ABSTRACT

Title of Document: IMPAIRMENT IN FACIAL AFFECT RECOGNITION: DEFICIT OR ANXIETY?

Autumn M. Paulson, Master of Arts, 2005

Directed By: Deborah C. Beidel, Ph.D., Department of Psychology

Although individuals with social phobia are generally considered to exhibit social skills deficits, the existence of a potential deficit in the area of facial affect recognition remains largely unexplored. The current study investigated if individuals with high social anxiety are less able to accurately determine facial affect as compared with individuals with low social anxiety. Furthermore, this study examined whether or not this impairment is an actual deficit or results from an increased level of anxiety. Fifty-nine subjects completed an affect-labeling task at a baseline level of anxiety and again following a 5 minute speech designed to elicit anxiety. Results indicated that socially anxious and non-socially anxious individuals did not differ in accuracy of facial affect identification either at a baseline level or after engaging in a moderately stressful public performance. Based on these results, facial affect recognition does not appear to represent a skills deficit in socially anxious individuals.

IMPAIRMENT IN FACIAL AFFECT RECOGNITION: DEFICIT OR ANXIETY?

By

Autumn M. Paulson

Thesis submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Master of Arts
2005

Advisory Committee:
Dr. Deborah Beidel, Chair
Dr. Barry Smith
Dr. Carl Lejuez

Acknowledgements

I would like to express my gratitude and appreciation to Dr. Deborah C. Beidel for all of her guidance, suggestions, and patience throughout this project. Her assistance has been integral in its formation and completion and I deeply appreciate all of her time, attention, and energy. Also, I would like to thank Dr. Barry Smith for all of his suggestions and assistance in this endeavor. To my final committee member, Dr. Carl Lejuez, I would like to extend my appreciation and gratitude for his flexibility and willingness to serve on my committee towards the end of its completion and provide his time and suggestions. Finally, I would like to extend a special thank you to Dr. Samuel M. Turner who lost his fight with cancer and left this world much before his time. As an original committee member, Dr. Turner was very helpful in providing suggestions and advice from the conception of the project to the initial revisions. He is deeply missed.

Table of Contents

List of Tables

Introduction

Social phobia is a highly prevalent disorder that affects approximately 13% of the adult population (Kessler et al., 1994). An individual suffering from social phobia fears situations where he or she may be scrutinized by others or situations where he or she may fear doing something that would be perceived as embarrassing (American Psychiatric Association, 1994). This fear may exist across a variety of settings (Rapee, 1995; Turner, Beidel, Dancu, & Keys, 1986) including social interactions (e.g., conversing with others, joining a conversation, using the telephone, eating in public) and performance situations (e.g., public speaking, musical or athletic performances, asking questions from the audience). When in a social situation, those with social phobia experience physiological symptoms such as increased heart rate, trembling, sweating, nausea, flushing, and urinary urgency (Boone, McNeil, & Masia, 1999; Gorman & Gorman, 1987; Rapee, 1995) to a greater degree than non-socially anxious individuals (Turner, Beidel, Dancu, & Stanley, 1989). In addition, individuals with social phobia have more negative thoughts in an anxiety-evoking situation than non-anxious controls (Beidel, Turner, & Dancu, 1985) and often perceive themselves as inadequate (Alden & Wallace, 1995). This latter concern raises the question of whether those with social phobia actually are less skilled in social interactions compared to non-socially anxious individuals.

Studies examining potential social skills deficits in individuals high in social anxiety have consistently found that socially phobic and socially anxious individuals differ from non-socially anxious individuals in their social interactions. These differences include specific behaviors such as fewer and shorter responses (Alden &

Wallace, 1995; Pilkonis, 1977), longer response latency (Halford & Foddy, 1982; Pilkonis, 1977), and poorer verbal content (Halford & Foddy, 1982; Hofmann, Gerlach, Wender, & Roth, 1997). Other studies have found that social phobics and normal controls differed on global measures such as overall skill (Beidel, Turner, & Dancu, 1985; Fydrich, Chambless, Perry, Buergener, & Beazley, 1998). Concerning non-verbal aspects of behaviors during interactions, socially anxious individuals differ from non-socially anxious individuals on use of hand and body gestures (Halford & Foddy, 1982) and measures of eye contact (Beidel et al., 1985; Hofmann et al., 1997). Alden and Wallace (1995) found that socially phobic individuals appeared more visibly anxious and were rated as less likeable then controls when participating in a role play task.

Although individuals with social phobia behave differently in social situations, the reason for the difference remains unclear. The most parsimonious explanation is that individuals with social phobia are lacking the necessary skills during observed interactions; that is, they have a skills deficit. An alternative explanation is that they possess the skill, however, when in an anxiety-evoking situation (such as a behavioral assessment task), anxiety interferes with the ability to use their skills. Some support for this hypothesis has been found. For example, shy and non-shy subjects did not differ in their knowledge of appropriate social behaviors, however, shy subjects were less willing to use these skills in social situations (Hill, 1989). Research in other domains suggests that state anxiety but not trait anxiety impairs prospective memory performance which in turn could impair ability to use previously acquired skills (Harris & Cumming, 2003). In a study

investigating the skill versus anxiety hypothesis, Shackman (unpublished manuscript) compared verbal content, speech length, and flow of social conversation when social skills were assessed either through a traditional role play task or through a paper and pencil written format. Socially anxious individuals and those without social anxious were compared. Socially anxious individuals did not differ from those without social anxiety on skill level when comparing specific and individual verbal content ratings using either assessment format. However, when comparing individuals who had participated in the role play task, socially anxious participants were rated as having less overall skill than non-socially anxious participants. This finding suggests that socially anxious individuals probably possess knowledge of appropriate verbal content, but, despite this, appear less socially skilled when actually engaged in a social situation. It is plausible that higher levels of anxiety may be hindering the socially anxious subjects' ability to utilize what skills they do possess; however, as yet it remains unclear as to what other aspects of social skill might be attributed to their overall level of poorer performance.

To date, most studies have conceptualized deficits primarily in terms of verbal skills and a few non-verbal and paralinguistic elements such as eye contact and voice volume. One potential non-verbal deficit that has not received much attention is facial affect recognition, and deficits in this area would likely impact a person's social experiences. For example, if an individual is exhibiting a flat affect, or an unhappy expression, attempting social interaction may lead to negative consequences. An individual possessing this social skills deficit may not accurately determine facial expressions that represent different emotions. This could conceivably lead to

rejection by an interpersonal partner. Thus, the ability to accurately identify another person's affect has importance particularly when interacting with others. Identifying appropriate times to approach other people is critical to positive interactions and impairment in this skill may result in negative social experiences. This may in turn lead to either increased anxiety when approaching others or actual avoidance of social situations.

