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Cognitive Processes and Moderators of Willingness in Individuals with Social Anxiety Disorder and Non-Anxious Controls in Response to a Social Performance Task

Lauren P. Wadsworth
University of Massachusetts Boston

COGNITIVE PROCESSES AND MODERATORS OF WILLINGNESS IN

INDIVIDUALS WITH SOCIAL ANXIETY DISORDER AND NON-ANXIOUS

CONTROLS IN RESPONSE TO A SOCIAL PERFORMANCE TASK

A Thesis Presented

by

LAUREN P. WADSWORTH

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Approved as to style and content by:

_____
Sarah Hayes-Skelton, Assistant Professor
Chairperson of Committee

_____
Lizabeth Roemer, Professor
Member

_____
Laurel Wainwright, Senior Lecturer
Member

                                       _____
                                       Alice S. Carter, Program Director
                                       Clinical Psychology Program

                                       _____
                                         Jane Adams, Chairperson
                                         Psychology Department

ABSTRACT

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December 2014

Lauren P. Wadsworth, B.A., Smith College
M.A., University of Massachusetts Boston

Directed by Assistant Professor Sarah Hayes-Skelton

The present study investigated differences between individuals with social anxiety disorder (SAD) and non-anxious controls (NAC) on measures of thought processes and anxiety responses surrounding an anxiety-provoking situation. Participants gave a spontaneous speech to an audience and reported their anxiety throughout. Measures of trait decentering and anxiety, situational anxiety, negative thoughts and believability, and willingness to repeat the task were administered. Compared to NAC, individuals with SAD reported a higher prevalence of negative thoughts, found the thoughts more believable, reported lower levels of trait decentering, and reported less willingness to repeat an anxiety-provoking task. Collapsing the groups, we found an inverse relationship between the amount of negative thoughts and willingness to repeat the task, and a positive correlation between decentering and willingness. We did not find evidence to support that decentering and believability moderate this relationship. The present study partially supports the proposed model of SAD, as the SAD and NAC groups differed at each step of the proposed model, however moderation analyses were not significant.

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CHAPTER 1

SPECIFIC AIMS

Over the past few decades, researchers studying social anxiety disorder (SAD) have become increasingly interested in the cognitive processes that maintain the disorder. Models of SAD suggest that negative feedback loops surround each social and performance situation. In these negative feedback loops, individuals expect that a given social interaction will go poorly, experience anxiety and negative thoughts during the event, interpret their performance as negative, find those negative interpretations very believable, and predict that future events will also go unfavorably, leading them to more avoidance of and less willingness to engage in future social or performance situations. Throughout this loop, individuals experience anxiety before, during, and after social encounters or performance situations. The interpretations of each event then serve to perpetuate social anxiety. During each stage of the above model, individuals experience negative and self-critical thoughts, which are referred to as "maladaptive thoughts" (Rapee & Heimberg, 1997). There has been a fair amount of research suggesting that maladaptive thoughts maintain SAD symptomology (e.g., Edwards, Rapee, & Franklin, 2003; Lundh & Sperling, 2002; Mellings & Alden, 2000). In addition, research suggests that individuals with SAD find these thoughts more believable than individuals without

SAD (Kiko et al., 2012). Therefore, not only do individuals with SAD experience more negative thoughts, they also consider these thoughts an accurate representation of their performance. Together, these beliefs provide heightened "evidence" that future events will also go negatively, which increases behavioral avoidance (a key aspect of SAD) by decreasing the individual's willingness to engage in future social situations.

On the other hand, little is known about *adaptive* cognitive strategies that might be naturally employed to mitigate the cycle of anxiety. In one adaptive technique, termed decentering, individuals step back and evaluate their thoughts and feelings more objectively (Safran & Segal, 1990). Such metacognitive cognitive strategies could act as a filter, weakening the negative feedback loop, and thus decreasing the anxiety experienced by individuals surrounding social and performance situations. This more objective interpretation of events might also be linked to reduced avoidance of social situations (and greater willingness to engage). Evidence of individuals without SAD engaging in more decentering than those with SAD might suggest that naturally engaging in such cognitive processes also aids in prevention of SAD.

Using a sample of individuals with SAD and those without significant anxiety (non-anxious controls; NAC), we evaluated differences in trait and state cognitive processes (such as the frequency of negative thoughts, believability of those thoughts, and decentering) experienced and employed in relation to a potentially anxiety-provoking performance situation in the form of a speech task. In addition, we measured state levels of subjective anxiety before and during the task, and willingness to repeat the task immediately following its completion.

1. **To investigate differences in a) maladaptive thoughts experienced during the speech task and b) degree of willingness to repeat the task between the SAD and NAC groups.**

   a) We hypothesized that, consistent with previous research, following the speech task individuals with SAD would report higher levels of negative thoughts experienced during the task than those in the NAC group.

   b) We also hypothesized that individuals with SAD would report less willingness to engage in a similar task in the future compared to the NAC group.

2. **Investigate differences in a) decentering, an ameliorative cognitive process and b) believability, an exacerbating cognitive process, between SAD and NAC groups.**

   a) We hypothesized that the NAC group would exhibit higher levels of trait decentering compared to individuals with SAD.

   b) Conversely, we hypothesized that the NAC group would report lower levels of believability of negative thoughts encountered, suggesting that they may be using more advantageous cognitive approaches (i.e., decentering) to anxiety provoking situations, giving them a broader perspective regarding negative thoughts that arise.

3. **Investigate if levels of decentering and/or believability moderate the relationship between post-event negative thoughts and willingness to repeat task between SAD and NAC groups.**

a) Collapsing the groups together, we hypothesized that there would be an inverse relationship between the amount of negative thoughts and willingness to repeat the task and that decentering and believability would moderate this relationship, in that when low levels of decentering and/or high believability were reported there would be a strong association between negative thoughts and willingness, whereas in high levels of decentering and/or low believability the relationship would be weakened or absent.

CHAPTER 2

BACKROUND AND SIGNIFICANCE

Feeling nervous in evaluative or interactive social situations is a normative experience (Kiko et al., 2012). However, this anxiety can start causing significant distress once it reaches a certain threshold. This threshold has been classified as social anxiety disorder (SAD). According to DSM-IV, SAD is characterized by marked and persistent fear of negative evaluation during performance situations or social interactions often due to fears of poor performance or of showing physical signs of anxiety (American Psychological Association, 1994). SAD is a disabling condition that affects approximately 12% of the population (Kessler, Berglund, Demler, Jin, & Walters, 2005) and is associated with higher financial dependency, lower wages, lower educational achievement (Heimberg & Becker, 2002), and interference with both romantic and platonic relationships (Whisman, Sheldon, & Goering, 2000).

