Therapeutic Benefits of an Enhanced Video Feedback Intervention for Socially Anxious Individuals

by

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A thesis

presented to the University of Waterloo

in fulfillment of the

thesis requirement for the degree of

Master of Arts

in

Psychology

Waterloo, Ontario, Canada, 2008

Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Video feedback (VF) has been widely integrated into cognitive behavioural treatment protocols for socially anxious individuals due to its presumed efficacy in improving negative self-perception and reducing underestimations of performance. However, studies examining VF in social anxiety reveal, surprisingly, that correction of overly negative self-perception does not unequivocally facilitate anxiety reduction during subsequent social interactions. In the current study, we examined whether VF could be optimized to facilitate social anxiety reduction through the inclusion of a post-VF encoding manipulation. The manipulation was designed to enable individuals to *internalize* the positive information received from VF by enhancing the *depth* at which they processed the self-exposure information. Forty-three individuals high in social anxiety and verbal communication anxiety were randomly assigned to one of the following three conditions: A) VF + Manipulation; B) VF + No Manipulation; and C) No VF. Results revealed that VF + Manipulation led to significant cognitive changes pertaining to self-efficacy and internal attributions of performance relative to the other two conditions. Unexpectedly, both VF conditions were equally efficacious in the facilitation of anxiety reduction relative to the No VF condition. Results are discussed in the context of cognitive behavioural models of anxiety and the mechanisms of exposure-based learning.

Acknowledgements

I would like to acknowledge the following people who contributed to the completion of my Master's Thesis.

First and foremost, I would like to thank my research supervisor, Dr. David Moscovitch for his help at all stages of my study. He supported my enthusiasm in the area of video feedback and social anxiety and encouraged me to go forth with my original research question. He spent much time brainstorming with me about ways that I could test my research questions; subsequently, he helped me design a study that was controlled and methodologically sound. In the final stages of my study, Dr. Moscovitch helped me interpret the results from both a theoretical and a practical perspective and challenged me to think critically about the implications of my findings. Most importantly, Dr. Moscovitch taught me to never lose sight of the research questions and storyline that drove the study's design.

I would also like to acknowledge Dr. Christine Purdon and Dr. Jonathan Oakman for their assistance in reviewing my Master's thesis in the stages before completion. Dr. Purdon helped me consider the way in which cultural factors might moderate the relation between video feedback and treatment outcome; she also contributed statistical help that greatly improved the clarity of the findings. Dr. Oakman challenged me to think conceptually about my hypotheses and research arguments; further, his suggestions pertaining to the thesis content improved the overall readability and flow of the thesis. Finally, Dr. Oakman contributed substantially to the statistical analyses.

I would further like to thank the members of Dr. Moscovitch's research lab: Dr. Moscovitch, Dr. Oakman, Susanna Reimer, Vanessa Huyder, Meagan MacKenzie and Josh

Svec. They listened to my research proposals and gave suggestions about ways in which I could improve my study.

On a more personal level, I would like to thank Garry Lee, Karina Schumann, Jen McClellan, Sharon So, Yael Goldberg, and Jen Aquino for their research help and advice, and, for their unconditional moral support.

Dedication

This Master's Thesis is dedicated to my mom, Anne Orr, who has inspired and encouraged my interest in psychology, and my dad, Ed Orr, who taught me the importance of self-discipline in meeting one's goal.

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Introduction

Social phobia is a debilitating disorder lying on the extreme end of the social anxiety continuum, affecting approximately 12% of the population (Kessler, Berglund, Demler, Jin, & Walters, 2005). One of the most puzzling aspects of social anxiety and social phobia is that symptoms persist despite individuals' frequent exposure to social situations and repeated experiences of non-catastrophic social outcomes.

According to cognitive models, social anxiety is maintained in the face of such frequent exposure because socially anxious and phobic individuals allocate most of their attention during social situations to their own internal symptoms of anxiety rather than what is actually occurring around them (Clark & Wells, 1995; Rapee & Heimberg, 1997). As such, they rely on their perception of their own anxiety symptoms to infer how they come across to others instead of using more objective factors such as external social cues and other people's actual social reactions (which are typically more positive than imagined). Because socially anxious individuals assume that their own impression of their performance matches what others see and notice about them, they tend to *underestimate* how well they come across to others (Clark & Wells, 1995; Mansell & Clark, 1999).

Indeed, research has shown that socially anxious individuals underestimate their social performances across a variety of social situations including public speeches (Rapee & Lim, 1992; Rapee & Hayman, 1996; Harvey et al., 2000), mock interviews (Strahan & Conger, 1998), role plays (Hope, Heimberg & Bruch, 1995), conversations with others (Stopa & Clark, 1993) and tape-recorded voice passages (Lundh et al., 2002).

Given that excessively negative self-perception (resulting from heightened focus on anxiety symptoms) is hypothesized to maintain social anxiety, much research has focused on

improving self-perception and correcting underestimations of performance in socially anxious and phobic individuals. VF, an intervention that has been widely integrated into CBT protocols, involves providing individuals with a video playback of their social performances in situations such as public speaking or social conversations. Watching themselves on video in the moments following their participation in a social task enables individuals to gain a more objective perspective on their performance; subsequently, individuals may correct any discrepancies between the felt perception of their performance, and the observed reality on video. Conceptually, VF is a type of positive feedback, as it enables clients to objectively examine their performance and adopt more positive self-perceptions (Rapee & Hayman, 1996; Harvey et al., 2000; Rodebaugh, 2004).

In a study that set the stage for a progression of research on social anxiety and VF, Rapee and Hayman (1996) found that socially anxious participants provided with VF of a speech performance rated their performance more positively and consistently with observer ratings than did anxious control participants who did not receive the feedback. These results generalized to a second speech 10 minutes after the first. Thus, VF was not only responsible for improvements in self-perception, but the effects of the VF intervention were also powerful enough that participants maintained their gains in a subsequent speech situation. Rodebaugh and Chambless (2002) replicated Rapee and Hayman's (1996) study with a more stringent control group that controlled not only for the time of the VF task (as was the case in Rapee and Hayman's study) but also for the type of task (the control participants were shown a 3-minute videotape of themselves filling out questionnaires). Results indicated that against the more stringent control group, VF still demonstrated strong beneficial effects on self-perception of performance. Further research in the field demonstrated that the beneficial effects of VF could

be enhanced with the addition of a "cognitive preparation" task prior to VF, in which participants are cognitively prepared for what they would see and experience while watching the video of their speech performance (Harvey et al., 2000). Results from Harvey et al.'s study (2000) indicated that while VF reduced participants' underestimates of performance and improved their impressions of how well they came across, the improvement was significantly greater for participants who received cognitive preparation prior to VF. Furthermore, the beneficial effects of cognitive preparation with VF were found to generalize to a second speech situation (Kim, Lundh and Harvey, 2002). Based on these results, cognitive preparation was implemented into subsequent study protocols on social anxiety and VF (Rodebaugh, 2004; Clark et al., 2003; Smits et al., 2006).

The above mentioned studies indicate that VF has clear efficacy in improving socially anxious individuals' negative self-perceptions. However, do changes in self-perception translate into reductions in symptoms of social anxiety - a fundamental goal of cognitive behavioural treatments? If negative self-perception is thought to maintain social anxiety, improving self-perception through VF should lead to decreases in anxiety. However, researchers have surprisingly found that VF does not lead to significant reductions in social anxiety above and beyond exposure alone (i.e. all participants, regardless of whether or not they received VF, demonstrated reductions in social anxiety; Rapee & Hayman, 1996; Smits et al., 2006). Furthermore, Rodebaugh (2004) demonstrated that improvements in self-perception through VF do not lead to changes in *symptoms related to social anxiety* such as low self-efficacy and avoidance behaviour (pertaining to a willingness to take part in a subsequent speech situation). Table 1 below presents a review of the aforementioned studies on social anxiety and VF (including effect sizes pertaining to changes in self-perception and

corresponding levels of self-reported anxiety). The results from these studies suggest that *significant* changes in anxiety do not reliably follow from *significant* changes in self-perception (Rapee & Hayman, 2006; Rodebaugh, 2004; Smits et al., 2006).

Table 1. *Changes in self-perception and corresponding levels of self-report anxiety across studies on social anxiety and VF. See notes below chart for explanation on how to interpret effect sizes for each study.*

Study	Research Question	Sample	Change in self-perception	Cohen's *d* effect-size for change in self-perception	Sig. change in anxiety *following* change in self-perception	Cohen's *d* effect-size for change in anxiety
Rapee & Hayman (1996)	What is the effect of VF on self-perception of performance?	40 uni. students high on FNE and SAD.	Yes	VF cond.: **1.47** No VF cond.: **.45** *Difference between cond's* ***significant***	No	VF cond.: **1.05** No VF cond: **.41** *Difference between cond's* ***non-sig.***
Rodebaugh & Chambless (2002)	Can beneficial effects of VF be replicated w/ control gp?	90 university students high on PRCA-24.	Yes	Difference *between cond's* in improvement: **.49**	Not tested	N/A
Harvey, Clark, Ehlers & Rapee, (2000)	Does cognitive preparation (CP) enhance therapeutic effects of VF?	74 uni. students in top and bottom 25% on FNE	Yes	CP cond: **1.13** No CP cond: **.52** *Difference between cond's* ***significant***	Not tested	N/A
Kim, Lundh & Harvey (2002).	Do Harvey et al.'s (2000) results generalize to 2nd speech?	40 uni. students high on FNE.	Yes	CP cond: **1.60** No CP cond: **.96** *Difference between cond's* ***significant***	Not tested	N/A
Rodebaugh (2004)	Effects of CP + VF on self-per., anxiety, self-efficacy & avoidance?	95 uni. students high on PRCA-24.	Yes	Cannot be calc. due to absence of *M*'s & *SD*'s in manuscript.	No	Cannot be calc. due to absence of *M*'s & *SD*'s in manuscript
Smits, Powers, Buxkamper & Telch, (2006)	Does VF enhance efficacy of exposure in reducing SP?	77 uni. students & community members high on CIDI/WHO	Not tested	N/A	No	Difference *between conditions* in improvement: **0.13**

For studies **1, 3** and **4**, estimates represent the mean difference ***within*** conditions (VF or No VF; Cognitive Preparation or No Cognitive Preparation, etc.) from **time one to time two.** For changes in self-perception, time one was "Prior to VF" and time two was "After VF." For changes in anxiety, time one was "Speech One" and time two was "Second or Subsequent Speech(s)." **Two effect sizes** are therefore listed for these studies: one effect for the first condition, and one effect for the second condition. These effects were not listed in the original manuscripts, but were rather derived using Cohen's *d (*pooled variance estimate). For studies **2** and **6**, estimates represent the mean difference ***between*** conditions (VF or No VF; Cognitive Preparation or No Cognitive Preparation, etc) in ***improvement*** from time one to time two (prior to VF and after VF or Speech One and Speech Two). **One effect size** representing difference in improvement is therefore listed. These effects were listed in the original manuscripts.

Given the presumed link between negative self-perception and the persistence of anxiety symptoms outlined in prominent cognitive models of social phobia (e.g., Clark & Wells, 1995; Rapee & Heimberg, 1997), how can we make sense of these findings that seem to indicate that changes in self-perception do not reliably translate into changes in self-reported social anxiety? Despite the widespread use of VF in the treatment of social anxiety, no studies have yet empirically addressed this question.

A novel explanation as to why VF leads to significant reductions in negative self-perception without corresponding significant decreases in social anxiety is that highly socially anxious individuals may not be internalizing the positive information they receive from VF. That is, although they are *acknowledging* the positive information: "I did better than I thought" (as demonstrated through their improved performance ratings from before to after VF), they may not be *incorporating* the positive feedback into their global perceptions of their own social abilities. As such, anxiety levels in subsequent speeches may not be correspondingly affected. This hypothesis is based on social cognition research, which has shown that individuals with social phobia respond in an atypical and maladaptive manner to positive feedback. For example, instead of attributing positive feedback (e.g., "you did well on your speech") to their own internal abilities (e.g., "I did well because I am a good speaker"), they tend to attribute their success to external, uncontrollable factors such other people, circumstances, or luck (e.g., Taylor & Wald, 2003). Therefore, when socially anxious individuals in past VF studies acknowledged (after VF) that they did better than they thought, they may have the attributed this positive feedback to factors beyond their control (e.g., luck). Because socially anxious and phobic individuals do not internalize the positive feedback as indicative of their own social

abilities, the feedback may do little, if anything to reduce their anxiety in subsequent social interactions.

Further, research indicates that not only do socially anxious and phobic individuals attribute positive feedback to factors beyond their control, but they also tend to worry (upon receiving positive feedback) that the standards for performing well on future occasions will be higher (Wallace & Alden, 1995; 1997). If socially anxious individuals believe that they cannot live up to new, higher standards, their anxiety levels may remain high or even increase in subsequent social interactions. Indeed, much research supports the notion that positive feedback leads to an increase in negative emotional states (e.g., fear, sadness) for socially anxious individuals (Arkin & Appelman, 1983; Lake & Arkin, 1985; Wallace & Alden, 1997).