Although a seemingly important element of social skill, there are few data addressing affect recognition in either adults or children with social phobia. In a study with socially phobic children, Simonian and colleagues (2001) found that children made more errors in identifying facial expression than children without social phobia. Another study examining event-related potentials found that children who exhibited high levels of shyness demonstrated smaller N400 amplitudes in response to anger. Furthermore, this study found shyness to be associated with a specific genotype which also predicted this different pattern of processing affective stimuli of interpersonal hostility (Battaglia, Ogliari, & Zanoni, 2005). In the adult literature, one study compared amygdala activation in generalized socially phobic individuals with that of non-socially phobic individuals (Stein et al., 2002). The amygdala in socially phobic subjects exhibited increased activation with contemptuous and angry faces as compared to happy faces whereas this difference was not found for non-socially anxious subjects. This difference does not necessarily suggest an abnormal amygdala as groups did not differ in performance on an emotion-labeling task that occurred after face stimuli presentation. This finding stands in contrast to deficits found in children and suggests that socially phobic adults

4

may not exhibit impairment in ability to accurately recognize facial expression. However, a decision on this issue should await further study.

Although the ability to accurately perceive facial affect in socially anxious adults remains largely unexplored, a literature examining facial expression and socially phobic adults does exist. This literature involves using facial expression to examine cognitive biases of socially phobic individuals, including memory bias and attentional bias. Memory bias examines which stimuli the individual recalls, and with respect to facial expression, some support for a memory bias in socially phobic individuals has been found. Socially phobic individuals correctly recognized more critical faces than accepting faces (Lundt & Ost, 1996) and socially phobic individuals demonstrated enhanced recognition of negative as compared to non-negative facial expressions (Foa et al., 2000). However, not all of the findings have supported this negative memory bias (Perez-Lopez & Woody, 2001) and thus, a final decision should wait further studies.

Facial expressions also have been used in studies investigating the existence of an attentional bias. In a review of the literature on cognitive biases in socially phobic and socially anxious individuals, Heinrichs and Hofmann (2001) reported that for facial cues, individuals exhibit an attentional bias away from the source of information. Support for this hypothesis comes from a dot-probe task paradigm (Chen, Ehlers, Clark, & Mansell, 2002). The results indicated that those with social phobia directed their attention away from facial stimuli and towards stimuli of household objects and the behavior was consistent for all emotional valences. Other studies have found support for an attentional bias towards angry expressions (Gilboa-

Schechtman, Foa, and Amir, 1999; Hansen & Hansen, 1988; Hampton, Purcell, Bersine, Hansen, & Hansen, 1989; Purcell, Stewart, & Slov, 1996). However, studies using facial expressions to investigate cognitive biases rest on the assumption that individuals accurately identified each emotion; an assumption that has yet to be validated. If individuals with social phobia are deficient in accurately recognizing facial affect, these findings would need to be reconsidered.

In summary, despite strong evidence that social phobics have deficits in overall interaction skill (Beidel et al., 1985; Fydrich et al., 1998), specific verbal interaction skill (Alden & Wallace, 1995; Hofmann et al., 1997), and specific non-verbal aspects of behavior (Alden & Wallace, 1995; Beidel et al., 1985; Hofmann et al., 1997), there are no data examining deficits among socially anxious adults with respect to facial affect recognition. However, as previously mentioned, one study examining facial affect recognition in children found that socially phobic children were deficient in accurately recognizing facial affect (Simonian et al., 2001). Another study found that highly shy children have differing patterns of processing facial expression, particularly hostility (Battaglia, et al., 2005). If this deficit exists in socially anxious children, it seems plausible that it may be present in socially anxious adults. In addition, anxiety has been shown to have a negative impact on various types of social performance and, therefore, may also negatively affect performance (i.e., accuracy) on tasks of facial affect recognition (Rapee & Spence, 2004). Therefore, even if adults with social phobia are able to accurately perceive facial expression in a calm, testing environment, they might not be able to do so while experiencing anxiety due to a social interaction. As non-socially anxious individuals

are not expected to experience significant anxiety during these tasks, their

performance is not expected to be affected.

As noted, thus far, facial expressions have primarily been used as a tool to

examine cognitive biases that may exist in those with social phobia. Studies have

found some support that those with social phobia exhibit a memory bias towards

negative facial expressions (e.g., Foa et al., 2000) however, the results in this

literature have been somewhat equivocal (Perez-Lopez & Woody, 2001). In addition,

those high in social anxiety have been found to look away from facial stimuli and

focus on other non-facial stimuli, thus exhibiting an attentional bias (Heinrichs and

Hofmann, 2001). When only presented with facial stimuli, socially phobic and

socially anxious individuals display an attentional bias towards angry expressions

(e.g., Gilboa-Schechtman, Foa, & Amir, 1999). However, studies examining

cognitive biases with this population assume that those with social phobia are

accurate at identifying facial expression which has not yet been adequately

determined.

The primary purpose of this study is to determine if socially anxious adults

display an impaired ability to accurately determine facial expression. Moreover, if

they are found to have this impaired ability, this study will attempt to disentangle

whether the impairment is due to a true deficit that exists within socially anxious

individuals regardless of anxiety level or is strictly a result of an inability to access

available skills due to anxiety. A secondary purpose of this study is to help establish

a foundational component for the cognitive bias literature by determining whether

those with social anxiety can accurately identify facial affects. If these individuals

have deficits in this area, the findings of the cognitive bias literature would need to be revisited.

Based on the review of the literature, the hypotheses for the study are as follows:

1. At baseline, individuals with high social anxiety will perform more poorly overall as compared to low socially anxious individuals on facial recognition tasks.

2. Individuals with high social anxiety will perform more poorly on tasks of facial recognition after participating in an anxiety-producing task than before the task.

3. After the anxiety-producing task, individuals with high social anxiety will perform even more poorly compared to the baseline task on facial recognition tasks than individuals with low social anxiety.

Methodology

Subjects

Participants for this study consisted of undergraduates from the University of Maryland and were recruited either through the Introductory Psychology subject pool or from flyers posted in the psychology building. Participants from the subject pool received extra credit for their class as compensation for participating in the experiment and subjects who responded to the flyer were provided with $15 financial compensation for their participation.

