Examining the Generalizability of Video Feedback with Cognitive Preparation to a Social Interaction Role-play

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Examing the Generalizability of Video Feedback with Cognitive Preparation

to a Social Interaction Role-play

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Abstract

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Examining the Generalizability of Video Feedback with Cognitive Preparation to a Social Interaction Role-play

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Individuals diagnosed with social anxiety disorder (SAD) tend to form negatively-distorted and inaccurate self-images during social situations (Clark & Wells, 1995; Heimberg, Brozovich, & Rapee, 2010). Extensive research has provided support for the existence of these negative mental representations, and has shown how they contribute to the maintenance of SAD symptoms. A cognitive-behavioral treatment component known as video feedback (VF) has been shown to be effective in altering such distorted self-representations; additionally, a modified VF technique involving cognitive preparation has been shown to enhance VF treatment effects. The present study evaluated whether the effects of VF with cognitive preparation replicate and extend to a semi-structured social interaction, and further examined the link between VF-induced changes in self-perception and state anxiety. A sample of 29 participants who met diagnostic criteria for SAD were randomly assigned to receive VF (VF condition) or a mental arithmetic task (No-VF condition) in between two social interaction role-plays with a trained confederate. Results suggest that, in response to a social interaction, VF: [1] results in improved self-evaluation of performance, and [2] exerts an effect on state anxiety in SAD individuals.

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Justin W. Weeks

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Introduction

Social anxiety disorder (SAD; i.e., social phobia) is a psychological disorder that is predominantly characterized by a persistent fear of performance or social situations in which the individual is subject to potential evaluation by others (American Psychiatric Association, 2000). More specifically, for individuals diagnosed with SAD, exposure to a social situation will induce marked anxiety and distress that is irrational in basis and excessive in severity, and such anxiety often causes the individual to avoid feared social situations entirely. Therefore, clinically severe social anxiety interferes significantly with one’s level of functioning, particularly occupational or interpersonal functioning (APA, 2000). According to the National Comorbidity Survey-Replication (NCS-R), SAD is also one of the most prevalent psychiatric disorders in the United States, with a 1-year prevalence of 6.8% and a lifetime prevalence rate of 12.1% (Kessler et al., 2005).

Substantial research has shown that individuals diagnosed with SAD tend to form inaccurate, negatively-distorted images of themselves when in a feared social situation, and that these images contribute to the maintenance of social anxiety (e.g., see Clark & Wells, 1995; Hackmann, Clark, & McManus, 2000; Hackmann, Surawy, & Clark, 1998; Heimberg, Brozovich, & Rapee, 2010; Leary, Kowalski, & Campbell, 1988). The present paper will review the literature on distorted self-images and their relationship to negative self-evaluative tendencies in socially anxious individuals. Additionally, the ways in which these self-images are amenable to modification through a cognitive-behavioral therapeutic technique, video feedback (VF; see Clark & Wells, 1995), and the effects of such a modification on SAD symptomatology, will be explored. Although various factors contribute to the maintenance of SAD, the specific role of negative self-images in
perpetuating SAD symptoms will be focused on most extensively in the present paper, given that these images are most relevant to the purported mechanisms through which VF works. The present study seeks to replicate and extend the effects of VF to a semi-structured social interaction role-play, and to assess whether VF is capable of reducing the severity of state anxiety evoked by this role-play.

A crucial component of SAD pertains to the dysfunctional cognitions that socially anxious individuals hold that pertain to both the self (e.g., “I look awkward”) as well as others (e.g., “Everyone thinks I am boring”); these negative automatic thoughts are regarded by individuals with SAD as factual, and are induced by anxiety-provoking social situations or anticipation of/ reflection on these situations (Heimberg et al., 2010). According to the cognitive model of social anxiety posited by Clark and Wells (1995), individuals with SAD believe that they are likely to behave in an unappealing manner and that this will lead to catastrophic personal consequences such as loss of status.

In addition, individuals with SAD tend to hold the core beliefs that: a) others are fundamentally critical and prone to negatively evaluate others in social situations (Leary, Kowalski, & Campbell, 1988), and b) others will reject them (Ledley, Erwin, & Heimberg, 2008). More specifically, Leary and Kowalski (1995) posited that SAD will occur when an individual desires to make a favorable impression on others but doubts one’s ability to do so. Socially anxious individuals also are proposed to hold a negatively distorted mental representation that depicts how their own appearance and behavior are
seemingly perceived by the audience in a social situation (Hackmann, Clark, & McManus, 2000; Hackmann, Surawy, & Clark, 1998; Heimberg et al., 2010).\(^1\)

Cognitive-behavioral models of social anxiety (Clark & Wells, 1995; Heimberg et al., 2010) posit that the negatively-distorted mental self-images held by individuals with SAD play a crucial role in the maintenance of the disorder. Specifically, socially anxious individuals are proposed to hold negative views of their performance, abilities, and appearance that serve to increase one’s expectation of negative evaluation from others, thereby increasing anxiety and associated symptoms. Therefore, Harvey, Clark, Ehlers, and Rapee (2000) proposed that it is likely that socially anxious individuals would benefit from a technique that corrects these negative distortions and allows for more accurate self-perceptions. This is the basic premise behind video feedback, a clinical technique initially suggested by Clark and Wells (1995), wherein an individual attempts to objectively evaluate one’s performance in a social situation upon reviewing it via a video recording (Parr & Cartwright-Hatton, 2009).

**Negatively-Distorted Mental Self-Images in Socially Anxious Individuals**

When a socially anxious individual encounters a social situation, the individual forms a mental image of his/her external appearance and behavior based on how one believes the perceived (critically-evaluative) audience will negatively appraise him/her,

\(^1\) In the context of social anxiety, the term “audience” is not used to distinguish a group of observers, as is the typical use of the word, but rather, refers to any individual or group of individuals who may perceive, and therefore potentially evaluate, a person’s appearance or behavior (Heimberg et al., 2010).
rather than on how the individual actually perceives his/her own appearance or behavior (Heimberg et al., 2010). This internal mental representation is based on associations from multiple sources, including information from long-term memory as well as internal and external cues. Long-term memory information might include recollections of past experiences in social situations or memories of one’s appearance; internal cues include physical symptoms (i.e., proprioception; e.g., anxious arousal), whereas external cues are those that pertain to verbal and nonverbal feedback from the audience (Heimberg et al., 2010). Thus, socially anxious individuals’ mental representations are often not an objective image of their own appearance or behavior, but are instead negatively distorted based both on: a) the sources of information that are most predominant for the individual in the situation; and b) how an individual weighs such information (Heimberg et al., 2010).

As noted by Clark and Wells (1995), socially anxious individuals also tend to turn their attention inwards during social situations and to make an automatic assumption that how one feels at that time is relevant to how others evaluate them. For example, the socially anxious individual will liken feeling “out of control” with appearing observably “out of control” (Clark & Wells, 1995). Consequently, Wells, Clark, and Ahmad (1998) posited that, because socially anxious individuals’ self-images are partially based on anxious feelings, the image formed from such feelings is likely to be excessively negative.

Hope, Rapee, Heimberg, and Dombeck (1990) further noted that individuals diagnosed with SAD do not selectively attend to all emotional information, but instead, exhibit an attentional bias toward processing negative or threatening social information. Therefore, even if a socially anxious individual attends to external information, he/she
will be more apt to negatively distort ambiguous social cues, and prone to exaggerate those aspects of their mental self-image that they believe are most likely to elicit criticism from others (Heimberg et al., 2010).

Findings from numerous studies have upheld the notion that socially anxious individuals form negatively biased mental self-representations that are discrepant from how others perceive them. A study by Hirsch, Clark, Mathews, and Williams (2003) lent support to the hypothesis that negative mental self-representations play a *causal* role in the maintenance of social anxiety. The study involved having individuals diagnosed with SAD engage in two conversations with a stranger; once while holding the negative mental self-image in mind that participants typically produce during anxiety-provoking social situations, and once while holding a less negative self-image in mind (as a control condition).

Results showed that when patients held the typical (negative) image in mind, they reported greater state anxiety, rated anxiety symptoms as being more visible to others, and rated their performance more poorly than when they held the less negative self-image in mind. In the negative imagery condition, independent observers also objectively rated participants’ anxiety as more evident, and their behaviors as less positive, relative to ratings from the control condition. Lastly, in both the negative imagery and control conditions, participants underestimated the quality of their performance and overestimated anxiety symptom visibility compared to independent assessors; however, these discrepancies were significantly greater for the negative imagery condition (Hirsch et al., 2003). Hirsch, Meynen, and Clark (2004) replicated the Hirsch et al. (2003) study and obtained results consistent with their earlier findings.
Taken together, the findings of Hirsch and colleagues exemplify both the importance of the negative mental self-image in perpetuating anxiety, and that a discrepancy exists between socially anxious individuals’ self-evaluation of performance compared to that of objective observers (wherein socially anxious individuals perceive their performance to be more negative). These findings also support the supposition by Clark and Wells (1995) that negative self-images in SAD increase social anxiety and maintain negative beliefs about social performance and appearance.

**Field versus Observer Perspectives**

Clark and Wells (1995) have also posited that the self-image that socially anxious individuals generate when in a social situation often occurs from an *observer perspective* (in which the individual sees oneself as though from another’s point of view), as opposed to a *field perspective* (in which the individual views the situation as if looking out through one’s *own* eyes, i.e. as if gazing upon a field). Socially anxious individuals tend to direct their attention *inwardly* during a feared social situation as a means of self-monitoring anxiety symptoms; the inward direction of one’s attention interferes with objective processing of both the situation and others’ behavior towards oneself, and exaggerates awareness of one’s own anxiety response. This is problematic, in that SAD individuals tend to interpret interoceptive information (i.e., somatic anxiety symptoms) as a direct reflection of how others are actually *thinking about them* (Clark & Wells, 1995).

Providing support for the self-observer discrepancy in socially anxious individuals, Wells, Clark, and Ahmad (1998) asked individuals diagnosed with SAD and nonclinical controls to imagine a recent social and nonsocial situation. Participants were then asked questions about the perspective from which they remembered viewing
themselves during the situation (i.e. as if from one’s own eyes, or as if from outside of one’s body). Outpatients diagnosed with SAD were significantly more likely than non-patient controls to recall an observer perspective when imagining a past social situation. Interestingly, however, both SAD patients and non-patient controls adopted a field perspective for non-social situations. Wells and Papageorgiou (1999) replicated these findings and additionally found that the change from field to observer perspective in anxiety-provoking social situations is specific to individuals diagnosed with SAD.