Thus, previous VF studies may have failed to find strong reductions in social anxiety following improvements in self-perceptions because a) participants discounted the feedback as indicative of factors beyond their control, and b) they believed themselves to be inefficacious at meeting standards for future speech situations. A typical thought in response to the VF might therefore be, "That fact that I did well was just luck, and next time the standards will be even higher. What will I do then?" Due to maladaptive thought processes such as these, participants may have had difficulty integrating the positive feedback ("I'm not as bad at public speaking as I thought") into their more global representations of self.

Research Questions

The present study attempted to address the following research questions: 1) How can we enable socially anxious individuals to integrate positive feedback into their global sense of selves and make meaningful generalizations from their performances? 2) Will doing so optimize VF to facilitate both improvements in self-perception and reductions in symptoms of

social anxiety? To design a study that would adequately test these questions, we extrapolated from recent research on self-esteem and positive feedback (Marigold, Holmes & Ross, 2007), and examined theoretical models of a) emotional processing in the anxiety disorders literature (Foa & Kozak, 1986) and b) 'levels of processing' in the memory literature (Craik & Lockhart, 1972; Craik & Tulving, 1975).

Research on self-esteem and positive feedback demonstrates that individuals who are low in self-esteem are similar to socially phobic or high-trait socially anxious individuals in the way that they respond to positive feedback from others. That is, rather than benefit from positive feedback, they experience increased anxiety and distress following praise or positive feedback from others (Murray, Holmes, MacDonald, & Ellsworth, 1998; Logel, Spencer, Wood, Holmes & Zanna, 2006). They also tend to worry (as do individuals high in social anxiety) that success will raise others' expectations of them, which they are not confident about meeting in the future (Logel et al., 2006; Murray et al., 1998).

In a recent study, Marigold et al. (2007) found that a way to enable individuals low in self-esteem to internalize and derive meaningful generalizations from positive feedback was to modify the *depth* at which individuals thought about and processed the feedback they received. In this study, participants low and high in self-esteem were asked to consider a past compliment from a romantic partner in concrete terms (considering what the compliment was and the time it was given) or to analyze the compliment in deeper, more abstract terms (explaining why their partner admired them, what the compliment meant to them, and what significance it had for their relationship). They found that people low in self-esteem felt more positively about the compliment, themselves, and their relationships when they were asked to

analyze the meaning and significance of the compliment. Those asked to merely acknowledge the feedback did not derive the same benefit.

In a similar vein, research on emotional processing and the mechanisms of fear reduction within the anxiety disorders literature (Foa & Kozak, 1986) suggests that facilitating decreases in pathological anxiety requires interventions that not only expose anxious individuals to new, corrective information that is inconsistent with feared representations of self (e.g., "I am a better public speaker than I thought"), but also to exposure conditions that promote mindful attention and *elaborative processing* of this new information (such that individuals can derive new meaning from it).

Cognitively avoiding or distracting oneself from corrective feedback during exposure weakens the encoding of fear-relevant information, and impedes the reduction of fear (Foa & Kozak, 1986; see Moscovitch, Antony, & Swinson for a review of subsequent supporting evidence). Further, classic studies on "levels of processing" within the memory literature support the notion that new information is best learned and recalled when processed on a deeper, more elaborate level (Craik & Lockhart, 1972; Craik & Tulving, 1975).

Based on these findings pertaining to self-perception, emotional processing, and memory, it is likely that highly socially anxious individuals would benefit from analyzing and encoding the VF they receive in a deeper and more meaningful, self-relevant manner. Doing so may subsequently enable them to incorporate the positive feedback they receive into their global sense of selves, rather than discounting it as specific to the particular situation at hand, or caused by factors beyond their control. Individuals may then feel better equipped to handle the challenges of future social situations (including perceived higher standards), and their anxiety levels may subsequently decrease.

In line with these assumptions, the research goals of the present study were a) to optimize VF methods by enhancing the depth at which socially anxious individuals process and analyze the feedback they receive and b) to examine whether doing so would facilitate both improvements in self-perception and reductions in symptoms of social anxiety. In essence, the over-arching research goal was to manipulate 'depth of encoding' in order to facilitate the learning of new information (e.g., "I am a better public speaker than I thought") that would be inconsistent with participants' feared representations of self that maintain their symptoms of anxiety (e.g., "I am a poor public speaker").

Present Study

Socially anxious individuals (N = 43) pre-screened as scoring high in both social anxiety and verbal communication apprehension delivered two video-recorded speeches in a laboratory setting. Participants delivered their speeches in front of a video camera and a one-way mirror (behind which the experimenter sat watching participants' performances). Participants were randomly assigned to one of three conditions. In the first condition, *VF + Manipulation*, participants a) received standard VF with cognitive preparation (as per previous studies on social anxiety and VF) and b) received a novel encoding manipulation, in which they were asked to analyze the feedback they received by completing a cognitive processing exercise (developed for the study and described in greater detail below). The cognitive processing exercise was designed to enhance encoding and consolidation of the feedback information.

In the second condition, *VF + No Manipulation*, participants received standard VF with cognitive preparation, and no subsequent encoding manipulation. In the *No VF* condition,

participants performed two public speeches, but received neither VF, nor the encoding manipulation.

Emotion researchers are increasingly recognizing the importance of including both subjective and objective measures of anxiety in order to improve the reliability and validity of emotional assessment, particularly among patient populations (e.g. Mauss, Levenson, McCarter, Wilhelm & Gross, 2005). Many emotion theorists (e.g. Tomkins, 1962; Ekman, 1992) believe the "experience of emotion" to involve not only experiential changes (as determined by self-report), but also changes related to physiology and behaviour. However, no previous studies on VF in social anxiety have measured physiological indices of distress. To address this dearth in the literature, both participants' self-reported anxiety (assessed at various intervals during the study) and physiological arousal (heart rate and skin conductance--monitored continuously throughout the experiment) were assessed in the current study. This study was the first to measure changes in autonomic arousal during a VF intervention for social anxiety.

We hypothesized that, relative to participants who received only standard VF (VF + No Manipulation condition) and no VF (No VF condition), participants who analyzed the VF they received (VF + Manipulation condition) would be more likely to internalize and make meaningful generalizations from the feedback and as a result, experience a significant reduction in self-reported anxiety from speech one to speech two. We also hypothesized that participants who analyzed and encoded the positive feedback would demonstrate important cognitive changes related to social anxiety relative to participants in the other two conditions. Namely, it was expected that participants who analyzed the feedback would report a significant increase in self-efficacy from speech one to speech two, relative to participants who received

only standard VF and to those who received no VF. It was also expected that participants who analyzed the feedback would be more likely to attribute their successful social performance to their internal ability (as opposed to external factors), relative to participants in the other two conditions.

Predictions involving heart rate and skin conductance levels were less obvious. Although researches have shown that different emotional response systems (e.g., subjective, physiological, behavioural) show substantial coherence (e.g. Ekman, Davidson & Friesen, 1990), other, more recent studies have demonstrated that autonomic arousal varies *independently* of self-reported emotion (see Mauss et al., 2005 for a review). Therefore, we proposed the following exploratory research questions, without making any definitive predictions: A) What is the coherence between self-report and physiological anxiety at various time points throughout the VF intervention? B) What is the effect of the encoding manipulation on subsequent levels of physiological arousal during a second speech situation?

Method

Participants

Seventy socially anxious individuals were recruited from a) the University of Waterloo undergraduate psychology research pool (*n* = 59), b) a poster placed in University of Waterloo buildings and the surrounding community (*n* = 10), and c) a listing placed on an online classified ads site called Craigslist.com (*n* = 1). All participants met a cut-off score of 19 or higher on the Social Phobia Inventory (SPIN; Connor et al., 2000), and a score of 59 or higher on the Personal Report of Communication Apprehension (PRCA-24; McCroskey, 1982). Cut-off scores were chosen based on past research by Connor et al. (2000), and Rodebaugh (2004). The data from 27 of the 71 participants recruited for the study were excluded from the current study. Ten participants were excluded due to initial difficulties with lab equipment and study protocol (these were the first 10 participants run in the study and were therefore relegated as pilot participants); seventeen participants recruited for the study no longer met inclusion criteria upon re-administration of the SPIN and PRCA-24 in the lab, and their data were consequently excluded from the study. There were no other exclusion criteria.

Participants (*N* = 43) were randomly assigned to one of the following three conditions: 1) VF + Manipulation (*n* = 13; 62% male), 2) VF + No Manipulation (*n* = 17; 41% male) and 3) No VF (*n* = 13; 77% male). The different recruitment methods were represented relatively equally across conditions. In the VF + Manipulation condition, 69% of participants were recruited from the psychology undergraduate pool and 31% from poster advertisements. In the VF + No Manipulation condition, 76% were recruited from the psychology undergraduate pool, 18% from poster advertisements, and 6% from the online advertisement. In the No VF

condition, 77% of participants were recruited from the psychology undergraduate pool and 23% from poster advertisements.

Sixty-three percent of the total sample was between the ages of 17-20, 15% was between 21-25, and 2% was between 31-35. Participants represented the following ethnicities: Caucasian (40%), Chinese (30%), Other Asian Group (12%), East Indian (7%), Middle Eastern (7%), Korean (2%) and Black/African (2%). English was the first language for 53% of participants. In terms of employment status, 91% of the participants were undergraduate or graduate students, and 9% were working. Table 2 below displays the distribution of demographic variables for participants across the three conditions.

Table 2. *Demographics Across Three Conditions: Numbers Represent Number of Participants*

	VF +Manipulation	VF + No Manipulation	No VF	Total
Gender				
Male	5	7	10	22
Female	8	10	3	21
Age				
17-20	10	10	7	27
21-25	3	7	5	15
31-35	0	0	1	1
Ethnicity				
Caucasian	8	6	3	17
Chinese	3	5	5	13
Other Asian Group	2	1	2	5
East Indian	0	2	1	3
Middle Eastern	0	2	1	3
Korean	0	1	0	1
Black/African	0	0	1	1
First Language				
English	8	9	6	23
Other	5	8	7	20

Self-Report Measures

Social Phobia Inventory (SPIN; Connor et al., 2000). The SPIN is a 17-item scale that assesses fear, avoidance, and physiological discomfort in a variety of social situations. Each item is rated on a 0 ("not at all") to 4 ("extremely") Likert-type scale, with higher scores equaling greater levels of distress. Authors of the scale reported excellent internal consistency, good test-retest reliability, and good convergent validity (Connor et al., 2000). They also report that a cut-off score of 19 clearly differentiates between individuals with and without social phobia. In the current study, the SPIN displayed very good internal consistency ($\alpha = .83$), and was used for the purpose of selecting socially anxious participants, along with the PRCA-24 (below). See Appendix A for a copy of the SPIN.

Personal Report of Communication Apprehension (PRCA-24; McCroskey, 1982). The PRCA-24 is a 24-item scale that measures fear of verbal communication pertaining to discussions, meetings, conversations, and public speaking. Items are rated on a 1 (strongly agree) to 5 (strongly disagree) Likert-type scale, with higher scores corresponding to greater levels of communication apprehension. Past research demonstrates that the PRCA-24 has very good internal consistency (Rodebaugh & Chambless, 2002; Rodebaugh, 2004), and is predictive of anxiety and avoidance in public-speaking situations (Beatty, 1987).

Consequently, the PRCA-24 has been used in previous studies on VF and social anxiety (Rodebaugh & Chambless, 2002; Rodebaugh, 2004) to select speech-anxious individuals. In line with these studies, the current study used the PRCA-24 to select participants with at least a moderate level of communication apprehension (cut off-score of 59 or above; Beatty, 1987). The PRCA-24 was used as a selection tool in conjunction with the SPIN to ensure that participants were not only socially anxious as measured on a general scale of social anxiety,

but that they were also (more specifically) fearful of verbal communication (in line with the nature of the experimental speech task). In the current study, the PRCA-24 displayed excellent internal consistency ($\alpha = .92$). See Appendix B for a copy of the PRCA-24.

Perception of Speech Performance (PSP; Rapee & Lim, 1992). The PSP is a 17-item measure that assesses both global (5 items) and specific (12 items) aspects of participants' speech performance. Participants were asked to rate the extent to which they agreed with various statements about their speech from 0 ("not at all") to 4 ("very much"). Examples of specific aspects of performance were: "Voice quivered," and "Had a clear voice;" examples of general aspects of performance were: "Made a good impression" and "Appeared Nervous."

Two objective observers were also asked to rate participants' performances on the same indictors (for more information on the observers and inter-rater reliability data, please see below). In line with past research, specific and global items were collapsed together and summed to represent participants' and observers' perceived quality of performance (one total score for each), with higher scores equaling more negative perceptions (Rapee & Hayman, 1996; Rodebaugh, 2004). Past research demonstrates that the PSP has very good internal consistency (Rodebaugh, 2004), and in the present study, the internal consistency of the total scale score ranged from .74 to .86 for observer ratings and .80 to .90 for participant ratings. See Appendix C for a copy of the PSP.

Subjective Units of Distress Scale (SUDS). After each speech, participants were asked to rate on a scale of 0-100 the highest level of anxiety they felt throughout the speech, where 0 = "not at all anxious" and 100 = "extremely anxious." Participants were then asked to rate (on the same scale) the level of anxiety they felt at minute one, minute two, and minute three of their speech. Because participants were not aware of the *exact* time each minute occurred, they

were asked to give a rating that corresponded to the level of anxiety they felt at *approximately* minute one, minute two, and minute three. Ratings for minute one, two, and three were averaged to represent participants' mean level of self-reported anxiety for each speech.

