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

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A B S T R A C T
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 predicted decreases in subsequent social anxiety during CBT. Reappraisal success increases predicted decreases in subsequent social anxiety during 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,
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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