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Social Anxiety: Attentional Bias in Reaction to Emotional Faces before and after Participation in a College Level Public Speaking Course

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This study was designed to examine the effectiveness of a semester-long public speaking course in reducing the self-reported levels of communication anxiety and social anxiety among college students enrolled in such a course. The current study also sought to replicate and extend a recent line of research that has demonstrated that highly socially anxious individuals show an attentional bias away from emotional faces under conditions of social-evaluative threat. The current study extended this line of research by conducting the same reaction time procedure with participants in a pretest/post-test design.

The project was designed to determine if groups (rating high vs. low on a self-report measure of social anxiety at the beginning of the semester) significantly differ from one another with respect to a reaction time/modified dot probe task. Participants were asked to complete the pencil and paper measures of anxiety and the modified dot probe task at the beginning of the semester and again at the end of the semester. Pretest and posttest scores on the self-report measures and the reaction time task were analyzed to determine if any significant change occurred for either of high anxiety or
low anxiety participants. Finally, differences between groups from pretest to posttest on these measures were examined.

One-way repeated measures ANOVAs examining the pretest and posttest scores on the Fear of Negative Evaluations Scale (FNE) indicated that the high anxiety group showed a statistically significant reduction in self-reported anxiety. Additionally, a significant positive correlation was identified for all participants at pretest between scores on the FNE and reaction time bias scores on the modified dot probe task for faces expressing negative emotions. Finally, a series of Mann-Whitney U and repeated measures t-tests were conducted to identify any significant changes within groups and between groups from pretest to posttest on the FNE and the reaction time-modified dot probe task. These results and the directions for future research are discussed.
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ACKNOWLEDGMENTS

I find myself in the unique and fortunate position of being able to take a moment to reflect on both my dissertation and on my graduate experience as a whole before beginning the next phase of my life and career. First and foremost, I want to express my deepest appreciation to my family and friends for their unwavering love, support, and encouragement throughout my graduate career. I'm not sure that words alone can express how important their support has been to me and I know that I would not be where I am today without them.

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Scott Walter Maieritsch
# TABLE OF CONTENTS

ACKNOWLEDGMENTS .................................................................................. ii
LIST OF TABLES ....................................................................................... viii
LIST OF FIGURES .................................................................................... ix

CHAPTER

I. INTRODUCTION .................................................................................. 1
   Social Anxiety ..................................................................................... 1
   Social Anxiety Disorder/Social Phobia .................................................. 1
   Diagnostic Issues ................................................................................ 2
   History and Conceptualization Issues .................................................. 3
   Prevalence, Epidemiology, and Course of Social Anxiety Disorder ......... 6
   Communication Apprehension ............................................................... 7
   Treatment Approaches for Communication Apprehension ................. 8
   Treatment of Social Anxiety Disorder ................................................. 11
   Treatment Efficacy ............................................................................. 14
   Attentional Bias and Reaction Time Assessment ............................... 16
   Statement of Purpose ......................................................................... 19

II. METHOD ............................................................................................ 20
   Participants ......................................................................................... 20
   Setting ............................................................................................... 20
   Materials and Apparatus .................................................................. 21
Table of Contents—continued

CHAPTER

Bias Scores at Posttest .................................................................48
Changes in Errors from Pretest to Posttest .................................49
Changes in Reaction Time from Pretest to Posttest ......................50
Changes in Bias Scores from Pretest to Posttest .........................52
Between Group Comparisons on Change Scores .........................53

IV. DISCUSSION.............................................................................56

Outcomes of This Research .........................................................56

Social and Communication Anxiety ..............................................56
Reaction Time and Attentional Bias ..............................................58
Reaction Time and Bias Scores as a Measure of Change .................62
Changes in Reaction Time Observed in the Low Anxiety Group ....63

Attentional Bias: Vigilance vs. Avoidance ..................................64

Limitations of This Research ......................................................67

Directions for Future Research ....................................................69

APPENDICES

A. Demographic Questionnaire ....................................................71
B. Brief Medication/Treatment Questionnaire ..............................73
C. Sample Series of Modified Dot Probe Slides ............................76
D. Phase I Oral Recruitment Script ..............................................83
E. Informed Consent Documents ...............................................85
F. Phase II Phone Recruitment Script at Pretest .........................89
Table of Contents—continued

APPENDICES

G.  Phase II Phone Recruitment Script at Posttest .....................................91

H.  WMU HSIRB Approval Forms .................................................................93

BIBLIOGRAPHY .............................................................................................96
LIST OF TABLES

1. Demographic Characteristics of the Participants ........................................38
2. Descriptive Statistics ..................................................................................39
3. Correlation Among the Six Self-Report Measures of Anxiety ..................40
4. Means and Standard Deviations for the FNE at Pretest and Posttest .......41
5. Differences between Groups at Pretest on the Reaction Time Task ......44
6. Correlation between the FNE and Computed Bias Scores at Pretest .........45
7. Differences between Groups at Posttest on the Reaction Time Task ......47
8. Change from Pretest to Posttest on the Reaction Time Task .................50
9. Change from Pretest to Posttest on the Reaction Time Task .................51
10. Differences between Groups on Change Scores from Pretest to Posttest on the Reaction Time Task .............................................................55
11. Means and Standard Deviations Obtained on the FNE for both Studies ...61
LIST OF FIGURES

1. Boxplot Distributions for FNE Total Scores at Pretest..............................57
2. Comparison between Groups on Computed Bias Scores at Pretest..............59
3. Computed Attentional Bias Scores for both the Current Study and Mansell et al. (1999)...............................................................................60
CHAPTER I

INTRODUCTION

Social Anxiety

People experience anxiety in a variety of social situations, ranging from important and meaningful encounters to mundane and seemingly trivial ones. For some individuals the discomfort caused by such situations is only a minor annoyance, but for others, the feelings of anxiety might be so great that they are unable to function normally or are compelled to flee such anxiety provoking situations. At least 20% of all college students report an excessively high degree of apprehension about public speaking (McCroskey, 1977; Pollard & Henderson, 1988) and at least 2% are so distressed in social encounters that they can be characterized as being socially phobic (Pollard & Henderson, 1988).

Social Anxiety Disorder/Social Phobia

Social anxiety disorder/social phobia is characterized by extreme levels of anxiety and avoidance of social and performance situations. There are a variety of common themes that sufferers often describe as central to their anxiety. Typically, these include fears of scrutiny from others, fears of doing or saying something embarrassing, and fears of being seen by others as anxious. Central to the disorder is a pervasive fear of negative evaluation (Beck, Emery, & Greenberg, 1985; Liebowitz,
Social anxiety disorder/social phobia is a common and chronic condition that affects a large proportion of the population. It is estimated that at least 1 in 50 Americans experience trait social anxiety to a degree sufficient enough to qualify for a diagnosis of social anxiety disorder/social phobia (Pollard & Henderson, 1988; Robins, Helzer, Weissman, Orvaschel, Gruenberg, Burke, & Regier, 1984). The National Comorbidity Survey (NCS) reported a lifetime prevalence rate of 13.3% (Magee, Eaton, Wittchen, McConigle, & Kessler, 1996) and similar results were found in Europe, where a French study reported a lifetime prevalence rate of 14.4% (Weiller, Bisserbe, Boyer, & Lepine, 1996). Based on these statistics, it can be argued that social anxiety disorder/social phobia is the most prevalent of all of the anxiety disorders.

Diagnostic Issues

The key feature of social anxiety disorder, as described in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994), is a persistent fear of social situations. Exposure to common social or public situations may provoke anxiety and feared situations are typically avoided, if possible, or endured under extreme distress. Social anxiety disorder is characterized as having two distinct subtypes, a generalized and a nongeneralized form, which appear to differ in terms of
symptoms, course of illness, morbidity, comorbidity, and treatment response (Liebowitz, 1999). Generalized social anxiety disorder is the more prevalent subtype, and individuals that meet criteria tend to be anxious in a variety of different social situations. Thus, individuals diagnosed with the generalized subtype tend to suffer from significantly increased impairment and comorbidity as compared to individuals diagnosed with the nongeneralized form. The nongeneralized subtype is predominantly associated with fears related to specific social situations, such as speaking in public, and these individuals may be less likely to seek treatment (Moutier & Stein, 1999). Generalized social anxiety disorder is considered to be more disabling, and only one third of individuals presenting for treatment are diagnosed with the nongeneralized subtype (Kessler, Stein, & Berglund, 1998). Individuals diagnosed with generalized social anxiety disorder tend to have increased occupational and social impairment and also tend to have a high incidence of comorbid depression or alcohol abuse (Moutier & Stein, 1999).

History and Conceptualization Issues

Social phobia, as a distinct diagnostic entity, dates back only as far as the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III; APA, 1980). At that time, the central feature for the diagnosis of social phobia was an excessive fear of scrutiny or observation in discrete social situations such as public speaking, writing, or the use of a public restroom. Individuals with a more generalized avoidance of social situations were typically given the diagnosis of avoidant
personality disorder and excluded from the diagnosis of social phobia (Moutier & Stein, 1999). As would be expected, the diagnosis of social phobia has evolved with each new edition of the DSM. However, social phobia has only begun to receive extensive and systematic attention in the literature during the past fifteen years. Within that time, a significant portion of the research conducted has been on improving the understanding of the nature and maintenance of the disorder (Hudson & Rapee, 2000; Clark & Wells, 1995; Rapee & Heimberg, 1997). Interestingly, a conceptual shift is currently underway which brings such diagnostic issues, and specifically differential diagnosis, full circle. The DSM-IV committee currently recognizes both "social phobia" and "social anxiety disorder" as descriptors for the same condition. A growing number of researchers endorse a shift towards adopting "social anxiety disorder" as the preferred terminology (Ballenger, 1998). Recent findings in the literature suggest that generalized social phobia does not differ qualitatively from avoidant personality disorder (Hudson & Rapee, 2000; Heimberg, Holt, Schneider, Spitzer & Liebowitz, 1993; Herbert, Hope, & Bellack, 1992; Holt, Heimberg, & Hope, 1992). Instead, it is suggested that the difference may lie in severity, with avoidant personality disorder being a more severe expression of social phobia. Thus, Hudson and Rapee (2000) suggest that it may be more appropriate to consider these diagnoses on a continuum, with nongeneralized social phobia/social anxiety disorder at one end and avoidant personality disorder at the more extreme end of the diagnostic continuum, rather than perceive the two as qualitatively distinct disorders.
Realistically, such a continuum could easily be expanded to include the subclinical forms of social anxiety such as shyness and social withdrawal to provide an even clearer picture of such a conceptual continuum. Concepts such as shyness, self-consciousness, social anxiety, and social withdrawal likely share significant overlap with the symptomology of social anxiety disorder but are considered trait social anxiety if they occur at a subclinical level (Turner, Beidel, & Townsley, 1990; Turner, Beidel, & Wolff, 1996). Much of the current evidence in the literature appears to indicate that there are few qualitative differences between social anxiety disorder and such trait social anxiety beyond severity (Heimberg, Dodge, & Becker, 1987; Scholing & Emmelkamp, 1990). Individuals diagnosed with social anxiety disorder can be characterized as having more intense feelings of anxiety in social situations, more frantic and extreme attempts to avoid social encounters, and more deleterious impact on their daily lives due to the anxiety. However, the precipitating factors and behavioral consequences are far more similar than different between trait social anxiety and social anxiety disorder.

Given the conceptual shift towards viewing social anxiety along such a continuum, a change in terminology would appear to be appropriate as well as advantageous in aiding in such a shift. For this reason, the term social anxiety disorder will be used predominantly for the remainder of this paper. However, the term social phobia will still appear when discussing research utilizing diagnostic criteria prior to the DSM-IV or if it is the preferred terminology employed by the researchers being discussed.
Prevalence, Epidemiology, and Course of Social Anxiety Disorder

The overall lifetime prevalence rate for social anxiety disorder, as reported by the U.S. National Comorbidity Survey, is 13.3% (Magee, Eaton, Wittchen, McCongle, & Kessler, 1996). Similar results were found in Europe, where a French study reported a lifetime prevalence rate of 14.4% (Weiller, Bisserbe, Boyer, & Lepine, 1996). Additionally, women have been reported to be more likely to meet criteria for social anxiety disorder than men in the general population. In a large epidemiological study, females outnumbered males by a two-to-one margin among individuals diagnosed with social phobia (Schneier, Johnson, Horning, Leibowitz, & Weissman, 1992). Based on these statistics, social anxiety disorder is one of the most prevalent mental disorders in the U.S. However, it is notable that epidemiological studies estimate that only about 5% of individuals meeting criteria for social anxiety disorder in the general population seek care from a mental health practitioner for their condition (Magee, et al., 1996).

Given that the majority of individuals who meet criteria for social anxiety disorder are reluctant to pursue treatment, its clinical course is that of a chronic, lifelong disorder which is unlikely to remit spontaneously (Wittchen & Beloch, 1996; Moutier & Stein, 1999). Retrospective reports estimate the mean age at onset to be between 14 and 16 years of age with estimates from the majority of studies falling between early and late adolescence (APA, 1994; Leibowitz, Gorman, Fyer, & Klein, 1985; Amies, Gelder, & Shaw, 1983; Turner, Beidel, Dancu, & Keys, 1986). Additionally, prognosis was poorest for individuals meeting diagnostic criteria prior
to age 11 with earlier ages of onset correlating with increased impairment in a variety of domains such as social, educational, and career development (Ballenger, Davidson, Lecrubier, Nutt, Bobes, Beidel, Ono, & Westenberg, 1998). Finally, a large-scale epidemiological study found that only one quarter of the clients are reported to recover. Likelihood of recovery was greatest for individuals with higher educational levels, higher ages of onset, and no comorbid psychological conditions (Davidson, Hughes, George, Blazer, 1993).