Perceived self-efficacy. Consistent with past research by Rodebaugh and Chambless (2002), Rodebaugh (2004), and Zane and Williams (1993), participants were asked to rate the following two questions prior to each speech performance: 1) "What is your confidence (0-100) that you will be able to perform the task (i.e., to get through the 3-minute speech)?" 2) "What is your confidence (0-100) that you will be able to perform the task adequately, or as well as the average person?"

Attributions for Performance. Participants were asked the extent to which they agree with the following two statements about their first speech: 1) "My speech performance was a result of my own ability" 2) "My speech performance was a result of external factors beyond my control (e.g., luck, or the environment)." Each question was rated on a scale of 1 ("strongly disagree") to 5 ("strongly agree).

Beck Depression Inventory-II (BDI-II; Beck, Steer & Brown, 1996). The BDI-II is a 21-item self-report instrument designed to assess the existence and severity of depressive symptoms. Respondents are asked to consider each depressive symptom (e.g., "I do not expect things to work out for me") as it relates to the way in which they have felt over the last two weeks. Items are rated from 0 - 3, where 0 = no depressive symptomology, and 3 = high depressive symptomology. Past research demonstrates that total scores on the BDI-II have high internal consistency, and moderate to strong convergent validity (Steer & Beck, 2000). In the present study, the internal consistency of the BDI-II was .92. See Appendix D for a copy of the BDI-II.

Physiological Measures

Heart Rate and Skin Conductance Levels. Autonomic measurement was accomplished with equipment and software designed by the James Long Company (JLC; Caroga Lake, NY), and with the data-acquisition program Snap-Master™ for Windows. Electrocardiogram (ECG) and skin conductance levels (SCL) were measured continuously during the experiment. The physiological measures were digitized at 512 samples per second with a 31-channel A/D converter operating at a resolution of 12 bits, and with an input range of -2.5 volts to +2.5 volts.

Amplification rates, high-pass filter (HPF), and low-pass filter (LPF) settings were as follows: ECG (Gain = 500, HPF = 0.1 Hz, LPF = 1000 Hz) and SCL (Gain = 0.1 volt per microsiemens, HPF = none/DC, LPF = 10 Hz, 6 dB/octave, single pole RC). For additional information on computer-assisted recordings of psychophysiological indicators, readers are referred to Cacioppo, Tassinary, and Berntson (2000). During the collection of physiological data, the onset and termination of periods of interest were defined using an event marker that was engaged manually by the experimenter at the appropriate times.

Heart rate (HR; in beats per minute) was recorded via two resting, conductive adhesive electrodes (CDI UMP3-P) that were placed on participants' left and right torso at the level of the lower rib cage (active sites); a third reference electrode was placed on participants' chest at the mid-sternum level. Target skin areas were cleaned with alcohol swabs and allowed to dry. ECG signals were amplified using a JLC Bioamplifier Output Box and SA Instrumentation Bioamplifiers from JLC. HR data were analyzed using the ECGRWAVE program by JLC, a computer program that employs an algorithm to detect R-waves and examine the data for artifacts. Artifacts were manually corrected with a mouse to remove R-wave identification marks that were incorrectly specified (e.g., a movement artifact that the computer coded as an

R-wave) or to score R-waves that were missed by automated detection. HR was calculated as the number of R-waves per minute.

SCL was measured using two Ag-AgCl electrodes (UFI 1081FG) filled with electroconductive gel (Electro-Gel) and placed onto the palmar side of the medial phalanges of the third and fourth fingers of participants' non-dominant hand. Participants washed their hands with water before the electrodes were attached. SCL was averaged over one second intervals and are reported in microsiemens.

Procedure

Students in the psychology research-pool self-selected into the study if they met cut-off criteria on the PRCA-24 and the SPIN (made available to them online). Students and community members who responded to the recruitment poster or online advertisement were e-mailed the screening measures (PRCA-24 and SPIN), and asked to complete and send them back by e-mail to the researcher. If participants met the cut-off criteria, they were invited to participate in the experiment and scheduled for individual appointments in the study laboratory.

The laboratory room housed a lazy boy chair on one side of the room, and a video camera (mounted on a tripod) and television on the other. Beside the chair sat the psychophysiological equipment (bioamplifier, headbox, electrodes, etc.). On the wall facing participants was a one-way mirror, with the blinds drawn in such a way to prevent participants from seeing their reflection, but to allow the experimenter to observe participants discreetly from behind the mirror.

Participants were informed that the purpose of the study was to examine people' perceptions of their own public speaking performance on topics related to broad life issues. They were told a) that they would be asked to perform at least one 3-minute speech, b) that

their speech would be videotaped, and c) that they may be shown the video of their performance later on in the experiment.

Participants were then asked to fill out a packet of questionnaires including a second SPIN and PRCA-24. Other measures were also included that are not relevant to the current study. Participants who no longer met cut-off criteria on either the SPIN (score of 19) or the PRCA-24 (score of 59) continued with the study, but their data were excluded from the analyses. Participants were then hooked up to the physiological equipment.

Following a baseline phase of sitting quietly, participants were presented with a list of six possible speech topics. See Appendix E. Controversial topics were chosen (e.g., the death penalty, euthanasia) to ensure that participants would feel sufficiently anxious about having to express opinions that others might find objectionable.

Participants were told that they would be given three minutes to pick a topic and prepare a 3-minute speech, which they would deliver from a seated position (on the chair) in front of the video camera. They were informed that while they spoke, the researcher would observe them from behind the one-way mirror, evaluating their performance on various indicators. They were also told that at a later point in time, two naïve research assistants (i.e., objective observers) would watch the video of their performance and provide an objective evaluation of their speech.

During a subsequent 3-minute speech preparation phase, participants were allowed to write notes; however, to increase the likelihood that participants were engaged and mentally "present" during the public speaking task, they were asked to refrain from actually using their notes during the speech.

After they prepared their speech, participants were asked two questions about their perceived self-efficacy concerning the upcoming speech (i.e., their confidence that they would be able to get through the task, and their confidence that they would perform as well as an average person). They were then instructed to sit for three minutes while the researcher "prepared the next task in the other room." The purpose of this phase was actually to track participants' heart rate and skin conductance levels in anticipation of their speech performance. After three minutes of anticipation, the researcher informed participants through an intercom connecting the two rooms that a) the video camera was on, b) the experimenter would be watching and evaluating the performance through the one-way mirror, and c) they should speak until they were informed that the three minutes had elapsed. Participants were told they could put up their hand at any point throughout the speech to inform the researcher that they wished to terminate the task early.

After their speech, the researcher asked participants to rate the highest level of anxiety they experienced throughout the speech, and to estimate the level of anxiety they experienced at minutes one, two, and three. Participants were then instructed to sit for a few minutes (3-min.) while the researcher "prepared the next task" in the other room. The purpose of this phase was to give participants time to recover from the anxiety-provoking speech situation, and to track their autonomic arousal during this period. After the recovery period, participants reported on the quality of their speech performance by filling out the Perception of Speech Performance questionnaire (PSP; Rapee & Lim, 1992).

Participants in the "VF + Manipulation" condition and the "VF + No Manipulation" condition (as per random assignment) then completed the "cognitive preparation" task prior to receiving VF. As developed by Harvey et al. (2000), cognitive preparation (CP) involves

helping participants a) predict in detail how they will appear in the video, b) form a vivid mental image of themselves and their performance and c) learn how to watch the video as if one was an objective observer watching the performance of a stranger. Steps a) and b) are designed to make participants' *perception* of how they came across more salient, such that when participants view themselves on video, they will be more apt to spot the difference between how they *felt* they came across and how they *actually* came across. Step c) helps participants view themselves in a more objective manner. Detailed instructions on the three stages of the CP task were taken from Rodebaugh's (unpublished) manual, which was based on research by Harvey et al., (2000).

While participants in the "VF + Manipulation" condition and the "VF + No Manipulation" condition completed the CP, the participants in the "No VF" condition completed a "filler cognitive task," in which they were asked to find figures hidden among other larger shapes. The activity was chosen to match the approximate length of time of the CP task. It was also chosen because it was non-challenging and non-arousing, and therefore unlikely to interfere with participants' anxiety levels. After the cognitive tasks, participants in the "VF + Manipulation" condition and the "VF + No Manipulation" condition received VF of their speech performance; participants in the No VF condition watched a three-minute National Geographic clip entitled, "Jewels of the Caribbean Sea." The clip was chosen for its neutral and non-threatening content. All participants then rated the quality of their speech performance for a second time on the PSP.

Participants in the "VF + Manipulation" condition then received the encoding manipulation developed for the current study, in which they progressed through a two-step, in-depth process of analyzing the feedback they received, in order to facilitate processing and

internalization of this new information. See Appendix F. The first step of the manipulation was the "comparison of ratings" stage; the researcher sat down with participants and went over the items on the PSP that participants rated more positively from before to after watching the VF. To do so, participants were presented with a form in which they were asked to fill in the blanks to statements such as: "*At first I thought I stuttered _____ (← insert PSP rating before VF). After watching the video, I realized I stuttered_____ (← insert PSP rating after VF).*" An example response to the statement above is: "*At first I thought I stuttered extremely. After watching the video, I realized I stuttered not at all.*" Participants were asked to fill in the blanks for all items on the PSP that improved from before to after VF. Items that did not improve were left blank. The purpose of the "comparison of ratings" stage was to help participants recognize through their *own* PSP ratings that they did not perform as poorly as they originally expected (in essence, that at first glance they underestimated their performance). Because socially anxious individuals have difficulty accepting and internalizing positive feedback from others (Wallace & Alden, 1995; 1997; Taylor & Wald, 2003), it was important to have participants come to this realization on their own.

The second step of the encoding manipulation was an open-ended question phase, in which participants were asked to provide elaborate, written answers to a series of four questions. The questions were designed to induce a contemplative and meaningful analysis of the feedback, and to thereby enhance the *depth* at which socially anxious individuals processed and analyzed the feedback they received. The assumption was that by encouraging individuals to encode feedback in a deeper, more meaningful, self-relevant manner, they may be better able to incorporate this new information into their global sense of selves. The first question, *"How does this feedback make you feel?"* was designed to allow participants to freely identify

and explore their thoughts and feelings about themselves, their ability, or the speech situation itself.

The second question, "*What have you learned from this feedback about your social ability in situations such as public speaking, interacting, and communicating with others?"* challenged participants to consider the feedback (i.e. "I didn't do as poorly as I thought") as an indication that they not only underestimated their performance in the isolated lab situation, but also that they may have underestimated their more general public-speaking ability. Further, the question was meant to encourage participants to think about how the feedback may generalize to situations other than public speaking, such as interacting and communicating with others.

The third question, *"What is the significance of this feedback to your sense of self?"* was designed to encourage participants to link the feedback to their more global sense of self-worth. Instead of considering the feedback as tied only to their public-speaking abilities, participants may begin to think about how the feedback plays into their sense of who they are as people. The fourth question, *"How will this feedback influence your capability to perform in future social situations such as public speaking, interacting, and communicating with others?"* challenges participants to generalize the feedback to multiple contexts across time, at least in their own imagination. In answering this question, participants may begin to entertain the idea that they might not perform as poorly as they originally anticipated in future social situations. Overall, the questions in the analysis condition were meant to encourage participants to consider the feedback as being: a) representative of their internal sense of social abilities, and b) generalizable across time and social situations.

At the time that participants in the "VF + Manipulation" condition completed the encoding manipulation, participants in the other two conditions completed a filler task. The

filler task involved answering a number of simplistic demographic questions, such as "Where are you from?" and "What is the population of the city where you were born?" They were then asked to read a passage about the history of the township of Waterloo. The filler task was matched for time with the "Analysis of Feedback" manipulation, and was designed to be a neutral, non-threatening task (so as to not elicit increases in anxiety). All participants then answered two questions about their attributions for their speech performance (i.e., the extent to which their speech performance was a) a result of their own abilities, and b) a result of external factors beyond their control).

Participants were subsequently told that for the next stage of the experiment, they would perform a second, three-minute speech under the same conditions as the first. Participants were given the same list of six speech topics and asked to pick a topic different from the original topic chosen. They were then given three minutes to prepare their speech, after which they were asked about their perceived self-efficacy concerning their upcoming second speech. They then sat for a three-minute anticipation period, performed their speech in front of the video camera (with the researcher behind the one-way mirror), reported on their perceived level of anxiety throughout the speech (highest level of anxiety, and at each minute of speech), and sat for a final three-minute recovery period. Following the recovery period, participants rated the quality of their second speech performance on the PSP. Finally, participants were disconnected from the physiological equipment and debriefed. The entire experiment lasted approximately two hours.