Another study by Hackmann et al. (1998) involved asking patients diagnosed with SAD and non-patient controls to evoke an image of oneself during an anxiety-provoking social situation, and report on the perspective from which the image was viewed during the situation. SAD patients were significantly more likely than controls to report spontaneously occurring, negative images viewed from an observer perspective when in an anxiety-provoking social situation. Hackmann et al. (2000) replicated these findings and further found that images seen from an observer perspective tend to recur, in that their content is stable across feared situations and over time. Taken together, these findings highlight that a mental self-image, as seen from an observer perspective, may serve to maintain symptoms of social anxiety, in that such an image (and accompanying self-focus) may interfere with a socially anxious individual’s ability to access external information during social situations, thereby disallowing awareness that an audience may not have responded as poorly to one’s behavior as one may have initially feared (Wells et al., 1998).
**Socially Anxious Individuals and Self-Judgments**

Findings from numerous studies provide further evidence indicating that socially anxious individuals are characterized by a negative bias in self-perception that is exhibited across multiple aspects of social behavior, and that these biases can be conceptualized as negative self-judgments. In a study by Rapee and Lim (1992), individuals diagnosed with SAD and nonclinical controls completed a speech role-play that participants as well as audience members rated on both global aspects (e.g., whether one appeared confident) or specific aspects (e.g., whether one’s voice shook) of behavior. Results indicated that, although all subjects rated their public speaking performance worse than did observers, individuals diagnosed with SAD rated their performance as significantly worse than did controls.

Similarly, in a study done by Alden and Wallace (1995), individuals diagnosed with SAD and nonclinical controls engaged in a structured positive or negative social interaction with an experimental confederate. Both participants and experimental confederates (who were blind to group status) rated the participants’ behavior following the role-play. Relative to the confederate ratings and those of objective observers, individuals diagnosed with SAD significantly underestimated their overall likeability and the degree to which they expressed warmth and interest, and overestimated the visibility of their anxiety. More importantly, individuals diagnosed with SAD underestimated their social performance to the same extent in the positively- and negatively-structured conditions, relative to observer ratings. This finding highlights that the negative biases in individuals with SAD are not necessarily related to the skill level of one’s social behavior,
or to *social cues from others*, but result instead from *self*-evaluation (Alden & Wallace, 1995).

Furthermore, Rapee and Abbott (2004) conducted a study in which individuals diagnosed with SAD and nonclinical controls engaged in a public speech role-play. Participants and independent observers rated participants’ speech performance and attractiveness following the speech. Results showed that socially anxious individuals not only rated their own observable attributes (i.e. social performance skills and external appearance) as less favorable in comparison to nonclinical controls’ self-ratings, but also rated their own attributes as significantly worse in comparison to how independent observers rated the socially anxious individuals’ skills and appearance.

Taken together, the above findings are consistent with cognitive-behavioral models of social anxiety, which posit that socially anxious individuals’ self-perceptions are discrepant from observer perceptions and are negatively biased. In particular, socially anxious individuals’ negative mental self-representations most likely involve underestimation of general ability, role-play performance, and physical attractiveness, and over-estimation of anxiety visibility and negative personality characteristics (Rapee & Abbott, 2006). Given the evidence supporting the role of negative self-images and subsequent negative self-judgments in perpetuating and possibly causing social anxiety, researchers have begun to focus on interventions designed to ameliorate these negative images; in the next section, research on *video feedback*, a technique intended to modify such images, is reviewed.
Video Feedback

As previously noted, cognitive-behavioral models of social anxiety have specified that negatively distorted self-perceptions play a key role in the maintenance of SAD (Clark & Wells, 1995; Heimberg et al., 2010). Based on this notion, Rapee and Hayman (1996) posited that altering socially anxious individuals’ tendency to underestimate their own social performance may result in an improvement in social anxiety symptoms. Rapee and Hayman (1996) hypothesized that, to change one’s self-evaluation of performance, either: a) negative, internal input must be minimized; or b) attention to external, opposing input (e.g., audience feedback) must be maximized. The authors suggested that the usage of video feedback could be a fitting way to achieve maximization of external input.

Findings reported by Rapee and Hayman (1996) support the notion that VF is effective in correcting socially anxious individuals’ negatively distorted mental images formed during speeches. This study involved having socially anxious participants deliver two speeches; the experimental group received VF in between the speeches, whereas the control group was instructed to wait for a 3-minute period as a control condition. The authors found that participants who received VF (in comparison to controls) were significantly more capable of rating their social performance following speech # 2 in a manner that, in comparison to speech # 1, was increasingly: a) positive, and b) consistent with that of independent (objective) observers (Rapee & Hayman, 1996).

A study by Rodebaugh and Chambless (2002) replicated the Rapee and Hayman (1996) study. The authors had moderately communication-apprehensive participants randomly assigned to one of three groups: an experimental condition (wherein participants
received VF for a speech), or one of two control conditions (wherein participants received either [1] non-speech-related VF; or [2] no VF). All participants engaged in two speech role-plays; afterwards, participants and independent observers rated both speeches. The authors reported that speech-specific VF produced beneficial effects for participants who had higher self-observer discrepancies (i.e., greater discrepancies between their own ratings of speech #1 and those of observers), in comparison to those low in self-observer discrepancy. Specifically, the high self-observer discrepancy participants rated themselves as less nervous-looking during both of their speeches following speech-specific VF than did the high self-observer discrepancy participants in the two comparison conditions.

Consequently, the authors posited that VF is most effective as a treatment component for individuals who are most in need of correction of the discrepancy between self- and objective ratings of performance (Rodebaugh & Chambless, 2002). Taken together, the above findings ( Rapee & Hayman, 1996; Rodebaugh & Chambless, 2002) suggest that video feedback is effective in improving socially anxious individuals’ negative self-evaluation of performance, thereby making it a) less negative and b) less discrepant from the arguably more objective evaluation of others; furthermore, video feedback may have a stronger effect on individuals who exhibit a greater initial self-observer discrepancy.

In outlining the theoretical rationale behind video feedback, Rapee and Hayman (1996) posited that, for socially anxious individuals, input from manifest anxiety symptoms and long-term memories outweighs information from external feedback (e.g., audience cues), thus perpetuating negative self-perception of performance; hence, the observation of one’s actual performance via video serves to increase the importance and
impact of external feedback, which serves to alter one’s mental representation of the performance to be more objective (Rapee & Hayman, 1996). Rodebaugh and Chambless (2002) further postulated that the usage of video as a medium is effective in allowing the individual to view themselves more objectively, in that video is not as subject to the cognitive distortions exhibited by those with SAD as one’s imagination may be.

**Video Feedback with Cognitive Preparation**

However, the findings reviewed above notwithstanding, as initially pointed out by Clark and Wells (1995), an inherent problem with the video feedback technique involves the fact that SAD patients could confuse what was *actually being seen* on the videotape with their *biased memory of the image* formed during the role-play (i.e., watching the videotape may serve to trigger the mental image of how one *thought one appeared*, thus causing interference in one’s ability to attend to the actual image being displayed in the videotape). Consequently, the authors posited that having the participant construct an image of how one believed he/she appeared *before viewing the videotape* would solve this problem by providing a baseline image to be juxtaposed with one’s actual performance. Thus, Harvey, Clark, Ehlers, and Rapee (2000) conducted an experiment that examined whether or not the construction of an image prior to VF would enhance the benefits of this technique. Harvey et al. (2000) referred to this concept as *cognitive preparation* (CP) and defined it as “asking participants to (1) predict in detail what they will see in the video, (2) form an image of themselves giving the speech and (3) watch the video as though they were watching a stranger” (p. 1183).

Multiple studies have provided support for the enhanced efficacy of video feedback with cognitive preparation (VF) in comparison to VF alone, with findings
indicating that the use of VF is effective overall in altering socially anxious individuals’ negatively distorted mental self-representations, which in turn effectively serves to reduce features associated with SAD. Results from these studies have been summarized in Table 1.
Table 1

*Previous findings involving Video Feedback as an Intervention for Speech Anxiety.*

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample characteristics</th>
<th>Subjects $(n)$</th>
<th>Conditions</th>
<th>Methodology specifics</th>
<th>Measurement of state anxiety</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvey, Clark, Ehlers and Rapee (2000)</td>
<td>Individuals low and high in fear of negative evaluation (self report) as determined by the Fear of Negative Evaluation Scale (FNE)</td>
<td>74</td>
<td>Video feedback with cognitive preparation (VF with CP) compared to VF without CP following one speech role-play</td>
<td>♦ Participants gave video-recorded speech, rated their performance, received VF with CP or VF without CP (with a simple copying task used in place of CP), then re-rated previous speech</td>
<td>None</td>
<td>Compared to those receiving VF without CP, participants receiving VF with CP ♦ made higher self-ratings of specific aspects of performance and overall performance ♦ exhibited reduced discrepancy between assessor and self-ratings</td>
</tr>
<tr>
<td>Kim, Lundh, and Harvey (2002)</td>
<td>Individuals high in fear of negative evaluation (self-report) as determined by the FNE</td>
<td>40</td>
<td>VF with CP compared to VF without CP, administered in between two speech tasks</td>
<td>♦ Participants gave video-recorded speech, rated their performance, received VF with CP or VF without CP (plus an emotional Stroop task), then gave and rated second speech</td>
<td>None</td>
<td>♦ Replicated Harvey et al. (2000) findings ♦ Found a significant cognitive preparation enhancement effect for increased positive and decreased negative aspects of performance post-second speech</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Methodology</td>
<td>Results</td>
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<td>Parr and Cartwright-Hatton (2009)</td>
<td>Highly socially anxious adolescents and non-anxious controls (self-report) as determined by the Social Phobia and Anxiety Inventory for Children (SPAI-C)</td>
<td>VF with CP compared to no VF, administered in between two speech tasks</td>
<td>Participants gave video-recorded speech, rated their performance, received VF with CP or no VF, then gave and rated second speech.</td>
<td>Compared to controls, participants who received VF with CP; assigned more positive self-ratings of performance of the second speech; predicted the second speech would be better post-VF; showed a reduction in anticipatory anxiety before the second speech.</td>
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<td>McManus et al. (2009)</td>
<td>Individuals diagnosed with SAD via the Anxiety Disorders Interview Schedule and Structured Clinical Interview-I and –II who were currently receiving cognitive therapy</td>
<td>VF with CP following two separate role-plays (one conducted with safety behaviors, and one conducted without use of safety behaviors)</td>
<td>In a counterbalanced order, each participant participated in both types of role-plays; In each scenario, participants engaged in and rated the role-play, received VF with CP, then re-rated role-play.</td>
<td>Compared to pre-VF predictions, participants in both conditions (following VF with CP) reported that they: appeared less anxious; had fewer feared outcomes occur than expected; had better overall performance; exhibited fewer social anxiety symptoms one week post-experiment.</td>
<td></td>
<td></td>
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<tr>
<td>Study (Year)</td>
<td>Participants</td>
<td>Group Size</td>
<td>Conditions</td>
<td>Measures</td>
<td>Findings</td>
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<tr>
<td>Rodebaugh (2004)</td>
<td>Speech anxious participants (self report) as determined by the Personal Report of Communication Apprehension</td>
<td>95</td>
<td>VF with CP compared to VF without CP (i.e. a neutral imagery condition was used in place of CP) in between two speech tasks</td>
<td>Brief State Anxiety Measure, measured before and after each speech</td>
<td>Three speeches were given; VF occurred in between speeches 1 and 2 Ratings of state anxiety were measured before and after each speech, with ratings of evaluation of performance rated after each speech</td>
<td></td>
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</table>

