tolin, 2010). However, relatively few studies rigorously examine

mediators of CBT for anxiety disorders. Understanding CBT-specific vs. treatment-common processes requires comparing CBT mediators to those of another active psychotherapy (see Arch & Craske, 2008; Kraemer, Wilson, Fairburn, & Agras, 2002). Yet, relatively few studies compare CBT for anxiety disorders to fully active psychotherapy-based treatments (Tolin, 2010). Of those that do, very few compare treatment mediation between the two approaches.

Acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999, 2012), an acceptance-based behavioral therapy, has been applied specifically to the treatment of anxiety disorders (e.g., Arch et al., in press; Eifert & Forsyth, 2005; Eifert et al., 2009). With roots in the behavioral and experiential therapy traditions, ACT cultivates mindfulness, acceptance and cognitive defusion with the aim of decreasing avoidance of internal discomfort, increasing psychological flexibility, and above all, promoting behavior change consistent with personal values (Hayes et al., 1999). Case studies, multiple-baseline studies, and an initial randomized study (Towhig et al., 2010) provide nascent evidence that ACT is an effective treatment for anxiety disorders, including obsessive compulsive disorder (Towhig, Hayes, & Masuda, 2006; Towhig et al., 2010), social anxiety disorder (Dalrymple & Herbert, 2007), panic disorder (Eifert et al., 2009), and posttraumatic stress disorder (Orsillo &

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Batten, 2005). In addition, an acceptance-based behavioral therapy for generalized anxiety disorder has shown effectiveness relative to a wait-list control condition (Roemer, Orsillo, & Salters-Pedneault, 2008). We recently completed a randomized trial comparing ACT and CBT for the treatment of a mixed anxiety disorder sample, showing similar effectiveness of ACT compared to traditional CBT (Arch et al., *in press*). Thus, initial evidence suggests that ACT is effective for the treatment of anxiety disorders.

Within the context of anxiety disorder treatment, the question remains of how traditional CBT (herein abbreviated as CBT) and ACT work and whether they work for the same reasons. The cognitive model for CBT identifies reductions in anxiety-related thoughts and beliefs as the central treatment process, leading to subsequent fear or symptom reduction (see Craske, 2010). Although the evidence has been mixed, several CBT studies report that changes in cognitions predict or mediate symptom improvements. For example, Hofmann (2004) found that pre- to post-treatment reductions in negative social cost ratings (patient ratings of “how bad would it be” if a feared social event occurred) predicted symptom outcomes in CBT for social phobia, though such changes also mediated outcomes in a comparison behavioral therapy condition. Smits, Rosenfield, McDonald, and Telch (2006) established that session-by-session estimates for probability of a feared social outcome predicted subsequent fear reduction in social phobia. Further, Hofmann et al. (2007) demonstrated that changes in panic-related cognitions across pre-post-follow up predicted panic disorder symptom improvement in conditions that included CBT (CBT-only, CBT plus medication) but not in a medication-only condition. Meuret, Rosenfield, Hofmann, Seidel, and Bhaskara (2010) demonstrated changes in negative beliefs about panic and anxiety-related sensations were bidirectionally related to panic symptom severity in cognitive therapy but not in capnometry-assisted respiratory training for panic disorder. Elsewhere, pre- to post-treatment reductions in fear of and negative beliefs about panic and anxiety-related sensations accounted for significant variance in panic disorder symptom change in CBT (Smits, Powers, Cho, & Telch, 2004). These studies provide initial evidence for a significant relationship between cognitive and symptom changes in CBT for panic disorder and social phobia, and suggest that this relationship is sometimes specific to CBT. However, with two notable exceptions (Meuret et al., 2010; Smits et al., 2006), these studies did not assess changes in the mediator variable during treatment, and thus did not establish the temporal precedence of the mediator required for full mediation testing. Furthermore, few compared mediation of CBT to that of another active psychotherapy.