Objective Observer Ratings

Two undergraduate research assistants, blind to the purpose and design of the study and the experimental conditions to which participants were assigned, watched all of the speech

performances on video and rated their quality on the Perception of Speech Performance scale (PSP; Rapee & Lim, 1992). The observers met for training sessions with the principal investigator prior to watching the videos. In these sessions, they learned how to properly interpret the scale items and apply them to participants' speech performances. Pilot participants were used as training examples to help the observers calibrate their ratings. Following the training sessions, the two objective observers watched the participant videos and completed their ratings independent of any interactions with each other or the principal investigator. To assess inter-rater reliability, a two-way mixed intraclass correlation coefficient (ICC) was calculated for the *consistency* and *agreement* of the average measure. The average measure (as opposed to single measure) is used when observers' scores are averaged together to create one observation rating. The ICC for the *consistency* of the average measure for observer ratings of speech one and speech two ranged from high to substantial (.80 for speech one; .67 for speech two), while the ICC for the *agreement* of the average measure for observer ratings of speech one and speech two ranged from modest to low (.49 for speech one; .37 for speech two).

These results indicate that the two observers rated participants in the same manner (i.e., when one observer's ratings became more positive to a certain degree, so did the other's ratings, and vice versa), but showed less agreement about the absolute values of the ratings. Indeed, one of the observers systematically rated participants more negatively than did the other observer. Previous studies on VF and social anxiety that used an ICC to measure inter-rater reliability (Rodebaugh & Chambless, 2002; Rodebaugh, 2004) tested only the *consistency* of the average measure, and found consistency ratings between raters ranged from modest (.64) to excellent (.93). The inter-observer reliability data in the present study are in line with Rodebaugh's (2002; 2004) findings of modest to high consistency between raters. Taking into

consideration the substantial to high consistency agreement between raters in the present study, it was decided that the total PSP scores from each observer would be averaged together to create one observer rating used in the data analysis (as was done in Rodebaugh et al.'s studies); the limitations of doing so in light of the low to moderate agreement between observer's absolute ratings are addressed in the discussion section.

Results

Descriptive Statistics

An alpha level of .05 was used for all statistical analyses. Overall, participants were high in both verbal communication anxiety (PRCA-24 $M = 85.44$, $SD = 14.05$) and trait social anxiety (SPIN $M = 35.63$, $SD = 10.68$). Past research has shown that scores over 80 on the PRCA-24 indicate high levels of communication apprehension (according to a community norm sample of 40 000 participants; McCroskey, 1982). SPIN norms from a patient sample ($N = 148$) revealed that individuals diagnosed with social phobia had a mean SPIN score of 41.1, in contrast to a mean score of 12.1 for non-psychiatric controls ($N = 68$; Connor et al., 2000). In the present study, conditions did not differ from one another in initial PRCA-24 scores, F, (2, 42) = .66, $p > .05$, nor did they differ in initial scores on the SPIN, F, (2, 42) = 1.13, $p > .05$.

Participants' overall level of depressive symptomology on the BDI-II fell in the mild range ($M = 16.47$, $SD = 10.92$). Across conditions, participants did not differ from one another in BDI-II scores, F (2, 40) = .92, $p > .05$. See Table 3 below for mean PRCA-24, SPIN, and BDI-II scores by condition.

Table 3. *Means and Standard Deviations (in Brackets) of Participants' Total PRCA, SPIN and BDI-II scores, by Condition.*

Condition	PRCA-24	SPIN	BDI-II
VF + Manipulation	89.08 (15.48)	38.08 (12.02)	16.69 (10.12)
VF + No Manipulation	83.18 (13.38)	32.65 (10.55)	14.00 (12.48)
No VF	84.77 (13.81)	37.08 (9.21)	19.46 (9.44)

Scale ranges: PRCA-24 (24-120); SPIN (0-68); BDI-II (0-63).
Higher scores = greater distress.

Results Pertaining to Cognitive Changes

Changes in Self-Perception Following VF. Before replicating the past finding that VF leads to improvements in self-perception of performance, it was important to ensure that participants in all three conditions significantly underestimated their performance prior to receiving VF. A 3 (between-subjects) x 2 (within-subjects) mixed model ANOVA was conducted, in which the between-subjects factor was *condition* (VF + Manipulation, VF + No Manipulation, and No VF), and the within-subjects factor was *type of rating* (self vs. observer). The dependent variable was participant and observer mean ratings of performance on the PSP. Results revealed a main effect of type of type of rating, F (1, 40) = 276.54, $p < .001$, partial η^2 = .87, and no interaction, F (2, 40) = .67, p = .52, partial η^2 = .032, indicating that, as expected, all participants' self-performance ratings (regardless of condition) were significantly more negative than were ratings made by objective observers prior to receiving VF, $p < .001$. See Table 4 below for self and observer performance means prior to VF.

Next, to replicate the past finding that VF leads to improvements in self-perception of performance, a 3 (between-subjects) x 2 (within-subjects) mixed model ANOVA was conducted. The between-subjects factor was *condition* (VF + Manipulation, VF + No Manipulation, and No VF), and the within-subjects factor was *time* [prior to video exposure, (i.e., prior to watching VF or the national geographic video) and after video exposure]. The dependent variable was participants' mean ratings of performance on the PSP. Results revealed a main effect of time, F (1, 40) = 64. 39, $p < .001$, partial η^2 = .62; after video exposure, participants' self-ratings were significantly more positive and in line with objective observers' ratings than before video exposure, $p < .001$. There was also a significant interaction between condition and time, F (2, 40) = 12.09, $p < .001$, partial η^2 = .38.

Post-hoc pairwise comparisons revealed that at time one (before VF or the national geographic movie) there were no significant differences in self-performance ratings between the three conditions (VF + Manipulation *vs.* VF + No Manipulation, $p = .92$, Cohen's $d = .04$; VF + Manipulation *vs.* No VF, $p = .57$, Cohen's $d = .25$; VF + No Manipulation *vs.* No VF, $p = .62$, Cohen's $d = .18$). However, at time two, participants who received VF demonstrated significantly higher self-performance ratings than participants who did not receive VF (VF + Manipulation *vs*. No VF, $p = .009$, $d = 1.12$; VF + No Manipulation *vs*. No VF, $p = .044$, $d = .68$). As expected, there was no difference in self-ratings ratings between participants in the VF + Manipulation and the VF + No Manipulation condition ($p = .39$, $d = .37$). This result was expected because at this point in the experiment, the two conditions underwent identical study procedures. Finally, the improvement in ratings from before to after VF was significant for participants in the VF + Manipulation ($p < .001$, $d = 1.76$) and the VF + No Manipulation condition ($p < .001$, $d = .96$). Participants in the No VF condition demonstrated no such improvement ($p = .56$, $d = .11$).

Changes in Self-Perception Following Encoding Manipulation. Of interest to the current study was whether further improvements in self-perception during the second speech situation would occur amongst participants who received the encoding manipulation relative to participants who did not analyze the VF and those who did not receive VF at all. To answer this question, a 3 (between-subjects) x 2 (within-subjects) mixed model ANOVA was conducted. The between-subjects factor was *condition* (VF + Manipulation, VF + No Manipulation, and No VF), and the within-subjects factor was *time* (rating of speech one after video exposure and rating of speech two— note that time point one in the current analysis was time point two in the previous analysis). In the current analysis, the first time point was before

the encoding manipulation and the second time point was after the manipulation. The dependent variable was participants' mean self-ratings on the PSP.

Results revealed a main effect of condition, F (2, 40) = 8.43, p = .001, partial η^2 = .30; participants in the No VF condition demonstrated significantly more negative scores on the PSP than participants in the VF + Manipulation and VF + No Manipulation condition, $p < .001$ and p = .003, respectively. This effect was expected due to the absence of VF in this condition. Results also revealed a significant interaction, F (2, 40) = 3.33, p = .046, partial η^2 = .14.

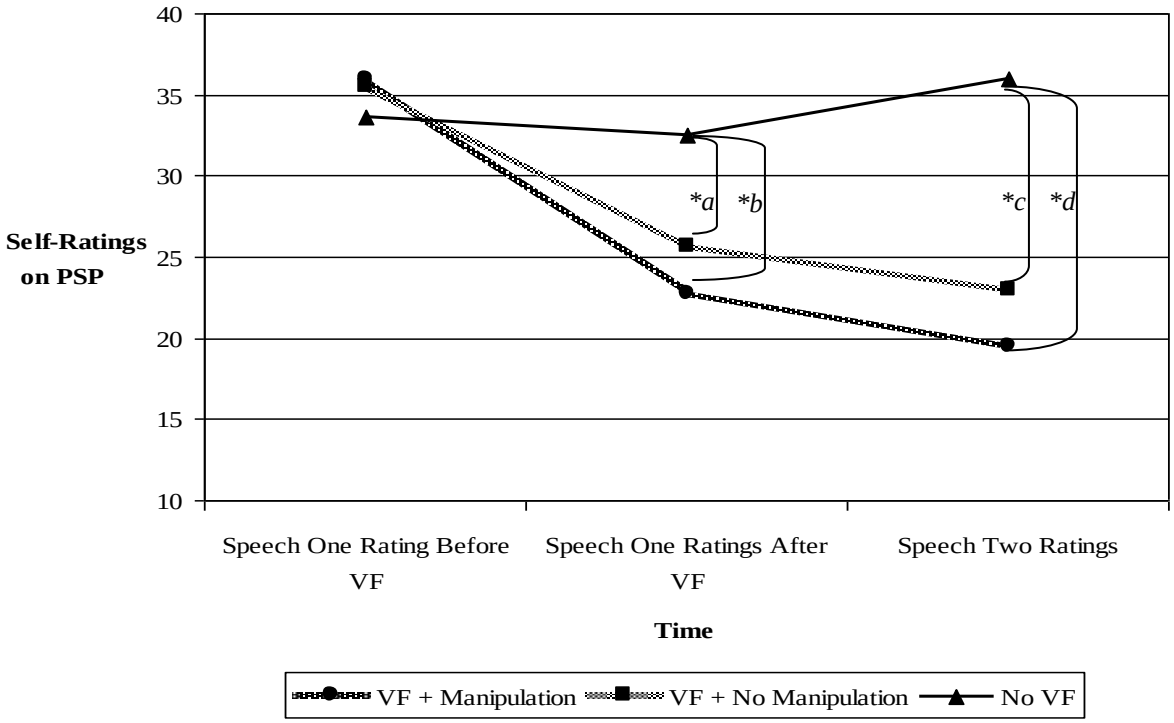
Post-hoc pairwise comparisons revealed that, contrary to expectations, there was no significant difference in self-ratings between participants in the VF + Manipulation and the VF + No Manipulation condition at time two (p = .33, d = .38). Interestingly however, the magnitude of the difference in performance self-ratings between participants in the VF + Manipulation and the No VF condition almost doubled in size from time one to time two *as did* the difference between ratings for participants in the VF + No Manipulation and No VF condition (VF + Manipulation vs. No VF *time one*: p =.009, d = 1.12 and *time two*: $p < .001$, d = 2.02; VF + No Manipulation vs. No VF *time one*: p =.044, d = .68 and *time two*: p = .001, d = 1.22). This difference can be accounted for by a slight (non-significant) improvement in performance ratings from time one to time two for participants in both the VF + Manipulation condition (p = .12, d = .53) and the VF + No Manipulation condition (p = .15, d = .25) and a slight (non-significant) worsening in performance ratings for participants in the No VF condition (p = .11, d = .33). See Table 4 and Figure 1 below.

Table 4. *Mean Self and Observer Performance Ratings on the PSP and Standard Deviations (in brackets) for Speech One (Prior To & After VF) and Speech Two. Corresponding Underestimations of Performance Also Included.*

Type of Rating	Speech One Ratings Prior to VF	Speech One Ratings after VF	Speech Two Ratings
VF + Manipulation Condition			
Self-Rating	35.92 (8.70)	22.77 (5.97)	19.46 (6.49)
Observer Rating	11.50 (4.87)	11.50 (4.87)	11.15 (4.37)
Underestimation of Performance	**24.42 (8.90)**	**11.27 (6.01)**	**8.31 (7.12)**
VF + No Manipulation Condition			
Self-Rating	35.53 (11.61)	25.65 (9.36)	23.00 (11.54)
Observer Rating	14.06 (7.49)	14.06 (7.49)	11.50 (4.75)
Underestimation of Performance	**21.47 (9.27)**	**11.59 (10.51)**	**11.50 (10.75)**
No VF Condition			
Self-Rating	33.62 (9.69)	32.54 (10.84)	35.92 (9.50)
Observer Rating	12.89 (4.07)	12.89 (4.07)	14.65 (5.41)
Underestimation of Performance	**20.73 (7.60)**	**19.65 (8.36)**	**21.27 (10.26)**

Note: observers only rated participants once for speech one, and therefore scores prior to and after VF are identical. Further, participants in the No VF condition did not receive VF, but were asked to fill out the PSP at the same time points as participants in the other two conditions. Speech one ratings occurred after VF and before the encoding manipulation or filler task, while speech two ratings occurred after the manipulation or filler task. Higher scores on the PSP represented more negative ratings.

Scale range of PSP: 0-68. Lower scores = more positive ratings.



*a: p = .044, d = .68
*b: p = .009, d = 1.12
*c: p = .001, d = 1.22
*d: p < .001, d = 2.02

Figure 1. *Mean Self-Performance Ratings on the PSP, by Condition. Scale range of PSP: 0-68. Lower scores = more positive ratings.*

An analysis of the way in which *observer ratings* changed (or did not change) from speech one to speech two across conditions was also conducted through a 3 (between-subjects) x 2 (within-subjects) mixed model ANOVA. The between-subjects factor was *condition* (VF + Manipulation, VF + No Manipulation, and No VF), and the within-subjects factor was *time* (rating of speech one and speech two). The dependent variable was observers' mean ratings on the PSP. Results revealed a significant interaction, F (2, 40) = 4.76, p = .014, partial η^2 = .19.