Smits, Powers, Buxkamper, & Telch (2006) | Individuals diagnosed with SAD, as determined by the Liebowitz Social Anxiety Scale (LSAS) and the Composite International Diagnostic Interview | 77 | 2 VF with CP conditions were compared to 2 no VF conditions of a speech task; VF with CP or No-VF followed each speech | Subjective Units of Distress Scale ratings, provided following each speech; LSAS administered pre- and post-intervention | All four conditions showed a significant reduction in anxiety pre- to post-treatment (i.e. following 15 speeches) Participants in the no VF (i.e. with filler task) condition demonstrated clinically significant change in speech fear when compared to the relaxation condition |
**Table 1:** continued

<table>
<thead>
<tr>
<th>Source</th>
<th>Individuals diagnosed with SAD</th>
<th>Sample Size</th>
<th>Participants</th>
<th>Anticipatory Anxiety</th>
<th>VF with CP lead to a:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chen et al. (2010)</td>
<td>via the SCID-I who were currently receiving group-based cognitive behavioral therapy</td>
<td>52</td>
<td>All participants received VF with CP following one role-play; no control condition was employed</td>
<td>Participants rated anticipatory anxiety, engaged in and rated performance of the role-play, received VF with CP, re-rated performance, then rated anticipatory anxiety regarding a future role-play</td>
<td>VF with CP lead to a: decrease in participants’ estimation of performance.</td>
</tr>
<tr>
<td>Rodebaugh, Heimberg, Schultz, &amp; Blackmore (2010)</td>
<td>via the ADIS</td>
<td>26</td>
<td>VF with CP compared to no VF following one speech task; this protocol was conducted twice over two sessions</td>
<td>In one session, participants engaged in and rated speech task, received VF with CP or no VF, then re-rated speech #1 6 – 14 days later, session content was repeated (but control participants received VF to alleviate ethical concerns.)</td>
<td>Brief State Anxiety Measure, measured before and after each speech role-play</td>
</tr>
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</table>

**Notes.** FNE = Fear of Negative Evaluation Scale; VF = Video Feedback; CP = Cognitive Preparation; SPAI-C = Social Phobia and Anxiety Inventory for Children; STAI – S = State-Trait Anxiety Inventory – State version; LSAS = Liebowitz Social Anxiety Scale; ADIS = Anxiety Disorders Interview Schedule for DSM-IV; SCID – I = Structured Clinical Interview for DSM-IV Axis I Disorders; SCID – II = Structured Clinical Interview for DSM-IV Axis II: Personality Disorders; BSAM = Brief State Anxiety Measure.
Harvey et al. (2000) postulated that VF has enhanced effects compared to video feedback without cognitive preparation for several reasons. First, asking individuals to articulate how they think they appeared prior to actually viewing the video may serve to increase the availability of the distorted self-image experienced during the speech. This then maximizes the likelihood that the individual will be able to detect the discrepancy between how they thought they came across in comparison to how they actually came across, which would further increase the likelihood that the individual’s belief that they performed poorly would be disconfirmed (Harvey et al., 2000). In addition, Harvey et al. (2000) proposed that, because cognitive preparation serves to make the distinction between how the individual actually performed and how they felt they performed more clear-cut, the individual is less likely to conflate the feelings they experienced during the performance role-play with how they appeared during the video.\(^2\)

A number of important issues remain to be addressed regarding VF. The first critical issue concerns extending the generalizability of the finding that VF enhances positive self-evaluations of performance to social tasks other than public speeches. To the author’s knowledge, all previous studies examining VF in regard to social anxiety have used speech tasks as the experimental social situation, with the exception of two recent

\(^2\) Of note, in some studies, participants were told that the purpose of video feedback is to demonstrate that one may appear less anxious than they believe (e.g., Rodebaugh, 2004); however, in other studies, participants are provided with no rationale for the video feedback role-play (e.g., Harvey et al., 2000; Parr et al., 2009).
studies that also used role-plays (i.e. Chen et al., 2010, which had not yet been
published when the present study began data collection, and McManus et al., 2009).
Thus, the first aim of this study is to evaluate whether the effects of VF (e.g., Harvey et
al., 2000; Kim et al., 2002; Parr et al., 2009; McManus et al., 2009) replicate and extend
to a semi-structured social interaction. To this end, the present study involved socially
anxious participants engaging in two semi-structured social interaction role-plays with
trained confederates while being video recorded. Participants in the experimental
condition received VF with cognitive preparation in between the two social interaction
role-plays, while participants in the control condition (No-VF) engaged in a mental
arithmetic task in place of video feedback.

Second, although it has been largely established that VF is effective in reducing
the discrepancy between socially anxious individuals’ negatively distorted self-
perceptions compared to that of objective observers, the link between enhanced objective
self-perception and state social anxiety reduction is unclear, as indicated by the dearth of
research on this particular issue (see Table 1). Video feedback has been supported by
recent findings as being effective in reducing anticipatory speech anxiety (Chen et al.,
2010; Parr & Cartwright-Hatton, 2009; Rodebaugh et al., 2010), with one study showing
a small effect in anxiety reduction from state anxiety ratings preceding a speech to state
anxiety ratings following a second speech (although only upon controlling for
participants’ state anxiety during the first speech; see Rodebaugh, 2004, in Table 1).
However, no study to date has shown VF to be effective in bringing about a reduction in
state social anxiety when comparing initial state anxiety to state anxiety following a
second social interaction role-play. Therefore, it was examined whether such an
improvement in state social anxiety occurred during the social interaction role-play utilized in the present study. Lastly, this study will examine the relationships between self-evaluations of performance, state anxiety, and trait fears of negative and positive evaluation, as these relationships have not been empirically evaluated previously.

The following hypotheses were generated for the present study, to be tested in a sample of individuals who qualified for a diagnosis of SAD: 1) measures of self-evaluation of performance and state anxiety would relate more positively and strongly to measures of social anxiety and related cognitions than a measure of depression during the first social interaction role-play; 2) participants in the VF condition would report a greater state anxiety reduction from the first to the second social interaction role-play in comparison to controls; 3) participants in the VF condition would report enhanced positive self-evaluations of performance from the first to the second social interaction role-play in comparison to controls; 4) any obtained reduction in state anxiety from the first to the second social interaction role-play would be specific to social anxiety and social anxiety-related cognitions rather than depression.
Method

Participants

Twenty-nine Ohio University undergraduate students were selected for the present study on the basis of meeting an empirically-replicated cut-off score of 34 or above on the Social Interaction Anxiety Scale (SIAS; Mattick & Clark, 1998; see Measures section for details), as administered through a pre-screening process of Ohio University’s undergraduate psychology participant pool. Participant age ranged from 18 – 36 years old ($M_{age} = 19.76$, $SD = 3.32$). Women ($n = 18$) made up 62.1% of the sample. The ethnic make-up of the sample was as follows: Caucasians (79.3%), African Americans (6.9%), Asians (3.4%), Native Hawaiian/Pacific Islander (3.4%) and those identifying as “Other,” (6.9%).

Measures

Clinician-administered measures.

Anxiety Disorders Interview Schedule for DSM-IV; Social Phobia subsection (ADIS-IV-SP; Brown, DiNardo, Lehman, & Campbell, 2001). The ADIS-IV is a widely used structured clinical interview that assesses current episodes of anxiety disorders, including SAD, and allows for the differential diagnosis of DSM-IV disorders by

3 Note that a total of 39 participants completed all study procedures; however, the primary analyses of the present study were restricted to the subsample of individuals who met diagnostic criteria for social anxiety disorder ($n = 29$, as determined by an abbreviated clinical interview; see Measures section for details) so as to enhance the generalizability of the present study’s findings to clinical populations.
providing screening questions and probes. Clinician’s Severity Ratings (CSRs) for diagnoses are made using a 9-point Likert-type rating scale that ranges from 0 to 8; scores of 4 or above are indicative of clinical severity. The ADIS-IV demonstrates strong inter-rater reliability, kappa = .77, as evidenced by the assessment of SAD in a sample of 362 anxiety disordered patients who were administered two independent ADIS-IV interviews (Brown et al., 2001). All interviews in the present study were conducted by the author, who had completed ADIS-IV certification training (Brown et al., 2001). The ADIS-IV was used in the current study to ensure that all participants met diagnostic criteria for SAD.

Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987). The LSAS is a 24-item, clinician-administered measure that uses two separate, 4-point Likert-type rating scales (ranging from 0 to 3) to assess fear and avoidance in social interaction and performance situations. Specifically, 11 items assess fear and avoidance in social interactions, with 13 items assessing performance situations. It has been reported that both the fear and avoidance scores are able to adequately discriminate between individuals with: generalized SAD, non-generalized SAD, and avoidant personality disorder (Holt, Heimberg, & Hope, 1992). The LSAS has been previously found to demonstrate excellent internal consistency for the total and subscale scores (all $\alpha$s > .81), and adequate convergent validity for the LSAS total score (all $r$s > .49) (Heimberg, Horner, Juster, Safren, Brown, Schneier, et al., 1999). It has also been reported that the LSAS demonstrates significantly stronger correlations with social anxiety measures than a measure of depression (Heimberg et al., 1999). The internal consistency of the LSAS in
the present sample was excellent (α = .95). The LSAS was also used in the current study to ensure that all participants met diagnostic criteria for SAD.