Model of Social Anxiety Disorder

Models of SAD suggest that social anxiety is characterized by maladaptive cognitions including an increased focus on internal experiences during a social interaction or performance, which is followed by negative predictions of future events

and then avoidance of specific social situations (e.g. Clark & Wells, 1995; Herbert & Cardaciotto, 2005; Rapee & Heimberg, 1997). These maladaptive cognitions also include the individuals' interpretation of their abilities and performance as largely negative, and a comparison of this self-assessment to the suspected interpretation by the audience. These maladaptive thoughts occur before, during, and after anxiety provoking events, and work together as part of a negative feedback loop to exacerbate, maintain, and/or perpetuate the distressing symptoms of SAD.

In their model, Rapee and Heimberg (1997) break down this negative feedback loop into a series of parts that cycle throughout an anxiety-provoking social situation. They propose that upon entering the situation, individuals with SAD predict that their audience will negatively evaluate them. The audience can be anyone from an authority figure with power over their job or education, to a stranger encountered on the street. The key is that individuals perceive the other person/people as evaluative. Viewing the situation in this context leads the individuals to perceive themselves as performers. When this is paired with characteristic negative expectations of ability, individuals view themselves as inadequate at such "performances."

The prediction and experience of poor performance is imagined to have social consequences or losses, such as not making new friends, failure in dating situations, and not making gains in work or school. These potential losses then activate a fear response, as the event is encoded as socially dangerous. Perceiving a threat in the environment then triggers cognitive and physiological manifestations of anxiety, such as activation of the autonomic nervous system and increased allocation of attentional resources to the environment. Along with physiological symptoms, individuals focus on detecting cues in

the environment such as confirmation from the audience that they are performing inadequately or displaying visible signs of anxiety. These cues can range from potential signs of actual boredom ("audience" yawning) to positive cues ("audience" smiling; Laposa, Cassin & Rector, 2010). In either case, the cues are interpreted negatively. For example, the audience smiling might be encoded as laughing, thinking the performer is stupid. This negative interpretation of the experience then leads to increased negative prediction of future performance and likely avoidance of such circumstances, perpetuating the cycle.

The aforementioned steps of the feedback loop lead to cognitive, behavioral, and physical symptoms of anxiety. The cognitive symptoms include the maladaptive thoughts, like those mentioned above, that confirm the predicted negative performance. Behavioral symptoms include avoidance and safety behaviors, or behaviors that usually include distancing oneself from the situation, due to being unwilling to engage in anxiety provoking situations (Wells, Stopa, & Clark, 1995). Finally, physical symptoms include manifestations of autonomic arousal, such as racing heart, sweating, and blushing. These physical symptoms are not only uncomfortable to experience, but they also contribute to fears that the audience will notice that the individual is experiencing anxiety. According to this model, these cognitive, behavioral, and physical symptoms of anxiety confirm the individual's prediction of poor performance, which in turn, exacerbates the symptoms and negative interpretation of the situation, completing the cycle, feeding back into the loop.

<u>Negative Thoughts</u>

One of the key components of the Rapee and Heimberg (1997) model, and the part that we will focus on, is the encoding of negative thoughts and negative self-evaluation with a specific focus on potential mechanisms through which the self-evaluations are encoded more and less negatively. Individuals with and without SAD experience negative thoughts (Laposa et al., 2010). However, once these negative self-evaluations reach a certain level, they become overwhelming, characterizing SAD. This higher level of symptom severity is partially due to the fact that individuals with SAD focus almost exclusively on the negative aspects and cues of a situation, and also find them more believable (Kiko et al., 2012). Similarly, when compared to a low social anxiety symptom group, individuals with high social anxiety symptoms report increased believability of their negative thoughts pertaining to an upcoming anxiety-provoking situation (Tanner, Stopa, & De Houwer, 2006).

It is adaptive to interpret past events, learn from them, and in turn, better plan for the future. However, the content of social situational interpretation in individuals with SAD is four times more negative than those without SAD (Stopa & Clark, 1993), indicating that there is a difference between individuals with and without SAD in their interpretation of social events. Thus (like the other symptoms of SAD mentioned above), at some level negative thoughts are normative, but high levels of this negativity have been associated with clinical levels of SAD (Abbott & Rapee, 2004; Perini, Abbott & Rapee, 2006). These higher levels usually include increased negative self-evaluation and the ignoring or misinterpretation of cues suggesting successful performance.

Theoretically, we could expand the Rapee and Heimberg (1997) model and suggest that the extra allocation of attentional resources focusing on cues that confirm the individuals' poor performance self-evaluation hypothesis could exacerbate negative thoughts and believability of them. Since individuals with SAD primarily focus on negative cognitions (engaging in more negative self-evaluation) and ignore or alter positive feedback (Alden, Taylor, Mellings, & Laposa, 2008; Laposa et al., 2010; Clark & Arkowitz, 1975; Rapee & Lim, 1992), they are likely engaging in more negative interpretations and increased believability of them, leading to more negative expectations of future interactions, and in turn lower willingness to re-enter the situation. Alternatively, individuals without SAD interpret both positive and negative environmental cues, carrying with them a more broadened evaluation of their performance, leading to more positive predictions of future events (Laposa et al., 2010). Interestingly, these findings do not extend to nonsocial events, suggesting that individuals with SAD have a unique set of maladaptive cognitive processes specific to social situations (Foa, Franklin, Perry, & Herbert, 1996; Stopa & Clark, 1993). As described in more detail below, this more broadened perspective, in turn, would likely lead to less negative pre-event cognitions when approaching the next social situation (i.e., a more positive feedback loop).

Thus, research suggests that individuals with SAD experience a higher proportion of negative thoughts (and higher focus on them) than their non-socially anxious counterparts, before, during, and in response to social situations. This increase in negative thoughts, paired with a higher focus on them, and believability of them (Clark & Wells, 1995; Rapee & Heimberg, 1997) likely perpetuates SAD symptoms and decreases

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willingness. Our research will assess the presence of these negative thoughts, and examine what cognitive processes individuals with and without SAD are engaging in that may be exacerbating or ameliorating, or filtering the negative cues.

Believability of Negative Thoughts

In addition to a higher prevalence of negative thoughts, individuals with SAD also interpret their negative thoughts as more believable (Kiko et al., 2012; Tanner et al., 2006). Believability can be related to more commonly studied construct of fusion, the cognitive quality of taking one's thoughts too seriously (Hayes, Strosahl, & Wilson, 1999) and causing a more narrowed perspective (Eifert et al., 2009; Kocovski, Fleming, & Rector, 2009). The danger of fusion or believability, when considered in the context of individuals with SAD who tend to interpret largely negative thoughts, is that it will lead to a stronger negative association with social interaction and performance situations, which will then lead to higher avoidance of such situations. In support of this theory, greater fusion has been linked to higher avoidance (Blackledge & Hayes, 2001).

This increase in believability likely strengthens the interpretation of the negative thoughts, increasing negative predictions of future performance. Similar to research on fusion, we hypothesize that increased believability of negative thoughts will be related to less willingness to repeat an anxiety provoking situation.