Communication Apprehension

Researchers in the field of communications have also examined similar constructs. The most similar is a construct labeled communication apprehension (CA). Communication apprehension refers to a state of fear or anxiety experienced in relation to real or anticipated communication with another person (McCroskey, 1977; Powers & Smythe, 1980). This fear or anxiety often is referred to as "stage fright" and is typically accompanied by a variety of physical and psychological symptoms including rapid heart rate, muscle tension, difficulty speaking, and nausea. As with social anxiety disorder, individuals experiencing high levels of CA will typically avoid situations in which they might be required to engage in more formal communication with others or will endure such situations under extreme distress.

Apprehension about public speaking is likely the most common form of communication apprehension. Research indicates that as many as 85% of individuals report being uncomfortably anxious regarding public speaking (Motley, 1988).
However, for an estimated 15% to 20% of American college students, this anxiety and apprehension is severe enough to significantly interfere with the individual’s personal and academic functioning (McCroskey & Leppard, 1975; McCroskey, 1977). The impact that CA may have on such highly anxious individuals can be far-reaching. Research conducted with such individuals provides evidence that significantly apprehensive students tend to score lower on college entrance exams and earn lower cumulative grade-point averages while attending college (McCroskey & Anderson, 1976; McCroskey, Daly, & Sorensen, 1976). Individuals with severe CA have also been found to be less likely to receive job interviews, and less likely to seek career advancement after they have been hired (Daly & Leth, 1976, as cited in Robinson, 1997).

Treatment Approaches for Communication Apprehension

Given that communication apprehension is common among college students and the ramifications that such apprehension may have in terms of individuals personal, social, and professional functioning can be significant, researchers in the field of communications have sought to identify ways to effectively reduce CA at the college level. As such, public speaking and basic communication courses have been the most typical contexts in which the treatment of CA has been explored (Hoffman & Sprague, 1982; Stacks & Stone, 1984). These courses serve as a fairly ideal setting in which to conduct such research for a variety of reasons. First, such courses are typically an academic requirement for many students and such classes often may
represent the only systematic instruction that they may receive regarding communication and public speaking skills. Secondly, estimates indicated that as many as 20% of students enrolled in basic public speaking courses report experiencing extreme levels of CA (McCroskey, 1993). Additionally, research conducted by Hoffman and Sprague (1982) found that over 80% of the colleges and universities they sampled rely primarily on such courses to reduce communication apprehension and anxiety for their students. Thus, such courses are ideal settings in which to examine the effectiveness of various treatment methods or techniques for reducing CA.

Traditionally, the focus of such performance-oriented communications courses has been on skills training (Rose, Rancer, & Crannell, 1993). Researchers have proposed that such courses may be more effective for reducing CA when additional techniques such as systematic desensitization, cognitive restructuring, and visualization are included. Such a multicomponent approach would continue to provide students with instruction on essential public speaking skills, but would also include additional content such as relaxation and relaxation exercises and the benefits of examining and countering negative self-statements (Connell & Borden, 1987).

Robinson (1997) conducted a national survey to determine the most common approaches that instructors of basic college level public speaking courses employ to reduce CA. The results of his survey indicated that 96% of respondents utilize skills training and that skills training remains the primary technique utilized to treat CA in the classroom. However, Robinson reported that 63% of instructors also address CA
utilizing cognitive techniques such as raising awareness of one’s negative self-statements and another 59% who indicated that they teach specific visualization strategies to help student reduce their anxiety about public speaking. However, only 25% of the respondents indicated that they employ specific systematic desensitization concepts or techniques. Finally, 75% of the respondents indicated that they attempt to use a variety of general therapeutic approaches within the classroom setting such as normalizing students’ fears, establishing a warm classroom climate, encouraging students to become more audience centered, and encouraging in-class participation (Robinson, 1997).

A small number of studies have examined the effectiveness of such techniques on reducing communication apprehension. In general, the majority have found that basic public speaking courses are effective in significantly reducing CA as measured predominantly by a variety of self-report measures (Rose, Rancer, & Jordan, 1993; Rubin, Rubin, & Jordan, 1997). One meta-analysis of such studies utilizing self-report data has been conducted to date (Allen, Hunter, & Donohue, 1989). The researchers concluded that all forms of treatment (skills training, cognitive modification, and systematic desensitization) were effective in significantly reducing self-reported public speaking anxiety. However, Allen and his colleagues reported that the treatments did differ in terms of the observed relative effectiveness. Their results indicate that the most effective approaches utilize a combination of all three techniques, while skills training alone was demonstrated to be the least effective method. However, the authors of this meta-analysis study indicate that their
quantitative review of the literature has several limitations. First, due to the limited outcome research in this area, not all possible combinations of treatment techniques were of sufficient sample size to draw any firm conclusions. Additionally, most of the observed effect sizes represent samples of less than 1000 participants. Given that the sample size is small, statistical comparisons between therapies tend to be without sufficient statistical power to detect significant differences. Finally, the meta-analysis that was conducted by Allen and his colleagues, as well as in the majority of studies examining the treatment of CA, bases treatment effectiveness on the results obtained from self-report measures. Few studies utilize more objective measures of anxiety, such as observer ratings, course performance, or physiological data, to attempt to corroborate the reduction in anxiety detected by the more subjective self-report measures.

Treatment of Social Anxiety Disorder

When compared to the research conducted to date regarding communication apprehension, the supporting literature for the treatment of social anxiety disorder is more extensive. At this time, cognitive-behavioral and pharmacological approaches are considered to be the most effective treatment approaches available for the treatment of social anxiety disorder. A brief review of the current literature provides an overview of each of the major treatment approaches, as well as the studies that have been conducted to demonstrate their efficacy.
Cognitive-behavioral treatment (CBT) approaches for social anxiety disorder attempt to target many of the different components of anxiety during treatment. Most attempt to include multiple components within the same treatment package and look to target issues such as escape and avoidance behaviors, the physiological responses that accompany anxiety, and the negative predictions and expectations regarding social situations individuals commonly hold. Based on the treatment outcome studies conducted to date, the key factor influencing the outcome of CBT for social anxiety disorder is the inclusion of exposure within treatment (Turner, Beidel, Cooley, & Woody, 1994; Heimberg, Dodge, Hope, & Kennedy, 1990; Butler, Cullington, & Munby, 1984; Newmann, Hofmann, Trabert, & Roth, 1994; Taylor, 1996). The other procedures used in conjunction with exposure have not been shown to significantly affect treatment outcome (Shear & Beidel, 1998; Mersch, 1995). However, a line of systematic dismantling studies would need to be conducted to determine the individual contribution of each of the CBT components.

CBT can be characterized as a short-term, symptom-focused intervention strategy. Success of the intervention is dependent upon careful assessment, which includes the identification of anxiety-provoking cues and the resulting physical symptoms experienced by the client. CBT commonly includes a psychoeducational component to address the nature of anxiety, its various physical and psychological components, and potential etiological factors. Additionally, clients are informed of the active nature of treatment and the expectation that homework assignments are an important and integral part of a successful treatment program (Shear & Beidel, 1998).
One of the most successful and well-researched CBT packages to date is cognitive-behavioral group therapy (CBGT) for social anxiety disorder (Heimberg, Dodge, Hope, 1990; Heimberg, Salzman, Holt, & Blendel, 1993; Heimberg, Dodge, Holt, & Kennedy, 1990). This program combines stepwise exposure and cognitive structuring intervention in a group format. CBGT is usually conducted with 6-10 group members in 12-15 sessions, with each session lasting approximately 2 1/2 hours (Heimberg et al., 1990). The group is typically led by two therapists, ideally one male and one female therapist, which allows for both genders to be represented in a variety of exposure situations (Shear & Beidel, 1998).

In empirical studies, CBGT has been found to be significantly more effective than support group-based treatment and has been shown to maintain gains throughout follow-up (Heimberg et al., 1990). Therapeutic gains continued to be maintained for CBGT during a five year long-term follow-up, indicating that clients likely learn techniques to manage their anxiety that continue long after formal treatment is concluded (Heimberg et al., 1993).

Regarding the most common pharmacologically based treatments for social anxiety disorder, the standard monoamine oxidase inhibitors (MAOIs) have the longest history of use and a well-demonstrated efficacy with the disorder (Leibowitz, 1999). Several controlled trial studies have demonstrated marked relief of acute symptoms of anxiety, even in individuals diagnosed with social anxiety disorder who were categorized as highly disabled by their symptoms (Leibowitz, 1999). In one example, 74 clients with social anxiety disorder were randomly assigned to treatment
with phenelzine, atenolol, or a placebo for 8 weeks (Liebowitz, Schneier, Campeas, & Hollander, 1992). In this study, 64% of clients responded to the phenelzine as compared to 30% and 23% for those treated with atenolol and placebo, respectively.

The selective serotonin reuptake inhibitors (SSRIs) have been receiving increased research attention for the treatment social anxiety disorder and are increasingly being considered the pharmacological treatment of choice for the disorder (Davidson, 1998). The SSRIs are favored because they can be administered in a single daily dose and have been shown to have limited side effects (Leibowitz, 1999). Paroxetine is the most studied of all SSRIs for the treatment of social anxiety disorder (Davidson, 1999). One double blind, placebo-controlled study evaluated the effectiveness of paroxetine in comparison to placebo with 187 clients diagnosed with the disorder (Stein, Liebowitz, Lydiard, Pitts, Bushnell, & Gergel, 1998). Fifty-five percent (55%) of the clients taking paroxetine were considered therapeutic responders based on the results obtained on outcome measures as compared with 24% of the placebo group (p<.001).

Treatment Efficacy

In 1997, a meta-analysis was published which examined the effectiveness of treatment for all available controlled outcome studies for social anxiety disorder/social phobia conducted between 1974 and 1995 (Gould, Buckminster, Pollack, Otto, Yap, 1997). Gould and his colleagues compared across studies by computing effect sizes based on the advantage of the active treatment condition over
the control condition. Based on their review, the overall effect size for CBT was 0.74, with the highest effect size occurring in treatments that included an exposure-based component (0.85), regardless of whether or not cognitive restructuring was included in the treatment package. The overall effect size for the pharmacologically based treatments was 0.62, with the highest contributing effect sizes from the two studies examining SSRIs (1.89) and the two studies examining benzodiazepines (0.72). However, these figures should be interpreted cautiously given the extremely small number of studies from which each of these figures are based.

Comparison of the overall effect sizes for CBT and the pharmacologically based treatments revealed no significant differences which led Gould and his colleagues (1997) to conclude from the available evidence that the study suggested approximately equal efficacy for these interventions. Their analysis of the dropout rates for each treatment modality also revealed similar results with CBT yielding a slightly lower dropout rate (approximately 10% for CBT and 14% for pharmacotherapy).

It is important to note, however, that a significant limitation of all of the medications studied to date is the substantial rate of relapse observed after the medications are discontinued. Even if CBT, the MAOIs, and the SSRIs have been demonstrated to have similar treatment efficacy, there appears to be a much lower rate of relapse following the discontinuation of CBT (Heimberg et al., 1993; Scholing & Emmelkamp, 1996).
Attentional Bias and Reaction Time Assessment

Several research studies have provided evidence to indicate that heightened anxiety is associated with an attentional bias toward threat cues in certain situations (MacLeod, Mathews, & Tata, 1986; Mogg, Mathews, & Eysenck, 1992). Such findings support recent cognitive theories that have proposed that such biases play a critical role in the etiology of anxiety disorders (Beck, Emery, & Greenberg, 1985; Williams, Watts, MacLeod, & Mathews, 1997; Eisenck, 1992). Such theories hold that anxious individuals will demonstrate an attentional bias toward threat cues because such individuals vigilantly scan the environment for any perceived threats.

Evidence for such a relationship between an attentional bias for threat and anxiety has predominantly come from a range of studies that utilized either a modified Stroop task or a word-based dot probe task. When completing a Stroop task, anxious individuals tend to be slower in naming the colors of threat-related words than neutral words, which is consistent with the theory that their attention is being selectively allocated toward the threat word content (Williams, Mathews, & McLeod, 1996; Bradley, Mogg, White, Groom, & de Bono, 1999). In studies utilizing a word-based dot probe task, pairs of stimuli, typically a threat word and a neutral word, are briefly presented on a screen and a small dot replaces one of the words immediately after they disappear. Participants are asked to respond as quickly as possible and press a key that corresponds to the current location of the dot probe. In such studies, anxious individuals have been found to respond faster to dot probes which replace threat
words, which also is consistent for attentional vigilance toward threat cues (Mogg & Bradley, 1998, Bradley et al., 1999).

While such evidence exists for an attentional bias toward threat cues, the majority of these studies only utilize word-based stimuli. Such stimuli are likely to have a limited and indirect relationship to real life dangers (Bradley et al., 1999). For this reason, researchers have recently attempted to study attentional bias by utilizing stimuli which are more directly related to stimuli that are likely to be encountered in a feared situation (Mansell, Clark, Ehlers, & Chen, 1999). Examples include a study in which spider phobic individuals demonstrated an attentional bias toward pictures of spiders (Lavy & Van den Hout, 1993) and another in which panic disorder patients, who commonly fear bodily sensations, demonstrated an attentional bias towards an unpleasant tactile cue (Ehlers & Breuer, 1995).

A recent line of research utilizing picture-based reaction time tasks has begun to explore whether individuals with heightened levels of social anxiety also display an attentional bias to threatening stimuli (Mansell, Clark, Ehlers, & Chen, 1999; Yuen, 1994). In contrast to the other anxiety-based reaction time studies, these studies demonstrate that highly socially anxious individuals tend to direct attention away from pictures of emotional faces. In the study conducted by Yuen (1994), social anxiety was induced in participants by informing them that they would have to give a brief public presentation immediately following the completion of the reaction time task. Participants then completed a modified version of a dot probe task in which pictures of two faces were presented on a computer screen, one above the other. On
critical trials, the facial expression of one of the faces was negative and the other was neutral. The pictures were then removed and replaced by a dot probe. Participants were asked to classify the expression of the top picture as fast as possible. Under the condition of provoked anxiety, participants with high scores on a measure of social anxiety responded more slowly to probes that were preceded by negative facial expressions than to probes that were preceded by neutral faces. Participants with low scores on the measure of social anxiety did not demonstrate this effect.