**Convergent measures.**

Social Interaction Anxiety Scale – Straightforward (SIAS-S; Rodebaugh, Woods, & Heimberg, 2007). The Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) is a 20-item measure that uses a 5-point rating scale with values ranging from 0 to 4 to assess fears of general social interactions. Items on the SIAS pertain to behavioral, affective, and cognitive reactions to such interactions. In the present study, the SIAS was used as a pre-screening measure for recruiting an analogue sample of individuals with probable clinically-severe social anxiety symptoms – a cut-off score of 34 on the SIAS was found to differentiate 82% of patients with SAD from community (i.e. control) individuals (Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992). However, Rodebaugh and colleagues have recommended that the SIAS be scored using only the 17 straightforwardly worded items, given that these straightforward items more validly assess social interaction anxiety than do the reverse-scored items in both undergraduate and clinical samples. Consequently, the 17-item SIAS-S was utilized in the present study as a measure of trait social anxiety symptoms pertaining to social interactions, although the full 20-item SIAS was administered to the overall sample. The SIAS-S has demonstrated excellent construct validity in both undergraduate and clinical samples, and excellent factorial validity and internal consistency in undergraduate samples (Rodebaugh et al., 2007). The SIAS-S demonstrated excellent internal consistency in the present sample (α = .90).
Social Phobia Scale (SPS; Mattick & Clarke, 1998). The SPS measures fear of public scrutiny and consists of 20 items which are scored on a 5-point Likert-type rating scale ranging from 0 *(Not at all characteristic or true of me)* to 4 *(Extremely characteristic or true of me)*. The SPS has demonstrated strong internal consistency in clinical, community, and undergraduate samples, with αs ranging from .89 to .94 (Mattick & Clarke, 1998), and adequate retest reliability over periods of one to two weeks (*r* = .66) in a sample of undergraduates (Heimberg et al., 1992). Furthermore, Mattick and Clarke (1998) reported that the SPS adequately discriminated among patients with anxiety disorders (i.e., social anxiety disorder, agoraphobia, and specific phobia) and between individuals with social anxiety disorder and controls (i.e., undergraduate and community samples), providing evidence of construct validity. The SPS was administered for: a) descriptive purposes, to account for social fears other than social interaction anxiety in the obtained study sample; and b) as a trait measure of fears of public scrutiny and performance situations. The SPS exhibited excellent internal consistency in the present study (*α* = .91).

Brief Fear of Negative Evaluation Scale-Straightforward Items (BFNE-S: Rodebaugh et al., 2004; Weeks et al., 2005). The BFNE (Leary, 1983) is a 12-item self-report measure of fear and distress related to negative evaluation from others. Items are rated on a 5-point Likert-type scale, ranging from 1 *(Not at all characteristic of me)* to 5 *(Extremely characteristic of me)*. Rodebaugh et al. (2004) and Weeks et al. (2005) have reported that the 8 straightforwardly-worded items are more reliable and valid indicators of fear of negative evaluation than the reverse-scored items in undergraduate and clinical samples, respectively. Consequently, Rodebaugh et al. and Weeks et al. have suggested
utilizing only the 8 straightforward (-S) BFNE items to calculate the total score. The BFNE-S has demonstrated excellent internal consistency (all $\alpha > .92$), factorial validity, and construct validity in undergraduate (Rodebaugh et al., 2004) and clinical (Weeks et al., 2005) samples. The 12-item BFNE was administered for the purposes of examining the relationships between fear of negative evaluation, self-evaluation, and state anxiety. Of note, only the BFNE-S items were utilized in the present analyses. The BFNE-S demonstrated excellent internal consistency in the present sample ($\alpha = .94$).

Fear of Positive Evaluation Scale (FPES; Weeks, Heimberg, & Rodebaugh, 2008a). The 10-item FPES uses a 10-point Likert-type rating scale, ranging from 0 (not at all true) to 9 (very true). Two reverse-scored items are included (for the purpose of potentially detecting response biases) but are not utilized in the calculation of the FPES total score. The FPES has demonstrated strong internal consistency (all $\alpha > .80$) and 5-week retest reliability (intraclass correlation coefficient = .70) in undergraduate samples. Furthermore, the FPES has demonstrated strong convergent and discriminant validity (Weeks et al., 2008a; Weeks, Heimberg, Rodebaugh, & Norton, 2008b) as well as factorial validity in a series of CFAs (Weeks et al., 2008a; Weeks, Jakatdar , & Heimberg, 2010) in several undergraduate samples. The FPES was administered to assess the relationships between fear of positive evaluation, self-evaluation, and state anxiety. The internal consistency of the FPES in the present sample was good, $\alpha = .80$.

Brief State Anxiety Measure (BSAM; Berg, Shapiro, Chambless, & Ahrens, 1998). The BSAM is a brief version of the State-Trait Anxiety Measure (STAI: Spielberger, Gorsuch, & Lushene, 1970) developed by Berg for unpublished pilot work. The six items with the highest item-to-item remainder correlations were selected from the
original 20-item STAI (i.e., relaxed, steady, strained, comfortable, worried, and tense) to comprise the BSAM (Berg et al., 1998). The BSAM consists of 3 straightforward items (i.e. strained, worried, and tense) and 3 reverse-coded items (i.e. relaxed, steady, and comfortable). The BSAM correlated strongly with the full 20-item scale ($r = 0.93$; Berg et al., 1998) and exhibits good internal consistency across up to six administrations (all $\alpha > 0.75$) (Berg et al., 1998; Rodebaugh, 2004). The BSAM was administered as a measure of participants’ state anxiety during the two social interaction role-plays. The internal consistency of the BSAM in the present sample was good, $\alpha = .85$.

Perception of Interaction Performance (PIP). The PIP is a 17-item measure created by the author, modified from the Perception of Speech Performance measure (PSP; Rapee & Lim, 1992) for the purposes of the present study. The PIP items ask participants to rate the quality of their social performance during a social interaction role-play, by rating agreement with statements such as “I kept interaction partner interested” on a 5-point, Likert-type scale ranging from 0 (Not at all) to 4 (Very Much). The internal consistency of this measure in the present sample was good, $\alpha = .83$. In the present study, the PIP was administered as a measure of participants’ self-evaluation of performance.

**Discriminant measures.**

Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report measure of depression. The items of the BDI-II pertain to depressive symptoms and attitudes that can be rated from 0 to 3 in terms of intensity. Excellent internal consistency has been reported for the BDI-II in both outpatient ($\alpha = .92$) and undergraduate ($\alpha = .93$) samples (Beck et al., 1996), and convergent validity has
been demonstrated by positive correlations between scores on the BDI-II and scores on measures of hopelessness and suicidal ideation. Furthermore, scores on the BDI-II are more strongly correlated with clinician-rated depression than with clinician-rated anxiety (Beck et al., 1996). The BDI–II was administered in this study as a discriminant measure to rule out the possibility that any obtained VF-related changes in state anxiety or self-evaluation of performance could be attributable to changes in depressive symptoms (in addition to, or instead of, social anxiety symptoms). The BDI-II exhibited excellent internal consistency in the present sample (α = .93).
**Procedure**

Participants were randomly assigned to either the VF or No-VF condition. Participants in the VF condition were informed that: a) the main purpose of the study was to evaluate a one-session component of treatment for social anxiety, known as video feedback; and b) that VF could potentially result in a reduction in symptoms associated with social anxiety, in that it has been found to bring about improved self-perception. Conversely, participants in the No-VF condition were informed that: a) the purpose of the study was to evaluate a one-session component of treatment for social anxiety that involves a simple arithmetic task; and b) that engaging in simple arithmetic tasks in between anxiety provoking situations could result in a reduction in state anxiety due to the effects of distraction from one’s anxiety symptoms. All participants were also informed that the secondary purpose of the study was to evaluate individual interaction styles during everyday conversations, as assessed by ratings from objective observers.

Participants were asked to provide written informed consent, after which the Anxiety Disorders Interview Schedule for DSM-IV, Social Phobia Subsection (ADIS-IV-SP) and the Liebowitz Social Anxiety Scale (LSAS) were administered for the purposes of determining the number of participants who meet diagnostic criteria for SAD. All participants were also asked to fill out several self-report measures, including the SPS, SIAS-S, BFNE-S, FPES, BDI-II, and a demographics questionnaire.

All participants were also asked to take part in two semi-structured social interaction role-plays with an undergraduate student at Ohio University (who was, in actuality, an experimental confederate), for a period of four minutes each, while being video recorded. The experimental social interaction role-play was conducted in a
behavioral assessment room at the Center for Evaluation and Treatment of Anxiety on Ohio University’s main campus, which is outfitted with video and audio recording equipment installed in the ceiling. In addition, participants were asked to report Subjective Units of Distress Scale (SUDS) ratings, which are subjective ratings of the intensity of one’s anxiety on a 0 to 100 scale. These were requested four separate times (i.e. two minutes prior to each social interaction role-play, immediately prior to each social interaction role-play, immediately after each social interaction role-play, and two minutes post-role-play).

During each social interaction, the participant was instructed to converse with the confederate for a duration of four minutes while standing in a standardized location (for the purposes of optimizing the video recordings; see below for details). Different confederates were used for each social interaction; the utilization of different confederates prevented state anxiety-related habituation effects pertaining to any one particular confederate. All confederates were blind to the experimental condition of the participants, and were not informed of any study hypotheses throughout the duration of the study. Additionally, all confederates were female, for the purpose of standardizing the nature of the social interactions.

For each interaction, the confederates were trained and instructed to act neutrally toward the participant: specifically, they were instructed not to respond to any of the participant’s verbalizations or behaviors in an overtly positive or negative manner, but rather, to act indifferently towards the participant (but without appearing impolite). Participants and confederates were instructed to continue each conversation throughout the full four minutes, and after each social interaction role-play, participants completed
the BSAM and provided two SUDS ratings as indices of post-role-play state anxiety, in addition to filling out the PIP as an index of social interaction performance.

Following the first social interaction role-play, participants in the VF condition were then provided with a general explanation of the rationale behind video feedback (see Introduction) and were given the following instructions, as originally laid out by Harvey et al. (2000).

1. Participants were asked to predict in detail what they thought they would see in the video. To help facilitate this prediction, the experimenter reviewed the participants’ responses to items on the Perception of Interaction Performance (PIP) questionnaire, and asked participants to specify the reasons that they answered each item in the manner that they did.

2. Participants were then asked to close their eyes and to form a clear image of how they thought they came across during the social interaction role-play. In particular, participants were instructed to imagine themselves as though they were watching a videotape of themselves during the previous interaction.

3. Prior to viewing the video, participants were instructed to pay attention to how they looked rather than to how they remember having felt in the video, and to watch the video as if they are watching a stranger. This instruction served to facilitate watching the video as objectively as possible, as well as to prevent the participant from confusing how they felt during the interaction with how they believe they came off to others.

Participants in the VF condition then watched the video of themselves taking part in the social interaction role-play. The videotape visually contained only footage of the
participant (i.e., the confederate was outside of camera view) while interacting during
the social role-play; this was to ensure that the participant would only focus on his/her
interactional style and behaviors, without comparing these to those of the confederate,
during the video feedback task.

In contrast, participants in the No-VF condition were instructed to complete a
mental arithmetic task following the first social interaction, in place of VF. The mental
arithmetic task lasted for an equivalent amount of time (i.e., 7 minutes) as the VF of the
role-play. Participants were given two separate mental arithmetic tasks, each lasting three
minutes with a one-minute break in between; during the arithmetic tasks, the participant
was asked to perform serial mental subtractions of the number seven from a starting
number (note: starting numbers were standardized, and differed for the two arithmetic
tasks). Participants were instructed to provide the responses verbally to the experiment
administrator throughout the role-play. Participants in the No-VF condition did not
review the video footage of their social interaction.