Pairwise comparisons revealed that revealed there were no significant differences between conditions in observer ratings for *speech one* (VF + Manipulation *vs.* VF + No

Manipulation, p = .24, d = .41; VF + Manipulation *vs.* No VF, p = .55, d = .31; VF + No Manipulation *vs.* No VF, p = .59, d = .19) or *speech two* (VF + Manipulation *vs.* VF + No Manipulation, p = .85, d = .076; VF + Manipulation *vs.* No VF, p = .073, d = .71; VF + No Manipulation *vs.* No VF, p = .085, d = .62). However, within-group comparisons from speech one to speech two revealed that the observer ratings for participants in the VF + No Manipulation were significantly more positive during speech two than speech one (p = .009, d = .41). Observer ratings for participants in the VF + Manipulation and the No VF condition remained constant from speech one to speech two (p = .76, d = .076 and p = .11, d = .36, respectively).

Changes in Self-Efficacy from Speech One to Speech Two. To test the hypothesis that participants who analyzed the feedback ("VF + Manipulation") would report a significant increase in self-efficacy from speech one to speech two, relative to participants who received only standard VF (VF + No Manipulation) and no VF, two 3 (between-subjects) x 2 (within-subjects) mixed model ANOVAs were conducted. For each ANOVA, the between-subjects factor was *condition* ("VF + Manipulation," "VF + No Manipulation," and "No VF"), and the within-subjects factor was *time* (prior to speech one and prior to speech two). The two dependent variables were a) participants' perceived self-efficacy that they would be able to perform the task (i.e., to complete the 3-minute speech), and b) their perceived self-efficacy that they would be able to perform the task adequately, or as well as the average person. Ratings were made on a scale of 0-100, where higher scores equaled greater self-efficacy.

For the analysis pertaining to participants' perceived self-efficacy that they would be able to perform the task, a main effect of condition was found, F (2, 40) = 3.75, p = .032, partial η^2 = .16; participants in the No VF condition had significantly lower self-efficacy ratings

than did participants in the VF + Manipulation condition, $p = .009$. However, neither a main effect of time nor a significant interaction emerged, F (1, 40) = 1.58, $p = .22$, partial $\eta^2 = .04$, and F (2, 40) = 2.38, $p = .11$, partial $\eta^2 = .11$, respectively.

For the analysis pertaining to participants' perceived self-efficacy that they would be able to perform the task adequately, or as well as the average person, a significant main effect of condition was found, F (2, 40) = 7.02, $p = .002$, partial $\eta^2 = .26$; participants in the No VF condition had significantly lower self-efficacy ratings than participants in both the VF + Manipulation condition and the VF + No Manipulation condition, $p = .001$ and $p = .006$, respectively. A significant interaction was also found, F (2, 40) = 3.86, $p = .029$, partial $\eta^2 = .16$ was found. Post-hoc pairwise comparisons revealed that prior to speech one, participants in the No VF condition had slightly lower ratings of self-efficacy than participants in the other two conditions; however, these differences between conditions were not significant (VF + Manipulation *vs.* No VF, $p = .06$, $d = .68$; VF + No Manipulation *vs.* No VF, $p = .08$, $d = .61$). There was also no difference in self-efficacy ratings prior to speech one between participants in the VF + Manipulation and VF + No manipulation condition, $p = .84$, $d = .092$.

Prior to speech two, the difference in self-efficacy ratings between participants in the VF + No Manipulation and the No VF condition became more pronounced ($p = .003$, $d = 1.14$) and the difference in ratings between participants in the VF + Manipulation and the No VF condition became larger still ($p < .001$, $d = 1.46$). The difference in self-efficacy ratings between participants in the VF + Manipulation and the VF + No Manipulation condition was not significant ($p = .20$, $d = .52$).

Within-group comparisons revealed that self-efficacy ratings of participants who received standard VF (VF + No Manipulation) did not significantly change from speech one to

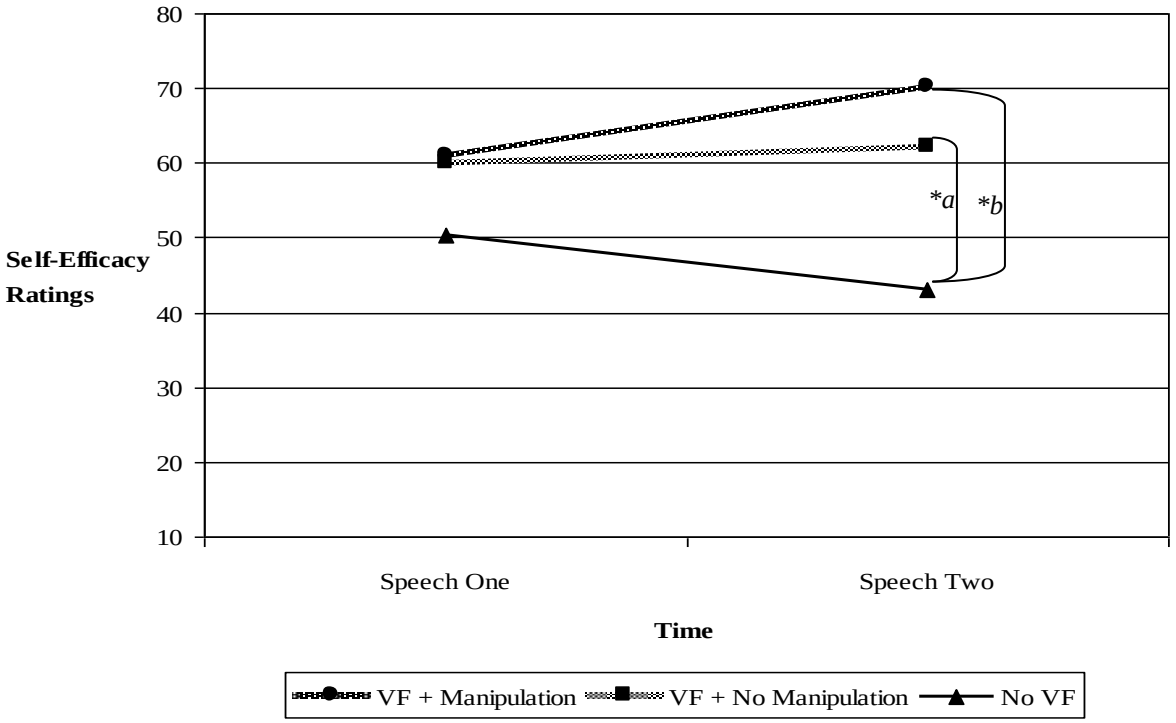
speech two (p = .56, d = .17). On the other hand, participants who analyzed the feedback (VF + Manipulation) demonstrated a significant improvement from speech one to speech two in their confidence that they would be able to perform the task adequately (p = .037, d = .61). Participants who received no VF reported marginally *lower* confidence that they would be able to perform the task adequately from speech one to speech two (p = .089, d = .38).

Overall, these results suggest that the encoding manipulation not only protected participants from the decline of self-efficacy from speech one to speech two, but also *increased* their confidence in being able to adequately perform the task. See Table 5 and Figure 2 below for means pertaining to self-efficacy for speech one and speech two, by condition.

Table 5. *Means, Standard Deviations (in Brackets), and Change Scores of Participants' Self-Reported Self-Efficacy during Speech One and Speech Two.*

Condition	Speech 1	Speech 2	Change Scores
VF + Manipulation	61.15 (11.93)	70.31 (17.55)	9.16
VF + No Manipulation	60.06 (11.76)	62.24 (13.30)	2.18
No VF	50.46 (18.94)	43.08 (19.64)	-7.38

Scale range: 0-100. Higher scores = greater self-efficacy.



a: $p = .003$, $d = 1.14$
b: $p < .001$, $d = 1.46$

Figure 2. *Mean Self-Efficacy Scores Prior to Speech One and Speech Two, by Condition. Scale range: 0-100. Higher scores = greater self-efficacy.*

Attributions of Performance. Two, one-way ANOVAs were conducted to test the hypothesis that participants who analyzed the feedback (VF + Manipulation) would be a) more likely to attribute their successful social performance to their internal ability and b) less likely to attribute their performance to external factors, relative to participants who received only standard VF (VF + No Manipulation) and who did not receive VF (No VF). Scores ranged from 0-5, with lower scores representing more agreement that their performance was attributable to their internal ability.

The ANOVA for internal attributions of performance was marginally significant, F (2, 40) = 2.85, $p = .07$. An LSD post-hoc test revealed that participants in VF + Manipulation

condition were significantly more likely to attribute their social performance to their own internal ability than were participants in No VF condition, $p = .03$, $d = 1.39$. They were also marginally more likely to attribute their social performance to their internal ability than were participants in the VF + No Manipulation condition, $p = .069$, $d = .83$. Finally, participants in the VF + No Manipulation condition did not significantly differ from participants in the No VF condition in their internal attributions of performance, $p = .60$, $d = .17$. The ANOVA for external attributions of performance was non-significant, $F(2, 40) = .37$, $p = .69$. See Table 6 for means and standard deviations pertaining to internal attributions of performance, by condition. See Figure 3 for a graphical depiction of the differences across conditions.

Table 6. *Means, Standard Deviations (in Brackets) of Participants' Internal Attribution Scores, By Condition.*

Condition	**Internal Attribution Score**
VF + Manipulation	4.31 (.63)
VF + No Manipulation	3.47 (1.28)
No VF	3.23 (1.54)

Scale range = 0-5; higher scores = more agreement that their performance was a result of their own ability.

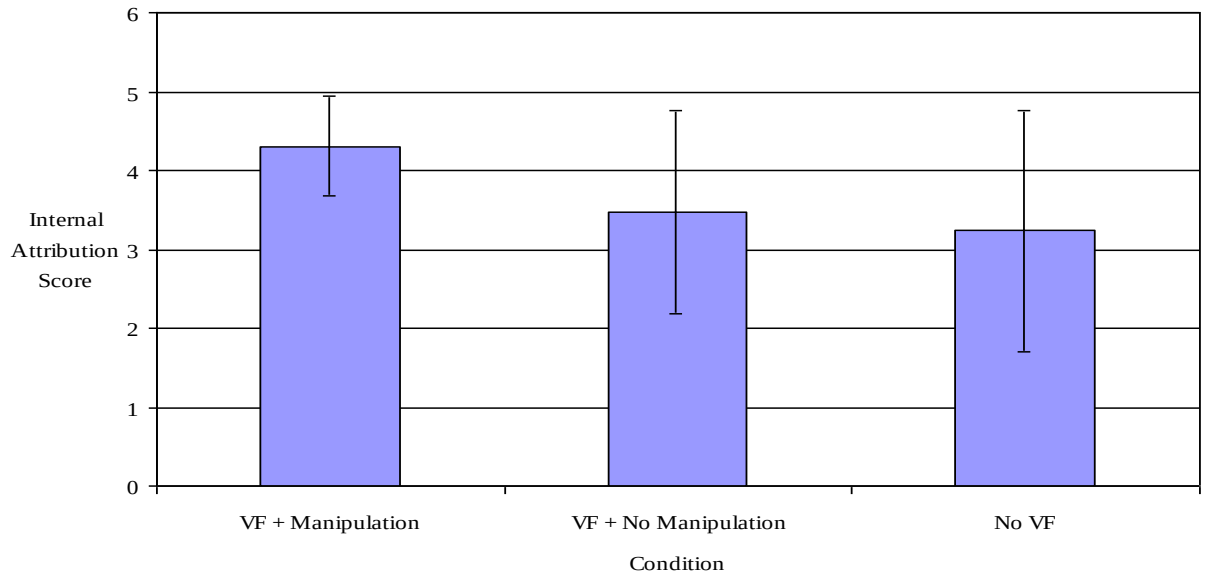


Figure 3. *Mean Internal Attribution Scores, by Condition With Standard Deviation Bars. Scale range = 0-5; higher scores = more agreement that their performance was a result of their own ability.*

Results Pertaining to Changes in Emotion

Changes in Self-Reported Anxiety from Speech One to Speech Two. To test the hypothesis that participants in the "VF + Manipulation" condition who analyzed the feedback would report a significant reduction in self-reported anxiety from speech one to speech two, relative to participants who received only standard feedback, or no feedback at all, a 3 (between-subjects) x 2 (within-subjects) mixed model ANOVA was conducted. The between-subjects factor was *condition* (VF + Manipulation, VF + No Manipulation, and No VF), and the within-subjects factor was *time* (speech one and speech two). The dependent variables were a) participants' mean self-reported level of anxiety during each speech, calculated by averaging their anxiety ratings at minute one, minute two, and minute three (0-100), and b) participants' self-reported highest levels of anxiety during each speech (0-100). Two participants from the "VF + No Manipulation" condition terminated their speeches early. Because these participants

were unable to estimate their level of anxiety at each minute of their speeches, their data could not be used for the first analysis pertaining to mean self-reported anxiety.