Students were invited to participate in the study based on their performance on the Social Phobia and Anxiety Inventory (SPAI; Turner, Beidel, Dancu, & Stanley, 1989; Appendix A). Students with scores of 60 or above were classified as socially anxious (SA) and students with scores of 30 or below were classified as non-socially anxious (NSA). These cutoffs were selected because of the low rates of false positives and false negatives that are associated with each score. Only 8.9% of non-socially anxious subjects should be incorrectly classified as being socially anxious when using a cut-off score of 60 to identify socially anxious individuals (Turner et al., 1989). Similarly, only 8.6% of socially anxious subjects would be incorrectly classified as non-socially anxious with a cut-off score of 30 (Turner et al., 1989). In addition, because the anxiety induction task to be used in this study required participants to give an impromptu speech, the SPAI questionnaires of those who scored a 30 or below were also further screened on speech-related questions. Specifically, individuals who rated items pertaining to giving a speech or speaking in an informal meeting as anxiety-evoking were screened out even if they scored below the general cut-off for non-socially anxious. On these three items (numbers 5, 6, and 22) scores of 1 to 4 were allowed which indicated that the individual felt anxious while giving speeches "never" to "sometimes". This additional step was taken to help ensure that the NSA participants would not become anxious during the anxiety manipulation of the experiment. This additional criterion resulted in the exclusion of 33 potential subjects.

Participants also could be excluded based on other criteria. Substantial research has indicated that those who are either currently depressed (Gur et al., 1992;

Rubinow & Post, 1992; Zuroff & Colussy, 1986) or have schizophrenia (David & Cutting, 1990; Edwards, Jackson, & Pattison, 2002; Mueser et al., 1996) demonstrate impairment in accurately recognizing facial affect. Therefore, three subjects who met criteria for major depression were excluded from the study and given clinical referrals. No participant met criteria for schizophrenia. In addition to avoid confounding effects of individuals with slowed reaction times, those who either smoked marijuana frequently (defined as more than once weekly) or were taking psychotropic medication were also ineligible to participate in the study. These criteria excluded six potential subjects. Due to the high level of co-occurrence between other anxiety disorders and social phobia, and a lack of literature suggesting that individuals with other disorders display impairment in recognizing facial expression, no other diagnoses were used as exclusionary criteria.

Fifty-nine subjects participated in the study. Of these participants, 26 were male and 33 were female. Twenty-nine were classified as non-socially anxious and 30 were classified as socially anxious. Of those classified as socially anxious, four subjects met criteria for social phobia. The mean age of the sample was 20 years of age. The ethnic composite of the sample mirrored the ethnic break-down of the Introductory Psychology class and was as follows: African-American 15.3%, Asian 18.6%, Caucasian 57.6%, Latino 3.4%, bi-racial 1.7%, and other ethnic groups not previously listed 3.4%.

<u>Assessment Instruments</u>

        <u>Social Phobia and Anxiety Inventory</u>. The Social Phobia and Anxiety

Inventory (SPAI; Turner, Beidel, Dancu, & Stanley, 1989) is an empirically derived

self report measure developed to assess social phobia in adults. More specifically, the

SPAI assesses somatic symptoms, cognitions, and measures anxiety and avoidant and

escape behaviors. It consists of 45 items that are rated on a 7 point Likert scale where

1= never and 7= always. The SPAI has two subscales: Social Phobia and

Agoraphobia. The total score (called the Difference Score) is based on the difference

between the two subscales. This difference-based scoring technique helps to isolate

potentially confounding agoraphobia symptoms, subtracting out any possible inflation

of score due to these symptoms (Turner et al., 1989). Thus the final score may be a

better indicator of the presence of social phobia.

        Studies of its psychometric properties indicate good reliability and validity.

The SPAI has high test-retest reliability (r = .86) and internal consistency

(Cronbach's alpha = .96) (Turner et al., 1989). Construct validity was supported as

the SPAI has been shown to differentiate both severity of social phobia and

improvement (Beidel, Turner, & Cooley, 1993; Beidel, Turner, Stanley, & Dancu,

1989; Turner et al., 1989) and distinguishes between socially anxious and non-

socially anxious subjects, as well as individuals with agoraphobia (Turner et al.,

1989). Regarding concurrent validity, studies have found a high correlation between

the SPAI and other methods of determining social anxiety such as self-report and

clinical interview for assisting in determining diagnosis and assessing the severity of

distress in social encounters in the dimensions of cognitions, behaviors and overall

distress, and avoidance behavior (Beidel, Borden, Turner, & Jacob, 1989; Beidel,

Turner, Stanley, & Dancu, 1989; Turner, Beidel, Dancu, & Stanley, 1989).

Composite International Diagnostic Interview, (CIDI). The Composite

International Diagnostic Interview-Automated Version, Version 2.1 (WHO, 1993)

was used to assess the presence of any Axis I disorder within the past 12 months. The

CIDI is a self-administered fully structured interview that asks questions regarding

various symptoms and reports when criteria for an Axis I disorder have been met.

There is both a pencil-and-paper version administered by a human interviewer and an

automated version that can be self-administered. The CIDI has been used in a variety

of cultures and settings and can be administered by a lay interviewer (Wittchen,

Robins, Cottler, Sartorius, Burke, & Regier, 1991). It also has been used in large

epidemiologic studies (Kessler et al. 1994). Studies on its psychometric properties

have demonstrated acceptable reliability and validity. Inter-rater reliability for the

anxiety disorders and depressive disorders as assessed by kappa were above 0.9 and

all other Axis I disorders assessed including psychotic disorders, eating disorders, and

substance abuse disorders were at or above 0.78 with somatization disorder being the

exception of .67 (Wittchen, 1994). Test-retest reliability for various disorders ranged

from k = 0.52 to 0.86 (Wittchen, 1994). Validity studies have found adequate

concordance rates between the CIDI and clinicians' checklists (kappa = .76) and

between the CIDI and independent clinicians' diagnoses (kappas ranging from .73 to

.83) (Wittchen, 1994). The CIDI-Auto, has been compared with the pencil-and-paper

version, the CIDI, and concluded to be an acceptable substitute, based on excellent

agreement rates, acceptable to excellent test-retest reliability, and good validity (Andrews & Peters, 1998; Wittchen, 1994).

Self-Report Anxiety Measure. A self-report measure of the subject's anxiety was collected at the beginning of the experiment (baseline), as well as before and after each recognition trial, and before and after each anxiety induction task for a total of nine inquiries. The Subjective Units of Distress Scale (SUDS) is an 8-point Likert scale with 1 representing the lowest level of anxiety and 8 representing the highest.

NimStin Facial Pictures. Facial affect stimuli were drawn from the NimStin Facial Picture Set. The picture set was developed by The Research Network on Early Experience and Brain Development and consists of 646 facial pictures representing different genders and ethnicities. Content validity has been shown to be acceptable with agreement rates at or above 0.70 (Tottenham, Borscheid, Ellertsen, Marcus, & Nelson, 2002). For the purposes of this study, only pictures with agreement rates of 76% and above were chosen for presentation. Participants viewed six emotions (happy, sad, fearful, angry, surprised, and disgusted) and neutral expressions. Each of the two tasks consisted of 49 pictures each (7 repetitions of the 7 different expressions). The stimuli were presented on a computer. Consistent with a pilot study in which a correct recognition rate of 0.75 was attained, the stimuli was presented for 3750 ms (Perez-Lopez & Woody, 2001) with an inter-stimulus latency of 5000 ms. Subjects' scores were determined by the number of affect pictures rated correctly out of the 49 total in each task.