Willingness to Engage in Future Situations

In the present study, "willingness" refers to how disposed the individual is to repeat the speech task. This measure attempts to model likeliness of future avoidance or

approaching of social interactions. Willingness can be compared theoretically to both experiential (attempting to escape, avoid, alter, or conceal undesirable emotions and thoughts; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996) and behavioral avoidance. Research suggests that there is greater experiential avoidance in individuals with SAD compared to non-anxious controls (Heuer, Rink, & Becker, 2007; Kashdan et al., 2013). Addressing and reducing experiential avoidance is a focus of many behavioral therapies including acceptance and commitment therapy (Hayes & Wilson, 1994) and dialectical behavior therapy (Linehan, 1994). Though research has yet to explore the relationship between experiential avoidance and SAD in depth, treatment research suggests that addressing it might be a key mechanism of change (Dalrymple & Herbert, 2007).

Similarly, greater behavioral avoidance has been associated with greater SAD symptomology (Moitra, Herbert & Forman, 2008). Conceptually, as mentioned above, we also see willingness as similar to behavioral avoidance. For example, someone with high anxiety surrounding class presentations would likely want to avoid class presentations and would therefore score low on willingness to repeat a presentation directly after giving one. Without this willingness to engage in feared situations and the therapy that follows, individuals remain in the cycle of anxiety, likely with stable or worsening symptoms.

Adding willingness to the model, we hypothesize that experiencing a higher level of negative thoughts and believability of those thoughts would be linked to lower willingness to engage in similar situations in the future. This is similar, theoretically to operant conditioning, where individuals are less likely to repeat negative experiences (Skinner, 1937). With operant conditioning in mind, it makes sense that individuals with

SAD engage in behavioral avoidance of social situations that previously left them feeling humiliation, failure, and rejection.

As mentioned above, fears and anxiety related to social experiences is a normative experience. However, we hypothesize that individuals without SAD will have higher willingness to repeat anxiety-provoking situations. Being willing to engage in anxiety provoking situations allows individuals to actually engage in the situations and experience outcomes, both positive and negative, and thus, have a broader set of expectancies of future events. This is likely also corroborated by the aforementioned fewer negative thoughts and reduced believability of them experienced by individuals without SAD.

The Filter: Potential Adaptive Strategies

Recent studies have found evidence that maladaptive cognitive processes are core mechanisms that perpetuate SAD (Kiko et al., 2012). However, less is known about *adaptive* strategies that may protect individuals from the consequences of having negative thoughts. Adaptive cognitive strategies might act as filters to interpret social and performance situations more broadly, considering both negative and positive evidence. This "filter" may then lead to individuals anticipating future situations to have both positive and negative aspects, increasing willingness to engage in future situations, thus protecting them from developing debilitating social anxiety. As described below, one of these adaptive strategies may be decentering, or the process of seeing thoughts or feelings as objective events in the mind rather than personally identifying with them (Safran & Segal, 1990).

Decentering may reduce the perceived likelihood of negative social cost experienced by individuals with SAD. Models of SAD suggest that individuals with SAD view social events (and predicted failures) as more "costly" than their NAC counterparts (Butler & Matthews, 1993; Foa & Kozak, 1985). In fact, experimental models suggest that reducing cost-estimates of social events increases improvement of individuals with SAD, even without adjusting for likelihood of future negative social events (Foa et al., 1996; Uren, Szabo′, & Lovibond, 2004). Thus, symptoms decrease when individuals place less value on poor social performance, even if they still predicted that future events would be negative. Attributing less cost to one's performance likely takes off some cognitive "weight", decreasing the cognitive symptoms of anxiety. These findings suggest that stepping back and evaluating potential costs from a more broadened (and adaptive) perspective may lead to lower SAD symptomology by reducing the cost associated with performance.

This concept of "stepping back" can be thought of in the context of the cognitive process decentering. Decentering has been shown as a potential change agent of cognitive behavioral therapy (CBT) (Fresco et al., 2007) and may interrupt the negative feedback loop that perpetuates and exacerbates anxiety (Hayes-Skelton & Graham, 2012).

Recently, Hayes-Skelton and Graham (2012) investigated whether decentering contributed to cognitive reappraisal, a link hypothesized by others (Ingram & Hollon, 1986). Results suggested that decentering accounts for a large portion of the relationship between cognitive reappraisal and social anxiety, suggesting that it may be an adaptive cognitive tool for coping with the negative thoughts following social and performance events. As mentioned above, both individuals with and without SAD experience negative

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thoughts during social interactions, but individuals with SAD focus mainly on the negative. Since decentering has been observed to have a negative correlation with SAD symptoms (Hayes-Skelton & Graham, 2012), we hypothesized that decentering may be a tool that allows individuals without SAD to view a social situation from a more broadened perspective, considering both positive and negative cues. This adaptive cognitive strategy may lead to fewer negative thoughts overall, and, in turn, less negative predictions for future events. Having a less negative prediction for future events then leads the individual to view social interactions as less threatening, again allowing them to view the next event with a more broadened, or decentered perspective. With this less negative perspective in mind, individuals might be more willing to engage in similar situations in the future.

In summary, the literature has found that both the situational (during event) and expanded (pre, during and post event processing) negative feedback loops are associated with SAD symptoms and severity. We are interested in learning more about negative thoughts in multiple parts of the expanded loop and potential adaptive strategies that can be used to interrupt the negative nature of the cycle in individuals with SAD, increasing their willingness to engage in future social interactions.

Current Study

The present study investigated multiple parts of the aforementioned feedback loop (see Figure 1), specifically whether there are differences between those with and without clinically significant anxiety on measures of the number of negative thoughts experienced, willingness to engage, believability of negative thoughts, and decentering

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surrounding an anxiety-provoking speaking task. We investigated this experimentally using a speech task, as it is typical for individuals with and without SAD to experience negative self-evaluative thoughts during public speaking tasks (Hirsch, Mathews, Clark, Williams, & Morrison, 2006). We hypothesized that, consistent with previous research, following the speech task individuals with SAD would report higher levels of negative thoughts experienced during the task, higher believability of those thoughts, and lower trait levels of decentering than those in the NAC group.

Additionally, we investigated whether or not believability and decentering moderated the negative feedback loop of negative thoughts and avoidance. Measures of this relationship included trait decentering, anticipatory and during-task anxiety, post-event negative thoughts and believability, and willingness to repeat a speech task. Each of these measures gave us information about the individual's experience of each part of the loop (pre, during, and post event). The willingness measure was used as a tool to simulate prediction of engagement in future events (high willingness suggesting a more positive prediction of engaging in future speeches, and low suggesting a more negative prediction). Collapsing the two groups together, we hypothesized that there would be an inverse relationship between the amount of negative thoughts and willingness to repeat the task and that decentering and believability would moderate this relationship, in that when low levels of decentering and/or high believability were reported there would be a stronger association between negative thoughts and willingness, whereas in high levels of decentering and/or low believability the relationship would be weakened or absent.

