



Attentional bias and emotional reactivity as predictors and moderators of behavioral treatment for social phobia



Andrea N. Niles, Bitá Mesri, Lisa J. Burklund, Matthew D. Lieberman, Michelle G. Craske*

University of California, 1285 Franz Hall, Box 951563, Los Angeles, CA 90095-1563, United States

ARTICLE INFO

Article history:

Received 13 February 2013

Received in revised form

25 June 2013

Accepted 26 June 2013

Keywords:

Social anxiety disorder

Attentional bias

Emotional reactivity

Cognitive behavioral therapy

Acceptance and commitment therapy

ABSTRACT

Cognitive behavioral therapy (CBT) is a well-established treatment for anxiety disorders, and evidence is accruing for the effectiveness of acceptance and commitment therapy (ACT). Little is known about factors that relate to treatment outcome overall (predictors), or who will thrive in each treatment (moderators). The goal of the current project was to test attentional bias and negative emotional reactivity as moderators and predictors of treatment outcome in a randomized controlled trial comparing CBT and ACT for social phobia. Forty-six patients received 12 sessions of CBT or ACT and were assessed for self-reported and clinician-rated symptoms at baseline, post treatment, 6, and 12 months. Attentional bias significantly moderated the relationship between treatment group and outcome with patients slow to disengage from threatening stimuli showing greater clinician-rated symptom reduction in CBT than in ACT. Negative emotional reactivity, but not positive emotional reactivity, was a significant overall predictor with patients high in negative emotional reactivity showing the greatest self-reported symptom reduction.

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The efficacy of Cognitive Behavioral Therapy (CBT) for treatment of anxiety disorders is well established (Butler, Chapman, Forman, & Beck, 2006; Norton & Price, 2007; Tolin, 2010). Other behavioral treatments, such as Acceptance and Commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999) are garnering support as well (Arch et al., 2012; Craske et al., 2013; Meuret, Twohig, Rosenfield, Hayes, & Craske, 2012). However, many patients do not respond to behavioral treatments, drop out of treatment or show a return of symptoms at follow-up (Loerinc, Meuret, Twohig, Rosenfield, & Craske, 2013). The National Institute of Mental Health has called for a focus on personalized medicine to identify which treatment under what conditions will be most effective (National Institute of Mental Health, 2010). The goal of the current study was to examine attentional bias and emotional reactivity as predictors of response to behavioral treatment and differential moderators of response to CBT and ACT for patients with social phobia.

Attentional biases and emotional reactivity each have been implicated as important factors in the development and maintenance of social phobia (Campbell-Sills & Barlow, 2007; Clark & Wells, 1995; Rapee & Heimberg, 1997). In particular, findings from meta-analyses

and review papers show that patients with social phobia are more likely to attend to social stimuli that are indicative of external threat (e.g. angry faces, social rejection words) than non-anxious controls (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007; Heinrichs & Hofmann, 2001). Cognitive theories of social phobia posit that selectively attending to external social threats increases anxiety, promotes maladaptive thinking, and maintains ineffective social behavior in social situations (Clark & Wells, 1995). In terms of emotional reactivity, individuals with social phobia report more negative affect when viewing negative images from the international affective picture system (Goldin, Manber, Hakimi, Canli, & Gross, 2009), and show more bilateral amygdala and insula activity (areas associated with emotional processing) than control participants while viewing these negative images (Brühl et al., 2011; Shah, Klumpp, Angstadt, Nathan, & Phan, 2009). Furthermore, proneness to emotional reactivity is not only characteristic of social phobia (Brown, Chorpita, & Barlow, 1998; Pienoveau et al., 2010) but has been shown to predict the onset of anxiety in general (Hayward, Killen, Kraemer, & Taylor, 2000; Krueger, Caspi, Moffitt, Silva, & McGee, 1996; Watson, Gamez, & Simms, 2005). Although social phobia has been linked to low positive affect (Brown et al., 1998; Watson, Clark, & Carey, 1988), there is no evidence for differential amygdala or insula activation in response to positive images in patients with social phobia compared to controls (Shah et al., 2009). Attentional bias and negative emotional reactivity are strongly related since induction of

* Corresponding author. Tel.: +1 (310) 825 8403; fax: +1 (310) 206 5895.

E-mail addresses: aniles@ucla.edu (A.N. Niles), bitamesri@gmail.com (B. Mesri), burklund@ucla.edu (L.J. Burklund), lieber@ucla.edu (M.D. Lieberman), craske@psych.ucla.edu (M.G. Craske).

negative affect in the form of anxiety enhances attentional bias to threat (Chen, 1996; MacLeod & Mathews, 1988; Mogg, Bradley, & Hallowell, 1994). Also, training attentional bias towards negative stimuli increases self-reported distress to a laboratory stressor (MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002), and training attention away from threatening stimuli lowers self-reported anxiety to a naturalistic stressor (See, MacLeod & Bridle, 2009). However, very few studies have examined attentional bias and emotional reactivity as predictors of treatment response.

Waters, Mogg, and Bradley (2012) assessed attentional bias for threatening faces as a predictor of response to CBT in 35 children with generalized anxiety disorder or social phobia. Although meta-analyses show that anxious individuals are vigilant to threat, some studies have found that socially anxious individuals avoid threatening stimuli (Chen, Ehlers, Clark, & Mansell, 2002; Mansell, Clark, Ehlers, & Chen, 1999). Therefore, Waters and colleagues assessed attentional bias using the dot probe task (MacLeod, Mathews, & Tata, 1986), which allows separation of individuals into vigilant (those who attend toward threat) and avoidant (those who attend away from threat) bias types. Children who were vigilant to threat responded more favorably to CBT than those who were avoidant of threat. Using a similar method, Price, Tone, and Anderson (2011) found that adults with social phobia who were vigilant to threat responded more favorably to CBT than those who were avoidant of threat. Price and colleagues speculated that those who are more avoidant of threat engage less in exposure practice, which limits corrective learning.