Procedure

The subjects who scored in the "high social anxiety" and "low social anxiety" ranges, as defined above, were invited to participate in the study. Upon arrival, the general procedure was explained to the participant and all questions were answered. Each participant signed an informed consent. Participants then completed the CIDI. If the participant did not meet the psychiatric exclusion criteria, he or she then began the study. First, the SUDS scale was explained and a baseline rating was obtained. Following this, each subject was asked to write down a synonym or short phrase that described each upcoming facial expression thereby ensuring that each participant understood each emotion. After confirming emotional understanding, another SUDS level was taken and the subject was asked to look at a series of pictures on a computer and identify each expression on a response sheet. At the completion of the trial, SUDS level was assessed again.

Because ability to recognize facial affect is a skill and performance can be impaired by anxiety (e.g., Goetsch & Adams, 1990; Ward & Salter, 1974), the second phase of the study involved assessment of facial affect under conditions of increased anxiety. To induce anxious distress, subjects were asked to give a 5 minute speech in front of two confederates. Subjects were allowed 2 minutes to prepare their speech. This speech task has been demonstrated to elicit anxiety in individuals with social phobia regardless of whether public speaking is the individual's primary fear (Beidel, Turner, & Jacob, 1989). Speech topics consisted of either 'career goals' or 'qualities most important in a friend' and were randomly assigned with one topic per speech.

Again, the participant provided a SUDS rating before and after giving the speech. Next, the participant was told that he or she will identify more pictures in the same fashion as previously and then give another 5 minute speech following a 2 minute preparation period. The second computer facial task was completed followed by the second speech with SUDS rating assessments before and after each task.

All participants were debriefed following the experiment. Participants that met criteria for a psychiatric disorder as assessed by the CIDI received a special debriefing. Additional questions were asked to gather more information regarding the diagnosis determined by the CIDI and determine if the disorder was causing functional impairment and/or significant distress. Based on this information, the participants were informed of sources where help for these problems could be obtained and assistance in obtaining an appointment was given if necessary.

Results

Preliminary Analyses

Based on chi-square and analysis of variance (ANOVA) tests there were no significant group differences based on gender (Phi $(1, 59)=.908$, $p>.05$], ethnicity [Phi $(7, 57)=.246$, $p>.05$], presence of a psychiatric disorder (Phi $(1,57)=.436$, $p>.05$), or age, $F(1, 57)=.111$, $p>.05$ (see Table 1).

Table 1: Between group comparisons on demographic variables

Demographic Variable	Socially Anxious	Non-socially Anxious	p value
Gender	F = 17 M =13	F = 16 M = 13	.908
Ethnicity	African-American: n = 5 Asian: n = 6 Caucasian: n = 15 Latino: n = 1 Bi-racial: n = 1 Other: n = 2	African-American: n = 4 Asian: n = 5 Caucasian: n = 19 Latino: n = 1 Bi-racial: n = 0 Other: n = 0	.600
Presence of psychiatric disorder	n = 10	n = 7	.436
Age	Mean = 20.3 SD = 2.7	Mean = 20.0 SD = 4.1	.740

Manipulation of Anxiety Level

To determine if the speech manipulation effectively increased anxiety, a 2 (group) x 2 (time: baseline, pre 2nd facial recognition task) repeated measures ANOVA was conducted. Recall that the purpose of the speech manipulation was to increase anxiety in the socially anxious participants at the time of the second affect recognition task. Therefore, the SUDS level chosen for comparison against baseline was the SUDS level assessed immediately prior to beginning the second affect recognition task as it was judged to be a better assessment of whether or not the participant was anxious during the second facial affect identification task. Results indicated a main effect of SUDS, $F(1, 57)=59.30$, $p< .001$ (see Table 2) with all subjects reporting more anxiety prior to completing the second facial identification task as compared to at baseline. There also was a main effect for group. Socially anxious subjects gave higher SUDS ratings than non-socially anxious at both baseline and prior to the second facial identification task, $F(1, 57)=27.71$, $p< .001$ (see Table

2). More specifically, socially anxious subjects reported an average baseline SUDS level of 2.13 which increased to 4.23 prior to the start of the second affect trial after the speech. Non-socially anxious subjects increased from an averaged baseline SUDS level of 0.414 to 1.90 prior to the second affect trial. The SUDS rating scores are out of a range of 0 to 8. There was no interaction between group and SUDS level indicating that the speech manipulation did not have a differential group effect, $F(1, 57)=1.76$, $p>.05$.

As an additional manipulation check, a 2 (group) x 2 (time: baseline, post 1st facial recognition task SUDS ratings) repeated measures ANOVA was conducted to determine that the first recognition task did not elicit substantial distress. Although socially anxious subjects were more anxious at both assessment points than their non-socially anxious counterparts, $F(1, 57)=23.85$, $p< .001$ (see Table 2), there was no increase in anxiety ratings between baseline and the first facial affect identification task post SUDS rating, $F(1,57)=2.78$, $p >.05$ (see Table 2). Thus, the facial affect recognition task did not significantly raise anxiety for either group.

Table 2: Self-reported anxiety ratings for groups across tasks

SUDS Level	Socially anxious Mean (s.d.)	Non-socially anxious Mean (s.d.)
Baseline	2.13 (1.61)	0.414 (0.733)
Prior to pre-speech trial	2.10 (1.47)	0.276 (0.528)
After pre-speech trial	1.67 (1.54)	0.448 (0.870)
Prior to 1st speech	4.77 (1.83)	2.52 (1.60)
After 1st speech	5.10 (2.41)	2.79 (2.11)
Prior to post-speech trial	4.23 (2.47)	1.90 (1.61)
After post-speech trial	3.77 (2.34)	1.31 (1.44)
Prior to 2nd speech	4.63 (2.09)	2.28 (1.69)
After 2nd speech	3.20 (2.06)	1.28 (1.33)

Accuracy of Facial Affect Recognition

An initial examination of the accuracy percentage of the subjects indicated that both groups were highly accurate for across trials. Socially anxious subjects were 90.8% accurate on the first trial and 92.7% accurate on the second trial. Non-socially anxious subjects were 92.0% accurate on the first trial and 92.1% accurate on the second trial.

A 2 (group) x 2 (trial) x 7 (expression score) repeated measures MANOVA revealed that there was no three-way interaction between group membership, trial, and expression score, $F(6, 52)=0.656$, $p >.05$ (see Table 3) indicating that there was no group difference in the number of faces correctly identified for either trial. There was a main effect for trial, $F(1, 57)=17.84$, $p< .001$ (see Table 3) with performance on the second trial surpassing performance on the first for both groups.

