



## Training implicit social anxiety associations: An experimental intervention

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### ABSTRACT

The current study investigates an experimental anxiety reduction intervention among a highly socially anxious sample ( $N = 108$ ;  $n = 36$  per Condition; 80 women). Using a conditioning paradigm, our goal was to modify implicit social anxiety associations to directly test the premise from cognitive models that biased cognitive processing may be causally related to anxious responding. Participants were trained to preferentially process non-threatening information through repeated pairings of self-relevant stimuli and faces indicating positive social feedback. As expected, participants in this positive training condition (relative to our two control conditions) displayed less negative implicit associations following training, and were more likely to complete an impromptu speech (though they did not report less anxiety during the speech). These findings offer partial support for cognitive models and indicate that implicit associations are not only correlated with social anxiety, they may be *causally* related to anxiety reduction as well.

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Social phobia, also known as social anxiety disorder, is an impairing condition characterized by excessive avoidance and fear of social situations (Diagnostic and Statistical Manual of Mental Disorders; APA, 1994). Although cognitive-behavioral interventions have received a great deal of empirical support, nearly half of the patients who seek treatment for social anxiety fail to fully respond (Turner, Beidel, Wolff, Spaulding, & Jacob, 1996). Clearly, additional research is necessary in order to better understand the mechanisms underlying symptom improvement.

In the current study, we developed an experimental intervention based on cognitive models of anxiety, and tested it among a highly socially anxious sample. Using a cognitive training paradigm, we sought to modify implicit social anxiety associations, which are automatic evaluations that reside outside conscious control (see Greenwald, McGhee, & Schwartz, 1998). These associations are thought to share some similarities with anxious schemas (see Teachman, Marker, & Smith-Janik, 2008). Thus, by training implicit associations and evaluating the impact on social behavior, our goal was to more directly test the causal premise underlying cognitive theories of social phobia—that maladaptive self-schemas contribute to the maintenance of social anxiety and avoidance behaviors (Clark & Wells, 1995).

### 1. Cognitive processing models of social anxiety

General cognitive models of anxiety propose that maladaptive schemas (i.e., cognitive scripts or frameworks) guide cognitive processing such that anxious individuals pay attention to, interpret, and remember information that is relevant to fear and anxiety (Beck & Clark, 1997). These biases theoretically maintain social anxiety by reinforcing the idea that social situations are threatening (Clark & Wells, 1995). When giving a speech, for example, individuals with social anxiety may initially notice the only negative facial expression in a large audience, and interpret this as a sign that they are failing miserably.

There is abundant evidence that cognitive biases are *correlated* with pathological anxiety, but many researchers theorize that there is also a *causal* relationship between cognitive processing and anxious responding (MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002). In our earlier example, initially attending to a negative facial expression and interpreting it in a biased way (e.g., “I’m a failure”) would be expected to cause elevated levels of anxiety and future avoidance behavior. However, experimental approaches to establish this causal relationship have been limited, so the direction or existence of causality remains unclear.

More recently, researchers have begun to manipulate cognitive biases to directly test causality. For instance, Amir et al. found that when participants were trained to attend *away* from threatening information, this not only resulted in reduced symptoms of social anxiety as assessed by an independent rater (Amir, Weber, Beard, Bomyea, & Taylor, 2008), but the benefits of training were evident for up to a year after the study (personal communication with N. Amir; July 2008). Similar demonstrations have been shown in

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interpretation bias training within the context of social anxiety (e.g., Beard & Amir, 2008; Murphy, Hirsch, Mathews, Smith, & Clark, 2007).

## 2. Implicit social anxiety associations and emotional vulnerability

Our goal in the current study was to draw from this exciting early work to investigate another bias that may be particularly valuable for understanding cognitive models of social anxiety: implicit associations (de Jong, 2002; Tanner, Stopa, & De Houwer, 2006). Although there is no way to directly measure schemas because they constitute an abstract construct, implicit associations are thought to reflect elements of anxious schemas in that they are interconnected evaluations in memory that are relatively less amenable to conscious control or introspection (Teachman & Woody, 2004). This connection to schemas is noteworthy because although schemas have been notoriously difficult to operationalize (Fiske & Taylor, 1991), they are integral for understanding cognitive models of anxiety (e.g., Beck, Emery, & Greenberg, 1985). For individuals with social anxiety, schemas related to extreme fears of negative evaluation are thought to filter information in socially relevant situations, leading to greater anxiety and avoidance (Rapee & Heimberg, 1997). Thus, while it is not possible to directly measure anxious schemas, we may be able to alter aspects of negative schematic processing by learning to manipulate implicit associations. Moreover, schemas are theorized to influence other forms of cognitive biases (e.g., selective attention to threat stimuli), so modifying maladaptive schemas through implicit associations may promote healthier cognitive processing more broadly.