For *mean self-reported anxiety*, results revealed a main effect of time, F (1, 38) = 7.78, p = .008, η^2 = .17; self-reported mean anxiety levels were significantly lower during speech two than speech one, p = .008. A marginally significant interaction was also found, F (2, 38) = 2.81, p = .073, partial η^2 = .13. Post-hoc pairwise comparisons revealed that during speech one, there were no significant differences in mean anxiety ratings between the three conditions (VF + Manipulation vs. VF + No Manipulation, p = .27, d = .41; VF + Manipulation vs. No VF, p = .88, d = .063; VF + No Manipulation vs. No VF, p = .34, d = .36). At time two, participants in the VF + No Manipulation condition demonstrated significantly lower mean anxiety ratings than participants in the No VF condition (p = .025, d = .904). Participants in the VF + Manipulation condition were not significantly different from participants in the No VF condition (p = .12, d = .63) nor the VF + No Manipulation condition (p = .503, d = .25) at time two.

Within-group comparisons revealed that a significant reduction in anxiety from speech one to speech two was present for participants in *both* the VF + Manipulation and the VF + No Manipulation condition (p = .008, d = .64 and p = .022, d = .49, respectively). Participants in the No VF condition demonstrated no such decrease in anxiety (p = .75, d = .076).

Almost identical results were found for participants' self-reported *highest levels of anxiety* during each speech. As demonstrated above, results revealed a main effect of time, F (1, 40) = 16.43, p < .001, partial η^2 = .29; self-reported highest levels of anxiety were significantly lower during speech two than speech one, p < .001. Likewise, an interaction was found, F (2, 40) = 3.99, p = .026, partial η^2 = .17. Pairwise comparisons indicated that during speech one,

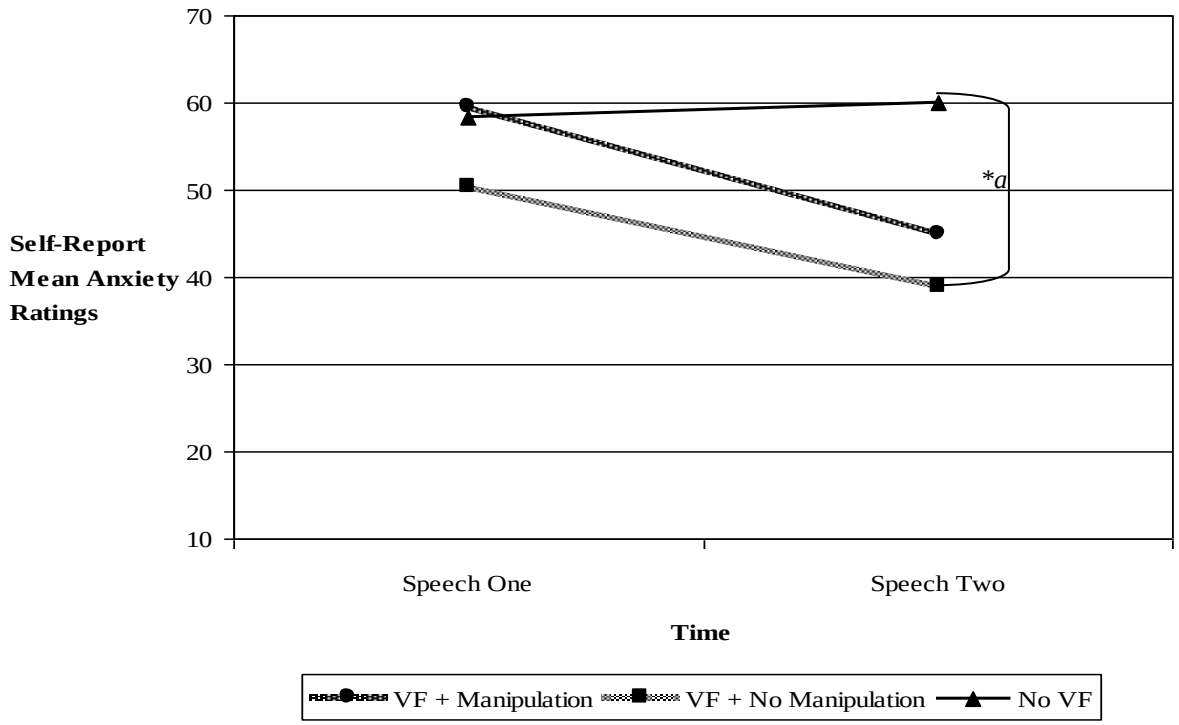
there were no significant differences in highest anxiety ratings between the three conditions (VF + Manipulation *vs.* VF + No Manipulation, $p = .44$, $d = .31$; VF + Manipulation *vs.* No VF, $p = .59$, $d = .21$; VF + No Manipulation *vs.* No VF, $p = .85$, $d = .068$). At time two, participants in the VF + No Manipulation demonstrated significantly lower anxiety ratings than participants in the No VF condition ($p = .026$, $d = .86$). Participants in the VF + Manipulation condition were not significantly different from participants in the No VF condition ($p = .11$, $d = .66$) nor the VF + No Manipulation condition ($p = .57$, $d = .21$) at time two.

Within-group comparisons revealed that a significant reduction in highest anxiety from speech one to speech two was present for *both* participants in the VF + Manipulation and the VF + No Manipulation condition ($p = .001$, $d = .94$, and $p < .001$, $d = .84$, respectively). Participants in the No VF condition demonstrated no such decrease in anxiety ($p = .99$, $d = .0034$). See Table 7 and Figure 4 below for means and standard deviations.

Table 7. *Means, Standard Deviations (in Brackets), and Change Scores of Participants' Self-Reported Anxiety (Mean and Highest) during Speech One and Speech Two.*

Condition	Speech 1	Speech 2	Change Scores
Mean Anxiety			
VF + Manipulation	59.62 (20.92)	45.08 (24.68)	14.54
VF + No Manipulation	50.44 (23.28)	39.00 (23.64)	11.44
No VF	58.31 (20.44)	59.95 (22.71)	-1.64
Highest Level of Anxiety			
VF + Manipulation	76.85 (17.78)	56.92 (24.20)	19.93
VF + No Manipulation	71.00 (20.16)	51.77 (25.18)	19.23
No VF	72.46 (22.94)	72.54 (23.18)	-0.08

Scale range = 0-100; higher scores = higher self-report anxiety.



*a: p = .025, d = .904

Figure 4. *Self-Report Ratings for Mean Level of Self-Reported Anxiety Experienced During Speech One and Speech Two, by Condition. Scale range = 0-100; higher scores = higher self-report anxiety.*

Changes in Physiological Anxiety from Speech One to Speech Two. To test the hypothesis that participants in the "VF + Manipulation" condition who analyzed the feedback would demonstrate a significant reduction in physiological arousal (as measured by heart rate and skin conductance) from speech one to speech two, relative to participants who received only standard feedback, or no feedback at all, two 3 (between-subjects) x 2 (within-subjects) mixed model ANOVAs were conducted. The between-subjects factor for each ANOVA was *condition* ("VF + Manipulation," "VF + No Manipulation," and "No VF"), and the within-subjects factor for each was *time* (speech 1 and speech 2). The two dependent variables were a)

participants' average heart rate during speech one and speech two, and b) participants' average skin conductance level during speech one and speech two.

In terms of heart rate, results revealed a main effect of time, F (1, 38) = 118.05, p < .001, partial η^2 = .75; heart-rate levels were significantly lower during speech two than speech one, p < .001. A significant interaction was also found, F (2, 39) = 5.33, p = .009, partial η^2 = .22. Pairwise comparisons indicated that during speech one *and* speech two, there were no significant differences in heart rate between the three conditions (*Time one*: VF + Manipulation *vs.* VF + No Manipulation, p = .49, d = .26; VF + Manipulation *vs.* No VF, p = .70, d = .17; VF + No Manipulation *vs.* No VF, p = .77, d = .105; *Time Two*: VF + Manipulation *vs.* VF + No Manipulation, p = .69, d = .14; VF + Manipulation *vs.* No VF, p = .12, d = .83; VF + No Manipulation *vs.* No VF, p = .21, d = .45).

Within-group comparisons revealed that while participants' heart rate levels in the VF + Manipulation and VF + No Manipulation significantly decreased from speech one to speech two (p < .001, d = .89 and p < .001, d = .45), the effect was surprisingly more pronounced for participants in the No VF condition (p < .001, d = 1.28). See Table 8 below for the mean heart-rate ratings during speech one and speech two, by condition.

Table 8. *Means, Standard Deviations (in brackets), and Change Scores of Participants' Average Heart Rate during Speech One and Speech Two.*

Condition	Speech 1	Speech 2	Change Scores
VF + Manipulation	96.33 (11.10)	87.32 (9.13)	-9.01
VF + No Manipulation	92.65 (16.38)	85.55 (15.24)	-7.10
No VF	94.21 (13.25)	79.93 (8.67)	-14.28

In terms of skin conductance, results revealed a main effect of time, F (1, 39) =32.16, p < .001, partial η^2 = .45; skin conductance levels were surprisingly significantly higher during speech two than speech one, p < .001. A marginally significant interaction was also found, F (2, 39) = 2.56, = .12, p = .09, partial η^2= .12. Pairwise comparisons indicated that during speech one, there were no significant differences in SCL ratings between the three conditions (VF + Manipulation *vs.* VF + No Manipulation, p = .51, d = .25; VF + Manipulation *vs.* No VF, p = .25, d = .44; VF + No Manipulation *vs.* No VF, p = .58, d = .22). However, at time two, participants in the No VF condition had marginally higher SCL ratings than participants in the VF + Manipulation condition; *this difference was non-significant* (p = .067, d = .72). Participants in the No VF and the VF + No Manipulation were not significantly different from one another in their SCL ratings at time two (p = .39, d = .33), nor were participants in the VF + Manipulation and the VF + No Manipulation condition (p = .27, d = .42).

Within-group comparisons revealed that skin conductance levels significantly increased from speech one to speech two, only for participants in the VF + No Manipulation and No VF conditions (p = .001, d = .55 and p < .001, d = .70, respectively). Skin conductance levels in the VF + Manipulation condition remained constant (p = .14, d = .22). See Table 9 below for the mean SCL ratings during speech one and speech two, by condition.

Table 9. *Means, Standard Deviations (in brackets), and Change Scores of Participants' Skin Conductance Levels during Speech One and Speech Two.*

Condition	Speech 1	Speech 2	Change Scores
VF + Manipulation	9.39 (4.36)	10.56 (6.12)	1.17
VF + No Manipulation	10.41 (3.63)	13.00 (5.55)	2.59
No VF	11.26 (4.20)	14.92 (6.06)	3.66

Also of interest was how coherent or bound together self-report and physiological measures of anxiety were from speech one to speech two. That is, did participants' self-reported anxiety levels during speech one and speech two correlate with their average heart rate and skin conductance during the two speeches? To answer this question, Pearson *r* correlations were calculated between self-report and physiological variables for speech one and speech two. Results revealed that, across conditions, there were no significant correlations for either speech one or speech two between self-report anxiety and heart rate, and self-report anxiety and skin-conductance, all *r's* < (+ or -) .25, all *p's NS*. Within the conditions, "VF + Manipulation" and "No VF" there were similarly no significant correlations between self-report and physiological measures during speech one and speech two, all *r's* < (+ or -) .48, all *p's NS*. However, within the condition, "VF + No Manipulation," there was a negative correlation between mean self-report anxiety during speech one and heart rate during speech one ($r = -.68$, $p = .007$), indicating that as participants reported increases in anxiety, their heart rate decreased. All other correlations between self-report and physiological anxiety during speech one and speech two were non-significant for participants in the VF + No Manipulation condition, all *r's* < (+ or -) .42, all *p's NS.* According to these results, there was little coherence between self-report and physiological measures of anxiety.

Discussion

The current study replicated previous findings from the literature on social phobia and self-perception, namely that a) socially anxious individuals possess overly negative images of their observable selves in social situations (Rapee & Lim, 1992; Strahan & Conger, 1998; Hope et al., 1995; Stopa & Clark, 2003; Lundh et al., 2002), and b) providing socially anxious individuals with cognitive preparation and VF of their public speaking performance enables them to rate themselves more positively and more consistently with objective observers (Rapee & Hayman, 1996; Harvey et al., 2000; Rodebaugh, 2004).

As previously outlined, an interesting query that stems from this area of research (previously not addressed in the literature) is why changes in self-perception following VF do not appear to reliably translate into changes in symptoms of social anxiety. Based on past research on social anxiety and positive feedback, the current study proposed the explanation that socially anxious individuals were not internalizing and making meaningful generalizations from the VF they received, and were therefore failing to demonstrate changes in self-reported social anxiety and symptoms related to social anxiety (low self-efficacy, avoidance behaviour). In line with this assumption, the questions of interest in the current study were: 1) How can we enable socially anxious individuals to integrate the positive feedback they receive from watching themselves on video into their global sense of selves and make meaningful generalizations from their performances? 2) Will doing so optimize VF to facilitate both improvements in self-perception and reductions in symptoms of social anxiety?

For question one, we hypothesized that encouraging participants to process and analyze the message, "I did better than I thought" would lead them to more deeply encode and internalize the feedback information. We expected that doing so would facilitate self-reported

and physiological changes in social anxiety as well as related cognitive changes in self-perception, self-efficacy, and attributional tendencies.

