



Trajectories of change in emotion regulation and social anxiety during cognitive-behavioral therapy for social anxiety disorder



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ABSTRACT

Cognitive-behavioral therapy (CBT) for social anxiety disorder (SAD) may decrease social anxiety by training emotion regulation skills. This randomized controlled trial of CBT for SAD examined changes in weekly frequency and success of cognitive reappraisal and expressive suppression, as well as weekly intensity of social anxiety among patients receiving 16 weekly sessions of individual CBT. We expected these variables to (1) differ from pre-to-post-CBT vs. Waitlist, (2) have differential trajectories during CBT, and (3) covary during CBT. We also expected that weekly changes in emotion regulation would predict (4) subsequent weekly changes in social anxiety, and (5) changes in social anxiety both during and post-CBT. Compared to Waitlist, CBT increased cognitive reappraisal frequency and success, decreased social anxiety, but had no impact on expressive suppression. During CBT, weekly cognitive reappraisal frequency and success increased, whereas weekly expressive suppression frequency and social anxiety decreased. Weekly decreases in social anxiety were associated with concurrent increases in reappraisal success and decreases in suppression frequency. Granger causality analysis showed that only reappraisal success increases predicted decreases in subsequent social anxiety during CBT. Reappraisal success increases pre-to-post-CBT predicted reductions in social anxiety symptom severity post-CBT. The trajectory of weekly changes in emotion regulation strategies may help clinicians understand whether CBT is effective and predict decreases in social anxiety.

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Introduction

Three decades ago, David Barlow and colleagues suggested several compelling reasons to measure change *during* therapy (Barlow, Hayes, & Nelson, 1984). One reason is that more refined assessment of change in a patient's psychological functioning during treatment provides the opportunity to modify specific treatment components or to shift the type of treatment being offered. Another reason is that such a focus is needed to advance our understanding of how, why, and for whom these clinical interventions work. A third reason is that more refined measurements of change during therapy may lead to greater accountability in how clinicians deliver and assess treatments they provide and

may empirically elucidate for patients, insurance companies, and governmental agencies the efficacy of psychotherapy.

Despite this urgent call for research on change processes during therapy, the empirical record of measuring change *during* therapy is still quite slim. Cognitive-behavioral therapy (CBT) is one of the best validated psychosocial interventions for psychological disorders (Butler, Chapman, Forman, & Beck, 2006), especially mood and anxiety disorders (Hofmann & Smits, 2008). Although change in emotion regulation processes has been proposed as one key mechanism of action in CBT for mood and anxiety disorders (Campbell-Sills & Barlow, 2007; Hofmann, Sawyer, Fang, & Asnaani, 2012), the session-to-session changes in emotion regulation and their relation to changes in clinical symptoms are still not well understood.

One psychological disorder in which emotion regulation processes have been examined is social anxiety disorder (SAD) (Goldin, Manber, Hakimi, Canli, & Gross, 2009; Goldin, Manber-Ball, Werner,

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Heimberg, & Gross, 2009; Werner, Goldin, Ball, Heimberg, & Gross, 2011). SAD is highly prevalent (12%; Kessler et al., 2005), usually begins early in life, well before the onset of other anxiety disorders, substance use, and major depression (Otto et al., 2001), and is associated with significant impairment in social, educational, and occupational functioning (Acarturk, Graaf, Straten, Have, & Cuijpers, 2008; Stein & Kean, 2000). SAD is characterized by excessive fear of humiliation and embarrassment in social evaluative situations (Stein & Stein, 2008), exaggerated emotional reactivity, and a maladaptive emotion-regulation profile characterized by relatively high levels of generally maladaptive forms of emotion regulation such as expressive suppression, and relatively low levels of generally adaptive forms of emotion regulation such as cognitive reappraisal (Goldin, Manber, et al., 2009; Goldin, Manber-Ball, et al., 2009). Thus, SAD can be viewed as involving problematic cognition–emotion interactions that persist unless treated (Bruce et al., 2005).

Both group (Heimberg & Becker, 2002) and individual (Clark et al., 2003; Clark et al., 2006; Goldin et al., 2012; Hope, Heimberg, Juster, & Turk, 2000; Ledley et al., 2009) formats of CBT have demonstrated efficacy as psychosocial interventions for SAD with similar levels of clinically significant change in social anxiety symptom severity (Goldin et al., 2012; Moscovitch et al., 2012). Because not all patients achieve clinically significant reduction of social anxiety symptoms, however, there is clearly a need to better understand what changes are occurring during CBT that relate to treatment outcome. Prior studies have shown changes in several cognitive processes during CBT for SAD, including changes in probability bias for negative social events (Smits, Rosenfield, McDonald, & Telch, 2006), estimated probability and estimated cost of negative social events, safety behaviors (Hoffart, Borge, Sexton, & Clark, 2009), anticipated aversive social outcomes (Hofmann, 2004), positive and negative self-views (Goldin et al., 2013), interpersonal core beliefs (Boden et al., 2012), and cognitive reappraisal self-efficacy (Goldin et al., 2012). What has not been reported to date, however, is how cognitive processes (specifically cognitive reappraisal and expressive suppression) change weekly during treatment, and whether they predict weekly changes in social anxiety and CBT outcome. This is important given the proposed role of emotion regulation in the etiology, maintenance, and treatment of most forms of psychopathology (Campbell-Sills & Barlow, 2007; Hofmann et al., 2012).