There is also evidence suggesting that implicit associations are relevant for social anxiety. For instance, de Jong (2002) investigated implicit self-esteem among women who were high (versus low) on social anxiety symptoms. Although both groups exhibited relatively lower “other” (versus “self”-esteem), the discrepancy was much weaker among socially anxious individuals. Further, Teachman and Allen (2007) found that implicit rejection associations were related to the emotional intensity and dependence of close peer interactions among a group of adolescents.

Finally, there is robust evidence demonstrating that implicit associations predict meaningful behavior. For example, in a meta-analysis of 86 independent populations, implicit associations predicted a variety of outcomes, including those relevant to social anxiety (e.g., social judgments; Greenwald, Poehlman, Uhlmann, & Banaji, 2009). More directly tied to the clinical field, Teachman et al. (2008) recently found that changes in implicit associations preceded and predicted changes in panic symptoms over the course of a 12-week CBT intervention. Evidence from Teachman and Woody (2003) also suggests that implicit associations within a clinical sample (spider phobia) are sensitive to treatment.

In the current study, we sought to evaluate whether implicit rejection associations may also be *causally* related to symptom reduction in social anxiety. Specifically, following training using a conditioning paradigm, participants were asked to complete a public speaking task. Consistent with Murphy et al. (2007), we hypothesized that creating healthier implicit associations would lead to fewer social anxiety symptoms associated with the speech. In line with many prior training studies, the intervention was not expected to impact state anxiety directly, reinforcing the argument that implicit associations were being trained and training was not simply an anxiety manipulation (see Mathews & MacLeod, 2002).

## 3. Training implicit social anxiety associations

Although directly training implicit associations is novel in psychopathology research, recent research suggests that implicit

associations are malleable. For example, Dasgupta and Greenwald (2001) showed participants photographs of disliked white and admired black people. Results indicated that this simple intervention actually attenuated the biased positive implicit evaluations of white (compared to black) individuals as assessed by the Implicit Association Test (IAT; Greenwald et al., 1998). Additionally, Gregg, Seibt, and Banaji (2006) demonstrated that they could shift automatic preferences for one imaginary social group versus another through the use of a classical conditioning paradigm. Most relevant to the current proposal, Baccus, Baldwin, and Packer (2004) were able to condition implicit self-esteem in an unselected sample by using a computer game where photographs of smiling faces consistently followed self-relevant information. The conditioning resulted in more positive implicit self-esteem when measured by an IAT (Greenwald et al., 1998). Drawing from their approach, we attempted to condition positive associations between the self and socially relevant feedback. Analogous to Baccus et al. (2004), our primary expectation was that individuals in the positive training condition (relative to our two control conditions) would display less negative implicit associations following training. We also wanted to test the potential for this training to influence subsequent emotional vulnerability (though, given the brevity of training, we did *not* expect that training effects would be comparable to what would be seen with a more standard form of treatment for social phobia). We thus included multiple indices of emotional vulnerability to determine whether the Positive training condition (relative to the two control conditions) could reduce any anxiety markers in response to a social stressor following training.

## 4. Methods<sup>1</sup>

### 4.1. Participants

Participants were college students from the university's psychology participant pool, invited to participate based on their responses during pre-screening to the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998), the Brief Fear of Negative Evaluation (BFNE; Leary, 1983), and an additional question assessing fear of public speaking (taken from the Social Phobia Scale; Mattick & Clarke, 1998). All participants: (a) scored more than a half a standard deviation above the mean SIAS score reported for a prior community sample ( $M = 19.9$ ,  $SD = 14.2$ ; Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992), (b) scored within one standard deviation of the mean reported for a socially phobic sample using the BFNE ( $M = 46.91$ ;  $SD = 9.27$ ; Weeks et al., 2005), and (c) endorsed a high level of public speaking fear (Very or Extremely) on the SPS item. This resulted in a highly socially anxious sample, with a mean SIAS score of 44.25 ( $SD = 9.77$ ; range: 30–80) and a mean BFNE score of 47.02 ( $SD = 6.42$ ; range: 36–60). Indeed, Brown et al. (1997) identified people as having social phobia if they scored greater than or equal to 34 and 24 on the SIAS and SPS, respectively. These means are consistent with or *lower* than the means reported in the current study, suggesting that our sample was highly symptomatic. The final sample in the current study ( $N = 108$ ;  $n = 36$  per Condition; 80 women) had a mean age of 18.63 ( $SD = 1.23$ ), and race was reported as 64% Caucasian, 25% Asian/Pacific Islander, 4% African-American, 4% Hispanic, 2% biracial, and 2% “other.”<sup>2</sup>

<sup>1</sup> Only those measures relevant for the current hypotheses are listed here; for a complete listing (including methods tied to a dot-probe and interpretation bias task that participants completed), please contact the first author.

<sup>2</sup> One participant scored just below the cutoff for the BFNE (36) and one participant only completed six items on the SIAS. Data from both participants were retained for analyses because they met criteria for inclusion based on the other two screening measures. In addition, one participant was excluded from the final sample because this individual dropped out mid-way through the study.

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