Results of the repeated measures MANOVA revealed an interaction between trial and specific facial affect, $F(6, 52)=34.71$, $p<.05$ (see Table 3). As group membership was not a factor, paired-sample t-tests were conducted collapsing the socially anxious and non-socially anxious groups. Risk of a Type 1 error was controlled by using the Bonferroni correction resulting in an alpha level of .007. The results indicated that both socially anxious and non-socially anxious subjects improved in rating accuracy from the first to the second presentation for three of the seven expressions: happy, $t(58) = -3.23$, $p<.007$; angry, $t(58) = -6.60$, $p<.007$, and fearful, $t(58) = -5.63$, $p<.007$. However, for two of the seven expressions, socially anxious and non-socially anxious subjects performed more poorly during the second

18

task: sad, t(58) = 3.57, p<.007; disgusted, t(58) = 7.59, p<.007. Performance on

neutral and surprised expressions did not change based on this criteria from the first

to the second facial affect identification task. The means of each of these groups is

listed in Table 3 and should be considered along with the results as the means

typically differ less than one picture slide per expression.

Table 3: Mean number of affect pictures correct based on trial and group.

Facial Expression	Trial	Mean number (s.d.) correct for non-socially anxious	Mean number (s.d.) correct for socially anxious	t-statistic collapsed across groups from pre to post
Neutral	Pre-speech	6.45 (1.02)	6.17 (1.02)	.278
	Post-speech	6.69 (.660)	6.17 (.950)	
Happy	Pre-speech	6.62 (.775)	6.77 (.626)	.002*
	Post-speech	6.97 (.186)	6.93 (.254)	
Angry	Pre-speech	6.00 (.926)	5.87 (1.33)	.000*
	Post-speech	6.97 (.186)	6.80 (.407)	
Sad	Pre-speech	6.97 (.186)	6.83 (.379)	.001*
	Post-speech	6.34 (1.23)	6.47 (.776)	
Fearful	Pre-speech	5.79 (.901)	5.60 (1.19)	.000*
	Post-speech	6.55 (.736)	6.53 (.890)	
Disgusted	Pre-speech	6.86 (.351)	6.97 (.183)	.000*
	Post-speech	6.24 (.577)	6.03 (.765)	
Surprised	Pre-speech	6.38 (.862)	6.30 (.794)	.008
	Post-speech	6.86 (.581)	6.50 (.777)	

* indicates significance at α = .05 level

Discussion

Results from this study indicated that socially anxious and non-socially

anxious individuals did not differ in accuracy of facial affect identification either at a

baseline level or after engaging in a moderately stressful public performance.

Contrary to expectation, socially anxious individuals did not exhibit impaired task performance when in a state of heightened anxiety; rather, they actually demonstrated improved performance relative to baseline. Their ability to correctly recognize various emotions was quite good. In fact, socially anxious subjects were 90.8% accurate in identifying facial affect at baseline and 92.7% accurate when at a heightened level of anxiety suggesting that this is one area of social skills where those with social anxiety do not exhibit skill deficit.

This finding stands in contrast to studies that have found support for facial affect recognition deficits in children (see Simonian et al., 2001). There are several possible contributing factors to this discrepancy. Firstly, this study was conducted using facial affect stimuli from the NimStin Facial Picture Set whereas Simonian and colleagues utilized the Pictures of Facial Affect (PFA) developed by Ekman and Friesen (1972). The NimStin Facial Picture Set was chosen primarily because of its representation of affect by different ethnicities but also because of its more recent development and presentation of more current stimuli models. Although these are attractive aspects of the facial affect set, the NimStin does not possess the widespread use, thus allowing for more controlled between-study comparisons, as the PFA. Therefore, it is unclear as to how the choice of a different set of affect stimuli may have affected the results of the study. Replication using the PFA would be important in addressing this issue.

Another possible explanation for the differing results is that ability to correct identify facial affect may increase with age. For example, one study comparing children aged 7-10 with adults on speed and accuracy in identifying facial emotions

found that not only did processing speed increase with age, but also adults were better at accurately identifying facial affect as compared to children (De Sonneville, Verschoor, Njiokiktjien, et al., 2002). This study did not assess for the presence of any psychiatric disorders and therefore does not specifically address the changes that may occur in facial affect recognition within the socially phobic population of children and adults. However, it suggests that this improvement in accuracy may account for the lack of group difference found in this investigation. The exact mechanisms to account for this improvement constitutes an empirical area of study and as of yet has not been examined.

Another difference between this study and the study by Simonian and colleagues (2001) is that this study involved socially anxious individuals as participants as compared with socially phobic participants. As only four of the subjects met criteria for social phobia, the majority of the socially anxious participants presented with less functional impairment than would be present in a sample of socially phobic subjects. Consequently, the ability to accurately identify facial affect may be more impaired in socially phobic individuals than in those who do not meet diagnostic criteria despite being socially anxious. However, although this may have intuitive appeal, Stein and colleagues (2002) did not find support for this theory. As an additional consideration, the children in the Simonian et al. (2001) study already met diagnostic criteria for social phobia and may thus represent a more impaired sub-group of individuals with social phobia. Research has suggested that early onset of various disorders including social phobia is predictive of greater severity of the disorder (e.g., Davidson, Hughes, & George, 1993; Mannuzza, et al.,

1995). Given this, it is possible that adults who not only meet criteria for social phobia but also are classified as more severely impaired may possess facial affect recognition deficits whereas those with social anxiety or mild social phobia do not display these deficits.

The results of this study add to a previous report that socially phobic individuals did not differ in accurately recognizing facial affect as compared to non-socially phobic individuals (Stein et al., 2002). Although affect recognition was not the crux of this earlier study and anxiety level in the subjects was not assessed, the results do provide preliminary support that socially anxious adults do not possess a deficit in accurately recognizing facial affect. The results of this study support these preliminary findings.

In considering how the findings of this study integrate into the larger literature on social skills deficits in those with social anxiety, it is interesting to note that the majority of social skills deficits that have been found have typically involved the lack of an interactive component of social interactions. For example, as compared to controls individuals who experience social anxiety or have social phobia speak less in an interaction as judged by longer response latency and fewer and shorter responses (Alden & Wallace, 1995; Halford & Foddy, 1982; Pilkonis, 1997). In addition, they also exhibit less eye contact than controls (Baker & Edelmann, 2002). Comparatively, accurately recognizing facial affect, while an integral component of a successful social interaction, is perhaps less of an interactive skill and maybe more of a basic skill that develops independently of social interactive experience. By

extension, the skill of recognizing facial affect may not fit conceptually with skills

deficits that are more interactive within the socially anxious population.