To investigate this proposed mechanism of action underlying CBT for SAD, clinical treatment studies have begun to quantify changes in specific emotion regulation processes during treatment in patients with SAD. Using the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), which measures the frequency of use of cognitive reappraisal and expressive suppression, Moscovitch and colleagues (Moscovitch et al., 2012) found that (a) group CBT led to linear increases in the habitual use of cognitive reappraisal but no changes in the use of expressive suppression, and (b) pre-to-mid-CBT increases in use of cognitive reappraisal were correlated with pre-to-post-CBT decreases in social anxiety symptoms. Using a more recently developed variant of the ERQ designed to assess emotion regulation self-efficacy (Goldin, Manber-Ball, et al., 2009), Goldin et al. (2012) found that the impact of individual CBT for SAD on reduction of social anxiety symptom severity was mediated by increases in cognitive reappraisal self-efficacy. These two studies provide initial empirical support for the role of change in emotion regulation during CBT for SAD. However, notwithstanding the imperative to elucidate the mechanisms of treatments by measuring change during therapy (Barlow et al., 1984), no studies have measured weekly change trajectories in emotion regulation processes and social anxiety symptoms throughout CBT for SAD.

Our goal in the present study was to investigate changes in the frequency and success of use of cognitive reappraisal and expressive suppression, as well as changes in social anxiety, during CBT for SAD. **Hypothesis 1:** From pre-to-post-treatment, we expected that, compared to a waitlist condition (WL), CBT for SAD would result in greater increases in the frequency and success of *cognitive reappraisal*, greater decreases in the frequency of expressive suppression, and greater decreases in *social anxiety*. **Hypothesis 2:** Across 16 sessions of CBT, we expected a linear trajectory of increases in the weekly frequency and success of *cognitive reappraisal*, decreases in the frequency of *expressive suppression*, and decreases in *social anxiety*. **Hypothesis 3:** During CBT, we expected that increases in *cognitive reappraisal* (both the frequency and success) would covary inversely with *social anxiety*. **Hypothesis 4:** Using Granger causality analysis, we expected that changes in weekly *cognitive reappraisal* would predict subsequent weekly social anxiety during CBT. **Hypothesis 5:** We expected that increases in both the frequency and success of *cognitive reappraisal* during CBT, as well as greater inverse covariation of *social anxiety* with both frequency and success in *cognitive reappraisal* would predict pre-to-post-CBT decreases in social anxiety.

Methods

Participants

From 436 individuals assessed for eligibility, 110 were administered the Anxiety Disorders Interview Schedule for the DSM-IV-Lifetime version (ADIS-IV-L); (Di Nardo, Brown, & Barlow, 1994) to determine whether they fulfilled DSM-IV (American Psychiatric Association, 1994) criteria for a principal diagnosis of generalized SAD (see CONSORT Figure in Goldin et al., 2012). With regard to exclusion criteria, because participants were part of a larger fMRI study, they had to pass a magnetic resonance safety screen, be right-handed as assessed by the Edinburgh Handedness Inventory (Oldfield, 1971), and could not report current pharmacotherapy or psychotherapy, past CBT, or history of neurological or cardiovascular disorders that might impact cerebral blood flow or psychological functioning. Excluding 26 individuals who did not meet diagnostic criteria and 9 with incomplete baseline assessments, 75 patients were randomly assigned to either immediate CBT ($n = 38$) or a WL control group ($n = 37$) who were subsequently offered CBT after the waiting period. Dropout rates did not differ for CBT ($n = 6$; 16%) and WL ($n = 5$; 14%). In total, 57 patients completed CBT.

Procedure

Participants had to pass a telephone screening before scheduling a face-to-face clinical interview based on the ADIS-IV-L. After all baseline assessments were completed, patients were randomly assigned to immediate CBT or WL as determined by Efron's biased coin randomization procedure (Efron, 1971) which supports approximately equal sample sizes throughout the duration of a clinical trial. CBT was provided at no charge. Participants provided written informed consent in accordance with the Institutional Review Board at Stanford University.

Weekly measures of emotion regulation and social anxiety

To investigate weekly changes in emotion regulation and social anxiety during CBT, we obtained weekly repeated measurements of clinical symptoms and emotion regulation processes during treatment of SAD. We assessed weekly frequency and successful use of *cognitive reappraisal* and *expressive suppression* on a scale from 0% to 100% of the time during social situations encountered during the

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