The study conducted by Mansell et al. (1999) used a further modification of the dot-probe task to provide a conceptual replication and extension of the study conducted by Yuen (1994). In this study, high and low socially anxious individuals were randomly assigned to complete the dot probe task either with or without exposure to an anxiety provoking condition. The modified dot probe task consisted of pairs of pictures followed by the presentation of a dot probe. However, the pictures consisted of a human face (with either a positive, negative, or neutral expression) and a household object. The pairs of pictures were presented diagonally on the screen, and after 500ms the pictures were removed and a dot probe replaced one of the two pictures. Results demonstrated that, compared to individuals who rated low on measures of social anxiety, highly socially anxious individuals show an attentional bias away from emotional faces. However, this effect was only observed under conditions of heightened anxiety as induced by a social-evaluative threat.
Statement of Purpose

The purpose of the present study is twofold. First, this study is designed to assess the effectiveness of a semester-long public speaking course in reducing the self-reported levels of communication anxiety and social anxiety among college students enrolled in such a course.

Second, the current study seeks to replicate and extend the recent line of research that has demonstrated that highly socially anxious individuals show an attentional bias away from pictures of faces displaying either positive or negative emotions under conditions of social-evaluative threat. The current study will extend this line of research by conducting the same reaction time procedure with participants in a pretest/post-test design. Thus, the project is designed to first determine if groups (rating high vs. low on a self-report measure of social anxiety at the beginning of the semester) significantly differ from one another with respect to the modified dot probe task at pretest. These results will then be compared to measures taken again at post-test (near the end of the semester) to determine if the procedure is sensitive enough to detect changes in social anxiety which are anticipated to occur during the semester.
Participants

Participants in both phases of the study were comprised of male and female undergraduate students registered for a 100 level undergraduate public speaking course offered at Western Michigan University. A combined total of fifty-seven undergraduate students were enrolled in two separate sections of the course. The same instructor taught both of these sections and both sections were taught utilizing identical syllabi and lesson plans. All of the students enrolled in these two sections of the course were eligible to participate in the large group testing phase (Phase I) of the study.

Selection for Phase II, the laboratory assessment phase of the study, was determined by the participants' level of social anxiety as measured by a self-report questionnaire completed during Phase I of the study. Participants who scored in either the top quartile or the bottom quartile of the class were contacted and invited to participate in Phase II. Subject recruitment for Phase II continued until both the high and the low social anxiety groups contained at least fifteen participants.

Setting

Both Phase I and Phase II were conducted on the campus of Western Michigan
University. Phase I of the study occurred within the classroom in which each of the sections of the public speaking course was taught. Participants were recruited via a brief announcement speech that was made at the beginning of the semester. Those individuals who elected to participate were invited to complete the Phase I consent form, the demographic questionnaire, and the initial packet of self-report measures.

Phase II of the study was conducted in the Clinical Studies Research Laboratory (Room 2502, Wood Hall). Participants who agreed to participate in Phase II were asked to schedule individual appointments to complete the computer-based reaction time program at the beginning of the semester and again just prior to the end of the semester.

Materials & Apparatus

Paper and Pencil Response Measures

The Personal Report of Confidence as a Speaker (PRCS; Paul, 1966) is a self-report instrument that is designed to assess participants’ fear of public speaking. This questionnaire requests that participants complete the measure while recalling one’s most recent public speaking experience. The PRCS is comprised of 30 items and is arranged in a true/false format. The PRCS has commonly been used as a screening measure in studies which examine fears related to public speaking (Fredrickson, Klein, & Ohman, 1990; Joens, Phillips, & Reiger, 1995) and also as an outcome measure in various public speaking anxiety treatment studies (Altmaier, Ross, Leary, & Thornbrough, 1982; Schuler, Gilner, Austein, & Davenport, 1982). However, few
studies have been conducted to determine the psychometric properties of the PRCS. Daly (1978) reported that the PRCS was positively correlated with 12 other measures of speech and social anxiety (r's ranging from .53 to .97) and indicated that it demonstrated high internal consistency (Cronbach’s alpha = .91). In a study conducted by Tarico, Van Velzen, and Altmaier (1986), a significant negative correlation was found between PRCS scores and speech performance ratings.

The Fear of Negative Evaluation Scale (FNE; Watson & Friend, 1969) and the Social Avoidance and Distress Scale (SAD; Watson & Friend, 1969) are companion questionnaires and are among the most commonly used self-report instruments for social anxiety. Each was designed to measure a distinct and independent construct of social anxiety. The FNE was constructed to assess for fears of negative evaluation in social situations and the SAD to assess for the avoidance of social situations due to feelings of distress. The FNE and the SAD are comprised of 30 and 28 items, respectively, and both utilize a true-false format. Watson and Friend (1969) reported a KR-20 reliability coefficient of .94 for both measures. Additionally, the authors reported test-retest reliability coefficients after one month interval were r = .78 for the FNE and r = .68 for the SAD in a college student sample.

The Social Phobia Scale (SPS) and the Social Interaction Anxiety Scale (SIAS) were developed by Mattick and Clarke (1989). These questionnaires are a newer set of companion self-report measures that were designed to assess for fears associated with social phobia. The SPS is designed to assess for fears of being scrutinized by others while doing routine activities and the SAIS is designed to assess
for fears associated with social interaction. Both the SPS and the SAIS contain 20 items and each is rated on a 5-point Likert scale. Both scales were found to correlate significantly (r's ranging from .54 to .69) with other measures of social anxiety (Mattick & Clark, 1989) and both are reported to have good test-retest reliability (r > .90 for intervals up to 13 weeks; Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992).

The Personal Report of Communication Apprehension (PRCA-24) was developed by McCroskey (1982). This scale is designed to assess an individual's level of anxiety while speaking in various public situations. The PRCS contains 24 self-report items that are rated on a 5-point Likert scale. McCroskey (1982) indicated that the PRCA-24 demonstrated high internal consistency (Cronbach's alpha > .75 for each subscale and Cronbach's alpha > .90 for the total score).

Finally, two unpublished questionnaires were utilized during the study. A basic demographic questionnaire was selected to examine for potential group differences among participants including gender, age, race, education, and religiosity (see Appendix A). Additionally, a brief pencil and paper measure was created for use at pretest and posttest to assess for any participants who might have started or discontinued psychotherapy and/or psychopharmacological treatment for anxiety over the course of the semester (Appendix B).

Computer-Based Assessment

A modified dot probe/reaction time computer program was developed to duplicate the program used by Mansell, Clark, Ehlers, and Chen (1999). The program
was created with a software package entitled E-Prime 1.0 (beta 4.0) which is manufactured by Psychology Software Tools, Inc. The reaction time data was recorded in real-time by the program and stored on an IBM-compatible computer hard drive.

The participant was seated in front of a computer in a private room that was free from distractions. Brief verbal instructions for the reaction time/modified dot probe task were given and participants were also informed that the program begins with various instruction screens and two series of practice trials. Participants were instructed to focus on a white fixation cross displayed on the computer screen. Pairs of pictures (always utilizing one picture of a person's face and a second picture featuring a common household object). The pictures were presented diagonally on the computer monitor (randomly presenting the photographs in either top right and bottom left corners of the screen or in top left and bottom right corners of the screen) for 500ms. Immediately following the displayed picture pair, a single letter will appear on the screen (either an “E” or an “F”) in a location that corresponds with the center point of one of the two pictures. This letter is referred to as a probe stimulus, and participants were instructed to press the button on a response box that matches the displayed letter as quickly and accurately as possible. Participants were informed that the letters “E” and “F” were the only two letters that appear during the computer task. After their response, the probe stimulus would disappear. Lastly, participants were briefly shown a screen which indicated if their response was correct or not and
displayed their reaction time in milliseconds. This sequence was then repeated, beginning with the white fixation cross, until the each of the trials was completed.

Participants were given eight trials to practice pressing the appropriate keys followed by eight complete practice trials using sample face-object pairs followed by a probe. After the practice trials were completed, the experimenter offered to answer any questions that the participant might have regarding the instructions for the task. After answering any questions, the experimenter left the experimental chamber allowing the participant to complete the experimental trials in private. The participants were instructed to press any button on the response box when they were ready to begin. Participants then completed each of the 96 randomly presented trials of the picture pair/reaction time task. The task typically took about eight minutes to complete from start to finish (Examples of the fixation cross, the face/object picture pairs, and the letter-based probe presentation are provided in Appendix C).

Stimulus Materials

The photographs of faces utilized by the modified dot probe/reaction time computer program were originally developed by Matsumoto and Ekman (1988; JACFEE and JACNeuF). One set of pictures was specifically developed to depict various emotional facial expressions (anger, contempt, disgust, fear, happiness, sadness, and surprise) and the other set contains photographs of the same models displaying an emotionally neutral facial expression. The photograph sets depict an
equal number of individuals from two visibly different cultural backgrounds and an equal number of male and female models.

Mansell and his colleagues (1999) selected 96 of these photographs (equal numbers of positive, neutral, and negative faces) for use in the study and paired each with pictures of various household objects. The object photographs consisted of an equal number of pictures depicting clocks, sofas, phones, and vacuum cleaners. Each of the pictures used in the study were digitally scanned and stored as color image computer files. Each picture was edited to fit within an area measuring 7.5cm x 6.0cm and the computer displayed a black background behind the picture sets during each of the trials.

Format for the Public Speaking Course

The introductory public speaking course served as semi-structured exposure-based treatment program for the purpose of this study. Both sections of the class were scheduled to meet for 50 minutes, three times each week for the duration of a sixteen-week semester. The goal of this public speaking course is to help students improve their public speaking skills and, in the process, help students learn to minimize the effect that anxiety may have on their ability to speak effectively in front of an audience. The course effectively combines the presentation of didactic information with stepwise exposure.

The didactic/psychoeducational material was presented to the students during class lectures, class activities, and assigned readings from the course textbook and
various handouts. The exposure-based component of the course consisted of in-vivo exposure to public speaking situations by requiring students to prepare and present a series short speeches in front of the class. Students in the course were required to give seven speeches throughout the semester. The speeches were scheduled systematically throughout the sixteen-week course and the length of time required for each speech increased with each subsequent speech.

Procedure

Phase I

Students enrolled in both sections of the introductory public speaking course (COM 104) taught by Dr. Loren Crane were given the opportunity to complete each of the brief paper and pencil questionnaires in class during the first and last week of the semester. All students enrolled in the course were eligible for Phase I of the study. The students were informed that the experimenter would also be providing Dr. Crane with the aggregate results of their scores on these measures at the end of the semester. For this reason, Dr. Crane elected to utilize class time to allow students to complete the measures and encouraged students to participate both for feedback regarding the course as well as for the purpose of gathering data for the current study. These measures included the following: 1.) The Personal Report on Confidence as a Speaker (PRCS; Paul, 1966). 2.) The Personal Report of Communication Apprehension (PRCA-24; McCroskey, 1982). 3.) The Fear of Negative Evaluation Scale (FNE; Watson & Friend, 1969) 4.) The Social Avoidance and Distress Scale (SAD; Watson
The students completed these questionnaires during the first and last week of the course as pretest/posttest measures of self-reported level of public speaking and social anxiety. The student investigator visited both sections of COM 104 taught by Dr. Crane during the first full week of classes to deliver a brief recruitment announcement. The recruitment script (Appendix D) was read to the class and the consent form was handed out to each of the students. The consent form (Appendix E) described the purpose of Phase I of the study in detail and explained that Dr. Crane would only release questionnaires from consenting individuals to the investigator. Additionally, students were informed that they might be contacted regarding possible participation in a second phase of the study. Finally, the students were also informed that they would be provided with feedback regarding the aggregate performance of the class on these measures at the end of the semester.

Participants from Phase I were selected for eligibility in Phase II based on their self reported level of social anxiety as measured by their responses to Fear of Negative Evaluation Scale (FNE). Participants scoring in the top and bottom quartiles of the class on this measure were contacted and invited to participate in Phase II. This phase of the study was conducted with each participant individually.
Phase II (Pretest)

Individuals meeting criteria for Phase II were contacted by telephone. When contacted, individuals were read the telephone recruitment script and asked if they were interested in participating in the laboratory portion of the study (Appendix F). Those who agreed to participate were scheduled to meet, at their convenience, with either the student investigator or research assistant to complete the measures selected for Phase II. When participants arrived for their scheduled appointment, each was provided with a consent form describing the laboratory assessment phase of the study (Appendix E).

After consent had been obtained, participants were asked to complete a brief pencil and paper measure. This brief measure was created to assess whether individuals participating in Phase II were currently receiving psychotherapy or taking prescription medication to treat anxiety (Appendix B).

Once both the consent form and the treatment/medication questionnaire were completed, each of the participants was informed they would be asked to give a brief speech immediately following the computer-based assessment portion of the study. Participants were told that they would be asked to read aloud a brief 2-3 minute speech and that they would be videotaped while they would be giving their speech. Additionally, the participants were also informed that a panel of graduate students would be viewing their videotape to rate their facial expressions and body language for any observable signs or indications of anxiety.
Providing this information to the participants prior to the reaction time task is a critical element in the design of the study. Prior studies that utilized such a computer-based reaction time procedure found that it was necessary to include an anxiety induction procedure to be able to detect significant differences in reaction time between the high and low anxiety participants.