Additionally, it has been suggested that the social skills deficits may not

constitute a fundamental inability to appropriately carry out the skill in question but

might rather reflect an impairing result of high anxiety on the ability to access

knowledge of how to carry out the skill (Rapee & Heimberg, 1997; Rapee & Spence,

2004; Shackman, unpublished manuscript). Some support for this suggestion

appears to exist as socially anxious subjects were found to appear less skilled as

compared to controls in a role play task but were not found to differ from controls

when verbal responses were written on paper rather than spoken in front of a

confederate (Shackman, unpublished manuscript). One possible explanation for why

this current study did not find either a deficit in recognizing facial affect or any

impairment in this task when at an increased level of anxiety in socially anxious

individuals is that this may represent a more basic level skill that is processed

independent of anxiety level. Facial emotion recognition tasks have found that using

the electroencephalograph (EEG) recordings, the brain was determined to begin

processing facial emotion stimuli at approximately 200 ms (0.20 s) (Streit, Wolwer,

Brinkmeyer, Ihl, & Gaebel, 2000). Comparatively, behaviors that occur within the

context of a social interaction may be more subject to the negative self-evaluations,

fear of negative evaluations from others, and avoidance that characterize social

phobia.

Research examining facial affect recognition in other psychiatric populations

has found that both depressive populations and schizophrenic populations display

deficits in this area. Given the characteristics of these disorders, these findings may

not be surprising. Individuals with depression typically have a negative view of

themselves, their environment, and their future and often distort their interpretations

of events to maintain these negative perceptions (Young, Weinberger, & Beck, 2001).

Studies examining the presence of a deficit in facial affect recognition have found

that those who are depressed are worse at accurately identifying facial affect than

those who are not depressed (Feinberg, Rifkin, Schaffer, & Walker, 1986; Gur et al.,

1992; Rubinow & Post, 1992; Zuroff & Colussy, 1986). However, although there is

consensus that those with depression exhibit deficits in identifying facial affect, there

lacks a consensus on the which specific valence expressions are impaired and on any

mechanism behind the impairment. Schizophrenia has been characterized by

disturbances of emotion as manifested by blunted or inappropriate affect for some

time (Bleuler, 1950). Many studies in the schizophrenia literature have explored the

range of this impairment in expressing emotion and also the existence of a deficit of

recognizing facial emotion. Although most studies find support for a deficit in

recognizing facial affect, again, as yet there is no consensus on which specific

emotional expressions the disturbances exist or on the mechanisms behind these

deficits (Edwards et al., 2002). Conceptually, it is easy to imagine how

characteristics of depression and schizophrenia (e.g., a negative outlook with

distorted interpretations and a blunted affect) might impact an individual's perception

of another person's affect. Anxiety disorders such as social phobia are less about

misperceptions targeted towards the external world, but rather are about internally

focused misperceptions related to evaluation. Therefore, one could argue that a

person with social phobia is less likely to exhibit a deficit in recognizing a facial expression but maybe more likely to possess a bias in the perception of the emotional expression. Indeed, many studies have been conducted examining this possibility and have found some support for certain biases (e.g., memory and attentional; Chen, Ehlers, Clark, & Mansell, 2002; Foa et al., 2000; Gilboa-Schechtman, Foa, & Amir, 1999; Hansen & Hansen, 1988; Lundt & Ost, 1996; Perez-Lopez & Woody, 2001). However, not all findings have been consistent and further research should be conducted to determine the mechanisms involved in any biases as well as the specific expressions affected.

Another limitation in the cognitive bias literature is that it is based on the assumption that individuals who are socially anxious do not possess a skills deficit which would impair their ability to accurately identify an emotional expression. To this author's knowledge, this study represents one of the first attempts to determine whether such a skills deficit exists. Results indicate that socially anxious and non-socially anxious participants did not differ in affect recognition skills. This finding has important implications for these cognitive bias studies as it helps establish that the socially anxious and non-socially anxious participants possess equivalent abilities to accurately recognize facial affect. Therefore, there is no skills deficit which systematically alters the way a socially anxious person views facial affect which would then lead to confounded results concerning any cognitive bias in this population. Instead, this study helps to support the validity of the findings in the cognitive bias literature by controlling for a potential confound which has not been previously examined.

In addition to lacking evidence that socially anxious adults do not possess a skills deficit in identifying facial affect, studies from the cognitive bias literature have failed to control for anxiety levels in the subjects. This is potentially problematic as the studies have employed manipulation tasks that involved other faces or other people which may have increased anxiety levels in those subjects who were socially anxious. Although studies examining potential cognitive biases may have no alternative but to involve stimuli that will likely arouseanxiety, this serves as a potential confound and raises the possibility that the results could have been influenced by an increased state of anxiety. Currently, it is not known how anxiety may or may not have influenced performance on tasks using facial affect. However, in the event that anxiety does influence facial affect recognition, future studies would need to assess for and statistically control for anxiety level.

In an attempt to address this issue, this study sought to determine if increased levels of anxiety affected performance on a task of facial affect recognition. The results of the study indicate that anxiety does not impair performance in identifying facial affect in socially anxious individuals. Even after being exposed to a task designed to evoke anxiety, socially anxious participants did not differ in their performance compared to non-socially anxious participants. This further suggests that socially anxious individuals are not deficient in this skill, and that an increased level of anxiety does not impair their performance. This finding was not specific to socially anxious subjects as non-socially anxious subjects also correctly identified more affect expressions when they were more anxious. This finding was contrary to expectation. One potential explanation may be that despite increased levels of

anxiety, the increase may not have been sufficiently high enough to cause task impairment. Indeed, the mean reported SUDS level increased from 2.13 at baseline to 4.23 prior to the second affect recognition task for socially anxious subjects and from 0.414 to 1.90 for non-socially anxious subjects out of an 8 point scale. Therefore, even the socially anxious participants were only at a "moderate" level of anxiety at the beginning of the second facial affect trial. This moderate level of anxiety may have actually served to improve performance. This phenomenon could be accounted for by the Yerkes-Dodson law which posits that performance at low and high levels of arousal is hindered whereas performance at a moderate level of arousal is actually facilitated (Yerkes & Dodson, 1908). Although the Yerkes-Dodson law could explain the findings of improved affect recognition while at a heightened level of anxiety, one should also remain cognizant of the small level of increased anxiety (0.414 to 1.90 for non-socially anxious and 2.13 to 4.23 for socially anxious). Although these increases in anxiety levels were sufficient to reach statistical significance, they most likely lack sufficient difference to be clinically significant and results should be considered with this in mind.