Contrary to our expectations, the encoding manipulation did not enhance the effects of the standard VF intervention in facilitating *further* improvements in self-perception (following gains in self-perception made from before to after VF). Although participants in the VF + Manipulation and the VF + No Manipulation showed improvements in self-perception from before to after VF of speech one, neither participants in the VF + Manipulation nor the VF + No Manipulation condition showed significant improvements in self-perception from speech one (*after* VF) to speech two, as shown in *Figure 1*. However, the fact that participants' self-ratings in the VF + Manipulation and VF + No Manipulation remained constant (rather than declining) from speech one (post VF) to speech two demonstrates that the effects of the standard VF are powerful enough that they generalize to a second speech situation. This finding is in line with past research on standard VF and social anxiety (Rapee & Hayman, 1996).

An interesting and unexpected finding was that observer ratings of participants' performance in the VF + No Manipulation condition were significantly more positive for speech two than speech one. One would not be surprised by a slight improvement in the actual quality of all participants' performances from speech one to speech two due to practice effects or increased familiarity with the examiner and study protocol; however, an improvement within only one condition was unexpected and difficult to explain. For example, if participants in the VF + No Manipulation condition actually improved from speech one to speech two as a result of the VF intervention, one would expect participants in the VF + Manipulation to improve as well. Further, participant characteristics were controlled across conditions through

random assignment and it is therefore unlikely that those in the VF + No Manipulation had a particular advantage over participants in other conditions. A replication of the current study could help clarify whether this finding simply reflects noise due to random error or is the result of an unlikely systematic difference between conditions.

Although the encoding manipulation did not enhance the effects standard VF in facilitating further improvements in self-perception, it led to important cognitive changes related to social anxiety. Participants who were asked to analyze and process the feedback information (i.e., that they did better than they thought) in a meaningful and self-relevant manner reported *increased confidence* (self-efficacy) that they would be able to perform their second speech adequately or as well as the average person. Participants who did not process and analyze the feedback demonstrated no such increase and participants who received no VF demonstrated marginally *lower* levels of self-efficacy from speech one to speech two (this effect was of marginal significance). Therefore the encoding manipulation seemed to not only protect participants from a decline in self-efficacy from speech one to speech two, but also increased their confidence in being able to adequately perform the task.

As shown in Figure 2, both participants in the VF + Manipulation and the VF + No Manipulation condition demonstrated significantly higher levels of self-efficacy prior to speech two than participants in the No VF condition; however, the significant difference between the VF + No Manipulation and the No VF condition at time two came about because of a *decrease* in self-efficacy for participants in the No VF condition. On the contrary, the significant difference between the VF + Manipulation and the No VF condition at time two arose because of both an *increase* in self-efficacy for participants in the VF + Manipulation condition and a *decrease* in self-efficacy for participants in the No VF condition.

A final cognitive change for participants who received the encoding manipulation was that they were more likely to attribute their successful social performance to their own *internal ability*, relative to participants who received no feedback at all. That is, participants who analyzed the meaning and significance of the feedback to their sense of self were less likely to discount the feedback as indicative of factors beyond their control and more likely to attribute the feedback to their own internal skill and ability. Research demonstrates that contrary to non-socially anxious individuals who demonstrate a self-serving bias when making attributions (i.e., taking credit for successes and denying responsibility for failure), socially anxious individuals display a non-self serving bias (i.e., taking credit for failures and denying successes). The results of the current study suggest that encouraging socially anxious individuals to process and think deeply about the positive feedback they receive may help them adopt a more adaptive attributional style.

In sum, the results of the current study suggest that the addition of the encoding manipulation to the standard VF protocol enabled socially anxious individuals to feel more confident about performing well during their second speech and to take more ownership over their successful speech performance (i.e., attributing performance to internal ability). That is, it seems that participants in the "VF + Manipulation" condition began to internalize and learn the new information, a) "*I am a better public speaker than I thought,"* and b) "*My performance was a result of <u>my own</u> public-speaking ability."*

Yet, how exactly does the internalization and learning of this new information occur? In other words, what are the underlying processes that account for participants' improved self-perception and confidence about their speaking ability? According to Barber and DeRubeis' (1989) accommodation model and Foa and Kozak's (1986) complimentary emotional

processing theory (subsequently updated by Foa & McNally, 1996), learning occurs when corrective information (e.g., "I am not as bad at public speaking as I thought") is presented during exposure, and subsequently incorporated into one's *existing* feared representation of the self (e.g. "I am poor public speaker"). Attention to new, previously unrecognized corrective information leads to changes in the content of existing negative self-schemas (see also Brewin, 2006). New research on extinction learning suggests that when individuals are presented with new, corrective information (e.g., "I am not so bad at public speaking") about a feared aspect of self ("I am a poor public speaker"), the original schema is not modified or erased from memory; rather, *new schemas* are formed that compete with the old for activation in subsequent situations (Bouton, 2002). The nature of such learning leaves individuals – even those who have undergone successful interventions for anxiety difficulties - vulnerable to return of fear (e.g., Rachman, 1989) in subsequent contexts that activate the old fear memories, particularly contexts that differ from those in which the intervention occurred (see Moscovitch, Antony, & Swinson, in press, for a complete review of this literature). Thus, participants in the current study may have internalized the corrective information about their public speaking ability into the formation a *new self-schema* (most likely fragile at this point due to the novelty of the information). Improvements in confidence and self-perception during the second speech situation (similar in context to the original speech situation) may have resulted from the activation of the new self-schema.

The current study was the first to examine changes in both subjective symptoms of anxiety and psychophysiological arousal during VF. Results indicated that two types of measures produced different outcomes. Participants who received the VF and the encoding manipulation, as well as participants who received only the VF (with no manipulation)

reported a significant reduction of anxiety (both in terms of mean and highest level of anxiety) from speech one to speech two. Participants who did not receive VF reported no such decrease in anxiety levels. Thus, in the present study, subjective anxiety decreased amongst *both* groups of participants who received VF, but not amongst those participants who did not.

Although this finding does not correspond to the current study's prediction (i.e., that only participants who received the encoding manipulation would report significant reductions in levels of anxiety during speech two), it is important nonetheless; the current study was the first to find such a reliable link between changes in self-perception (as a result of VF) and subsequent levels of self-reported anxiety. Why might this be the case? First, the present study utilized more stringent selection criteria than have past studies on social anxiety and VF, with the goal of recruiting participants who were not only high in social anxiety (as measured by the SPIN) but also highly fearful of the study's task at hand (the two public speeches, as measured by the PRCA-24). Foa and Kozak's emotional processing model (1986) highlights that, in order to experience fear reduction, information must be presented through exposure that *matches* the individual's feared object/representation. If there is not a match, the 'fear structure' will not be activated, and emotional processing cannot occur. In previous studies that used more general and less stringent selection criteria, there may have been less of a match between participants' fears about social situations, and the information presented in the exposures. This in turn may have impeded the effects of the VF intervention on subsequent levels of social anxiety.

Another reason that beneficial effects of VF on subsequent levels of social anxiety were found (when other studies found none) may be that the present study recruited a more diverse sample of participants (students + community members) than was the case in Rapee and

Hayman's (1996) study (undergraduate students). In Rapee and Hayman's (1996) study, all participants (regardless of whether they received VF or not) reported significantly lower levels of anxiety during subsequent in-lab speech situations. Perhaps university students are more apt to habituate to subsequent speech tasks (even without treatment) due to extended experience with speeches and presentations in class lectures. Evidence against this hypothesis, however, is that Smits et al. (2006) recruited both university students and community members, and failed to find reductions in levels of speech fear specific to the effects of VF.

The physiological data are not as easy to interpret. While participants in all three conditions demonstrated a significant reduction in heart rate from speech one to speech two, the effect was more pronounced for participants who received no VF. Moreover, skin conductance levels were higher during speech two than speech one for participants in the "No VF" and "VF + No Manipulation" condition, and participants in the "VF + Manipulation" condition demonstrated no change in skin conductance ratings. Finally, self-report and physiological measures of arousal were not correlated across or within conditions.

In a review of the literature on the coherence of subjective and physiological emotional response systems in social anxiety, Mauss et al. (2004) argue that there is little evidence across numerous previous studies to support the notion that individuals high in social anxiety exhibit higher levels of physiological activity during social situations than low-anxious individuals. Mauss and colleagues' (2004) own data on self-reported and physiological measures of anxiety for individuals high and low in social anxiety demonstrated that socially anxious individuals felt more anxious and perceived that they experienced stronger autonomic arousal during an impromptu speech task than individuals low in social anxiety; however, the two groups did not differ in actual levels of physiological arousal. Additionally, there were no significant

correlations between any of the multiple indicators of self-reported anxiety, perceived arousal, and actual physiological arousal. Thus, although puzzling given the theoretical premise that different emotional response systems should change together in a coherent fashion, the results in the present study are largely consistent with those reported in the extant literature.

Interestingly, Craske et al. (2007) note in their review of the literature on mechanisms of fear reduction during exposure therapy for anxiety disorders that self-reported fear and physiological arousal often decline within an exposure trial, but there is no evidence to indicate that such declines are representative of long-lasting learning and improvement. They suggest that regardless of the extent to which fear decreases during exposure therapy, it is most important to focus on the degree to which the exposure facilitated patients' learning and consolidation of new, fear-inconsistent information. Craske and colleagues (2007) predict that over time, as this new information is consolidated into representations of self through repeated exposure and generalized to different contexts, a stronger and more robust reduction in measures of anxiety and fear may occur.

Thus, in line with previous findings of non-coherence between self-reported social anxiety and physiological arousal (e.g., Mauss et al., 2004) and Craske et al.'s (2007) postulations pertaining to the importance of focusing on cognitive outcomes as indicators of changes in learning and memory consolidation during exposure, it is, perhaps, most prudent to highlight the significance of the substantial *cognitive improvements* that occurred following the encoding manipulation in the present study. Such cognitive improvements in self-perception, self-efficacy, and internal attributions of performance, once fully consolidated into long-term memory, might ultimately set the stage for unequivocal decreases in symptoms of social anxiety and arousal in the face of social threat.

Limitations and Future Research

Several limitations and corresponding areas of future research are worthy of mention. First, the study used an analogue sample of socially anxious university students and community members, rather than a clinical population. Although selected participants were high in social anxiety and verbal communication, their levels of anxiety and negative self-perception may have been less severe than would be seen in a clinical sample. If a clinical sample of patients with social phobia possesses an even more negative self-image than an analogue sample of socially anxious participants, the VF and encoding manipulation may prove to be *more* efficacious for patients in a clinical sample; past research suggests that those who greatly underestimate their social performances have the most to gain from VF interventions (Rodebaugh & Chambless, 2002; Rodebaugh, 2004; Rodebaugh & Rapee, 2006). This intriguing possibility should be examined in subsequent research.

A second limitation is that, although the encoding manipulation led to improvements in self-perception, self-efficacy, and attributions of performance in a second speech situation approximately 60 minutes after the first, it is unclear whether such improvements would generalize to subsequent speech situations hours or days after the encoding manipulation. That is, if participants were to return to the laboratory several days, weeks, or months after the initial intervention to perform a third speech, would they demonstrate the same improvements, or would they need repeated exposure to the VF and encoding manipulation? Future longitudinal research could address the number and nature of repetitions necessary for individuals to fully encode the new, corrective information and consolidate it into long-term memory.

Furthermore, it is unknown from the current study whether the effects of VF and the encoding manipulation would generalize to social situations other than public speech performances. Do improvements in self-confidence and self-perception garnered from the encoding manipulation lead to similar improvements in social conversations, group meetings, or discussions? Research demonstrates that return of fear is more likely in contexts that are different from those of the initial intervention (Bouton, 2002; Mineka, Mystkowski, Hladek, & Rodriguez, 1999; Rodriguez, Craske, Mineka, & Hladek, 1999). The current study attempted to address this concern by asking participants to write their answer to the question, "*What have you learned from this feedback about your social ability in situations such as public speaking, interacting, and communicating with others?"* This question was meant to encourage participants to think about how the feedback may generalize to situations other than public speaking, such as interacting and communicating with others. Doing so may increase the likelihood that new learning will translate into different contexts, thereby preventing the return of fear. Subsequent studies should test whether gains as a result of this intervention translate from public speaking to other social situation.

A further limitation is that the current study did not systematically measure the "internalization of positive feedback" (i.e., learning of new information). Rather, internalization and learning were theorized to have occurred due to outcome measures of increased self-efficacy and improved perception of performance. Future research could focus on developing a measure of internalization or learning of new information for social anxiety, both to judge the extent to which learning has occurred, and to better understand the processes underlying emotional and cognitive changes related to social anxiety.

Also important to mention is that although there was a high level of consistency between the objective observers' ratings in the current study, there was a low level of absolute agreement. In other words, while observers rated participants in the same manner, their actual numerical ratings of participants differed between them. Indeed, one observer consistently rated participants more negatively than did the other observer. Because the observers were consistent in their ratings, their scores were averaged together to create one overall average rating (in line with protocols from previous studies on VF and social anxiety); however, efforts should be made in future studies to more diligently train objective observers' on the expected guidelines and protocols for rating participants' performances.