After either viewing the video or performing the mental arithmetic task, both
groups of participants then took part in the second social interaction role-play with a
different confederate. Following the role-play, participants in both groups again provided
SUDS ratings and completed the BSAM and the PIP, after which all participants were
debriefed. The order of study procedures was counterbalanced for all participants, (i.e.
participants either completed the clinical interviews and questionnaire battery prior to
completing the social interaction role-plays, or participated in the social interactions prior
to the administration of the clinical interviews and questionnaire battery). Please see
Figure 1 for a depiction of the order of procedures for the VF and No-VF conditions.
Figure 1. Outline of procedure order for VF and No-VF conditions.
Of note, after conclusion of the study, confederates’ behavior toward the participant during each social interaction role-play was double-rated by objective raters (who were blind to experimental condition) as an integrity check of confederate neutrality. Raters watched confederates’ behavior via video-recording, and used the Confederate Responsiveness Form (CRF) to assess the nature of confederates’ behavior. The CRF is a 2-item rating scale that assesses the extent to which confederates responded positively or negatively to the participant. Responses were rated on a 10-point, Likert-type rating scale, ranging from 1 (Very Negative/Rude) to 10 (Very positive/They got along well). These items were included to assess potential differences in confederate responsiveness to participants, as these factors may have influenced participants’ state anxiety or evaluation of performance.
Results

Preliminary Analyses

As an integrity check, independent samples t-tests were employed to confirm that no group differences existed in scores on all self-report measures across the two conditions (i.e. VF vs. No-VF) during the first social interaction role-play. There were no significant differences between groups on any self-report measures at the time of the first social interaction role-play, all ts (27) >-2.04, all ps > .05. Means and standard deviations for all participant responses are included in Table 2, below.
Table 2

Means and Standard Deviations of All Self-Report Measures

<table>
<thead>
<tr>
<th>Study Measures</th>
<th>VF $M$ (SD)</th>
<th>VF $n$</th>
<th>No-VF $M$ (SD)</th>
<th>No-VF $n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIAS-S</td>
<td>28.80 (11.60)</td>
<td>15</td>
<td>37.50 (11.40)</td>
<td>14</td>
</tr>
<tr>
<td>SPS</td>
<td>25.10 (12.22)</td>
<td>15</td>
<td>32.36 (14.01)</td>
<td>14</td>
</tr>
<tr>
<td>BFNE-S</td>
<td>24.20 (8.00)</td>
<td>15</td>
<td>26.79 (9.10)</td>
<td>14</td>
</tr>
<tr>
<td>FPES-S</td>
<td>32.33 (14.00)</td>
<td>15</td>
<td>32.71 (14.65)</td>
<td>14</td>
</tr>
<tr>
<td>BDI-II</td>
<td>14.67 (10.50)</td>
<td>15</td>
<td>16.07 (11.57)</td>
<td>14</td>
</tr>
<tr>
<td>PIP - 1</td>
<td>29.07 (7.79)</td>
<td>15</td>
<td>28.21 (9.59)</td>
<td>14</td>
</tr>
<tr>
<td>PIP - 2</td>
<td>19.27 (7.50)</td>
<td>15</td>
<td>23.79 (5.15)</td>
<td>14</td>
</tr>
<tr>
<td>BSAM - 1</td>
<td>11.87 (3.56)</td>
<td>15</td>
<td>14.79 (4.10)</td>
<td>14</td>
</tr>
<tr>
<td>BSAM - 2</td>
<td>10.69 (3.59)</td>
<td>13</td>
<td>13.21 (4.41)</td>
<td>14</td>
</tr>
</tbody>
</table>

Notes. SIAS –S = Social Interaction Anxiety Scale – Straightforward, SPS = Social Phobia Scale, BFNE-S = Brief Fear of Negative Evaluation Scale – Straightforward, FPES = Fear of Positive Evaluation Scale – Straightforward, BDI-II = Beck Depression Inventory – II, PIP-1 = Perception of Interaction Performance scores following role-play #1, PIP-2 = PIP scores following role-play #2, BSAM – 1 =Brief State Anxiety Measure scores following role-play #1, BSAM – 2 = BSAM scores following role-play #2.

An independent samples t-test was also employed to confirm that no differences existed in SUDS levels across groups during the video feedback (i.e. experimental) task versus the mental arithmetic (i.e. control) task; indeed, both of these tasks elicited equivalent levels of state social anxiety across our experimental and control samples, $t$ (27) = -1.14, $p = .33$.

In addition, the behavior of every confederate with whom participants interacted in the present study was rated using the CRF (see Procedure section for details). Results indicated that average CRF scores across all confederates were $M = 4.82$ ($SD = 0.53$) and
$M = 4.94 \ (SD = 0.58)$, for the first and second social interaction role-plays, respectively. Both scores indicate that confederates’ behavior toward the participants was neutral.

**Hypothesis 1**

To examine whether self-evaluation of performance and state anxiety (i.e., PIP and BSAM scores, respectively) during social interaction #1 would be positively and more strongly correlated with trait social anxiety (i.e., SIAS scores) and social anxiety-related cognitions (i.e., BFNE-S and FPES scores) than with depression (i.e., BDI-II scores), Pearson bivariate correlations were first computed between BSAM, PIP, SIAS, BFNE-S, FPES, and BDI-II scores (see Table 3 for list of correlations between all study measures, below).
Table 3

Bivariate Correlations of All Study Measures Employed in Present Analyses

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SIAS-S</td>
<td>-</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. SPS</td>
<td>.83*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3. BFNE-S</td>
<td>.69*</td>
<td>.75*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4. FPES</td>
<td>.64*</td>
<td>.71*</td>
<td>.77*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5. BDI-II</td>
<td>.55*</td>
<td>.70*</td>
<td>.48*</td>
<td>.63*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. PIP-1</td>
<td>.57*</td>
<td>.59*</td>
<td>.42*</td>
<td>.54*</td>
<td>.49*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7. PIP-2</td>
<td>.64*</td>
<td>.78*</td>
<td>.48*</td>
<td>.55*</td>
<td>.76*</td>
<td>.57*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. BSAM-1</td>
<td>.68*</td>
<td>.61*</td>
<td>.56*</td>
<td>.46*</td>
<td>.42*</td>
<td>.49*</td>
<td>.56*</td>
<td>-</td>
<td></td>
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<tr>
<td>9. BSAM-2</td>
<td>.45</td>
<td>.55*</td>
<td>.36</td>
<td>.36</td>
<td>.54*</td>
<td>.30</td>
<td>.72*</td>
<td>.69*</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. SUDS-1</td>
<td>.57*</td>
<td>.51*</td>
<td>.49*</td>
<td>.48*</td>
<td>.30</td>
<td>.40</td>
<td>.37</td>
<td>.64*</td>
<td>.36</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>11. SUDS-2</td>
<td>.58*</td>
<td>.58*</td>
<td>.44</td>
<td>.34</td>
<td>.45</td>
<td>.23</td>
<td>.55*</td>
<td>.63*</td>
<td>.68*</td>
<td>.79*</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes. SIAS–S = Social Interaction Anxiety Scale – Straightforward, SPS = Social Phobia Scale, BFNE-S = Brief Fear of Negative Evaluation Scale – Straightforward, FPES = Fear of Positive Evaluation Scale – Straightforward, BDI-II = Beck Depression Inventory – II, PIP-1 = Perception of Interaction Performance scores following role-play #1, PIP-2 = PIP scores following role-play #2, BSAM – 1 = Brief State Anxiety Measure scores following role-play #1, BSAM – 2 = BSAM scores following role-play #2, SUDS – 1 = average of Subjective Units of Distress Scale ratings during role-play #1, SUDS – 2 = average of SUDS ratings during role-play #2. \( n = 29 \) for all correlations, with the exception of BSAM – 2 \( (n = 27) \). An overall correction of \( p < .01 \) was utilized. * \( p < .01 \), two-tailed.
A Fisher’s r-to-z transformation test refined by Meng, Rosenthal, and Rubin (1992) was then employed to examine whether social anxiety and social anxiety-related cognitions related significantly more strongly to self-evaluation of performance and state anxiety in comparison to depression. Inconsistent with hypothesis, self-evaluation of performance and state anxiety related equivalently to trait social anxiety and social anxiety-related cognitions, and depression, all zs < -0.41, all ps > .08.

**Hypotheses 2a & 2b**

To test whether participants in the VF (i.e., active treatment) condition would report significantly greater state anxiety reductions from social role-play #1 (pre-VF) to social interaction role-play #2 (post-VF) in comparison to participants in the No-VF condition, two repeated measures analyses of variance (ANOVA) were employed. In both ANOVAs, the repeated measure was the social interaction (role-play #1 versus role-play #2), with the independent variable being treatment condition (VF vs. No-VF). The dependent variable in the first repeated measures ANOVA was the difference between BSAM scores from social interaction role-play #1 to social interaction role-play #2, whereas the dependent variable in the second ANOVA was the average of SUDS scores after social interaction role-play #1 compared to the average of SUDS scores after social interaction role-play #2.\(^4\)

\(^4\) It is worth noting that, although the BSAM and SUDS are both measures of state anxiety, two distinct analyses pertaining to state anxiety were conducted due to the fact that these two measures assess state anxiety in qualitatively different ways (i.e. the BSAM provides a more comprehensive assessment of state anxiety, whereas the SUDS allows for more immediate and frequent assessments of state anxiety).
Inconsistent with hypothesis, the time-point by condition multivariate interaction was non-significant in both the ANOVA using BSAM scores as the dependent variable, $F(1, 25) = .01, p = .92$, and the ANOVA using SUDS scores as the dependent variable, $F(1, 27) < .001, p = .97$. However, the between subjects effect of SUDS differences was significant, $F(1, 27)=6.44, p = .02$. Taken together, these results indicate that participants in the VF condition did not exhibit larger BSAM or SUDS score changes than participants in the No-VF condition from social interaction #1 to social interaction #2.