As was previously noted, the speech task was selected to increase anxiety and perhaps differentially evoke anxiety in socially anxious as compared to non-socially anxious participants. These non-socially anxious participants were selected based on a low overall score as well as a low score on speech related tasks. Additionally, the length of the speech task was selected with the recognition that nearly everyone regardless of state level of anxiety, experiences an increased anxiety when initially giving a speech (Beidel, Turner, & Dancu, 1985). However, those low in social

27

anxiety have been found to habituate much quicker as compared to those high in social anxiety. The five minute limit was chosen to allow an opportunity for those low in social anxiety to habituate while anticipating that the highly socially anxious subjects would still exhibit increased anxiety levels. Despite this, there was no difference in the increase in level of self-reported anxiety. Both groups reported an averaged two point increase in SUDS rating (on an eight point scale). However, socially anxious were more anxious than non-socially anxious during both affect identification trials. Although the purpose of selecting non-socially anxious who would not experience increased anxiety for the second identification task was to compare whether a change in affect identification performance was due to anxiety, the bigger question was whether or not socially anxious individuals perform worse when they are anxious. In fact, both groups improved minimally in overall performance despite statistically significant differing levels of anxiety.

Although no group differences were found on overall performance, an interaction between trial and expression was found. Specifically, both groups improved in identifying expressions of happiness, anger and fear despite being more anxious. However, both groups performed more poorly on faces of sadness and disgust. Interpreting these findings is somewhat awkward as it is challenging to formulate a theoretically-driven explanation for why performance on some expressions improved while performance on other expressions deteriorated. Although one could posit that because performance on expressions of sadness and disgust worsened when in a state of increased anxiety, this may suggest a decreased ability to accurately recognize negative facial expressions when experiencing anxiety,

this seems unlikely as 1. performance on angry and fearful emotions improved, and 2. these findings applied to both socially anxious and non-socially anxious. While the increased level of anxiety in both groups could have affected these responses, socially anxious individuals were still at a higher level of anxiety as compared to non-socially anxious subjects. In addition, although change in performance on the different expressions was significant, one must exercise caution in generalizing from these findings because there was only a small change in the actual means of numbers correct for each expression from the first trial to the second trial. In fact, the average number of expressions correct for the groups combined improved or worsened less than one picture slide per expression. Given the similarity of the means across trials, the actual relevance that these findings have in real-world interactions may be quite limited and these findings, while statistically significant, are not clinically meaningful. Given these considerations, the findings of improvements and declines in accuracy may be more due to random chance and not a result of experimentally manipulated anxiety. In addition, this study utilized a more recently developed facial affect stimuli set which does not yet have a substantial prominence in the literature. The impact that this may have had on the responses is currently unclear.

There are limitations of this study that should be noted. First, this study was conducted using an undergraduate population and therefore, further generalization to populations such as middle-aged and elderly adults should await future study. In addition, this was a sample chosen based on response to a self-report measure and was not selected based on a diagnosis. Indeed, only four of the socially anxious subjects met criteria for social phobia. Therefore, although the socially anxious group

reported significantly higher levels of anxiety as compared to non-socially anxious participants, generalization of these findings to diagnosed socially phobic individuals should be made with caution. Socially phobic individuals represent a more impaired population by definition than socially anxious individuals and may therefore possess deficits that are not present in those with social anxiety.

Another limitation of the study is that all participants underwent the baseline condition first followed by the anxiety condition. It is possible that this may have affected the results of the second trial. In an attempt to help control for practice effects, a practice round was administered prior to completing the first affect identification task. Also, the fact that participants performed more poorly on some affects suggests that the results were not due to overall practice effects. Despite this, a better control for the potential of any practice effects might have been to counterbalance the baseline anxiety level and increased anxiety level trials. Obviously, as the increased anxiety level trial would affect a subsequent baseline anxiety level trial if the two were administered close together, additional steps would have been needed to ensure that a baseline level of anxiety was truly at baseline. One possible step would have been to determine an initial SUDS level and then have the subject complete the speech and heightened anxiety trial followed by a wait sufficiently long enough to allow the subject to return to baseline.

As noted previously, the means of the number correct on each affect are very similar across trials. Because of this, interpretation of these findings should be made with caution and may not have clinical relevance, particularly because the findings were not specific to socially anxious individuals. Another limitation is one of

external validity. In this study, participants were exposed to each facial stimuli for 3.75 seconds. In real life, we do not often focus our attention on a single person who is exhibiting a single affect for an extended amount of time like the study procedures. Admittedly, this is not a realistic paradigm. In an every day situation, expressions are fleeting and often intermingled. The face stimulus presentation time was based on a previous study (Perez-Lopez & Woody, 2001) which determined this interval after gathering pilot information yielding correct recognition rates of 0.75 in both threatening and reassuring faces. This recognition rate was chosen to serve as a mid-range between ceiling effect and chance recognition. Although Perez-Lopez and Woody were examining recognition memory in those with social phobia rather than affect recognition, the stimulus time was still expected to elicit a similar mid-range accuracy. However, it is still possible that the length of the presentation may have lead to improved accuracy.

Another inherent limitation in studies of affect recognition is that a certain level of agreement must be maintained in order to consider a face in a set to be valid. While in one sense it is necessary to use faces that are "valid," usually defined by a high agreement rating among test subjects, this may serve to generate a set of facial expressions that are not representative of "real-world" expressions and may be easier to accurately identify. Similar to what was previously stated, this may in turn not present a realistic representation of the emotional expressions one encounters in daily life. The high rate of accuracy for each group across both trials may be a result of these factors and may in turn serve as a testament to the difficulties inherent in using facial expression as stimuli.

Despite these limitations, the results of this study help increase the understanding of socially anxious individuals. Although socially anxious individuals possess various social skills deficits, facial affect recognition does not appear to be one of these deficits. This appears to be true during both before and after a period of heightened distress. Thus, even when anticipating an anxiety evoking situation (e.g., a social situation), socially anxious individuals do not read facial affect differently than non-socially anxious individuals. In addition to demonstrating that this is not an area of impairment in socially anxious individuals, these findings help to provide a foundation for the studies investigating cognitive biases in social phobia. Although investigators previously assumed that socially anxious individuals were identifying expressions the same as controls, there had been limited empirical evidence to support this assumption. This study provides greater support for this assumption. Regarding treatment implications, the results of this study indicate that while socially anxious individuals may certainly benefit from social skills training, teaching facial affect identification may not be the most productive and helpful choice of skill to teach. Rather, efforts would be better put to use by focusing on other social skills where a deficit actually exists. However, this applies only to adults as socially phobic children have been found to exhibit deficits in accurately recognizing facial affect. Currently, it remains unclear why socially anxious children appear to have difficulty accurately recognizing facial affect but socially anxious adults do not differ from non-socially anxious adults in this ability. Further investigation into the underlying mechanisms that may account for this difference may yield an increased understanding.