Figure 1.
Hypothesized relationship between anxiety, decentering, believability, and willingness in NAC and SAD groups

The Feedback Loop
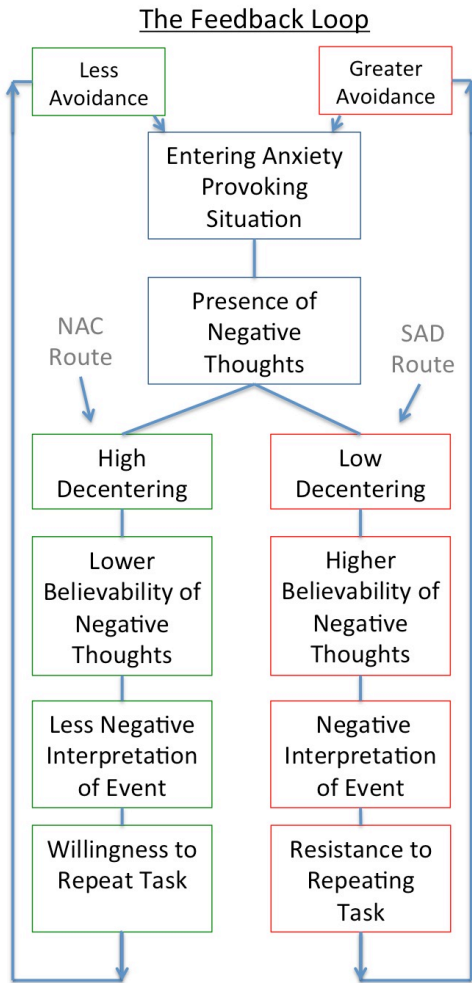
CHAPTER 3

RESEARCH DESIGN AND METHODS

<u>Participants</u>

The sample was composed of 60 individuals (30 NAC, 30 SAD). All participants (38 females 63.2%, 22 males 36.7%) were cis-gendered, meaning their gender identity matched their biological sex. For sexual orientation, 80.0% identified as Heterosexual (n=48), 8.3% as Bisexual (n=5), 10.0% as Gay/Lesbian (n=6), and 1.7% as "Other" (n=1). Of the sample, 47.5% identified as White (n=28), 18.6% as Asian (n=11), 15.3% as Black (n=9), 10.2% as Latino/a Non-white (n=6), 8.5% as Latino/a White (n=5), 5.1% as Other (n=3), 3.4% as Multiracial (n=2), 3.4% as Middle Eastern (n=2), and 1.7% as Nipmuc (n=1). Ages ranged from 18-55 (M=26.70, SD= 8.90). Highest level of education attained for the sample was as follows, 3.4% high school diploma (n=2), 1.7% vocational school/other non-college (n=1), 57.5% 1-3 years of college (n=34), 25.4% college degree (n=15), 11.9% master's degree (n=7), 1.7% did not respond (n=1).

Inclusion criteria for both groups included English fluency (with at least 3 years speaking English) and willingness to have assessments video recorded. Exclusionary criteria for both groups included a diagnosis of obsessive compulsive disorder (n=6) autism-spectrum disorders (n=1), bipolar disorder (n=1), or substance dependence (n=8). Participants were also excluded if they exhibited symptoms that required immediate attention (such as psychotic symptoms (n=0) or suicidal intent (n=0)).

Participants with Social Anxiety Disorder

When participants contacted the study in response to advertisements for treatment-seeking individuals with symptoms of social anxiety, they were first asked to complete a phone screen to determine whether they met initial inclusion/exclusion criteria. This included an initial screen of social anxiety symptoms based on the four questions from the social phobia section of the Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 2006). The MINI shows satisfactory inter-rater reliability (0.67-0.85), and good correlation with expert diagnoses with kappa values above 0.88 (Mukhtar et al., 2012). The MINI was followed by questions regarding other related disorders, any current psychotropic medication use, any other current therapy. Current therapy and use of psychotropic medications were not exclusionary for the SAD group.

Non-anxious Control Participants

Participants who responded to advertisements for a study about "social interactions and experiences" completed an online questionnaire (5-15 minutes) that assessed anxiety and depression levels using the Social Interaction Anxiety-Short-6,

Social Phobia Scale-6 (SIAS-6 & SPS-6; Peters, Sunderland, Andrews, Rapee, & Mattick, 2012) and Depression, Anxiety and Stress Scales-21 (DASS-21; Henry & Crawford, 2005). Psychometric properties for the SIAS and SPS show good internal consistency (Cronbach's α ranging from .88-.94) and moderate to strong convergent validity with correlations ranging from .53-.77 (Hughes et al., 2006; Mattick & Clarke, 1998). For the DASS, studies show internal consistency ranging from .81-.97 (McDowell, 2006), test-retest reliability between .71 and .81 (Brown, Chorpita, Korotitsch, & Barlow, 1997), good convergent validity, r's -.58 to -.69 and divergent validity, r's -.16 to -.34 (Sinclair et al., 2012). Individuals who scored low on these anxiety and depression measures (indicating that they likely did not have a clinically significant anxiety or depressive disorder) were contacted to complete a phone screen and ADIS-IV assessment to verify that they qualified. Cutoffs used for this sample were based on selecting for participants without significant anxiety or depressive disorders. Suggested cutoffs for each scale corresponded to an absence of symptoms. However, these cutoffs only qualified a very small percentage of participants so cutoffs were adjusted slightly and were as follows: SIAS-6: less than 18 out of 36 SPS-6: less than 9 out of 36; DASS-21 Depression less than 13 out of 42 (none-mild), Anxiety less than 11 out of 42 (none-low moderate), Stress less than 18 out of 42 (none-mild). The phone screen included the MINI to screen out individuals with SAD, diagnosed anxiety spectrum disorders, autism spectrum disorders, current psychotropic medication use, and asked about any current therapy.

Diagnostic Interview

After the phone screen, all qualified participants were scheduled for a diagnostic assessment using the Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV; Figure 2-a; Brown, DiNardo & Barlow, 1994). Assessors were either a licensed clinical psychologist or graduate students under the supervision of a licensed clinical psychologist. The ADIS-IV is a semi-structured diagnostic interview designed to assess the presence, nature, and severity of DSM-IV anxiety, mood, and somatoform disorders. The interview also contains a simple screen for alcohol and substance abuse and for psychotic symptoms. After the ADIS-IV, a team of assessors verified diagnoses, reaching consensus on a subjective rating quantifying all clinically significant and subclinical symptoms endorsed. This rating, called the Clinician Severity Rating (CSR), ranges from 0 (not at all severe) to 8 (extremely severe/distressing). Inclusion criteria for the SAD group was a primary diagnosis of SAD with a Clinician Severity Rating (CSR) of at least 4 (moderate impairment, the cut-off for a disorder of clinical significance; Brown et al., 1994; Heimberg et al., 1990). Co-occurring diagnoses were allowed in the SAD group, as long as SAD was primary. For the NAC group, a CSR greater than 2 (mild, non-interfering symptoms) of any anxiety or mood disorder was exclusionary.

Figure 2.