It is worth noting that Hypotheses 2a and 2b were generated on an *a priori* basis to specifically examine state anxiety following the role-plays. However, given that several studies have found that VF may be effective in reducing *anticipatory* state anxiety in response to both public speeches (see Parr & Cartwright-Hatton, 2009, and Rodebaugh et al., 2010) and role-plays (see McManus et al., 2009, and Chen et al., 2010), with one study finding a weak but significant difference when comparing initial state anxiety to state anxiety following a second speech task (see Rodebaugh, 2004), follow-up repeated-measures ANOVAs (with the same repeated measure and independent variable as above) were conducted in the present sample to examine potential VF effects on state anxiety throughout the entire course of the social interaction role-plays. Therefore, in the first of these ANOVAs, the dependent variable was the four SUDS ratings (taken at [1] two minutes pre-role-play; [2] immediately pre-role-play; [3] immediately post-role-play; and [4] two minutes post-role-play) provided in response to social interaction #1; with the dependent variable for the second ANOVA being the SUDS ratings (taken at the same
time points) in response to social interaction #2. A Bonferroni correction (.05/2=.025) was applied, which controlled for the number of social role-plays examined.

For social interaction #1, between-groups comparisons demonstrated that the SUDS ratings of participants in the VF and No-VF groups did not differ significantly (following Bonferroni correction), $F(1, 27) = 4.88, p = .04$. However, the effect of time alone on SUDS was significant, $F(3, 81) = 5.65, p = .001$; thus, post-hoc within-subject repeated contrasts were conducted. Participants’ SUDS ratings significantly increased from two minutes prior to the social interaction role-play to immediately before the role-play, $F(1, 27) = 9.14, p = .01$, and decreased from the time immediately following the role-play to two minutes later, $F(1, 27) = 22.09, p < .001$; all other repeated contrast results were non-significant. The time-point by condition multivariate interaction was not significant, $F(3, 81) = .07, p = .98$.

For social interaction role-play #2, the SUDS ratings of participants in the VF group were significantly lower overall than those of the participants in the No-VF group, $F(1, 27) = 5.92, p = .02$, effectively providing partial support for Hypothesis 2b (see Figure 2, below).

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5 Given that the original, *a priori* hypotheses pertaining to state anxiety across social role-plays were not supported in the present sample, these follow-up analyses were employed to further assess state anxiety across groups *within each role-play*. 
Social Interaction Role-play #2

Figure 2. Participant SUDS ratings during the second social interaction role-play, plotted separately for participants in the VF and No-VF conditions. Between-subjects effect was significant, $F(1, 27) = 5.92, p = .02$.

The within-subjects timepoint by condition interaction for the second role-play was not significant, $F(3, 81) = 1.39, p = .25$, although the multivariate effect for time was also significant, $F(3, 81) = 10.22, p < .001$. Follow-up within-subjects repeated contrasts revealed that a significant increase in SUDS scores occurred from two minutes prior to the role-play to immediately before the role-play, $F(1, 27) = 11.88, p < .01$, whereas SUDS ratings significantly decreased from the time immediately following the second role-play until two minutes later, $F(1, 27) = 13.06, p < .001$; all other repeated contrast results were non-significant.

**Hypothesis 3**

To examine whether participants in the VF condition would experience more positive self-evaluations of performance than participants in the No-VF condition following social interaction #2 (post-VF) in comparison to social interaction #1 (pre-VF),
a repeated measures ANOVA was employed, with the repeated measure being social interaction role-play (social role-play #1 versus social role-play #2), the independent variable being condition (VF vs. No-VF), and the dependent variable being the difference in PIP scores from the first to second social interaction. Consistent with hypothesis, a significant group by time interaction effect was found, $F(1, 27) = 4.40, p < .05$ (see Figure 3, below).

![Figure 3](image_url)

*Figure 3*. Participant ratings of self-evaluation of performance across social interaction role-plays. Within-between subjects interaction effect was significant, $F (1, 27) = 4.40, p < .05$. 
The within-subjects effect for time on self-evaluation of performance was significant, $F(1,27) = 30.88$, $p < .001$. Overall PIP scores decreased over time (reflecting increased self-evaluation of performance), although the between-groups comparison alone was non-significant, $F(1, 27) = 48.68$, $p = .48$.

To verify that only participants in the VF condition exhibited a significant increase in self-evaluation from social interaction role-play #1 to role-play #2, follow-up analyses using paired-samples t-tests were conducted. Indeed, participants in the VF condition exhibited a significant increase in positive self-evaluations of performance, $t(14) = 6.30$, $p < .001$, while participants in the No-VF condition did not, $t(13) = 2.15$, $p > .05$.

**Hypotheses 4a & 4b**

It was hypothesized that any obtained reductions in state anxiety (as measured by the BSAM [Hypothesis 4a] and SUDS ratings [Hypothesis 4b], respectively) from social interaction #1 to social interaction #2 in the VF condition would relate significantly more strongly to trait social anxiety and social anxiety-related cognitions in comparison to depression. However, due to the fact that no support was found for a reduction in state anxiety across role-plays, Hypotheses 4a and 4b were not tested. Note, however, that state anxiety was found to be significantly lower for the VF group in comparison to the non-VF group at post-treatment, during social interaction role-play #2, providing partial support for Hypothesis 2.
Discussion

The goal of the present study was to examine the generalizability of treatment effects of a one-session cognitive-behavioral technique for social anxiety disorder, *video feedback*. In particular, the present study sought to replicate and extend previous findings pertaining to VF when applied to public speech tasks by evaluating whether the effects of VF hold when applied to a social interaction role-play task. For this reason, the current study sample included (non-treatment seeking) SAD patients who engaged in two semi-structured social interaction role-plays with trained confederates while being video recorded. Participants in the experimental condition received video feedback with cognitive preparation (VF) in between the two social interaction role-plays, whereas participants in the control condition (No-VF) engaged in a mental arithmetic task in place of video feedback.

Specifically, the present study examined whether: 1) self-evaluation of performance and state anxiety during a social interaction role-play related more strongly with social anxiety and related cognitions than with depression; 2) participants who received VF experienced a greater state anxiety reduction from the first to second interaction role-play than did participants in a control condition who completed a mental arithmetic (i.e., distracter) task; and 3) participants who received VF experienced greater increases in positive self-evaluations of performance from the first to the second social interaction role-play than did participants in a control condition. Various analyses were conducted in order to replicate and extend previous findings regarding the effects of video feedback on state anxiety and self-evaluation of performance.
First, a Fisher’s $r$-to-$z$ transformation test was evaluated after computing Pearson bivariate correlations between measures of self-evaluation of performance, trait and state social anxiety, trait social anxiety related cognitions, and trait depression. Results demonstrated that trait social anxiety and social anxiety-related cognitions did not relate significantly more strongly to state social anxiety and self-evaluation of performance than did depression.

Second, repeated-measures ANOVAs were conducted to evaluate potential changes in state anxiety and self-evaluation of performance across treatment groups (i.e., VF versus non-VF) from the first social interaction role-play to the second role-play. Inconsistent with hypothesis, results demonstrated that all participants in the present study (irrespective of treatment group) experienced equivalent reductions in state anxiety from post social-role-play #1 to post social role-play #2. However, it is worth noting that follow-up repeated-measures ANOVAs were conducted to evaluate the effects of VF on state anxiety *throughout* the social interaction role-plays (as opposed to specifically assessing the effects of VF on state anxiety changes that occurred *following* participation in the role-plays, as was hypothesized *a priori*). Results from these latter, post-hoc analyses revealed that state anxiety was equivalent across the two treatment groups during the first social interaction role-play, but was significantly lower for participants who received VF than for control participants during the *second* social interaction role-play (i.e. following administration of VF).

Another repeated measures ANOVA demonstrated that a significant increase in positive self-evaluation of performance occurred in response to the second social interaction role-play, in comparison to self-evaluation of performance in response to the
first role-play, only for those participants who received VF. Indeed, although PIP scores across treatment groups decreased from role-play #1 to role-play #2 (indicating improved self-evaluation of performance), a paired samples t-test confirmed that only participants in the VF condition exhibited a significant enhancement in positive self-evaluations of performance from the first to the second social interaction role-play.

In addition, it is worth noting that two \textit{a priori} hypotheses, which stated that any obtained reductions in state anxiety from the first to second social interaction role-play in the experimental condition would relate more strongly to social anxiety and social anxiety-related cognitions than to depression, were not tested due to the fact that no support was found for a VF-specific state anxiety reduction from the first to the second role-play.

As was expected, the current study demonstrated that video feedback results in enhanced self-evaluations of performance during social interactions for socially anxious individuals. Contrary to expectation, however, the relationships between state anxiety and self-evaluation of performance in response to the first role-play (in the overall sample) and trait social anxiety and related cognitions were not significantly stronger than the relationships between state anxiety and self-evaluation of performance and depression. Further, the findings of the present study did not support the notion that video feedback results in a statistically significant reduction in the severity of state anxiety experienced in response to a social interaction task, as had been anticipated.

It is important to highlight that both treatment groups evidenced elevated depressive symptoms, in that mean scores for both groups on a measure of depressive symptoms (i.e., the BDI-II) fell within the range indicating mild depression (see Beck et
The elevated depressive symptomology exhibited in the current overall sample was somewhat unexpected, given that a number of previous studies evaluating VF have involved samples that did not demonstrate similarly elevated levels of depression symptoms (see Harvey et al, 2000; Kim et al, 2002; Rodebaugh, 2002). However, given the elevated levels of depressive symptoms in both treatment groups, it is reasonable to assume that the overlap between social anxiety and depressive symptoms in the present overall study sample accounted for the finding that self-evaluation of performance and state anxiety related equivalently to trait social anxiety (and related cognitions) and depression. Indeed, significant and strong positive correlations were found between the measure of depression and measures of state and trait social anxiety (all $rs > .42$), trait anxiety-related cognitions (all $rs > .48$), and self-evaluation of performance ($r = .49$).

Thus, elevated overall depressive symptoms may have served to inflate the correlations between the measure of depression and all other measures associated with social anxiety, thereby resulting in a non-significant difference when comparing the relationships between self-evaluation of performance and state anxiety with trait social anxiety, and the relationship between self-evaluation of performance and state anxiety with depression. Relevant to the latter findings, it is worth noting that high rates of comorbidity have been previously established between social anxiety and depression (Brown & Barlow, 1992).

The present study is the first to extend the finding that VF, when applied to social tasks other than a speech task (such as a social interaction task), results in enhanced self-evaluations of performance in socially anxious individuals in comparison to individuals who do not receive VF. As previously stated, in the current study, only participants who
received VF reported a significant increase in positive evaluations of social
performance from the first to the second social interaction role-play; participants who had
not received VF exhibited equivalent self-evaluation of performance during both role-
plays. This finding is consistent with the existing literature on video feedback, which
largely supports the notion that VF is effective in correcting socially anxious individuals’
negative biases in self-perception, making such self-perceptions both more positive and
objective (Harvey et al., 2000; Kim et al., 2002; Parr & Cartwright-Hatton, 2009;
Rodebaugh et al., 2010).