The study participants were next escorted into the experimental chamber. The participant was seated in front of a computer and the instructions for the reaction time/modified dot probe task were given. Participants were given eight trials to practice pressing the appropriate keys and eight full practice trials using sample face-objects pairs followed by a probe. After the practice trials were completed the experimenter offered to answer any additional questions that the participant might have. When the participant was ready to begin, the experimenter started the experiment and left the experimental chamber. The participant completed each of the 96 picture pair reaction time trials. The task typically took about eight minutes to complete from start to finish.

After completing the reaction time program, participants were invited to return to the main room of the research lab. Participants were asked to stand in front of a tripod-mounted video camera and were given a written copy of the speech that they would deliver. Each participant received a copy of the same speech.

Participants were asked to read a brief news story that had been selected from CNN's website. Participants were allowed to read through the text to become familiar with the material. The experimenter then began videotaping and asked the participants...
to read the story as best they could to the camera. Participants were asked to present
the material by emulating how a television news anchor might read such a story.

This videotaped speech is being used as a substitute for the social-evaluative
threat utilized in prior research (Yuen, 1994; Mansell et al., 1999). In those studies,
participants were informed that they would be giving a brief public presentation after
completing the dot probe task. These presentations never actually took place.
Participants were instead debriefed regarding the deception and dismissed. Given that
the present study requires a social-evaluative threat to be induced twice during the
semester (once at pretest and again at posttest), replicating such a procedure would
prove to be ineffective at posttest. Thus, for the purpose of this study, participants
actually completed speeches though this data was not utilized in the study in any way.

After completion of the videotaped speech, participants were thanked for their
participation, paid three dollars for their time, and excused from the session.

Phase II (Posttest)

Participants in the pretest portion of Phase II were contacted four weeks prior
to the end of the semester. These individuals were invited to participate in the
laboratory portion of the study a second time (Appendix G). Those who agreed to
participate were scheduled to meet with the student investigator to complete the final
portion of Phase II of the study. The laboratory procedures for the post-test portion of
the study were identical to those followed during the pretest. When participants
arrived for their scheduled appointment, each was provided with a consent form describing the posttest portion of Phase II of the study (Appendix E).

After consent has been obtained, participants were again asked to complete the brief pencil and paper measure to identify whether individuals participating in Phase II were currently receiving counseling or taking prescription medication to treat anxiety (Appendix B). This measure was repeated at the time of the posttest assessment to determine if any individuals participating in the study had received counseling or began taking medication during the course of the semester.

Once both the consent form and the treatment/medication questionnaire were completed, each of the participants were informed that they would be asked to give another speech immediately following the computer-based assessment portion of the study. Participants were told that they would be asked to read aloud a brief 2-3 minute speech and that they would be videotaped while they would be giving their speech. The participants were reminded that a panel of graduate students would be viewing their videotape to rate their facial expressions and body language for any observable signs or indications of anxiety.

The study participants were next escorted into the experimental chamber. The participant was seated in front of a computer and the instructions for the reaction time/modified dot probe task were given. Participants were given eight trials to practice pressing the appropriate keys and eight full practice trials using sample face-objects pairs followed by a probe. After the practice trials were completed the experimenter offered to answer any additional questions that the participant might
have. When the participant was ready to begin, the experimenter started the experiment and left the experimental chamber. The participant completed each of the 96 picture pair reaction time trials. The task typically took about eight minutes to complete from start to finish.

After completing the reaction time program, participants were invited to return to the main room of the research lab. Participants were asked to stand in front of a tripod-mounted video camera and were given a written copy of the speech that they would deliver, and each participant received the same speech. Participants received a different news story than the one that was utilized during the pretest portion of the study. The posttest news story was also selected from CNN's website. The stories were analyzed using Microsoft Word and both stories were determined to have similar word counts and reading level statistics.

Participants were allowed to read though the text to become familiar with the material. The experimenter then began videotaping and asked the participants to read the story as best they could to the camera. Participants were asked to present the material by emulating how a television news anchor might read such a story.

After completion of the videotaped speech, participants were thanked for their participation and each was given the opportunity to ask any questions they might have regarding the purpose and format of the study. Finally, participants were each paid seven dollars for their time and excused from the session.
Data Analysis

Pearson product moment correlation coefficients were computed between the Fear of Negative Evaluations Scale (FNE) and all of the other paper and pencil measures of anxiety used. One-way repeated measures ANOVAs were conducted on the FNE to compare pretest and posttest scores within groups to determine if either group yielded a significant change in self-reported anxiety.

A series of Mann-Whitney U tests were conducted to determine if there were significant differences between the high and low anxiety groups regarding the errors that participants committed while completing the reaction time task at pretest and again at posttest. A series of Mann-Whitney U tests were conducted to determine if there were significant differences between the high and low anxiety groups with regard to their reaction times at pretest and again at posttest. The reaction time for each of the emotional face types (anger, sadness, disgust, fear, happy, and neutral/no expression) was computed separately.

Reaction times for the various emotional face types were collapsed into three broad categories of facial expression (positive, neutral, and negative expressions). A bias score was then calculated separately for each of the three categories. Positive values on the resulting bias score reflect selective attention toward faces (vigilance) and negative values reflect an attentional bias away from the faces (avoidance). A Pearson product moment correlation coefficient was calculated to examine the relationship between the participants’ scores on the FNE and their bias scores as measured at pretest. Additionally, a series of Mann-Whitney U tests were conducted.
to determine if there were significant differences between the high and low anxiety
groups with regard to bias scores as measured at pretest and again at posttest.

A series of repeated measures $t$ tests were conducted to determine if there
were significant differences in reaction time at posttest as compared to pretest. A
series of repeated measures $t$ tests were also conducted to determine if there were
significant differences in computed bias scores at posttest as compared to pretest.

Finally, change scores were generated for each of the reaction time and bias
score categories by subtracting the posttest reaction time means from those at pretest.
This allowed for a direct comparison between the high and low anxiety groups
regarding change from pretest to posttest on each of the measures. A series of Mann-
Whitney $U$ tests were conducted to determine if there were significant differences
between the high and low anxiety groups.
CHAPTER III

RESULTS

A total of 51 students elected to participate in the study and completed the questionnaires during Phase I. Of those individuals who completed the questionnaire, the highest and lowest scoring individuals on the FNE were identified and phoned and asked to participate in the second phase of the study. Individuals were contacted until both groups were comprised of at least 15 participants (thereby generating groups that utilize roughly the top quartile and bottom quartile of students enrolled in the course based on the FNE).

Of the 33 individuals contacted for Phase II, 32 individuals agreed to complete the laboratory portion of the study. This yielded 16 participants in both the high anxiety and low anxiety groups for the study. Of these 32 pretest participants, 31 individuals returned to complete the posttest portion of Phase II at the end of the semester. The individual who did not complete the posttest portion of Phase II was a member of the low anxiety group and was unable to be reached by phone. Thus 31 participants were included for final data analysis. Sixteen participants comprised the high anxiety group and fifteen participants comprised the low anxiety group.

No participants in Phase II were excluded due to their answers on the brief questionnaire used to assess for significant changes in psychotherapy and/or psychopharmacological treatment. Examination of the responses to this questionnaire
revealed that only one participant at pretest of Phase II indicated receiving any form of treatment. This individual was a member of the low anxiety group and had been taking Zoloft for approximately two months at the time of pretest. This individual reported he or she had continued to take the medication at posttest. Additionally, one individual at posttest indicated having begun general psychotherapy one month prior to the end of the class. This individual belonged to the high anxiety group and reported no current use of medication at pretest or posttest.

**Demographic Characteristics**

The demographic characteristics for the high anxiety and low anxiety groups as well as the overall participant pool are summarized in Table 1 along with the results of the tests for analysis of variance (ANOVAs) between the groups. One-way ANOVAs were performed on these variables to determine if there were any significant differences between the groups based on the participants’ age or years of education.

A one-way ANOVA was conducted to examine for differences between groups based on the age of the participants. The means and standard deviations are presented in Table 1. The results of the ANOVA indicated no significant differences ($F(1,29) = 3.387, p = .109$) between the groups.

A one-way ANOVA was also conducted to examine for differences between groups based on the years of education of the participants. The means and standard
deviations are presented in Table 1. The results of the ANOVA indicated no significant differences \((F(1,29) = 1.201, p = .282)\) between the groups.

![Table 1](image)

**Table 1**

Demographic Characteristics of the Participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Anxiety</td>
<td>18.81</td>
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<td>.109</td>
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<tr>
<td>Low Anxiety</td>
<td>20.80</td>
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<tr>
<td>Overall</td>
<td>19.77</td>
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<td>Education (in years)</td>
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<td></td>
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<tr>
<td>High Anxiety</td>
<td>13.69</td>
<td>0.95</td>
<td>1.201</td>
<td>.282</td>
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<tr>
<td>Low Anxiety</td>
<td>14.13</td>
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<tr>
<td>Overall</td>
<td>13.90</td>
<td>1.14</td>
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</table>

Additional descriptive information was collected for all participants including ethnicity, marital status, and religiosity. These data are displayed in percentage form for all groups in Table 2.

Communication and Social Anxiety Measures

Correlation coefficients were computed among the six pencil and paper measures of anxiety. Using the Bonferroni approach to control for Type I error across the 15 correlations, a \(p\)-value of less than \(.003 (\frac{.05}{15} = .003)\) was required for
## Table 2

### Descriptive Statistics

<table>
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<th>Variable</th>
<th>Total Sample¹</th>
<th>High Anxiety¹</th>
<th>Low Anxiety¹</th>
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<tbody>
<tr>
<td></td>
<td>(n=31)</td>
<td>(n=16)</td>
<td>(n=15)</td>
</tr>
<tr>
<td><strong>Education (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 years</td>
<td>51.6</td>
<td>56.3</td>
<td>46.7</td>
</tr>
<tr>
<td>14 years</td>
<td>22.6</td>
<td>25.0</td>
<td>20.0</td>
</tr>
<tr>
<td>15 years</td>
<td>9.7</td>
<td>12.5</td>
<td>6.7</td>
</tr>
<tr>
<td>16 years</td>
<td>16.1</td>
<td>6.3</td>
<td>26.7</td>
</tr>
<tr>
<td><strong>Gender (%)</strong></td>
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<td></td>
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<tr>
<td>Male</td>
<td>48.4</td>
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<td>60.0</td>
</tr>
<tr>
<td>Female</td>
<td>51.6</td>
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<tr>
<td><strong>Race (%)</strong></td>
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<td>0.0</td>
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<td><strong>Relationship Status (%)</strong></td>
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<td>0.0</td>
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<td>Living with</td>
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<td>6.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Boy/Girlfriend</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Religion (%)</strong></td>
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<td>6.7</td>
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<td>0.0</td>
<td>6.7</td>
</tr>
<tr>
<td>Methodist</td>
<td>6.5</td>
<td>0.0</td>
<td>13.3</td>
</tr>
<tr>
<td>Baptist</td>
<td>12.9</td>
<td>0.0</td>
<td>26.7</td>
</tr>
<tr>
<td>Episcopal</td>
<td>6.5</td>
<td>12.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Other</td>
<td>32.3</td>
<td>37.5</td>
<td>26.7</td>
</tr>
<tr>
<td>Missing Data</td>
<td>3.2</td>
<td>6.3</td>
<td>0.0</td>
</tr>
</tbody>
</table>

¹ Percentages were calculated within each column individually

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significance. The results of the correlational analyses shown in Table 3 indicate that 13 of the 15 correlations were statistically significant and were greater than or equal to .53. Specifically, the Fear of Negative Evaluations Scale (FNE) was significantly correlated with all of the other pencil and paper measures of anxiety. In general, the results suggest that if participants indicated that they were highly anxious on the FNE that they also indicated that they were highly anxious on all of the other self-report measures. Given that prior reaction time studies utilized the FNE as their primary measure of anxiety and that each of the other measures were significantly correlated with the FNE, the FNE will be used in the remaining analyses for the purpose of self-reported anxiety.

Table 3
Correlation Among the Six Self-Report Measures of Anxiety

<table>
<thead>
<tr>
<th>Measure</th>
<th>FNE</th>
<th>SAD</th>
<th>SPS</th>
<th>SIAS</th>
<th>PRCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAD</td>
<td>.63*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPS</td>
<td>.74*</td>
<td>.66*</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIAS</td>
<td>.72*</td>
<td>.87*</td>
<td>.79*</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>PRCA</td>
<td>.71*</td>
<td>.76*</td>
<td>.75*</td>
<td>.81*</td>
<td>-</td>
</tr>
<tr>
<td>PRCS</td>
<td>.60*</td>
<td>.51</td>
<td>.42</td>
<td>.53*</td>
<td>.72*</td>
</tr>
</tbody>
</table>

*p < .003

Fear of Negative Evaluations Scale

Participants were selected for participation in Phase II based on their self-reported level of anxiety as measured by the Fear of Negative Evaluations Scale.
(FNE). Individuals scoring in the top quartile and bottom quartile of all participants who completed the measure during Phase I were invited to participate in Phase II. An independent samples t-test was conducted to determine if the participants who scored in the highest and lowest quartiles significantly differ from one another with regard to their FNE scores at pretest. The test was significant, t (22.738) = 11.751, p < .001. This result indicates that participants scoring in the highest quartile on the FNE at pretest (M = 21.25, SD = 4.28) self-report significantly higher levels of social anxiety than do individuals from the lowest quartile (M = 5.20, SD = 2.48).

One-way repeated measures ANOVAs were conducted within groups to determine if either group reported a significant change in self-reported anxiety from pretest to post test on the Fear of Negative Evaluations Scale (FNE). The means and standard deviations for the FNE are presented in Table 4 for both groups at pretest and posttest.