Order of study assessments and administration of questionnaires

Visit 1	Post Visit 1	Visit 2-During Task	Directly After Task
ADIS-IV	EQ	BAT	SCQ Willingness
Part a	Part b	Part c	Part d
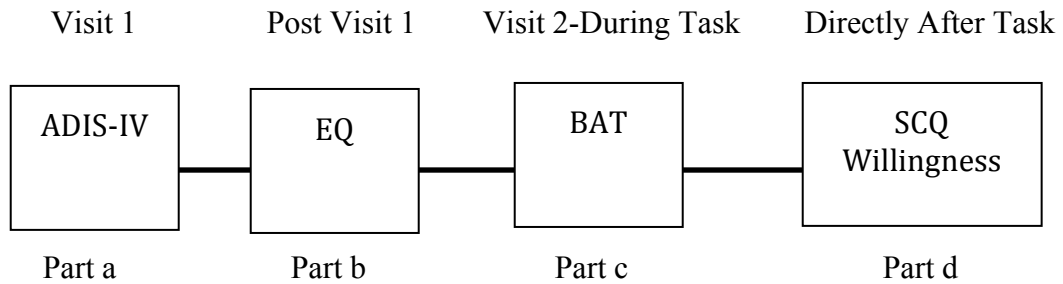
Procedure

Once exclusion/inclusion criteria based on the ADIS-IV were assessed, participants who qualified were asked to complete questionnaires (Figure 2-b) and were scheduled for the Behavioral Avoidance Test (BAT) assessment. The questionnaire packet included the Experiences Questionnaire (described below), the trait-level decentering measure used in this study. In a BAT assessment (Figure 2-c), participants are asked to engage in potentially anxiety-provoking situations in order to provide a behavioral assessment of anxiety. For this assessment, participants were asked to role-play an impromptu speech to an audience of one study confederate and a video camera. Though these BATs also included a brief social interaction, the speech task was selected for this study because it has been shown to elicit more anxiety in both SAD and NAC groups (Kiko et al., 2012). The confederate (audience) was instructed to keep a neutral expression throughout the task and to not give any feedback, positive or negative. There are two phases to the BAT: an anticipatory phase and a performance phase. The anticipatory phase lasts 2.5 minutes and consists of the time from when participants first learn that they are going to give a speech until the time when participants are ready to

begin the role-play. The performance phase lasts 4 minutes and begins when participants

enter the role-play situation. The role-players were either graduate students or

undergraduate research assistants working on this study. Negative thoughts were

measured directly after the task using the Social Cognition Questionnaire (SCQ) a

measure asking participants to rate the negative thoughts that they experienced during the

task, as well as the believability of those thoughts (Wells et al., 1993). Finally, we

measured willingness by asking participants to rate how willing they were to repeat the

task (Figure 2-d).

Assessment Measures

   Decentering. The Experiences Questionnaire-decentering factor (EQ: Fresco et

al., 2007) was administered between the ADIS assessment and speech task visit (within

approximately 2 weeks of the task) as a trait measure of decentering. The 11-item

decentering factor of the EQ was designed as a self-report measure to specifically assess

decentering. Participants are asked to rate how often (never, rarely, sometimes, often, all

of the time) they have experiences like "I remind myself that my thoughts aren't facts,"

and "I can separate myself from my thoughts and feelings" using a 5-point Likert scale.

This measure has shown good psychometric properties with an internal consistency of

$\alpha = .83$, significant convergent correlations with similar constructs, and negative

correlations with contrasting constructs like rumination and experiential avoidance

(Fresco et al., 2007). The internal consistency for current sample was acceptable

(Cronbach's $\alpha = .78$).

Negative Thoughts and Believability. The Social Cognition Questionnaire (SCQ: Wells et al., 1993) lists 22 thoughts that individuals with SAD often experience (i.e., people think I'm boring; people will see I am nervous; I will be unable to speak), and was administered following the speech task. For each thought, the SCQ asks respondents to indicate how often the thought occurred explicitly during the speech task on a scale of 1 (thought never occurred) to 5 (thought always occurs when I am nervous). If the thought did occur, they are asked to rate how believable the thought was to them on a scale of 0 (I do not believe this thought) to 100 (I am completely convinced this thought is true). For our analyses, we created a sum score for the negative thoughts and believability scales separately. For participants missing data, we performed a mean replacement if participants had less than 20% of items data. No participant in the present study was missing more than 20% of the items on this measure. The SCQ has shown high internal consistency and reliability (Kiko et al., 2012; Stopa, 1995), and differentiates between low and high anxious individuals (Tanner et al., 2006). The internal consistency for current sample was excellent (negative thoughts Cronbach's $\alpha = .95$).

Willingness. Participants were asked to complete a measure of willingness following the speech task, asking, "If you were asked to repeat the speech task right now, how willing would you be to complete it?" Participants were asked to rate their willingness on a 0 to 100 scale.

CHAPTER 4

RESULTS

Preliminary Analyses

Skew values for each of the measures (negative thoughts, believability, decentering, willingness) were within acceptable limits, ranging from 0.29-0.75, and Kurtosis values ranged from 0.12-1.50. We performed preliminary analyses using chi-squared tests and t-tests to investigate potential differences between the SAD and NAC groups on demographic variables. The tests revealed that the groups did not significantly differ on race/ethnicity, biological sex, gender identity, sexual orientation, or age (see Table 1). We checked for differences between minority and non-minority groups on the measures of interest (frequency of negative thoughts, believability, decentering, and willingness). Collapsing the SAD and NAC groups together, there were no significant differences between males and females (p's ranged from .32-.85) or between individuals that did or did not identify with a marginalized sexual orientation (p's ranged from .29-.97) on the measures of interest (listed above). White and non-White participants also did not differ significantly on these measures (p's ranged from .64-.87). However, there was

a trend in that Non-white participants rated greater frequency (*p*=.06) and believability

(*p*=.06) of negative thoughts.

Table 1.
*Comparison of demographic characteristics between the socially
anxious and non-anxious control groups*

	SAD		NAC		Total			
	n=30	(%)	*n*=30	(%)	*N*=60	(%)	*p*	χ^2
Biological Sex/Gender[a]							1.00	0.00
Female	19	(63.3)	19	(63.3)	38	(63.3)		
Male	11	(36.7)	11	(36.7)	22	(36.7)		
Sexual Orientation							.75	1.20
Heterosexual	24	(80.0)	24	(80.0)	48	(80.0)		
Gay/Lesbian	3	(10.0)	3	(10.0)	6	(10.0)		
Bisexual	2	(6.7)	3	(10.0)	5	(8.3)		
Other	1	(3.3)	0	--	1	(1.7)		
Race/Ethnicity[b]								
White	16	(53.3)	15	(50.0)	28	(47.5)	.90	0.02
Asian	6	(20.0)	5	(16.7)	11	(18.6)	.79	0.07
Black	5	(16.7)	4	(13.8)	9	(15.3)	.76	0.09
Latino/a Non-White	3	(10.0)	3	(10.3)	6	(10.2)	.97	0.00
Latino/a White	2	(6.7)	3	(10.3)	5	(8.5)	.61	0.26
Middle Eastern	0	--	2	(6.7)	2	(3.4)	.08	3.00
Multiracial/multi-ethnic	2	(6.7)	0	--	2	(3.4)	.08	3.00
Alaskan Native, Native American, or Indegenous	1	(3.3)	0	--	1	(1.7)	.32	.98
Pacific Islander, Native Hawaiian	0	--	0	--	0	--	--	--
Other	3	(10.0)	0	--	3	(5.1)	.08	4.95
	M	(SD)	*M*	(SD)	*M*	(SD)		
Age (in years)	27.30	(9.58)	26.07	(8.30)	26.68	(8.91)	0.60	