Whereas the cognitive model of CBT posits that change in thoughts and beliefs about anxiety predicts symptom reductions, ACT posits that “buying into” or being fused with anxiety-related thoughts and beliefs is a core cause of disordered anxiety (Eifert & Forsyth, 2005; Forsyth, Eifert, & Barrios, 2006). Consequently, ACT aims to reduce fusion with anxiety-related thoughts through “cognitive defusion” or flexibly distancing from the literal meaning of cognition so that cognition no longer rigidly dictates behavior. Acceptance is employed for approaching rather than avoiding anxiety-related thoughts, feelings, and physical sensations. A small, multiple-baseline study of ACT for social phobia (Dalrymple & Herbert, 2007) established that pre- to mid-treatment changes on a measure of cognitive defusion, acceptance, and valued action predicted subsequent symptom improvement. A randomized trial comparing ACT to relaxation training for obsessive compulsive disorder (Twohig et al., 2010) found greater pre- to post-treatment increases on a measure of cognitive defusion, acceptance, and value-guided action in ACT than in relaxation training, although the differences were no longer significant at 3 month follow up. Two small studies in samples of psychotic inpatients (e.g., Gaudio &

Herbert, 2006a,b; see Hayes, Luoma, Bond, Masuda, & Lillis, 2006) and depressed outpatients (Zettle & Hayes, 1986), support the notion that changes in the believability of distressing hallucinations or cognitions (a measure of cognitive defusion) predict outcomes in ACT.

Collectively, these studies identify cognitive defusion, acceptance, and value-guided action as likely mediators of ACT for anxiety disorders. Furthermore, evidence (Twohig et al., 2010) suggests that changes in these variables may be specific to ACT at post-treatment, at least compared to relaxation training. The evidence to date is only preliminary, however, and the methodological quality varies widely. For example, only one study (Dalrymple & Herbert, 2007) evaluated the temporal precedence of the mediator and none compared ACT mediators to those of CBT.<sup>1</sup>

In summary, few previous studies fulfill the highest standards for tests of treatment mediation. Full testing of treatment mediation requires that the mediation measure be administered *during* treatment, and preferably at multiple time points during treatment, to establish the temporal precedence of the mediator relative to outcome measures (Kraemer et al., 2002; MacKinnon, Fairchild, & Fritz, 2007). Also, the mediation measure should be treatment-specific and psychometrically valid. Methodologies such as multi-level modeling provide greater statistical power and permit fine-grained analyses such as the time sequencing of effects (Kenny, Kashy, & Bolger, 1998). Several exemplary studies in the anxiety disorders literature fulfill these standards (e.g., Meuret, Rosenfield, Hofmann, Suvak, & Roth, 2009; Moscovitch, Hofmann, Suvak, & In-Albon, 2005) but address different mediation questions than does the present study. Our aim is to apply these rigorous standards to investigating treatment mediation of CBT and ACT for anxiety disorders.

Our discussion has focused more on cognitive mediation (broadly defined) of CBT and ACT for two reasons. First, extant studies of mediation in CBT and ACT have focused on cognitive mediation, namely, reductions of anxiety-related beliefs in CBT (thought content) and reductions of cognitive fusion or believability in ACT (thought context). Second, we believe that cognitive mediators offered greater potential to distinguish CBT and ACT than behavioral mediators. In that CBT and ACT are both behaviorally-based therapies, they share the goal of reducing behavioral avoidance. ACT focuses on engaging in valued behaviors that have been avoided due to life narrowing that results from attempts to control symptoms, whereas CBT focuses on engaging in behaviors that have been avoided due to their association with fear and anxiety. In practice, however, these approaches may result in similar reductions in behavioral avoidance, which would likely drive change in both treatments (see Arch & Craske, 2008). For these two reasons, we focused the present investigation on assessing cognitive mediation of CBT and ACT, defined in the broad sense of mediators that reflect either the context (how we relate to) or content of cognition.

Our study investigated two central questions: 1) Do CBT and ACT affect the theorized mediators for each treatment, showing greater reductions in beliefs about the harmful effects of anxiety (i.e. anxiety sensitivity) in CBT and greater increases in cognitive defusion in ACT? 2) Do changes in anxiety sensitivity and cognitive defusion mediate treatment outcomes? Specifically, do treatment-specific processes mediate outcomes within the specified treatment only (anxiety sensitivity mediates CBT but not ACT outcomes, whereas cognitive defusion mediates ACT but not CBT outcomes), or, alternatively, do treatment-specific processes mediate outcomes across *both* treatments (anxiety sensitivity and cognitive defusion mediate outcomes across both CBT and ACT)?

<sup>1</sup> For effectiveness studies of ACT vs. CBT in undiagnosed patient samples, see Forman, Herbert, Moitra, Yeomans, & Geller, 2007; Lappalainen et al., 2007.

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