Finally, attention should be paid to the way in which cross-cultural factors may have influenced the results. Although factors such as language and ethnicity were represented relatively equally across conditions, the effectiveness of the intervention and overall study protocol may have been compromised by communication difficulties and/or misinterpretations of study measures. For example, English was the first language for only 53% of the overall sample and some participants occasionally expressed difficulty understanding instructions and study protocol. Further, participants whose first language is not English may be especially concerned about language-related issues during their speech and while watching VF. Rather than focusing on their actual social skill during the video playback as per instructions, they may alternatively fixate on their ability to master the English language. Corrections to underestimations of social performance may have therefore occurred to a lesser extent for participants with language-related difficulties.

Also of consideration is whether individuals from non-western cultures may have interpreted questionnaire measures in a manner different from individuals in western cultures.

For example, items on the SPIN screening measure such as "I avoid activities in which I am the centre of attention," and "I would do anything to avoid being criticized" are indicative of high social anxiety in western cultures, but may be more commonplace (and associated with lower anxiety) for those in collectivist cultures who routinely tend to avoid confrontational and individualistic experiences (such as being the centre of attention). Further, individuals from different cultures may have different ideas about what constitutes "appearing nervous" or "appearing confident," as per ratings on the PSP. That is, one may speculate that individuals from individualistic cultures may believe that confidence comes across through strong eye contact and a clear voice, while those from more collectivist cultures may believe that confidence reflects strong ideas and understandable speech content.

Finally, it is interesting to consider whether socially anxious individuals from different cultures respond to VF in varying ways. For example, research demonstrates that individuals from Asian cultures are less self-enhancing than those in Western cultures (Heine, 2005); individuals of Asian origin may therefore be less likely to admit upon receiving VF that they underestimated their performance. Furthermore, those from individualistic cultures who focus more on "I" (as distinctive from others) may be more likely to attribute their successful social performance to their *own* ability than those from collectivist cultures who focus more on "we." In addition, because individuals from collectivist cultures tend to avoid confrontational experiences, they might have found it difficult to express their opinions in front of the experimenter on controversial speech topics. Consequently, they might have felt more distressed by the study protocol than did individuals from individualistic cultures. No studies have yet examined the way in which cultural factors moderate the relation between VF and improvements in self-perception; future studies in this area are warranted.

In conclusion, the present study represents the first randomized, controlled investigation of a new encoding manipulation designed to enhance and better understand the mechanisms underlying a commonly-used VF intervention for social anxiety. This new manipulation - designed on the basis of current theories of mechanisms of exposure therapy, emotional processing, and extinction learning (e.g., Moscovitch et al., in press) – was crafted to enable socially anxious individuals to better internalize and make meaningful generalizations from corrective feedback information by facilitating their elaborative processing and later retrieval of such information, thereby more effectively disconfirming core self-schemas that maintain their anxiety symptoms and behaviours (Clark & Wells, 1995; Rapee & Heimberg, 1997; Moscovitch, in press). Though it did not reliably facilitate anxiety reduction relative to the standard VF intervention, the new manipulation led to significant cognitive changes related to self-perception, self-efficacy, and internal attributions of performance. Future studies are required to replicate and extend these promising initial findings. Efforts to enhance extant psychological treatments should continue to be made in the field of anxiety research by designing and testing innovative, empirically-oriented interventions (or adaptations of existing interventions) that are based on contemporary principles of the learning mechanisms underlying cognitive-behavioural change.

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Appendices

Appendix A

SPIN
(Connor et al., 2000)

Please choose a number to indicate how much the following problems have bothered you during the past week. Choose only one number for each problem, and be sure to answer all items.

0 = Not at all
1 = A little bit
2 = Somewhat
3 = Very much
4 = Extremely

1. I am afraid of people in authority. _____
2. I am bothered by blushing in front of people. _____
3. Parties and social events scare me. _____
4. I avoid talking to people I don't know. _____
5. Being criticized scares me a lot. _____
6. Fear of embarrassment causes me to avoid doing things or speaking to people. _____
7. Sweating in front of people causes me distress. _____
8. I avoid going to parties. _____
9. I avoid activities in which I am the centre of attention. _____
10. Talking to strangers scares me. _____
11. I avoid having to give speeches. _____
12. I would do anything to avoid being criticized. _____
13. Heart palpitations bother me when I am around people. _____
14. I am afraid of doing things when people might be watching. _____
15. Being embarrassed or looking stupid are among my worst fears. _____
16. I avoid speaking to anyone in authority. _____
17. Trembling or shaking in front of others is distressing to me. _____

Appendix B

PRCA-24 (McCroskey, 1982)

This instrument is composed of twenty-four statements concerning feelings about communicating with other people. Please indicate the degree to which each statement applies to you by circling whether you strongly agree (1-SA), agree (2-A), undecided (3-U), disagree (4-D), or strongly disagree (5-SD). Work quickly; record your first impression.

1. I dislike participating in group discussions. _____
2. Generally, I am comfortable while participating in group discussions. _____
4. I like to get involved in group discussions. _____
5. Engaging in a group discussion with new people makes me tense and nervous. _____
6. I am calm and relaxed while participating in group discussions. _____
7. Generally, I am nervous when I have to participate in a meeting. _____
8. Usually I am calm and relaxed while participating in meetings. _____
9. I am very calm and relaxed when I am called upon to express an opinion at a meeting _____
10. I am afraid to express myself at meetings. _____
11. Communicating at meetings usually makes me uncomfortable. _____
12. I am very relaxed when answering questions at a meeting. _____
13. While participating in a conversation with a new acquaintance, I feel very nervous. _____
14. I have no fear of speaking up in conversations. _____
15. Ordinarily I am very tense and nervous in conversations. _____
16. Ordinarily I am very calm and relaxed in conversations. _____
17. While conversing with a new acquaintance, I feel very relaxed. _____
18. I'm afraid to speak up in conversations. _____
19. I have no fear of giving a speech. _____
20. Certain parts of my body feel very tense and rigid while giving a speech. _____
21. I feel relaxed while giving a speech. _____
22. My thoughts become confused and jumbled when I am giving a speech. _____
23. I face the prospect of giving a speech with confidence. _____
24. While giving a speech, I get so nervous I forget facts I really know. _____

Appendix C

PSP
(Rapee & Lim, 1992)

We would like you to rate yourself on the features listed below. For each feature, please circle the appropriate number to indicate how you felt you actually performed. Your evaluation will remain confidential. For questions regarding the "audience," include anyone who was interacting with you, observing you, or listening to you during the exposure

0 = Not at all
1 = Slightly
2 = Moderately
3 = Much
4 = Very much

1.	Content was understandable.	_____
2.	Kept eye contact with audience.	_____
3.	Stuttered.	_____
4.	Had long pauses (more than 5 seconds).	_____
5.	Fidgeted.	_____
6.	"Um'ed" and "Ah'ed."	_____
7.	Had a clear voice.	_____
8.	Seemed to tremble or shake.	_____
9.	Sweated.	_____
10.	Blushed.	_____
11.	Face twitched.	_____
12.	Voice quivered.	_____
13.	Appeared confident.	_____
14.	Appeared nervous.	_____
15.	Kept audience interested.	_____
16.	Generally spoke well.	_____
17.	Made a good impression.	_____

Appendix D

BDI-II

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feeling during the **past two weeks.**

1. Sadness
0 I do not feel sad.
1 I feel sad much of the time.
2 I am sad all the time.
3 I am so sad or unhappy that I can't stand it.

2. Pessimism
0 I am not discouraged about my future.
1 I feel more discouraged about my future than I used to be.
2 I do not expect things to work out for me.
3 I feel my future is hopeless and will only get worse.

3. Past Failure
0 I do not feel like a failure.
1 I have failed more than I should have.
2 As I look back, I see a lot of failures.
3 I feel I am a total failure as a person.

4. Loss of Pleasure
0 I get as much pleasure as I ever did from the things I enjoy.
1 I don't enjoy things as much as I used to.
2 I get very little pleasure from the things I used to enjoy.
3 I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings
0 I don't feel particularly guilty.
1 I feel guilty over many things I have done/should have done.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.

6. Punishment feelings
0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

7. Self-Dislike
0 I feel the same about myself as ever.
1 I have lost confidence in myself.
2 I am disappointed in myself.
3 I dislike myself.

8. Self-Criticalness
0 I don't criticize or blame myself more than usual.
1 I am more critical of myself than I used to be.
2 I criticize myself for all of my faults.
3 I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes
0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I wouldn't carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10. Crying
0 I don't cry anymore than I used to.
1 I cry more than I used to.
2 I cry over every little thing.
3 I feel like crying, but I can't.

11. Agitation
0 I am no more restless or wound up than usual.
1 I feel more restless or wound up than usual.
2 I am so restless or agitated that it's hard to stay still.
3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest
0 I have not lost interest in other people or activities.
1 I am less interested in other people or things than before.
2 I have lost most of my interest in other people or things.
3 It's hard to get interested in anything.

13. Indecisiveness
0 I make decisions about as well as ever.
1 I find it more difficult to make decisions than usual.
2 I have much greater difficulty making decisions than I used to.
3 I have trouble making any decisions.

14. Worthlessness
0 I do not feel I am worthless.
1 I don't consider myself as worthwhile and useful as I used to.
2 I feel more worthless as compared to other people.
3 I feel utterly worthless.

15. Loss of Energy
0 I have as much energy as ever.
1 I have less energy than I used to have.
2 I don't have enough energy to do very much.
3 I don't have enough energy to do anything.

16. Changes in Sleeping Pattern
0 I have not experienced any change in my sleeping pattern.
1a I sleep somewhat more than usual.
1b I sleep somewhat less than usual.
2a I sleep a lot more than usual.
2b I sleep a lot less than usual.
3a I sleep most of the day.
3b I wake up 1-2 hours early and can't get back to sleep.

17. Irritability
0 I am no more irritable than usual.
1 I am more irritable than usual.
2 I am much more irritable than usual.
3 I am irritable all the time.

CONTINUED ON NEXT PAGE

BDI-II Continued

18. Changes in Appetite

0 I have not experienced any change in my appetite.
1a My appetite is somewhat less than usual.
1b My appetite is somewhat greater than usual.
2a My appetite is much less than before.
2b My appetite is much greater than usual.
3a I have no appetite at all.
3b I crave food all the time.

19. Concentration Difficulty

0 I can concentrate as well as ever.
1 I can't concentrate as well as usual.
2 It's hard to keep my mind on anything for very long.
3 I find I can't concentrate on anything.

20. Tiredness or Fatigue

0 I am no more tired or fatigued than usual.
1 I get more tired or fatigued more easily than usual.
2 I am too tired or fatigued to do a lot of things I used to do.
3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

Appendix E

Possible Speech Topics

1. Do you agree or disagree with the practice of Euthanasia? (terminating the life of a person or an animal because they are perceived as living an intolerable life). Why or why not?

2. Do you agree or disagree with Canada's decision to abolish (eliminate) the death penalty? Why or why not?

3. Do you agree or disagree with censoring material in books, magazines, videos and the internet that certain persons—individuals, groups or government officials—find objectionable or dangerous? Why or why not?

4. Do you agree or disagree with Canada's legalization of same-sex marriage? Why or why not?

5. Do you agree or disagree with gun control? (efforts to regulate or control sales of guns). Why or why not?

6. Do you agree or disagree with the practice of cloning and other reproductive technologies (e.g. in vitro fertilization, genetic manipulation of embryos). Why or why not?

Appendix F

For **only** the indicators that improved from before to after watching VF, please fill in the first blank of each question with your first speech rating (before VF) and fill in the second blank with your second speech rating (after VF). Rating choices were: "not at all," "slightly," "moderately," "much," and "very much."

1) At first I thought my speech content was _____ understandable

After watching the video, I realized my speech content was _____ understandable

2) At first I thought I kept eye contact with the audience _____

After watching the video, I realized I kept eye contact with the audience _____

3) At first I thought I stuttered _____

After watching the video, I realized I stuttered _____

4) At first I thought I had long pauses _____

After watching the video, I realized I had long pauses _____

5) At first I thought I fidgeted _____

After watching the video, I realized I fidgeted _____

6) At first I thought I "Um'ed" and "Ah'ed" _____

After watching the video, I realized I Um'ed" and "Ah'ed" _____

7) At first I thought my voice was _____ clear

After watching the video, I realized my voice was _____ clear

8) At first I thought I trembled and shook _____

After watching the video, I realized I trembled and shook _____

9) At first I thought I sweated _____

After watching the video, I realized I sweated _____

10) At first I thought I blushed _____

After watching the video, I realized I blushed _____

11) At first I thought my face twitched _____

After watching the video, I realized my face twitched _____

12) At first I thought my voice quivered _____

After watching the video, I realized my voice quivered _____

13) At first I thought I appeared _____ confident

After watching the video, I realized I appeared _____ confident

14) At first I thought I appeared _____ nervous

After watching the video, I realized I appeared _____ nervous

15) At first I thought I kept the audience interested _____

After watching the video, I realized I kept the audience interested _____

16) At first I thought I generally spoke well _____

After watching the video, I realized I generally spoke well _____

17) At first I thought I made a good impression _____

After watching the video, I realized I made a good impression _____

What does the feedback mean to *YOU?*

a) *How does this feedback make you feel?*

b) *What have you learned from this feedback about your social ability in situations such as public speaking, interacting, and communicating with others?*

c) *What is the significance of this feedback to your sense of self?*

d) *How will this feedback influence your capability to perform in future social situations such as public speaking, interacting and communicating with others?*