[a]Biological Sex and Gender were combined since all participants were cis-gendered
[b]Participants were given the option to select each race that was applicable

<u>Hypotheses 1a-2b: Between Group Comparisons on Decentering, Negative Thoughts,</u>

<u>Believability, and Willingness</u>

A series of one-way ANOVAs were run to investigate differences between the SAD and NAC groups on measures of trait decentering, frequency of negative thoughts and believability, and willingness to repeat an anxiety-provoking task (Table 2). As hypothesized, the NAC group reported a significantly lower number of negative thoughts (*M*=29.92, *SD*=5.93) than the SAD group (*M*=61.03, *SD*=18.48) [*F*(1, 58)=77.09, *p*<.001] during the speech task. In addition, the NAC group reported significantly lower believability scores (*M*=703.54, *SD*=503.50) than those with SAD (*M*=1360.29, *SD*=580.65) [*F*(1, 57)=21.59, *p*<.001]. The NAC group reported a significantly greater willingness to complete the task (*M*=66.83, *SD*=27.12) than the SAD group (*M*=37.00, *SD*=31.75) [*F*(1, 58)=15.32, *p*<.001]. Finally, participants without social anxiety had significantly higher scores of trait decentering (*M*=46.34, *SD*=8.38) than those with SAD (*M*=35.92, *SD*=6.57) [*F*(1, 58)=, *p*<.001].

Table 2.
T-test results comparing socially anxious and non-anxious control groups on Frequency of Negative Thoughts, Believability of Thoughts, Trait decentering, Willingness to complete task, and Clinical Severity Ratings

	SAD		NAC				
N=60	*M (SD)* *n=30*		*M (SD)* *n=30*		*t*	*df*	*p* (2-tailed)
SCQ							
Freq. Negative Thoughts	61.03	(18.48)	29.92	(5.93)	77.09	58	<0.001
Believability of Negative Thoughts	1360.29	(580.65)	'03.54	(503.50)	21.59	57	<0.001
Trait decentering	35.92	(6.57)	46.34	(8.38)	28.79	58	<0.001
Willingness	37.00	(31.75)	66.83	(27.12)	15.32	58	<0.001

 Note: SAD= Social Anxiety Disorder; NAC= Non-Anxious Controls; SCQ=Social Cognitions Questionnaire

Hypotheses 3a-3b: Moderation Analyses

To test the hypothesis that the frequency of negative thoughts is associated with willingness, and more specifically that decentering moderates the relationship between the frequency of negative thoughts and willingness (hypothesis 3a), a hierarchical multiple regression was conducted. First, we tested the relationship between negative thoughts, decentering, and willingness by performing correlation analyses (summarized in Table 3). Frequency of negative thoughts was strongly negatively correlated with willingness, in that a higher frequency of negative thoughts was correlated with lower willingness to repeat the task. Decentering was moderately positively correlated with willingness in that higher trait level decentering was correlated with greater willingness to repeat the task. Finally, there was a strong negative correlation between negative thoughts and decentering, in that higher decentering was correlated with lower frequency of negative thoughts.

Table 3.
Summary Statistics and correlations for hypothesis 3a

Weight Variable	Negative Thoughts	Believability	Willingness	Decentering
Negative Thoughts	--			
Believability	.79**	--		
Willingness	-.63**	-.63**	--	
Decentering	-.51**	-.47**	.35**	--
M (SD)	45.47 (20.77)	1026.35 (631.81)	51.92 (32.91)	41.13 (9.13)

**Correlation is significant at the *p<0.01* level

Next, a multiple regression model looking at negative thoughts and decentering with willingness as a criterion produced the following results: $R^2=.40$, $F(2, 57)=18.73$, $p<.001$, negative thoughts ($b=-0.61$, $p<.001$), decentering ($b=0.04$, $p=.73$), further detail in Table 4. The multiple regression results indicated that negative thoughts and decentering accounted for 40% of the variance in willingness. As can be seen, frequency of negative thoughts was significantly associated with the criterion (willingness) while controlling for decentering. However, decentering was not a significant unique predictor of willingness and did not account for additional unique variance when frequency of negative thoughts was in the model. This suggests that the association between decentering and willingness (shown in the bivariate correlation) is accounted for by the shared variance with the frequency of negative thoughts. Next, the interaction term between negative thoughts and decentering was added to the regression model as a second step. The interaction term did not account for a significant amount of the variance in willingness over and above the two indicators, $\Delta R^2=.000$, $\Delta F(1, 56)=.026$, $p=.87$, $b=-0.02$, negative thoughts ($b=-0.61$, $p<.001$), decentering ($b=0.03$, $p=.79$), negative thoughts * decentering ($b=-0.02$, $p=.87$). Adding decentering as a moderator, negative thoughts continued to contribute to the model, and decentering continued to not contribute to the

model. The moderator did not contribute significantly, indicating that this measure of

trait-level decentering is not a moderator of the relationship between negative thoughts

and willingness in our sample.

Table 4.
Analysis investigating hypothesis 3a: Decentering as a moderator of the relationship
between negative thoughts and willingness

Variable	R^2	b	SE	β	$R^2\varDelta$	p
Step 1	.40				.40	<.001
Negative Thoughts		-0.96	.19	-.61		<.001
Decentering		0.15	.43	.04		.73
Step 2	.40				.00	.87
Negative Thoughts		-0.97	.20	-.61		<.001
Decentering		0.12	.47	-.03		.79
Neg*Dec		-0.00	.02	-.02		.87

Note: Neg*Dec = the interaction term of negative thoughts and decentering

To test the hypothesis that the frequency of negative thoughts is associated with

willingness, and more specifically that believability of the thoughts moderates the

relationship between negative thoughts and willingness (hypothesis 3b), a hierarchical

multiple regression was conducted. First, we tested the relationship between negative

thoughts, believability and willingness by performing correlation analyses (Table 3).

Frequency of negative thoughts and believability of them were both strongly negatively

correlated with willingness, in that a higher frequency of negative thoughts and

believability of them were (independently) correlated with lower willingness to repeat the

task. Negative thoughts and believability were very strongly positively correlated in that

higher frequency of negative thoughts was correlated with greater believability of the

thoughts.