That being said, it is worth noting that the majority of previous studies involving
VF have used a public speech task as the experimental task. Given that a speech task is
largely unrepresentative of the range of social situations that a socially anxious individual
will likely come across and feel anxious about in day-to-day living, it remained necessary
to evaluate the effects of VF when applied to a greater variety of social contexts to
account for the multitude of situations in which social anxiety may be induced in socially
anxious individuals. However, two previous studies (i.e. Chen et al., 2010; McManus et
al., 2009) also used a role-play as the experimental task. Consistent with the present
study’s findings, these studies found that receiving VF resulted in a decrease in
participants’ under-estimation of their own social performance.

It is important, however, to emphasize that the role-play tasks employed in the
Chen et al. and McManus et al. studies were qualitatively different from those used in the
present study. For example, unlike the role-play used in the present study, the role-play
task used by Chen et al. did not require interaction with other individuals – rather,
participants were asked to perform a role-play of any social situation that would evoke
moderate anxiety (i.e. a SUDS level of 75). Similarly, although some (yet not all) of the role-plays used in the McManus et al. study involved having participants interact with other individuals, participants’ behavior during the role-plays was manipulated (i.e. participants were told to maintain either self-directed or externally-directed attention throughout the role-plays, in addition to being instructed to either utilize or refrain from typically-employed safety behaviors). Conversely, in the present study, participants were instructed to act as they normally would while interacting with an unfamiliar person for the first time. Additionally, to the author’s knowledge, all previous studies involving VF have allowed participants to prepare for the experimental task in advance (i.e. for a period of three minutes), whereas preparation prior to the experimental task was not permitted in the present study (see below for additional discussion on this point).

Thus, on the basis of both present, and previous (i.e., Chen et al., 2010; McManus et al., 2009) findings, it appears reasonable to conclude that VF effectively brings about improved self-perception in socially anxious individuals when applied to social tasks other than a public speaking task (i.e. social interaction or role-play tasks). Thus, the present findings serve to extend the empirical validation and broad-based efficacy of video feedback, and provide indirect support for the possibility that the VF format can be potentially extended to a greater number of social contexts when used during therapy (e.g., assertiveness training). However, the findings of the present study can also be seen as a further extension of previous findings. That is, the experimental task utilized for the current study (in that it: [a] required interaction with other individuals; [b] did not manipulate participants’ behavior; and [c] did not allow participants to prepare in advance for the experimental task) has greater ecological validity and, consequently,
enhanced applicability to socially anxious individuals. A social interaction (for which
the participant is largely unprepared) is more representative of the type of social situation
that socially anxious individuals fear (i.e., socially anxious individuals cannot prepare in
advance for a majority of the social situations they encounter).

Therefore, it appears that the video feedback technique, in making the
discrepancy between how one thought they came across in comparison to how they
actually came across more salient, demonstrates to a socially anxious individual that
his/her self-presentation is not as negative as had been assumed, thereby allowing for the
generation of a more positive self-image, and consequently, a more positive evaluation of
self. Furthermore, in that the extant literature supports that the negative self-evaluative
biases characteristic of socially anxious individuals serve to maintain social anxiety
symptomology (Clark & Wells, 1995; Heimberg et al., 2010), the correction of negative
self-evaluation of social performance in socially anxious individuals can therefore be
seen as a reduction in social anxiety symptoms.

The present study is also the first to demonstrate that VF exerts an effect on
global state anxiety, in contrast to previous studies that have shown VF to result in a
reduction in anticipatory state anxiety only (Chen et al., 2010; Parr & Cartwright-Hatton,
2009; Rodebaugh et al., 2010). In the context of the current study, global state anxiety
refers to a participant’s cumulative state anxiety in anticipation of and following the
social interaction, measured by the sum of two pre-interaction (i.e. anticipatory) state
anxiety ratings and two post-interaction state anxiety ratings. The present study
demonstrated that participants who received VF experienced less global state anxiety
during the second social interaction task than did participants in the control condition,
even when participants’ state anxiety severity did not significantly differ across groups during the first social interaction task.

Although the present study did not demonstrate that participants who received VF experienced a significantly greater reduction in state anxiety from pre- to post-intervention than did participants who did not receive VF, as had been hypothesized \textit{a priori}, the finding that participants who received VF exhibited less severe state social anxiety than did controls while interacting with another individual for a second time is nonetheless clinically important. Due to the fact that the only experimental manipulation in the present study involved the administration of VF, it can be plausibly inferred that the lowered state anxiety during the second social interaction exhibited by participants who received VF is resultant from the effects of the video feedback technique itself.

Furthermore, although the current study found that participants who received VF did not exhibit a significantly greater reduction in state anxiety from the first to second social interaction role-play, but that participants who received VF nonetheless experienced less global state anxiety during the second social interaction task than did participants in the control condition, it may be the case that VF may enable an individual to experience lower state anxiety in future social interactions, but that this effect is simply not strong following only a single administration of the intervention. That is, VF may lack the potency to demonstrate its anxiety-reducing effects from the first to second social interaction role-play after only one administration, but may very well have an additive effect on state anxiety (i.e., multiple administrations of VF may be required to result in a reduced state of anxiety following completion of social role-plays).
However, provided that participants who received VF in the present study had lower state anxiety levels during the second social interaction role-play than did controls, it is apparent that VF, even when administered only once, nonetheless exhibits anxiety-reducing effects. That is, although the effect of VF may not have been robust enough to result in a significant state anxiety reduction across the two role-plays, the effect of VF was powerful enough to reduce the average level of state anxiety experienced by participants in the VF condition by the time of the second social interaction role-play. Due to the fact that participants’ average state anxiety in the VF condition was lower than that of participants who had not received VF during the second social interaction role-play, and less variable (i.e., exhibited less spread about the mean), this allowed for the detection of a significant difference in state anxiety levels across groups during the second social interaction role-play.

Yet, an important question remains: what accounts for the generally supported finding that VF does not exert significant effects on state anxiety reduction from the first to second social interaction role-plays? A study conducted by Smits et al. (2006) also demonstrated a null effect of VF on anxiety reduction (see Table 1); the authors accounted for this finding by pointing to the fact that VF may not target the full mechanism through which a reduction in state anxiety occurs. Specifically, Smits et al. (2006) posited that state anxiety reduction requires modification of a socially anxious individual’s tendency to overestimate the severity of the consequences of negative outcomes (referred to as cost bias), as opposed to modification of one’s tendency to overestimate the probability of a negative outcome occurring (referred to as probability
bias). The fact that VF effectively targets probability bias, but not cost bias, may explain why a robust effect of VF on state anxiety reduction has not been found to date.

For example, in asking socially anxious individuals to compare how they believed they performed with how they actually performed, the individual typically comes to the realization that their appearance was more favorable than they had initially assumed. This realization (i.e. “I appeared better than I thought”) thus reduces the individual’s belief that a negative outcome (such as looking anxious or performing poorly) will be likely to occur in a subsequent interaction. However, as indicated by Smits and colleagues, a socially anxious individual may nevertheless retain the implicit belief that one must continue to perform well in order to allay negative evaluation from others. That is, VF does not allow for a socially anxious individual to disconfirm the belief that a negative outcome will occur when they do perform poorly or appear anxious (i.e., one cannot achieve the insight that others may continue to accept an individual, even if one performs poorly in subsequent interactions). Accordingly, it may be the case that socially anxious individuals require a modification of cost bias, in addition to probability bias, for a more robust reduction in state anxiety to occur.

Therefore, future studies may wish to alter the way in which VF has been traditionally administered. For example, in addition to having participants evaluate their typical social performance via video-recording, participants could also take part in a secondary, adjunct VF procedure wherein participants are instructed to perform in a way that is poorer than their typical performance when interacting with another individual. During this second administration of VF (which would specifically target cost-bias), the participant would evaluate the nature of the reaction of the individual with whom they
interacted, so as to assess whether there is as great a cost to their poor performance as they envisioned. Hypothetically, socially anxious participants may find out that others do not react as negatively to poor performance as had been assumed, thereby reducing both cost and probability bias, and potentially allowing for the reduction of state anxiety to be more robust.

The present study has some limitations that must be addressed. First, the current sample was comprised of undergraduate students primarily made up of Caucasians and females. Given the ethnic and gender homogeneity of the current sample, future studies should seek to use more diverse samples to allow for greater generalizability of findings to be established. Furthermore, the present study sample is not representative of a treatment-seeking sample. Future studies should utilize samples solely comprised of treatment-seeking individuals.

Furthermore, it is important to note that the specific social situations that socially anxious individuals fear can be quite variable across patients (e.g., see American Psychiatric Association, 2000). When considering this, in light of the fact that there is strong empirical support for the notion that effective psychological treatment requires tailoring of therapy to fit a client’s specific needs (e.g., see Norcross, 1993), it may be the case that the standardization of the social interaction role-play task across all participants, irrespective of one’s specific social concerns/feared social situations, may have limited the efficacy of the VF technique. Tailoring the social threat task to be representative of each participant’s specific social fears may have yielded larger VF effect sizes than those obtained in the present study.
Another important limitation to the present study concerns the fact that participants were given a diagnosis of SAD based upon the results of the ADIS-IV Social Phobia subsection and the LSAS. An administration of a full clinical interview would have also allowed for the assessment of any potentially comorbid psychological disorders. Due to the fact that a complete diagnostic interview was not administered to participants in this study, it is unclear how an individual’s comorbid diagnostic status may have affected one’s amenability to VF. Indeed, Chen et al. (2010) conducted a study that controlled for comorbidity of anxiety disorders other than SAD and reported that higher levels of overall distress resultant from the presence of multiple anxiety disorders reduced the benefit derived from VF. Future studies should seek to recruit a sample of SAD patients without comorbid anxiety disorders, in order to remove the impact of comorbidity on VF effects. In addition, all measures used in the present study, apart from the ADIS-IV SP and the LSAS, were self-report measures; thus, examining objective ratings of participants’ social performances provided by observers who are blind to treatment group could enhance the validity of future findings. Lastly, the sample size for the present study was relatively small; future studies should evaluate the effects of VF in a larger sample.
References


and item properties of the original and Brief Fear of Negative Evaluation Scale.

*Psychological Assessment, 16,* 169 – 181.