Table 4

Means and Standard Deviations for the FNE at Pretest and Posttest

<table>
<thead>
<tr>
<th>Group</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Anxiety</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FNE (Pretest)</td>
<td>21.25</td>
<td>4.82</td>
</tr>
<tr>
<td>FNE (Posttest)</td>
<td>17.50</td>
<td>7.77</td>
</tr>
<tr>
<td><strong>Low Anxiety</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FNE (Pretest)</td>
<td>5.20</td>
<td>2.48</td>
</tr>
<tr>
<td>FNE (Posttest)</td>
<td>6.35</td>
<td>3.50</td>
</tr>
</tbody>
</table>
For the high anxiety group, the results for the ANOVA indicated that a significant reduction in self-reported anxiety occurred from pretest to posttest, Wilks’ $\Lambda = .65$, $F(1, 15) = 8.25$, $p = .012$, multivariate $\eta^2 = .36$.

With regard to the low anxiety group, the results for the ANOVA indicated that there was not a significant change in self-reported anxiety occurred from pretest to posttest, Wilks’ $\Lambda = .773$, $F(1, 14) = 2.04$, $p = .175$, multivariate $\eta^2 = .13$. These results suggest that individuals who self-reported high levels of public speaking anxiety at pretest showed a statistically significant reduction in self-reported anxiety at posttest. However, the individuals in the low anxiety group did not report any significant change regarding their self-reported anxiety.

Mann-Whitney $U$ Test

The Mann-Whitney $U$ test was selected for all between group comparisons of the data gathered using the modified dot probe/reaction time task because it is a non-parametric alternative to the $t$ test for independent samples. Therefore, the Mann-Whitney $U$ can be used to analyze data where one or both of the samples do not meet the $t$ test’s assumption for normality. The Mann-Whitney procedure accomplishes this by converting the data to ranks and evaluating whether the mean ranks for the two groups differ significantly from one another.
Errors on the Reaction Time Task at Pretest

A series of three Mann-Whitney U tests were conducted to determine if there were significant differences between the high and low anxiety groups regarding the errors that participants committed while completing the reaction time task. The results of these analyses revealed no significant differences between groups for total errors committed, errors committed when the probe was presented behind faces, or when the probe was presented behind objects. The mean ranks, Mann-Whitney U statistics, and the corresponding z-scores for the errors committed on the dot probe task are summarized in Table 5.

Reaction Time at Pretest

A series of Mann-Whitney U tests were conducted to determine if there were significant differences between the high and low anxiety groups with regard to their reaction times as measured at pretest. The reaction time for each of the emotional face types (anger, sadness, disgust, fear, happy, and neutral/no expression) was computed separately. Additionally, a mean reaction time for all 96 reaction time trials was computed. The results of these analyses revealed no significant differences between groups for any of the emotional face types or for the mean reaction time on all trials. The mean ranks, Mann-Whitney U statistics, and the corresponding z-scores for reaction time are summarized in Table 5.
Table 5

Differences between Groups at Pretest on the Reaction Time Task

<table>
<thead>
<tr>
<th></th>
<th>High Anxiety (N=16)</th>
<th>Low Anxiety (N=15)</th>
<th>Mann-Whitney</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Errors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probe Behind Faces</td>
<td>15.00</td>
<td>17.07</td>
<td>104.0</td>
<td>-0.69</td>
<td>.489</td>
</tr>
<tr>
<td>Probe Behind Objects</td>
<td>16.06</td>
<td>15.93</td>
<td>119.00</td>
<td>-0.04</td>
<td>.966</td>
</tr>
<tr>
<td>All Trials</td>
<td>15.72</td>
<td>16.30</td>
<td>115.5</td>
<td>-0.19</td>
<td>.854</td>
</tr>
<tr>
<td><strong>Reaction Time</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>17.31</td>
<td>14.60</td>
<td>99.00</td>
<td>-0.83</td>
<td>.406</td>
</tr>
<tr>
<td>Sadness</td>
<td>14.63</td>
<td>17.47</td>
<td>98.00</td>
<td>-0.87</td>
<td>.384</td>
</tr>
<tr>
<td>Disgust</td>
<td>13.88</td>
<td>18.27</td>
<td>86.00</td>
<td>-1.35</td>
<td>.179</td>
</tr>
<tr>
<td>Fear</td>
<td>15.06</td>
<td>17.00</td>
<td>105.00</td>
<td>-0.59</td>
<td>.553</td>
</tr>
<tr>
<td>Neutral</td>
<td>15.16</td>
<td>16.90</td>
<td>106.50</td>
<td>-0.53</td>
<td>.594</td>
</tr>
<tr>
<td>Happy</td>
<td>16.59</td>
<td>15.37</td>
<td>110.50</td>
<td>-0.38</td>
<td>.707</td>
</tr>
<tr>
<td>All Trials</td>
<td>15.28</td>
<td>16.77</td>
<td>108.50</td>
<td>-0.46</td>
<td>.649</td>
</tr>
<tr>
<td><strong>Bias Scores</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Emotions</td>
<td>17.06</td>
<td>14.87</td>
<td>103.00</td>
<td>-0.67</td>
<td>.502</td>
</tr>
<tr>
<td>Neutral Emotions</td>
<td>15.16</td>
<td>14.27</td>
<td>94.00</td>
<td>-1.03</td>
<td>.304</td>
</tr>
<tr>
<td>Negative Emotions</td>
<td>18.69</td>
<td>13.13</td>
<td>77.00</td>
<td>-1.70</td>
<td>.089</td>
</tr>
</tbody>
</table>

1 Trials with errors were excluded from analyses
2 Type of facial expression depicted in photo

Computation of the Bias Scores

Reaction times for the various emotional face types were collapsed into three broad categories of facial expression (positive, neutral, and negative expressions). A bias score was then calculated for each of the categories following the equation constructed by MacLeod and Mathews (1988): Bias Score = 0.5 x (FLPU + FUPL – FUPU – FLPL) where FLPU corresponds to the reaction time latency for the faces.
occurring in the lower half of the computer screen with a probe that occurs in the upper half of the screen, and so on. Positive values on the resulting bias score reflect selective attention toward faces (vigilance) and negative values reflect an attentional bias away from the faces (avoidance).

Correlation between FNE and Bias Scores at Pretest

A Pearson product moment correlation coefficient was calculated to examine the relationship between the participants' scores on the FNE and their bias scores as measured at pretest. Bias scores were computed for each of the three facial expression categories (positive, neutral, and negative) and the results of these analyses are displayed in Table 6. No significant correlation was identified between the pretest scores on the FNE and either the positive or neutral emotion bias scores. However, a significant positive correlation was identified between the pretest FNE scores and the bias scores computed for faces displaying negative emotions at pretest ($r = .37, p = .04$). This indicates that a significant positive linear relationship exists whereby higher

<table>
<thead>
<tr>
<th></th>
<th>Positive Bias Scores</th>
<th>Neutral Bias Scores</th>
<th>Negative Bias Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest FNE</td>
<td>.02</td>
<td>-.01</td>
<td>.37*</td>
</tr>
</tbody>
</table>

* $p < .05$
scores on the FNE are associated with increased vigilance demonstrated for faces expressing negative emotions at pretest.

Bias Scores at Pretest

A series of Mann-Whitney U tests were conducted to determine if there were significant differences between the high and low anxiety groups with regard to bias scores as computed from the reaction time latencies as measured at pretest. Bias scores were computed for each of the three facial expression categories (positive, neutral, and negative) and the results of these analyses revealed no significant differences between groups for any of the three expression types. The mean ranks, Mann-Whitney U statistics, and the corresponding z-scores for the bias score computations are summarized in Table 5.

Errors on the Reaction Time Task at Posttest

A series of three Mann-Whitney U tests were conducted to determine if there were significant differences between the high and low anxiety groups regarding the errors that participants committed while completing the reaction time task at posttest. The results of these analyses revealed no significant differences between groups for total errors committed, errors committed when the probe was presented behind faces, or when the probe was presented behind objects. The mean ranks, Mann-Whitney U statistics, and the corresponding z-scores for the errors committed on the dot probe task are summarized in Table 7.
### Table 7

Differences between Groups at Posttest on the Reaction Time Task

<table>
<thead>
<tr>
<th></th>
<th>High Anxiety (N=16)</th>
<th>Low Anxiety (N=15)</th>
<th>Mann-Whitney U</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Errors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probe Behind Faces</td>
<td>15.63</td>
<td>16.40</td>
<td>114.00</td>
<td>-1.14</td>
<td>.781</td>
</tr>
<tr>
<td>Probe Behind Objects</td>
<td>13.67</td>
<td>13.67</td>
<td>85.00</td>
<td>-0.28</td>
<td>.120</td>
</tr>
<tr>
<td>All Trials</td>
<td>17.69</td>
<td>114.20</td>
<td>93.00</td>
<td>-1.56</td>
<td>.253</td>
</tr>
<tr>
<td><strong>Reaction Time(^1,2)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>12.81</td>
<td>19.40</td>
<td>69.00</td>
<td>-2.02</td>
<td>.044*</td>
</tr>
<tr>
<td>Sadness</td>
<td>13.59</td>
<td>13.59</td>
<td>81.50</td>
<td>-1.52</td>
<td>.129</td>
</tr>
<tr>
<td>Disgust</td>
<td>14.13</td>
<td>18.00</td>
<td>90.00</td>
<td>-1.89</td>
<td>.236</td>
</tr>
<tr>
<td>Fear</td>
<td>15.84</td>
<td>16.17</td>
<td>117.50</td>
<td>-0.10</td>
<td>.921</td>
</tr>
<tr>
<td>Neutral</td>
<td>13.81</td>
<td>18.33</td>
<td>85.00</td>
<td>-1.52</td>
<td>.166</td>
</tr>
<tr>
<td>Happy</td>
<td>16.87</td>
<td>16.87</td>
<td>107.00</td>
<td>-0.51</td>
<td>.607</td>
</tr>
<tr>
<td>All Trials</td>
<td>14.06</td>
<td>18.07</td>
<td>89.00</td>
<td>-1.23</td>
<td>.220</td>
</tr>
<tr>
<td><strong>Bias Scores(^1)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Emotions</td>
<td>17.31</td>
<td>14.60</td>
<td>99.00</td>
<td>-0.83</td>
<td>.406</td>
</tr>
<tr>
<td>Neutral Emotions</td>
<td>16.63</td>
<td>15.33</td>
<td>110.00</td>
<td>-0.40</td>
<td>.693</td>
</tr>
<tr>
<td>Negative Emotions</td>
<td>16.31</td>
<td>15.67</td>
<td>115.00</td>
<td>-0.20</td>
<td>.843</td>
</tr>
</tbody>
</table>

\(^1\) Trials with errors were excluded from analyses
\(^2\) Type of facial expression depicted in photo
* \(p < .05\)

**Reaction Time at Posttest**

A series of Mann-Whitney \(U\) tests were conducted to determine if there were significant differences between the high and low anxiety groups with regard to their reaction times as measured at posttest. The reaction time for each of the emotional face types (anger, sadness, disgust, fear, happy, and neutral/no expression) was
computed separately. Additionally, the mean reaction time for all 96 reaction time trials was computed. A significant result was found when comparing the reaction times for the high and low anxiety groups on trials depicting expressions of anger ($z = -2.02, p = .044$). The highly anxious group had an average rank of 12.81, while the low anxiety group had an average rank of 19.40. Tables 8 and 9 contain the corresponding reaction time means and standard deviations for both groups broken down by facial expression.

The remaining analyses for reaction time revealed no significant differences between groups for any of the other emotional face types or for the mean reaction time on all trials. The mean ranks, Mann-Whitney $U$ statistics, and the corresponding $z$-scores for reaction time are summarized in Table 7.

**Bias Scores at Posttest**

A series of Mann-Whitney $U$ tests were conducted to determine if there were significant differences between the high and low anxiety groups with regard to bias scores as computed from the reaction time latencies obtained at posttest. Bias scores were computed for each of the three facial expression categories (positive, neutral, and negative) and the results of these analyses revealed no significant differences between groups for any of the three expression types. The mean ranks, Mann-Whitney $U$ statistics, and the corresponding $z$-scores for the bias score computations are summarized in Table 7.
Change in Errors from Pretest to Posttest

A series of repeated measures \( t \)-tests were conducted to determine if there were significant differences in the number of errors committed at posttest as compared to pretest. These analyses were conducted within each group separately to identify if change occurred over time for either group. The results of these analyses for the highly anxious group revealed no significant differences from pretest to posttest for total errors committed, errors committed when the probe was presented behind faces, or when the probe was presented behind objects. However, the results for the low anxiety group indicated a significant decrease in the number of errors observed at posttest (\( M = 0.33, SD = 0.49 \)) as compared to pretest (\( M = 0.93, SD = 0.80 \)) for the slides in which the probe occurred behind objects, \( t(14) = 3.15, p = .007 \). The reduction in errors when examining the data collected on all trials is also statistically significant, \( t(14) = 2.39, p = .032 \), when comparing the total number of errors committed at pretest (\( M = 1.73, SD = 1.39 \)) to the total committed at posttest (\( M = 0.87, SD = 1.06 \)).