Next, a multiple regression model looking at negative thoughts and believability with willingness as a criterion produced the following results: $R^2=.47$, $F(2, 56)=24.79$, $p<.001$, negative thoughts ($b=-0.46$, $p=.005$), believability ($b=-0.26$, $p=.11$), further detail in Table 5. The multiple regression results indicated that negative thoughts and believability accounted for 47% of the variance in willingness. As can be seen, frequency of negative thoughts was significantly associated with the criterion (willingness) while controlling for believability. Similar to the results for hypothesis 3a, despite the high correlation between believability and willingness, believability was not a significant predictor of willingness (did not account for additional unique variance) when negative thoughts was in the model. Next, the interaction term between negative thoughts and believability was added to the regression model. The interaction term did not account for a significant portion of the variance in willingness over and above the indicators, $\Delta R^2=.001$, $\Delta F(1, 55)=0.06$, $p=.80$, $b=0.03$, negative thoughts ($b=-0.49$, $p=.02$), believability ($b=-0.24$, $p=.19$), negative thoughts * believability ($b=0.03$, $p=.80$). Adding believability as a moderator, negative thoughts continued to contribute to the model, and believability continued to not contribute. The indicator did not contribute significantly, indicating that believability of negative thoughts experienced during the task is not a moderator of the relationship between negative thoughts and willingness in this sample.

Table 5.
Analysis investigating hypothesis 3b: Believability as a moderator of the relationship between negative thoughts and willingness

Variable	R^2	b	SE	β	$R^2\Delta$	p
Step 1	.47				.47	<.001
Negative Thoughts		-0.72	.25	-.46		.005
Believability		-0.01	.01	-.26		.11
Step 2	.47				.00	.80
Negative Thoughts		-0.77	.32	-.49		.02
Believability		-0.01	.01	-.24		.19
Neg*Bel		-0.00	.00	.03		.80

Note: Neg*Bel = the interaction term of negative thoughts and believability

CHAPTER 5

DISCUSSION

The present study investigated cognitive processes comprising a proposed SAD-sustaining feedback loop. Following an anxiety-provoking 4-minute speech task, individuals with SAD were compared to NAC participants on measures of negative thought prevalence, their believability of the negative thoughts, decentering, and willingness to repeat the task. This study provides supporting evidence for negative feedback loops used in models of SAD and contributes to our understanding of differences in how SAD and NAC individuals engage in an anxiety-provoking social task. Our hypothesized loop was supported in that there were differences at each step of the model between SAD and NAC. However, our hypothesized moderators (decentering and believability) between negative thoughts and willingness were not supported by the data.

As hypothesized, individuals with SAD reported a higher frequency of negative thoughts during the speech task. Individuals with SAD rated these negative thoughts as more believable than NACs. Greater prevalence and believability of negative thoughts in the SAD group is consistent with prior research (Hirsch et al., 2006; Tanner et al., 2006) and suggests that individuals with SAD encode more negative evidence of self-

performance during a social situation. This increased quantity and believability of negative thoughts is consistent with models of SAD that suggest a negative feedback loop sustains SAD symptomology (Rapee & Heimberg, 1997). Individuals with SAD focus more on negative cues and thoughts (Alden, et al., 2008), likely because they are having an anxious response and finding the environment threatening (Gilbert, 2001). Finding self-critical negative thoughts more believable may lead to a more critical and negative self-perception. This negative evaluation of one's ongoing performance may lead to greater anxiety in current and future social interactions (Laposa et al., 2010). The increased negativity and anxiety then fuel predictions of future events (and likely lead to greater avoidance), completing the negative feedback loop.

NACs were more willing to repeat the speech task than individuals with SAD. We used willingness as a proxy for avoidance, an important maintaining symptom of SAD whereby individuals avoid anxiety-provoking situations (Clark & Wells, 1995; Herbert & Cardaciotto, 2005; Rapee & Heimberg, 1997). As expected, the SAD group indicated significantly lower willingness to repeat the speech task, likely reflecting that they think future interactions would be less successful than NACs would predict. Building on the findings with negative thoughts and believability, and considering the SAD loop, individuals who interpret a social situation as more negative will likely also assume that future events will also go negatively (not measured in this study), and will be more likely to engage in avoidance of similar situations in the future to avoid feelings of anxiety (i.e. less willing).

Individuals in the NAC group reported higher trait-level decentering than individuals with SAD. Higher levels of trait decentering, an adaptive cognitive strategy

(Fresco et al., 2007), in NACs suggests that individuals without anxiety disorders are more often cognitively "stepping back" from the anxiety-provoking situation (Safren & Segal, 1990), and examining their own thoughts, allowing them to take in a wider range of cues from their environment, including positive, neutral, and negative. Indeed, in previous research NACs have been shown to find anxiety-provoking social situations 4 times less negative than individuals with SAD (Stopa & Clark, 1993). Having a more rounded, less rigid interpretation of a social performance situation might protect individuals from developing a clinically significant fear of social situations, or SAD.

In sum, significant mean differences were found at each step of the negative feedback loop proposed: negative thoughts, believability, decentering, and willingness. These findings support the hypothesis that NAC and SAD individuals experience anxiety-provoking situations differently, and that there may be places in the model where differences characterize either group. However, further research is needed to look at the causal associations between these (and perhaps additional) steps.

We collapsed the SAD and NAC groups together to perform correlational and moderation analyses to test the hypothesis that regardless of the number of negative thoughts experienced, different levels of adaptive cognitions (decentering and believability) would determine the willingness of participants to repeat the task. By investigating this, we hoped to gain a better understanding of how the conclusions that are made by individuals following anxiety-provoking situations affect future engagement or avoidance, a key part of SAD models (Clark & Wells, 1995; Moitra, Herbert, & Forman, 2008; Rapee & Heimberg, 1997). Negative thoughts were inversely correlated with willingness, in that a higher frequency of negative thoughts was associated with

lower willingness to repeat the task. This is consistent with our theorized loop, as the more negative self-evaluative cognitions one has about their performance, the less likely they are to want to repeat the experience. Believability was very strongly correlated with frequency of negative thoughts, likely because they are two parts of the same measure answered in succession and because the more negative thoughts one has about a situation, the more likely one is to believe those negative thoughts. Decentering was moderately positively correlated with willingness in that higher levels of decentering were related to higher willingness to repeat the task. Since NACs also experience negative thoughts in speech tasks (Hirsch et al., 2006), we hypothesized that they might be using adaptive cognitive strategies (like decentering) to cope with the anxiety and leave with a less negative overall perception of the task and thus, more willing to repeat it. Finally, decentering and believability were highly correlated with each other, in that higher decentering was related to lower believability. This is consistent with our conceptualization of each, as we see decentering and believability as related constructs. Decentering is described as stepping back from one's thoughts and seeing them more objectively, more like experiences and less like fact (Safran & Segal, 1990). Similarly, one can have a negative self-critical thought like "I won't have anything to say," but not encode it as fact, and in turn find it less believable. Though we did expect relationships between variables, it is possible that the high correlations between the two sets of predictors (negative thoughts and decentering; negative thoughts and believability) has resulted in multicolinearity among the variables, which may be interfering with the moderation analyses.