Appendix A: Statistical Results of Analyses Conducted in Full Sample

Method

Participants

Thirty-nine Ohio University undergraduate students were selected for the present study on the basis of meeting an empirically-replicated cut-off score of 34 or above on the Social Interaction Anxiety Scale (SIAS; Mattick & Clark, 1998), as administered through a pre-screening process of Ohio University’s undergraduate psychology participant pool. Participant age ranged from 18 – 36 years old ($M_{age} = 19.76, SD = 2.99$). Women ($n = 20$) made up 54.1% of the sample. The ethnic make-up of the sample was as follows: Caucasians (81.1%), African Americans (8.1%), Asians (2.7%), Native Hawaiian/Pacific Islander (2.7%) and those identifying as “Other,” (5.4%). Twenty-nine individuals (75.6% of the full sample) met diagnostic criteria for social anxiety disorder; eight participants did not meet the clinical threshold for diagnosis.
Results

Preliminary Analyses

As an integrity check, independent samples t-tests were employed to confirm that no group differences existed in scores on all self-report measures across the two conditions (i.e. VF vs. No-VF) during the first social interaction role-play. There were no significant differences between groups on the PIP at the time of the first social interaction role-play, $t(35) = -.19, p = .85$, although analyses indicated that group differences did exist in BSAM scores at the time of the first social interaction, $t(35) = -.2.42, p = .02$. Means and standard deviations for all participant responses are included in Table A1, below.

<table>
<thead>
<tr>
<th>Study Measures</th>
<th>VF $M$ (SD)</th>
<th>VF $n$</th>
<th>No-VF $M$ (SD)</th>
<th>No-VF $n$</th>
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<tr>
<td>SIAS-S</td>
<td>26.53 (11.56)</td>
<td>19</td>
<td>34.06 (12.01)</td>
<td>18</td>
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<tr>
<td>SPS</td>
<td>22.58 (12.05)</td>
<td>19</td>
<td>28.44 (14.99)</td>
<td>18</td>
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<td>BFNE-S</td>
<td>23.74 (7.88)</td>
<td>19</td>
<td>26.06 (9.01)</td>
<td>18</td>
</tr>
<tr>
<td>FPES-S</td>
<td>29.79 (14.10)</td>
<td>19</td>
<td>29.44 (15.11)</td>
<td>18</td>
</tr>
<tr>
<td>BDI-II</td>
<td>12.61 (7.84)</td>
<td>19</td>
<td>14.72 (11.24)</td>
<td>18</td>
</tr>
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<td>PIP- 1</td>
<td>26.26 (9.38)</td>
<td>19</td>
<td>26.83 (8.91)</td>
<td>18</td>
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<tr>
<td>PIP - 2</td>
<td>16.53 (8.65)</td>
<td>19</td>
<td>23.41 (4.94)</td>
<td>17</td>
</tr>
<tr>
<td>BSAM- 1</td>
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<td>19</td>
<td>14.28 (3.85)</td>
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<td>BSAM - 2</td>
<td>10.00 (3.48)</td>
<td>17</td>
<td>12.39 (4.31)</td>
<td>18</td>
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</tbody>
</table>

following role-play #1, PIP-2 = PIP scores following role-play #2, BSAM – 1 = Brief State Anxiety Measure scores following role-play #1, BSAM – 2 = BSAM scores following role-play #2.

**Hypothesis 1**

To examine whether self-evaluation of performance and state anxiety (i.e., PIP and BSAM scores, respectively) during social interaction #1 would be positively and more strongly correlated with trait social anxiety (i.e., SIAS scores) and social anxiety-related cognitions (i.e., BFNE-S and FPES scores) than with depression (i.e., BDI-II scores), Pearson bivariate correlations were first computed between BSAM, PIP, SIAS, BFNE-S, FPES, and BDI-II scores (see Table A2, below).
Table A2

**Bivariate Correlations of All Study Measures Employed in Present Analyses**

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
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<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<td>2. SPS</td>
<td>.82*</td>
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<td>3. BFNE-S</td>
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<td>.71*</td>
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<td>4. FPES</td>
<td>.69*</td>
<td>.73*</td>
<td>.76*</td>
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<tr>
<td>5. BDI-II</td>
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**Notes.** SIAS –S = Social Interaction Anxiety Scale – Straightforward, SPS = Social Phobia Scale, BFNE-S = Brief Fear of Negative Evaluation Scale – Straightforward, FPES = Fear of Positive Evaluation Scale – Straightforward, BDI-II = Beck Depression Inventory – II, PIP-1 = Perception of Interaction Performance scores following role-play #1, PIP-2 = PIP scores following role-play #2, BSAM – 1 =Brief State Anxiety Measure scores following role-play #1, BSAM – 2 = BSAM scores following role-play #2, SUDS – 1 = average of Subjective Units of Distress Scale ratings during role-play #1, SUDS – 2 = average of SUDS ratings during role-play #2.  

A Fisher’s *r*-to-*z* transformation test refined by Meng, Rosenthal, and Rubin (1992) was then employed to examine whether social anxiety and social anxiety-related cognitions related significantly more strongly to self-evaluation of performance and state
anxiety in comparison to depression. Inconsistent with hypothesis, self-evaluation of performance and state anxiety related equivalently to trait social anxiety and social anxiety-related cognitions, and depression, all $zs < -0.11$, all $ps > .05$.

Of note, one participant had an extremely high depression score on the BDI-II (i.e. the score exceeded the mean by 2.68 standard deviations); for this reason, this participant was excluded from all analyses pertaining to depression. Additionally, one participant in the control condition had a lower than average score on the PIP (i.e. the score was lower than the mean by 2.56 standard deviations); consequently, this participant was excluded from all analyses involving the PIP.

**Hypotheses 2a & 2b**

To test whether participants in the VF (i.e., active treatment) condition would report significantly greater state anxiety reductions from social role-play #1 (pre-VF) to social interaction role-play #2 (post-VF) in comparison to participants in the No-VF condition, two repeated measures analyses of variance (ANOVA) were employed. In both ANOVAs, the repeated measure was the social interaction (role-play #1 versus role-play #2), with the independent variable being treatment condition (VF vs. No-VF). The dependent variable in the first repeated measures ANOVA was the difference between BSAM scores from social interaction #1 to social interaction #2, whereas the dependent variable in the second ANOVA was the average of SUDS scores after social interaction #1 compared to the average of SUDS scores after social interaction #2.

Inconsistent with hypothesis, the time-point by condition multivariate interaction was non-significant in both the ANOVA using BSAM scores as the dependent variable,
\[ F(1, 33) = .06, p = .82, \] and the ANOVA using SUDS scores as the dependent variable, \[ F(1, 35) = .11, p = .74. \] However, the between subjects effect of SUDS differences was significant, \[ F(1, 35) = 7.16, p = .01. \] Taken together, these results indicate that participants in the VF condition did not exhibit larger BSAM or SUDS score changes than participants in the No-VF condition from social interaction #1 to social interaction #2.

It is worth noting that Hypotheses 2a and 2b were generated on an \textit{a priori} basis to specifically examine state anxiety \textit{following} the role-plays. However, given that several studies have found that VF may be effective in reducing \textit{anticipatory} state anxiety in response to both public speeches (see Parr & Cartwright-Hatton, 2009, and Rodebaugh et al., 2010) and role-plays (see McManus et al., 2009, and Chen et al., 2010), with one study finding a weak but significant difference when comparing initial state anxiety to state anxiety following a second speech task (see Rodebaugh, 2004), follow-up repeated-measures ANOVAs (with the same repeated measure and independent variable as above) were conducted in the present sample to examine potential VF effects on state anxiety \textit{throughout the entire course of} the social interaction role-plays. Therefore, in the first of these ANOVAs, the dependent variable was the four SUDS ratings (taken at [1] two minutes pre-role-play; [2] immediately pre-role-play; [3] immediately post-role-play; and [4] two minutes post-role-play) in response to social interaction #1; with the dependent variable for the second ANOVA being the SUDS ratings (taken at the same time points) in response to social interaction #2. A Bonferroni correction (.05/2=.025) was applied, which controlled for the number of social role-plays examined.
For social interaction #1, between-groups comparisons demonstrated that the SUDS ratings of participants in the VF and No-VF groups differed significantly, $F(1, 35) = 6.67, p = .01$. The effect of time alone on SUDS was significant, $F(3, 105) = 7.53, p < .001$; thus, post-hoc within-subject repeated contrasts were conducted. Participants’ SUDS ratings significantly increased from two minutes prior to the social interaction role-play to immediately before the role-play, $F(1, 35) = 13.40, p = .001$, and decreased from the time immediately following the role-play to two minutes later, $F(1, 35) = 23.32, p < .001$; all other repeated contrast results were non-significant. The time-point by condition multivariate interaction was not significant $F(3, 105) = .09, p = .96$.

Inconsistent with hypothesis, the SUDS ratings of participants in the VF group for social interaction role-play #2 was not significantly lower overall than those of the participants in the No-VF group, $F(1, 35) = 5.54, p = .02$. The within-subjects timepoint by condition interaction for the second role-play was not significant, $F(3, 105) = 1.19, p = .32$. However, the multivariate effect for time was significant, $F(3, 81) = 9.20, p < .001$. Follow-up within-subjects repeated contrasts revealed that a significant increase in SUDS scores occurred from two minutes prior to the role-play to immediately before the role-play, $F(1, 35) = 14.04, p = .001$, whereas SUDS ratings significantly decreased from the time immediately following the second role-play until two minutes later, $F(1, 35) = 15.07, p < .001$; all other repeated contrast results were non-significant.

**Hypothesis 3**

To examine whether participants in the VF condition would experience more positive self-evaluations of performance than participants in the No-VF condition following social interaction #2 (post-VF) in comparison to social interaction #1 (pre-VF),
a repeated measures ANOVA was employed, with the repeated measure being social interaction role-play (social role-play #1 versus social role-play #2), the independent variable being condition (VF vs. No-VF), and the dependent variable being the difference in PIP scores from the first to second social interaction. Consistent with hypothesis, a significant group by time interaction effect was found, $F(1, 34) = 6.95, p = .01$. The within-subjects effect for time on self-evaluation of performance was significant, $F(1,34) = 38.70, p < .001$. Overall PIP scores decreased over time (reflecting increased self-evaluation of performance), although the between-groups comparison alone was non-significant, $F(1, 34) = 2.52, p = .12$.

Follow-up analyses using paired-samples t-tests were conducted to verify that only participants in the VF condition exhibited a significant increase in self-evaluation from social interaction role-play #1 to #2. Inconsistent with hypothesis, participants in both the VF condition, $t(18) = 7.06, p < .001$, and the No-VF condition, $t(16) = 2.26, p = .04$, exhibited a significant increase in positive self-evaluations of performance.

**Hypothesis 4a & 4b**

It was hypothesized that any obtained reductions in state anxiety (as measured by the BSAM [Hypothesis 4a] and SUDS [Hypothesis 4b] ratings, respectively) from social interaction #1 to social interaction #2 in the VF condition would relate significantly more strongly to trait social anxiety and social anxiety-related cognitions in comparison to depression. However, due to the fact that no support was found for a reduction in state anxiety across role-plays, Hypotheses 4a and 4b were not tested (note, however, that state anxiety was found to be significantly lower for the VF group in comparison to the non-
VF group at post-treatment, during social interaction role-play #2, providing partial support for Hypothesis 2).