Tables 8 and 9 summarize the corresponding means, standard deviations, \( t \)-scores and significance levels for the high anxiety and low anxiety groups, respectively, for each of the repeated measures \( t \) tests examining change in errors committed on the reaction time task.
Table 8
Change from Pretest to Posttest on the Reaction Time Task

<table>
<thead>
<tr>
<th>High Anxiety Group</th>
<th>Pretest M (SD)</th>
<th>Posttest M (SD)</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Errors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probe Behind Faces</td>
<td>0.38 (1.02)</td>
<td>0.38 (0.50)</td>
<td>1.16</td>
<td>15</td>
<td>.264</td>
</tr>
<tr>
<td>Probe Behind Objects</td>
<td>0.94 (0.68)</td>
<td>0.81 (0.91)</td>
<td>0.52</td>
<td>15</td>
<td>.609</td>
</tr>
<tr>
<td>All Trials</td>
<td>1.69 (1.35)</td>
<td>1.19 (1.35)</td>
<td>1.46</td>
<td>15</td>
<td>.162</td>
</tr>
<tr>
<td><strong>Reaction Time</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>668.00 (77.95)</td>
<td>659.94 (73.64)</td>
<td>0.44</td>
<td>15</td>
<td>.670</td>
</tr>
<tr>
<td>Sadness</td>
<td>674.06 (92.42)</td>
<td>669.75 (61.48)</td>
<td>0.28</td>
<td>15</td>
<td>.782</td>
</tr>
<tr>
<td>Disgust</td>
<td>629.06 (73.98)</td>
<td>644.88 (76.36)</td>
<td>-0.65</td>
<td>15</td>
<td>.525</td>
</tr>
<tr>
<td>Fear</td>
<td>653.19 (72.03)</td>
<td>671.50 (89.01)</td>
<td>-0.74</td>
<td>15</td>
<td>.469</td>
</tr>
<tr>
<td>Neutral</td>
<td>655.81 (66.69)</td>
<td>657.94 (57.45)</td>
<td>-1.63</td>
<td>15</td>
<td>.873</td>
</tr>
<tr>
<td>Happy</td>
<td>659.88 (60.46)</td>
<td>684.88 (58.91)</td>
<td>-2.37</td>
<td>15</td>
<td>.031*</td>
</tr>
<tr>
<td>All Trials</td>
<td>654.00 (65.09)</td>
<td>663.69 (56.92)</td>
<td>-0.87</td>
<td>15</td>
<td>.400</td>
</tr>
<tr>
<td><strong>Bias Scores</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Emotions</td>
<td>34.42 (56.95)</td>
<td>33.03 (48.47)</td>
<td>0.10</td>
<td>15</td>
<td>.926</td>
</tr>
<tr>
<td>Neutral Emotions</td>
<td>22.81 (60.53)</td>
<td>22.81 (60.53)</td>
<td>0.36</td>
<td>15</td>
<td>.727</td>
</tr>
<tr>
<td>Negative Emotions</td>
<td>34.78 (53.99)</td>
<td>37.38 (77.30)</td>
<td>-0.96</td>
<td>15</td>
<td>.924</td>
</tr>
</tbody>
</table>

1 Trials with errors were excluded from analyses
2 Type of facial expression depicted in photo
* p < .05

Change in Reaction Time from Pretest to Posttest

A series of repeated measures t-tests were conducted to determine if there were significant differences in reaction time at posttest as compared to pretest. These analyses were conducted within each group separately to identify if change occurred over time for either group. The pretest/posttest reaction times for each of the emotional face types (anger, sadness, disgust, fear, happy, and neutral/no expression)
were compared separately. Additionally, the mean pretest/posttest reaction times for all of 96 reaction time trials were compared.

Table 9
Change from Pretest to Posttest on the Reaction Time Task

<table>
<thead>
<tr>
<th>Low Anxiety Group</th>
<th>Pretest M (SD)</th>
<th>Posttest M (SD)</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probe Behind Faces</td>
<td>0.80 (0.86)</td>
<td>0.53 (0.83)</td>
<td>1.00</td>
<td>14</td>
<td>.334</td>
</tr>
<tr>
<td>Probe Behind Objects</td>
<td>0.93 (0.80)</td>
<td>0.33 (0.49)</td>
<td>3.15</td>
<td>14</td>
<td>.007**</td>
</tr>
<tr>
<td>All Trials</td>
<td>1.73 (1.39)</td>
<td>0.87 (1.06)</td>
<td>2.39</td>
<td>14</td>
<td>.032*</td>
</tr>
<tr>
<td>Reaction Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>661.00 (112.46)</td>
<td>712.73 (80.42)</td>
<td>-2.86</td>
<td>14</td>
<td>.013*</td>
</tr>
<tr>
<td>Sadness</td>
<td>697.07 (77.17)</td>
<td>709.80 (88.86)</td>
<td>-0.90</td>
<td>14</td>
<td>.383</td>
</tr>
<tr>
<td>Disgust</td>
<td>677.60 (95.18)</td>
<td>681.13 (89.12)</td>
<td>-0.19</td>
<td>14</td>
<td>.849</td>
</tr>
<tr>
<td>Fear</td>
<td>683.87 (91.70)</td>
<td>675.20 (88.07)</td>
<td>0.57</td>
<td>14</td>
<td>.587</td>
</tr>
<tr>
<td>Neutral</td>
<td>678.40 (97.13)</td>
<td>691.07 (67.43)</td>
<td>-0.93</td>
<td>14</td>
<td>.370</td>
</tr>
<tr>
<td>Happy</td>
<td>672.40 (92.85)</td>
<td>694.80 (66.86)</td>
<td>-1.67</td>
<td>14</td>
<td>.118</td>
</tr>
<tr>
<td>All Trials</td>
<td>677.20 (94.23)</td>
<td>693.20 (67.02)</td>
<td>-1.16</td>
<td>14</td>
<td>.266</td>
</tr>
<tr>
<td>Bias Scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Emotions</td>
<td>19.25 (45.05)</td>
<td>21.03 (41.68)</td>
<td>-0.14</td>
<td>14</td>
<td>.891</td>
</tr>
<tr>
<td>Neutral Emotions</td>
<td>12.01 (60.02)</td>
<td>14.19 (44.96)</td>
<td>-0.19</td>
<td>14</td>
<td>.856</td>
</tr>
<tr>
<td>Negative Emotions</td>
<td>2.38 (42.56)</td>
<td>21.66 (55.38)</td>
<td>-1.82</td>
<td>14</td>
<td>.090</td>
</tr>
</tbody>
</table>

1 Trials with errors were excluded from analyses
2 Type of facial expression depicted in photo
* p < .05
** p < .01

The results for the high anxiety group indicated a significant increase in reaction time at posttest (M = 684.88, SD = 58.91) as compared to pretest (M = 659.88, SD = 60.46) for faces depicting happy expressions, t(15) = -2.37, p = .031.

The remaining analyses for the highly anxious group revealed no significant
differences between pretest and posttest for any of the other emotional face types or for the reaction time on all trials.

The results for the low anxiety group indicated a significant increase in reaction time at posttest ($M = 712.73, SD = 80.42$) as compared to pretest ($M = 661.00, SD = 112.46$) for faces depicting angry expressions, $t(14) = -2.86, p = .013$. The remaining analyses for the low anxiety group revealed no significant differences between pretest and posttest for any of the other emotional face types or for the reaction time on all trials.

Tables 8 and 9 summarize the corresponding means, standard deviations, $t$-scores and significance levels for the high anxiety and low anxiety groups, respectively, for each of the repeated measures $t$-tests examining the change in reaction time.

Change in Bias Scores from Pretest to Posttest

A series of repeated measures $t$ tests were conducted to determine if there were significant differences in computed bias scores at posttest as compared to pretest. The bias scores for each of the three facial expression categories (positive, neutral, and negative) were compared and the results of these analyses revealed no significant differences between pretest and posttest for either the high or the low anxiety groups.

Tables 8 and 9 summarize the corresponding means, standard deviations, $t$-scores and significance levels for the high anxiety and low anxiety groups,
respectively, for each of the repeated measures t tests examining the computed bias scores.

Between Group Comparisons on Change Scores

Change scores were generated for each of the reaction time categories by subtracting the posttest reaction time means from those at pretest. This allowed for a direct comparison between the high and low anxiety groups regarding change from pretest to posttest on each of the measures.

A series of Mann-Whitney $U$ tests were conducted to determine if there were significant differences between the high and low anxiety groups with regard to their reaction time change scores. The change in reaction time for each of the emotional face types (anger, sadness, disgust, fear, happy, and neutral/no expression) was computed separately. Additionally, the change in mean reaction time for all 96 reaction time trials was computed. A significant result was found when comparing the reaction times for the high and low anxiety groups on trials depicting expressions of anger ($z = -2.10, p = .036$). The highly anxious group had an average rank of 19.31, while the low anxiety group had an average rank of 12.47.

The remaining analyses for change in reaction time revealed no significant differences between groups for any of the other emotional face types or for the mean reaction time on all trials. The mean ranks, Mann-Whitney $U$ statistics, and the corresponding $z$-scores for reaction time are summarized in Table 9.
Change scores were also generated for each of the computed bias scores by subtracting the various posttest bias scores from those at pretest. This allowed for a direct comparison between the high and low anxiety groups regarding change from pretest to posttest on each of the measures.

A series of Mann-Whitney U tests were conducted to determine if there were significant differences between the high and low anxiety groups with regard to their bias change scores. Separate analyses were conducted for each of the three facial expression categories (positive, neutral, and negative) and the results of these analyses revealed no significant differences between groups for any of the three expression types. The mean ranks, Mann-Whitney U statistics, and the corresponding z-scores for the bias score computations are summarized in Table 10.
Table 10

Differences between Groups on Change Scores from Pretest to Posttest on the Reaction Time Task

<table>
<thead>
<tr>
<th>Mean Ranks</th>
<th>High Anxiety (N=16)</th>
<th>Low Anxiety (N=15)</th>
<th>Mann-Whitney</th>
<th>( U )</th>
<th>( z )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reaction Time(^2)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>19.31</td>
<td>12.47</td>
<td>67.00</td>
<td>-2.10</td>
<td>.036*</td>
<td></td>
</tr>
<tr>
<td>Sadness</td>
<td>17.19</td>
<td>14.73</td>
<td>101.00</td>
<td>-0.75</td>
<td>.453</td>
<td></td>
</tr>
<tr>
<td>Disgust</td>
<td>14.25</td>
<td>17.87</td>
<td>92.00</td>
<td>-1.11</td>
<td>.268</td>
<td></td>
</tr>
<tr>
<td>Fear</td>
<td>14.88</td>
<td>17.20</td>
<td>102.00</td>
<td>-0.71</td>
<td>.447</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>17.53</td>
<td>14.37</td>
<td>95.50</td>
<td>-0.97</td>
<td>.333</td>
<td></td>
</tr>
<tr>
<td>Happy</td>
<td>16.19</td>
<td>15.80</td>
<td>117.00</td>
<td>-0.12</td>
<td>.906</td>
<td></td>
</tr>
<tr>
<td>All Trials</td>
<td>16.97</td>
<td>14.97</td>
<td>104.50</td>
<td>-0.61</td>
<td>.540</td>
<td></td>
</tr>
<tr>
<td><strong>Bias Scores(^1)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Emotions</td>
<td>15.44</td>
<td>16.60</td>
<td>111.00</td>
<td>-0.36</td>
<td>.722</td>
<td></td>
</tr>
<tr>
<td>Neutral Emotions</td>
<td>16.81</td>
<td>15.13</td>
<td>107.00</td>
<td>-0.52</td>
<td>.607</td>
<td></td>
</tr>
<tr>
<td>Negative Emotions</td>
<td>17.25</td>
<td>14.67</td>
<td>100.00</td>
<td>-0.43</td>
<td>.429</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Change scores calculated by subtracting posttest from pretest  
\(^2\) Type of facial expression depicted in photo  
\( * p < .05 \)
CHAPTER IV

DISCUSSION

Outcomes of This Research

The purpose of this study was to examine the effectiveness of a semester-long public speaking course in reducing the self-reported levels of communication anxiety and social anxiety among college students enrolled in such a course. The current study also sought to replicate and extend a recent line of research that has demonstrated that highly socially anxious individuals show an attentional bias away from emotional faces under conditions of social-evaluative threat.

Social and Communication Anxiety

The Fear of Negative Evaluations Scale (FNE) was selected as the primary measure for assessing self-reported social anxiety for the current study. Individuals scoring in the top quartile and bottom quartile of all participants who completed the measure during Phase I were selected to comprise the high and low anxiety groups for the study. An independent samples t-test demonstrated that students scoring in the highest and lowest quartiles on the FNE did significantly differ from one another. This result confirmed that participants that fell in the highest quartile of the class on the FNE at pretest self-reported significantly higher levels of social anxiety than did...
individuals from the lowest quartile. Figure 1 displays the distribution of scores on the FNE at pretest for both groups.

![Boxplot Distributions for FNE Total Scores at Pretest](image)

**Figure 1.** Boxplot Distributions for FNE Total Scores at Pretest

Given that groups were determined to be significantly different at pretest, one-way repeated measures ANOVAs were conducted to determine if either group reported a significant change in self-reported anxiety from pretest to posttest. A significant reduction in self-reported anxiety was found from pretest to posttest for the high anxiety group. Additionally, no significant change in self-reported anxiety was found for the low anxiety group from pretest to posttest. These findings are consistent with the hypothesis that the highly anxious individuals participating in the public speaking course would demonstrate a significant reduction in self-reported anxiety by semester's end. The present findings are also consistent with the limited number of
prior studies that have examined the efficacy of utilizing college level public speaking courses in the reduction of social anxiety (Allen, Hunter, & Donohue, 1989, Rubin, Rubin & Jordan, 1997). These results add tentatively to the growing evidence that such courses may be a valid approach to reducing communication apprehension and social anxiety, particularly on a college campus setting.

It is important to note, however, that certain factors inherent in the design of the present study do limit the interpretations that can be based on these current findings. The present study was conducted using a limited sample from one large university. Given that individuals were not randomly assigned to participate in the course, it is unknown whether such findings can be generalized beyond individuals who elect to enroll in such a course. Additionally, the design of the current study did not include a matched control group for the high anxiety participants. Therefore, it cannot be assumed that a causal relationship exists between the observed reduction in anxiety from pretest to posttest and participation in the public speaking course.

Reaction Time and Attentional Bias

The second purpose of the current study was to replicate and extend a recent line of research that had demonstrated that highly socially anxious individuals show an attentional bias away from emotional faces under conditions of social-evaluative threat. A series of Mann-Whitney U tests were conducted to determine if there were significant differences between the high and low anxiety groups with regard to their performance on the reaction time task as measured at pretest. A series of analyses
were conducted to examine the differences between groups at pretest regarding the number of errors committed while completing the reaction time task, the reaction time for each of the emotional face types (anger, sadness, disgust, fear, happy, and neutral/no expression), and the computed bias scores for each of the three facial expression categories (positive, neutral, and negative). The results of these analyses revealed no significant differences between groups for any of these factors related to the reaction time task.