Though decentering and willingness were correlated, decentering was not a unique predictor of willingness in the initial regression model when frequency of negative thoughts was also included. This lack of an evidenced relationship between decentering and willingness while controlling for negative thoughts is puzzling, as NAC had higher levels of trait decentering, and it is a proposed mechanism of change in CBT techniques (Hayes-Skelton & Graham, 2012). This lack of findings may be due to the aforementioned effects of multicolinearity, in that frequency of negative thoughts explained the shared variance between decentering and willingness. Another possibility is that frequency of negative thoughts drove the relationship so strongly that it prevented decentering from being able to add unique variance. It is also possible that the EQ does not capture the complex cognitive process of decentering in the way we theorize it interacting with this feedback loop. Because the EQ is a trait measure of decentering (and was administered up to 2 weeks before the speech task) we might not be capturing how decentering interacts with one's anxiety during a task.

In the second regression model looking at the relationship between negative thoughts and believability with willingness as a criterion, believability did not significantly contribute to the model over and above frequency of negative thoughts. This finding is likely due to the very high correlation between frequency of negative thoughts and believability, as they are two parts of the same measure (answered in succession). This high correlation might be because the measures are too similar for one to possibly add unique variance to a model including both. Further, the high correlation might indicate that the measure does not adequately discriminate between these two constructs that we theorize as more distinct than the data imply.

Indeed, moderation analyses did not reveal evidence for decentering or believability moderating the relationship between the frequency of negative thoughts and participants' willingness to repeat the task. Since decentering is a potential mechanism of change in cognitive behavioral therapies for anxiety disorders (Hayes-Skelton & Graham, 2012), we expected that it might explain how individuals could be willing to repeat an anxiety-provoking situation, despite experiencing negative thoughts. Our lack of findings in these moderation analyses suggests that we do not yet fully understand decentering, how it might be related to believability, and how both interact in the cognitive processes of individuals with and without anxiety disorders. Further, these results might suggest that a measure of trait-level decentering might not be the ideal measure of an adaptive cognitive strategy employed in the midst of an anxiety-provoking social situation. Instead, a state-level measure of decentering might be more fitting for our model. In terms of believability, this variable likely would have been much stronger if separate from frequency of negative thoughts. Because these two were so highly correlated, unique effects of believability and how it relates to willingness could not be measured.

Taken together, these results partially support models of SAD which suggest that negative feedback loops exacerbate and perpetuate symptoms of social anxiety, as NAC and SAD individuals differed significantly in each step of the process we examined (Clark & Wells, 1995; Rapee & Heimberg, 1997). During an anxiety-provoking situation, individuals with SAD experience more negative thoughts about the event and their performance, and also find those thoughts more believable. Willingness can be thought of as a proxy of future avoidance, in that being less willing to repeat the task is likely related to how the individual predicts future situations will go, and how likely they would be to

engage in them. Avoidance (or being un-"willing" to engage in a social situation) is correlated with greater SAD symptomatology (Moitra, Herbert, & Forman, 2008) and may perpetuate symptoms by preventing individuals from engaging in positive social interactions. Decentering has been proposed to be a potential mechanism of change in CBT treatments for SAD (Fresco, et al., 2007; Hayes-Skelton & Graham, 2012) and the present study supports that decentering is a key component in the distinction between individuals with and without anxiety disorders, at a trait level. Lack of findings in our moderation analyses indicate that future research is needed to understand how decentering interacts with anxiety and negative cognitions, as we have seen that individuals without anxiety disorders have higher levels of this adaptive cognitive strategy. Trait-level decentering was not uniquely related to willingness to repeat the task over and above the frequency of negative thoughts. Perhaps trait-level decentering is more related to how much anxiety is experienced by the participant in the anxiety-provoking situation on either physiological or self-report measures. Future studies could employ a state measure of decentering during the task to better measure this complex construct in the way we are theorizing it to interact with negative cognitions in the midst of an anxiety-provoking situation.

The findings of this study should be considered in the context of a few limitations. These data were collected cross-sectionally, so conclusions about directionality cannot be made. Often studies investigating BATs in social anxiety control for gender sameness or difference between the participant and confederate as a proxy of attraction, as it may play a role in the difficulty of the task. However, we did not control for this due to varying sexual orientation identification of our participants, and a lack of an alternative strong

measure of attraction. Not measuring attraction prevented us from controlling for this factor of our participants' experiences. Additionally, the "willingness" measure is relatively new and only a single item. Further investigation of the link between willingness and future social avoidance would make an important connection and allow for further insight into the negative feedback loop that we believe exacerbates anxiety. Also, we assessed trait decentering 1-2 weeks before the BAT, rather than measuring state decentering at the same time point as the task. This trait measure of decentering collected at a different time point might have prevented us from seeing the full effects of decentering employed during the speech task. Future studies should consider measuring trait decentering at the same time point, or perhaps measuring state decentering before or after the task. Ideally, a "live" measure of decentering would be created that would enable measurement of decentering at baseline and during anxiety provoking situations in individuals with and without anxiety to learn more about how this cognitive strategy works, and how it relates to anxiety. Learning more about how individuals experience, dispute, or relate to negative thoughts and the believability of them during anxiety-provoking situations (as opposed to after) would aid in elucidating this anxiety loop on a macro level.

Future empirical studies are necessary to explore this negative feedback loop model more fully, potentially using additional or different measures. First, models should be developed that use measures that are not as highly correlated as ones used in the present study, to avoid effects of multicollinearity in moderation analyses. Second, additional facets of the feedback loop surrounding anxiety-provoking situations should be considered and potentially added to the experimental model, such as level of anxiety

throughout the task. Ideally, a state, or "live" measure of decentering that more fully measures an individual's relationship with negative thoughts during the task would be used. Also, future studies should consider other statistical models that might more accurately describe or further explore causal relationships. For example, investigating potential mediation effects of decentering would allow us to see if decentering is a step that individuals take in response to negative thoughts before perceptions about the believability or overall perception of the task are made.

Gaining a greater understanding of the role of emotions and cognitions experienced and employed during anxiety provoking situations and further exploration of the cognitive processes that distinguish individuals with and without anxiety disorders is an important direction to explore in anxiety disorders. For example, including a post-treatment SAD group in the data would allow us to investigate the relationship between decentering before and after treatment in anxious samples compared to those without anxiety disorders. Decentering could potentially be a byproduct of treatment over and above that which NAC have at a trait level. Understanding more about the difference between learned and trait decentering in post-treatment and NAC control samples would help elucidate this cognitive process and potential mechanism of change. Learning more about the cognitive factors that exacerbate or maintain anxiety symptoms will aid in the development of more efficacious and efficient treatments for anxiety disorders.

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