Other researchers have aimed to precisely define the nature of bias within the vigilant group. In the original dot probe task (MacLeod et al., 1986), one neutral face and one threatening face are presented on the screen side by side. A probe then appears in place of one of the faces, and the participant identifies the location of the probe. Anxious individuals tend to take longer to identify probes that appear in place of neutral faces, suggesting that their attention is on the threatening face. However, this task does not differentiate between faster initial orienting toward threatening stimuli and delayed disengagement from threatening stimuli. Using the Spatial Cueing paradigm, Fox, Russo, Bowles, and Dutton (2001) identified that the attentional bias in anxiety is more likely explained by difficulty disengaging from threat rather than faster orienting toward threat. A number of studies have since supported this hypothesis (Amir, Elias, Klumpp, & Przeworski, 2003; Fox, Russo, & Dutton, 2002; Georgiou et al., 2005). Therefore, speed of disengagement from threat may be a more sensitive predictor of treatment response than vigilant versus avoidant subtypes. Thus, we elected to measure speed of disengagement as a potential predictor and moderator of treatment outcome.

In attentional bias tasks, many studies have used angry faces, even though the primary concern in social phobia is rejection by others. More relevant stimuli may be faces that appear disapproving or rejecting and indicate negative evaluation. In a recent study, Burklund, Eisenberger, and Lieberman (2007) found that individuals high in rejection sensitivity showed greater dorsal anterior cingulate cortex activity (an area activated in response to social distress) while viewing disapproving facial expressions compared to angry or disgusted expressions. The authors suggest that disapproving faces pose a distinct type of threat and should be tested in studies examining response to social threat. Therefore, we evaluated attentional bias to both angry and disapproving faces.

In terms of emotional reactivity as a predictor, one study evaluated neural activity to emotional stimuli as a predictor of social phobia treatment response (Doehrmann, 2012) but found no evidence for a relationship between amygdala activity and treatment outcome. To our knowledge, no studies have examined subjective report of positive or negative affect in response to positive and negative images respectively as predictors of treatment response.

The primary goal of the current study was to evaluate attentional bias to external threat and self reported emotional reactivity as predictors of response to behavioral treatment for social phobia. Based on previous research, we hypothesized that patients with social phobia who demonstrated slower disengagement from threatening facial stimuli (i.e., more vigilance to threat) would respond most favorably to treatment. We also hypothesized that greater self reported negative emotional reactivity to negative stimuli would predict better treatment response based on research showing a causal link between attentional bias and emotional reactivity (MacLeod et al., 2002). Further, we assessed speed of disengagement and emotional reactivity as moderators of response to two types of behavioral treatment, CBT and ACT, to determine whether these constructs indicated who would respond most favorably to each treatment. Because the question of moderation by attentional bias and emotional reactivity had not been previously been examined, we had no a priori hypotheses.

Method

Participants

Social phobia

Sixty-two participants who met DSM-IV criteria for a principal or co-principal diagnosis of social phobia, generalized type were randomized to ACT ($n = 29$) or CBT ($n = 33$). Participants were screened using the *Anxiety Disorders Interview Schedule IV* (Brown, Di Nardo, & Barlow, 1994) and had a clinical severity rating of 4 or greater. See below for a description of this interview and the clinical severity rating. Analysis of baseline data included all participants who were randomized. Analysis of follow-up data included only participants who completed treatment ($n = 24$ ACT, $n = 22$ CBT).² See Craske et al. (2013) for participant flow of the full sample. A revised chart summarizing flow of participants for the current sample is depicted in Fig. 1 and demographics are reported in Table 1. Participants were recruited from the Los Angeles area in response to local flyers, Craigslist and local newspaper advertisements, and referrals. The study took place at the Anxiety Disorders Research Center at the University of California Los Angeles, Department of Psychology.

Participants were either medication-free or stabilized on psychotropic medications for a minimum length of time (1 month for benzodiazepines and beta blockers, 3 months for SSRIs/SNRIs, heterocyclics, and MAO inhibitors). Also, participants were psychotherapy-free or stabilized on alternative psychotherapies (other than cognitive or behavioral therapies) that were not focused on their anxiety disorder for at least 6 months prior to study entry. Exclusion criteria included active suicidal ideation, severe depression (clinical severity rating > 6 , see below), or a history of bipolar disorder or psychosis. Participants with substance abuse or dependence within the last 6 months, or who had been diagnosed with respiratory, cardiovascular, pulmonary, neurological, muscular-skeletal diseases or pregnancy were excluded. Patients with asthma, high blood pressure or thyroid diseases were included only if they were currently receiving treatment and were stabilized for these conditions. In the case of uncertainty regarding medical conditions, confirmation was received from the

² Although multiple imputation can be used to estimate missing data, simulation studies suggest that with large amounts of missing data on the dependent variable (10–20%), multiple imputation can inflate standard errors, and therefore should not be used to replace missing values of dependent measures (Von Hippel, 2007). In the current study, the amount of missing data on the dependent variables was approximately 40%, and therefore, missing data were not imputed.

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