A visual inspection of Figure 2, which depicts the mean bias scores for both groups at pretest, yields an interesting pattern of responding when comparisons are made between groups. The high anxiety group demonstrated a higher level of vigilance to faces than did the low anxiety group across all three types of facial expressions. A Pearson product moment correlation coefficient was calculated to examine the relationship between all of the Phase II participants' scores on the FNE and their bias scores as measured at pretest. A significant positive correlation was

Figure 2. Comparison between Groups on Computed Bias Scores at Pretest
identified between the scores obtained on the FNE and bias scores computed for faces displaying negative emotions ($r = .37, p = .04$). This indicates that even though the difference in bias scores for negative faces between groups is not statistically significant, a significant positive linear relationship does exist whereby higher scores on the FNE are associated with increased vigilance for faces expressing negative emotions at pretest.

The present findings are inconsistent with those obtained by Mansell and his colleagues (1999). Most importantly, the pattern of responding observed in the current study with regard to the computed bias scores for both groups points toward all participants demonstrating varying levels of vigilance for emotional faces. Figure 3 displays the bias scores obtained by the present study at pretest and those obtained by Mansell and his colleagues (1999). Where the prior study demonstrated a consistent bias toward the avoidance of faces for both groups, the current study revealed a pattern of vigilance for emotional faces for both groups.

![Figure 3. Computed Attentional Bias Scores for both the Current Study and Mansell et al. (1999).](image)
It is difficult to determine what might account for such vastly different findings. The methodology of the current study and the reaction time program itself were based upon this previous work. Both studies utilized the FNE to distinguish between high and low anxiety participants (see Table 11) and the magnitude of the mean reaction times and the bias scores obtained in both studies are similar, indicating that the procedure utilized by the current study to induce anxiety prior to the reaction time task was effective.

The observed pattern of vigilance for emotional faces obtained in the current study is more consistent with the results obtained in studies examining social anxiety and attentional bias utilizing modified Stroop tasks or a word-based dot probe tasks (Williams et al., 1996; Bradley et al., 1999) than it is with either of the two studies that demonstrated that highly socially anxious individuals tend to direct attention away from pictures of emotional faces (Mansell et al., 1999; Yuen, 1994).

Table 11

Means and Standard Deviations Obtained on the FNE for both Studies

<table>
<thead>
<tr>
<th>Group</th>
<th>Current Study (Pretest)</th>
<th>Mansell et al. (1999)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>High Anxiety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FNE (Pretest)</td>
<td>21.25</td>
<td>4.82</td>
</tr>
<tr>
<td>Low Anxiety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FNE (Pretest)</td>
<td>5.20</td>
<td>2.48</td>
</tr>
</tbody>
</table>
Reaction Time and Bias Scores as a Measure of Change

The final purpose of the current study was to determine if highly socially anxious individuals would demonstrate a significant change in attentional bias to emotional faces after participating in a college level public speaking course. A series of repeated measures t tests were conducted to determine if there were significant differences in computed bias scores at posttest as compared to pretest. These analyses were conducted separately within each group to identify if change occurred over time for either group. The bias scores for each of the three facial expression categories (positive, neutral, and negative) were compared, and the results of these analyses revealed no significant differences between pretest and posttest for the highly anxious group. Figure 4 displays the mean bias scores for both groups at pre- and posttest. Visual inspection of this data reveals that the highly socially anxious group’s pattern of attentional bias did not change noticeably from pretest to posttest.

![Figure 4. Computed Attentional Bias Scores for Faces at Pretest and Posttest](image-url)
Changes in Reaction Time Observed in the Low Anxiety Group

The results obtained from the low anxiety group from pre- to posttest yielded a number of unexpected findings. The low anxiety group was actually found to become significantly more vigilant by semester's end on a number of the measures obtained during the reaction time task. A series of analyses were conducted to examine the differences between pretest and posttest performance on the reaction time task regarding the number of errors committed while completing the reaction time task; the reaction time for each of the emotional face types (anger, sadness, disgust, fear, happy, and neutral/no expression); and the computed bias scores for each of the three facial expression categories (positive, neutral, and negative). The results for the low anxiety group revealed an increase of more than 50 milliseconds in mean reaction time for faces depicting angry expressions at posttest ($M = 712.73$, $SD = 80.42$) as compared to pretest ($M = 661.00$, $SD = 112.46$) which was statistically significant. This group also demonstrated a statistically significant decrease in the number of errors observed at posttest ($M = .33$, $SD = .49$) as compared to pretest ($M = .93$, $SD = .80$) for the slides in which the probe occurred behind objects [$t(14) = 3.15$, $p = .007$]. The reduction in errors was also significant when examining the total number of errors observed at posttest ($M = 1.73$, $SD = 1.39$) as compared to pretest ($M = .87$, $SD = 1.06$) obtained on all reaction time trials [$t(14) = 2.39$, $p = .032$].

An examination of Figure 4 also yields an interesting pattern of responding for the low anxiety group when comparing the mean bias scores at pretest to those obtained at posttest. Though none of these changes from pretest to posttest are
statistically significant, the graph reveals that the pattern of responding at posttest for the low anxiety group has noticeably shifted, and now looks much more similar in pattern to the response pattern of the highly anxious group.

Given that these results are so unexpected, it is difficult to hypothesize what they might mean or what might account for these statistically significant changes in the low anxiety group. One hypothesis for an increase in vigilance, however, may stem from the method by which group membership was determined. Given that the low anxiety group was comprised of individuals who self-reported negligible levels of social anxiety at pretest on the FNE, it is possible that these individuals may have underestimated their comfort with regard to public speaking prior to having given any speeches in class. After participating in a semester-long public speaking course, these individuals may have come to find that they are not as comfortable and proficient at public speaking as they originally had believed. If this is the case, it might be possible that these individuals experienced increased levels of state anxiety during the posttest phase of the study and demonstrated increased vigilance on the reaction time task, and a decrease in the number of errors committed, as a result.

**Attentional Bias: Vigilance vs. Avoidance**

The primary question of whether or not socially anxious individuals tend to demonstrate a vigilant or avoidant attentional bias when processing emotional stimuli remains unclear. However, a new conceptual framework regarding the processing of and the allocation of attention for emotional or threatening stimuli has recently been
advanced in the literature. This theory challenges many of the previous conclusions that have been drawn regarding attentional bias by questioning whether it may be more important to determine whether the presence of threat-related stimuli may initially affect attentional dwell time (i.e. the ability to disengage attentional resources from threatening stimuli in anxious individuals) (Fox, Russo, Bowles, & Dutton, in press; as cited in Fox, Russo, & Dutton, 2002). Thus, emotional or threat-related stimuli might initially cause highly anxious individuals to dwell on such stimuli, if only briefly, after which they might turn their attention away in order to avoid further increases in anxiety (Hurtel, 2002; Fox et al., 2002). Fox and her colleagues propose that participants engaged in a standard probe detection task might have the opportunity to attend alternatively between both stimulus locations and may ultimately dwell on threat related-stimuli once such stimuli have been detected. Such an attentional pattern is proposed to be likely to occur when the location of both stimuli are task relevant and the presentation times are relatively long (500ms.). If this were the case, it would be nearly impossible to distinguish differences in attention allocation patterns from differences in attentional dwell time, particularly between groups, using a reaction time/modified dot probe task such as the one used in the current study. Fox and her colleagues propose a modified reaction time task that would be more conducive to researching this hypothesis. This task would instead present only one word or picture (either an emotional or a neutral stimulus) for an extremely brief period of time (250ms.) in one of two possible locations. A probe can
then either appear "validly" behind the same location as the stimulus or in the "invalid" location where the probe does not appear in the stimulus location. A reaction time task set up in this manner could specifically investigate participants' ability to disengage their attention from various emotional classes of stimuli (such as angry, neutral, or happy faces). This is a subtle but important distinction because if this conceptualization is accurate, it might reveal that highly anxious individuals demonstrate increased attentional dwell time initially, followed by attentional avoidance of threat stimuli in an effort to limit exposure to threatening stimuli.

Interestingly, Mansell and his colleagues (1999) hypothesized that the duration of the stimulus presentation might have been a determining factor for having detected a pattern of avoidance in their study. They reported that it is possible that an attentional bias towards threatening pictorial stimuli would be observed with extremely short stimulus durations, whereas patterns of avoidance are detected with longer stimulus presentation times (Williams, Watts, MacLeod, & Mathews, 1997, as cited in Mansell et al., 1999). Thus, Mansell and his colleagues acknowledge that highly socially anxious individuals might not have shown an attentional bias away from negative faces had the pictorial stimuli been displayed for a shorter period of time.

It is important to note, however, that research investigating this proposed conceptual framework for the allocation of attention has only begun to be published as of this year. In fact, only one article has been published to date utilizing the
suggested modified dot probe technique (Fox et al., 2002), though three additional studies are cited as 'in press' within that study. This line of research looks promising, and it may ultimately help to resolve the seemingly discrepant findings between studies investigating social anxiety which demonstrate vigilance for emotional or threat-related stimuli and those that demonstrate avoidance.

Limitations of This Research

The current study has several limitations that are important to address. First, the decision to utilize students from a specific subset of the whole student population, without a matched no treatment/control group, results in a quasi-experimental pre-post research design. Though it is desirable from an experimental design perspective to control for potential problems in sampling, some experimental control was sacrificed in order to conduct the study in the context of a more naturalistic university level public speaking course. Nevertheless, such a quasi-experimental design is inferior to a true experiment in which assignment to the treatment condition (in this case a semester long public speaking course) or a no treatment/control group would have been determined by random assignment. As a result, the statistical analyses with regard to the observed changes from pretest to posttest must be interpreted more cautiously. The lack of a control group prevents one from concluding that a causal relationship exists between participation in the course and the changes observed from pretest to posttest.
Second, the decision to utilize courses that were taught by only one instructor limited the total number of participants available to the study. This decision was made in an effort to eliminate the potential threats to validity caused by utilizing multiple instructors, and the resulting variations in teaching methods and course syllabi, given that the random assignment of participants to instructors was not possible. This resulted in a target of 15 participants per group. Though this sample size is comparable to those employed by previous studies (Mansell et al., 1999), smaller sample sizes reduce statistical power, which in turn limits the ability of any resulting analyses to detect significant differences between groups. This appeared to be particularly problematic for the reaction time and bias score data because of the inherent variability that naturally exists between individuals on such measures. Thus the observable trends in this data may be consistent and reliable differences between individuals who are highly socially anxious and their low anxiety counterparts, but the small sample size and observed variability in reaction time scores prevented this difference from achieving statistical significance.

Finally, another possible limitation of the study is that the methods used in the laboratory to induce social anxiety, though typically shown to be effective, may not elicit the same intense emotional arousal that actual public speaking situations might elicit in the “real world.” Such artificially contrived public speaking situations may not elicit responses that resemble the intense anxiety that individuals might experience when confronting personally relevant public speaking situations in vivo. Therefore, conducting such a reaction time assessment just prior to an individual
having to present an in-class speech may elicit greater anxiety in highly socially anxious individuals. This may allow the data collected on the reaction time task to detect differences between groups on the various emotional face types with greater specificity.

Directions for Future Research

The current study provides a number of possible directions that future research examining social anxiety, reaction time, and attentional bias might explore. With regard to the data collected as part of this study, a future study might utilize the videotaped speeches that were made at pretest and again at posttest. These videotaped speeches, in and of themselves, were not central to hypotheses being explored within the current study. However, few studies in the area of communication anxiety or communication apprehension have examined more objective means of assessing participants' performance beyond course grades and the more recent studies examining reaction time and attentional bias. To utilize such videotapes, a suitable coding method must be identified or created specifically for the purpose of rating observable signs of anxiety and overall speech performance. Once an appropriate and reliable rating system has been achieved, differences between the highly socially anxious individuals and their low anxiety counterparts can be explored as well as any changes from pretest to posttest on these more objective ratings of observable anxiety.

Future studies examining the relationship between social anxiety and attentional bias might consider collecting such data under “real life” conditions of
social evaluative threat. Given the recent advances in computer technology, it is becoming increasingly feasible and affordable to utilize more portable computer equipment to collect such reaction time data. This could allow for data collection to occur in many settings that would have been prohibitive, if not impossible, only 5-10 years ago. For example, a similar study could be structured such that participants would complete the reaction time computer program just prior to presenting an in-class speech. As previously mentioned, such a “real world” examination of actual public speaking situations would allow for more a clinically relevant design and might result in the ability to examine the differences between groups on the various emotional face types with greater specificity.

Finally, the current study highlights the need for future research to continue to explore whether socially anxious individuals demonstrate vigilance or avoidance of highly emotional content when under conditions of arousal or social-evaluative threat. More definitive research and continued exploration of such tendencies may be instrumental in developing more effective methods of education and treatment aimed at reducing social and communication anxiety.
Appendix A

Demographic Questionnaire
Demographic Data

Gender: _____ Male _____ Female

Age: _____ (in years)

Marital Status: _____ Single _____ Married _____ Divorced _____ Living with girlfriend/boyfriend _____ Separated

Race: _____ Caucasian _____ African-American _____ Asian-American _____ Hispanic (please specify) ______ Mixed race (please specify) ______ Alaskan Native _____ Pacific Islander _____ American Indian _____ International/Non-US Resident

Education: _____ Freshman _____ Sophomore _____ Junior _____ Some graduate school _____ Senior _____ Graduate degree

Religion: _____ Catholic _____ Episcopal _____ Lutheran _____ Methodist (please specify) _____ Christian Reformed _____ Jewish _____ Baptist _____ Presbyterian

Were you raised in a rural or urban area?
_____ Rural _____ Urban
Appendix B

Brief Medication/Treatment Questionnaire
Please mark the appropriate box or boxes for the following questions:

1. Are you currently seeing a counselor, therapist, psychologist, medical doctor, or psychiatrist for personal concerns related to anxiety?
   - No (Please skip to question 2)
   - Yes

   If yes, what type(s) of therapy are you currently participating in (mark as many as apply)?
   - Individual therapy
   - Group therapy
   - Medication based treatment
   - Other (specify) ________________________________

   Approximately when did you begin therapy? ____________

2. Are you currently taking any prescription medication to help you deal with concerns related to anxiety?
   - No
   - Yes

   If yes, please list the following information regarding medication:

   a.) Name of the medication(s) that you are currently taking to reduce anxiety:

   _____________________________________________

   _____________________________________________

   _____________________________________________

   b.) Approximately when did you begin taking medication for anxiety related concerns?

   ____________

   Month/Year
Please mark the appropriate box or boxes for the following questions:

1. Are you currently seeing a counselor, therapist, psychologist, medical doctor, or psychiatrist for personal concerns related to anxiety?
   - [ ] No (Please skip to question 2)
   - [ ] Yes
     - If yes, what type(s) of therapy are you currently participating in (mark as many as apply)?
       - [ ] Individual therapy
       - [ ] Group therapy
       - [ ] Medication based treatment
       - [ ] Other (specify) ____________________________
     - Approximately when did you begin therapy? ________________
       - Month/Year

2. Are you currently taking any prescription medication to help you deal with concerns related to anxiety?
   - [ ] No
   - [ ] Yes
     - If yes, please list the following information regarding medication:
       a.) Name of the medication(s) that you are currently taking to reduce anxiety:
          __________________________________________
          __________________________________________
          __________________________________________

       b.) Approximately when did you begin taking medication for anxiety related concerns?
          __________________
            - Month/Year
Appendix C

Sample Series of Modified Dot Probe Slides
Appendix D

Phase I Oral Recruitment Script
"Hello, my name is ____________ and I am here to ask for your help in completing a study that I am conducting regarding the relationship between participating in a public speaking course and social anxiety. In order to better understand this relationship, I need the help of students like yourselves who are willing to participate in my study and volunteer a little of their time. Participation in this study today is pretty straightforward. I am here to ask you to give me permission for Dr. Loren Crane to share with me your results on six questionnaires that you filled out this week in class and again when you fill them out at the end of the semester. Just to let you know, Dr. Crane will not share any other information about you with me and your decision to participate in the study or not, will not affect your grade in this course or your relationship with Dr. Crane.

If you are willing to help me out today, please read through the consent form and sign it. After signing the consent, I ask that you answer the brief demographic sheet about yourself. The whole process is expected to take about 5-10 minutes to complete. For most of you, that will be all that is asked of you. However, some of you may be contacted within the next two weeks and asked whether you would be willing to participate in a second phase of this study. That’s why the consent form asks for your phone number. Signing the consent form today does not obligate you to continue to participate in this study should I ask you to do so. I want you all to know that all of the information that I collect here today will be kept strictly confidential. To insure this, I ask that you place your name and telephone number on the consent page only. The consent forms and study data will be stored separately in a locked file cabinet. Only the student investigator or Dr. Lester Wright will be able to match your name with your responses and only so that we can contact some of you again.

Remember, participation in this study is completely voluntary and you can stop at any time without penalty.

"Thank you for your time."
Appendix E

Informed Consent Documents
I have been invited to participate in a research project entitled, "Social and Communication Anxiety." My consent to participate in this project indicates that I give my permission for Dr. Loren Crane to make my results on questionnaires that measure social anxiety available to Scott Maeritsch for the purpose of a research study. These measures are the ones that you have already completed in class as part of this course (COM 104) and will again at the end of the semester. No other information about me will be made available to Mr. Maeritsch. My consent to participate in this project also indicates that I will be asked to answer a basic demographic questionnaire about myself. It is estimated that it will take approximately 2-3 minutes to fill out the demographic questionnaire. I may not benefit from participating in this research. However, this study is designed to answer questions about the relationship between participation in a public speaking course and anxiety. Additionally, this research study will also serve as Scott Maeritsch's dissertation project.

As in all research, there may be some unforeseen risks to the participant. If an accidental injury occurs, appropriate measures will be taken, however, no compensation or treatment will be made available to me except as otherwise specified in this consent form. One potential risk of my participation is that I may experience some level of anxiety while completing the questionnaire. However, I may refuse to participate or withdraw from the study at any time and for any reason without prejudice or penalty. Additionally, if I decline participation in the study, my grade in this course or relationship with Dr. Crane will not be affected in any way.

All information and data collected from me will be kept strictly confidential. Confidentiality will be maintained through the use of code numbers and no questionnaire that I fill out or data pertaining to me will ever have my name or other identifying information on it. Both my name and code number will only appear on this consent page, which will be separated from all data and kept in a locked file cabinet in Dr. Wright's lab. Furthermore, once data collection has been completed, the master list linking my name to a subject number will be destroyed. After this occurs, it will be impossible to connect my name to my data. All data will be retained for a minimum of three years in a locked file cabinet in Dr. Wright's lab.

Based on my responses to these questionnaires, I may be contacted in the future to participate in an additional phase of the study. However, completing the questionnaires today does not obligate me in any way to participate in future phases of the study.

If I have any questions or concerns about the study, I may contact Dr. Wright at 387-4472. I also may contact the Chair of the Human Subjects Institutional Review Board at 387-8293 or the Vice President for Research at 387-8298 if questions or problems arise during the course of the study.

This consent document has been approved for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Participants should not sign this document if the corner does not have a stamped date and signature.

My signature below indicates that I have read or had explained to me the purpose and requirements of the study and that I agree to participate.

Name (please print)________ Phone Number________
Signature________ Date________

Consent obtained by:________________________ Date________________________
I have been invited to participate in a research project entitled, "Social and Communication Anxiety." This study is designed to explore the relationship between participation in a public speaking course and anxiety. I further understand that this research will also serve as Scott Maieritsch's dissertation project.

My consent to participate in this portion of the study indicates that I will be asked to fill out a brief questionnaire regarding any prior treatment that I have received to help deal with anxiety. Next I will be asked to perform a computer-based reaction time task. During this task, two pictures will be flashed up on a computer screen followed by either the letter "E" or the letter "F." I will be asked to find the letter as quickly as possible and press the corresponding key on the computer. Completion of this computer-based task is expected to take approximately 10 minutes. After I complete this computer-based task, I will be asked to read aloud a brief 2-3 minute speech and I will be videotaped while giving this brief presentation. A panel of graduate students will be viewing these tapes to rate my facial expressions and body language for any observable indication of anxiety.

As in all research, there may be some unforeseen risks to the participant. If an accidental injury occurs, appropriate measures will be taken; however, no compensation or treatment will be made available to me except as otherwise specified in this consent form. A potential risk of my participation is that I may experience some level of anxiety while completing the computer-based task or brief presentation. However, I may refuse to participate or withdraw from the study at any time and for any reason without prejudice or penalty. Additionally, if I experience undue discomfort during the study, both Dr. Wright and Mr. Maieritsch are prepared to provide crisis counseling and are prepared to make an appropriate referral for counseling if necessary. I will be responsible for the cost of therapy if I choose to pursue it.

This study is designed to answer questions regarding the relationship between participation in a public speaking course and anxiety. Additionally, I will be given $3 dollars to compensate me for my time. Finally, I will be contacted again at the end of the semester and given the opportunity to complete this computer task again.

Completing the task today does not obligate me to participate again at the end of the semester.

All information collected from me will be kept strictly confidential. Confidentiality will be maintained through the use of code numbers. My signature will only appear on this consent page, which will be kept separate from all data collected here today and will be kept in a locked file cabinet in Dr. Wright's lab. Furthermore, once data collection has been completed, the master list linking my name to a subject number will be destroyed and all videotapes will be erased. After this occurs, it will be impossible to connect my name to my data. All data will be retained for a minimum of three years in a locked file cabinet in Dr. Wright's lab.

If I have any questions or concerns about the study I may contact Dr. Wright at 387-4472. I also may contact the Chair of the Human Subjects Institutional Review Board at 387-4295 or the Vice President for Research at 387-4298 if questions or problems arise during the course of the study.

This consent document has been approved for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Participants should not sign this document if the corner does not have a stamped date and signature.

My signature below indicates that I have read or had explained to me the purpose and requirements of the study and that I agree to participate.

______________________________  __________________________
Signature                                      Date

Consent obtained by: ________________________________  ________________
Inside of Researcher                                      Date
I have been invited to participate in a research project entitled, “Social and Communication Anxiety.” This study is designed to explore the relationship between participation in a public speaking course and anxiety. I further understand that this research will also serve as Scott Maier's dissertation project.

My consent to participate in this portion of the study indicates that I will be asked to fill out a brief questionnaire regarding any prior treatment that I have received to help deal with anxiety. Next I will be asked to perform a computer-based reaction time task. During this task, two pictures will be flashed up on a computer screen followed by either the letter “E” or the letter “F.” I will be asked to find the letter as quickly as possible and press the corresponding key on the computer. Completion of this computer-based task is expected to take approximately 10 minutes. After I complete this computer-based task, I will be asked to read aloud a brief 2-3 minute speech and I will be videotaped while giving this brief presentation. A panel of graduate students will be viewing these tapes to rate my facial expressions and body language for any observable indication of anxiety.

As in all research, there may be some unforeseen risks to the participant. If an accidental injury occurs, appropriate measures will be taken; however, no compensation or treatment will be made available to me except as otherwise specified in this consent form. A potential risk of my participation is that I may experience some level of anxiety while completing the computer-based task or brief presentation. However, I may refuse to participate or withdraw from the study at any time and for any reason without prejudice or penalty. Additionally, if I experience undue discomfort during the study, both Dr. Wright and Mr. Maier are prepared to provide crisis counseling and are prepared to make an appropriate referral for counseling if necessary. I will be responsible for the cost of therapy if I choose to pursue it.

This study is designed to answer questions regarding the relationship between participation in a public speaking course and anxiety. Additionally, I will be given $7 dollars to compensate me for my time.

All information collected from me will be kept strictly confidential. Confidentiality will be maintained through the use of code numbers. My signature will only appear on this consent page, which will be kept separate from all data collected here today and will be kept in a locked file cabinet in Dr. Wright's lab. Furthermore, once data collection has been completed, the master list linking my name to a subject number will be destroyed and all videotapes will be erased. After this occurs, it will be impossible to connect my name to my data. All data will be retained for a minimum of three years in a locked file cabinet in Dr. Wright's lab.

If I have any questions or concerns about the study I may contact Dr. Wright at 387-4472. I also may contact the Chair of the Human Subjects Institutional Review Board at 387-8293 or the Vice President for Research at 387-8298 if questions or problems arise during the course of the study.

This consent document has been approved for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Participants should not sign this document if the corner does not have a stamped date and signature.

My signature below indicates that I have read or had explained to me the purpose and requirements of the study and that I agree to participate.

Signature Date

Consent obtained by: __________________________ Date

[Signature]

[Date]
Appendix F

Phase II Phone Recruitment Script at Pretest
Hi, my name is ______________ and I'm calling from the research study that came into your public speaking course last week. I was calling to see if you would be interested in participating in the second phase of the study. Do you mind if I tell you a bit more about the study before you decide?

(IF YES...) The second phase of the study would take place in our research lab on campus. We would schedule a time for you to come in and have you use a brief reaction time program on the computer. The program would take about 10 minutes to complete and would consist of pictures of faces and household objects being flashed up on the computer screen followed by a letter. You would try to type the letter into the computer as quickly as you could. We are also able to offer you $3 to compensate you for your time. Do you think you would be able to help us out?

[We then would schedule a time for the individual to come in as well as provide directions to our research lab]
Appendix G

Phase II Phone Recruitment Script at Posttest
Phone Recruitment Script 2

Hi, my name is ____________ and I’m calling from the research study that came into your public speaking course at the beginning of the year and invited you into the lab participate in the computer-based part of the study. I was calling to see if you would be interested in participating in the final phase of the study. Do you mind if I tell you a bit more about the study before you decide?

(IF YES...)The final phase of the study would be just like the first time that you came into the lab for us. We would schedule a time for you to come in again and have you use the same reaction time program on the computer. The program would take about 10 minutes to complete and we are able to offer you $7 to compensate you for your time. Do you think you would be able to help us out?

[We then would schedule a time for the individual to come in as well as provide directions to our research lab, if needed]
Appendix H

WMU HSIRB Approval Forms
Date: 3 November 2000

To: Lester Wright, Principal Investigator
    Scott Mauritsch, Student Investigator for dissertation

From: Sylvia Culp, Chair

Re: HSIRB Project Number: 00-10-07

This letter will serve as confirmation that your research project entitled “Social and Communication Anxiety” has been approved under the full category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: 3 November 2001
Date: 7 December 2000

To: Lester Wright, Principal Investigator
   Scott Maierisch, Student Investigator for dissertation

From: Michael S. Prichard, Interim Chair

Re: Changes to HSIRB Project Number: 00-10-07

This letter will serve as confirmation that the changes to your research project "Social and Communication Anxiety" requested in your memo dated 1 December 2000 with the revisions that you made on 6 December 2000 have been approved by the Human Subjects Institutional Review Board.

The conditions and the duration of this approval are specified in the Policies of Western Michigan University.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: 3 November 2001


Matsumoto, D., & Ekman, P. (1988). *The Japanese and Caucasian Facial Expressions of Emotion (JACFEE) and Neutrals (JACNeuF)* [Slides]: Intercultural and Emotion Research Laboratory, Department of Psychology, San Fransisco State University, 1600 Holloway Avenue, San Fransisco, CA 94132, USA.


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