Appendix A: Literature Review

A. Symptomatology

Social phobia is characterized by an excessive fear of situations where the individual may be subjected to the scrutiny of others or where the individual may do something that would be perceived as embarrassing (American Psychiatric Association, 1994). For those with social phobia, this fear may exist across a variety of situations (Rapee, 1995; Turner, Beidel, Dancu, & Keys, 1986) including social situations (e.g., interacting with others, joining a conversation, using the telephone, eating in public) and performance situations (e.g., public speaking, musical or athletic performances, asking question from the audience). The symptoms of social phobia can be classified along three dimensions: cognitive, physiological and behavioral.

Cognitive symptoms. Cognitively, individuals with social phobia are characterized by a fear of negative evaluation by others, an excess of negative thoughts, and perceived inadequacy of their own abilities or characteristics (Rapee, 1995). Beidel, Turner, and Dancu (1985) examined the cognitions of individuals with and without social phobia. Those with social phobia had significantly fewer positive thoughts than non-anxious controls in a same sex interaction task, an opposite-sex interaction task, as well as an impromptu speech task. Additionally, individuals with social phobia also exhibited a greater number of negative thoughts during each of these tasks. Furthermore, there was a difference in the content as well as the valence of the cognitions. Specifically, the negative thoughts of those without social phobia were about the situation where the negative thoughts of those with social phobia were about the individual's inability. A subsequent study (Turner, Beidel, & Larkin, 1986)

replicated these findings and also found that situation-specific factors can influence

the number of positive and negative thoughts in individuals with social phobia.

Those with social phobia reported more negative thoughts during the opposite-sex

interaction task than during the same-sex interaction task. There were also a greater

number of positive thoughts reported for the same-sex interaction as compared to

either the opposite-sex interaction or the speech task and more positive thoughts

during the opposite-sex interaction as compared to the speech task. The results were

consistent for non-socially phobic individuals as well as those with social phobia. In

addition to specific negative thoughts, those with social phobia sometimes perceive

themselves as inadequate (Alden & Wallace, 1995). Following a "getting

acquainted" conversation, individuals with social phobia rated their interaction more

poorly than the experimenter on the following variables: the interest conveyed to their

partner, visibility of their anxiety, and overall likeability. Subjects without social

phobia also displayed this tendency; however, individuals with social phobia did so to

a greater degree than those without social phobia. In contrast, those with social

phobia rated their partner more positively than the experimenter, whereas those

without social phobia rated the partner more negatively than did the experimenter.

These data lend support to the idea that those with social phobia have a negative bias

regarding their own performance in social situations. In summary, those with social

phobia appear to have a pervasive view of themselves as socially inadequate.

Furthermore, when engaged in social situations, they experience a plethora of

negative cognitions.

Physiological symptoms. Individuals with social phobia also experience a variety of physiological symptoms when anxious and these physiological responses can cause great distress. Some of these symptoms are similar to those experienced by individuals with anxiety disorders in general and include sweating, hot flushes, blushing, trembling, increased heart rate, and nausea (Rapee, 1995). These symptoms can become particularly pronounced in the context of the most feared stimuli (Boone, McNeil, Masia, et al., 1999). Symptoms such as sweating, blushing, trembling, and heart palpitations have been characterized as particularly characteristic of individuals with social phobia (Gorman and Gorman, 1987). When in a social situation, heart palpitations, blushing, shaking, sweating, and urinary urgency were endorsed more often by individuals with social phobia as compared to controls while the subject was in a social situation (Turner, Beidel, Dancu, & Stanley, 1989). A study by Davidson, Foa, Connor, and Churchill (2002), consisting solely of individuals with social phobia, reported that excessive sweating was experienced by 25-33% of the sample, depending upon the scaled used. This excessive sweating can lead to an impaired quality of life, further social isolation, and even interfere with job functioning. Blushing is another symptom that can particularly lead to distress, presumably because it is easily detected by others.   Interestingly, fears and complaints of blushing by those with social phobia are not always confirmed by direct observations. For example, Gerlach, Wilheim, Gruber, and Roth (2001) reported that among individuals with social phobia, those with a complaint of blushing did not actually blush more during experimental tasks than social phobics who did not complain of blushing. However, both groups of social phobics blushed more than controls in the

one task that was designed to be embarrassing. Of note is that those who complained of blushing did show an elevated heart rate through all of the tasks. The authors theorized that this could indicate a higher arousability of this subgroup. Individuals with social phobia experience a variety of physiological symptoms particularly when in a heightened state of anxiety. These symptoms include elevated heart rate, sweating, trembling, blushing, and urinary urgency and lead to distress in the individual.

Behavioral symptoms. A key behavioral symptom of social phobia is avoidance of the feared stimuli. Turner, Beidel, Dancu, and Keys (1986) found that over 70% of individuals with social phobia reported avoiding at least two social situations, including formal and informal speaking, eating or drinking in public, and writing in public. In an analogue situation, Boone et al. (1999) found that individuals with social phobia terminated both a speech task and a conversation task prematurely. However, total time avoided (i.e. time not spent in the behavioral task) varied with regard to subtype of social phobia with generalized social phobics terminating tasks more quickly. In summary, social phobia can be a very debilitating disorder expressing itself in cognitive, physiological, and behavioral realms. Those with social phobia fear negative evaluation from others, have more negative thoughts, and often perceive themselves to be inadequate. They also suffer from physiological symptoms such as increased heart rate, sweating, blushing, nausea, and trembling. As these characteristics are not pleasant, it is not surprising that those with social phobia often avoid situations where they become fearful and experience these physiological symptoms. Thus, individuals with social phobia frequently avoid social situations

that can have a negative or at the least, limiting, impact on the individual's career

advancement, social relationships, as well as overall happiness and functioning.

B. Subtypes

As data examining the clinical syndrome of social phobia has accrued over

time, the conceptualization of the disorder has changed. Currently, social phobia is

considered to have two subtypes: generalized and nongeneralized. They are

considered distinct with regard to symptoms, course of illness, morbidity,

comorbidity, treatment response, and physiological responses (Liebowitz, 1999).

Individuals who are made particularly anxious in one or two specific areas (i.e.,

performance situations) are said to have the nongeneralized subtype. When a variety

of different situations evoke anxiety (i.e., performance situations and most social

situations), individuals are classified with the generalized subtype. As the

generalized subtype includes more situations that evoke anxiety, and these situations

are encountered more frequently in daily life, it follows that the generalized subtype

would be considered to be more severe. Indeed, studies have shown that those with

generalized social anxiety do experience more life interference and greater disability

(Boone et al., 1999; Heimberg, Hope, Dodge, & Becker, 1990; Stein & Kean, 2000;

Stein, Torgrud, & Walker, 2000; Turner, Beidel, & Townsley, 1992). This distinction

has also been conceptualized as continuum of severity with increasing number of

feared situations correlated with greater disability instead of existing as distinct

subtypes (Stein et al., 2000).

<u>C. Prevalence and Distribution</u>

      <u>Prevalence.</u> Social phobia is one of the most prevalent psychological disorders in the general population. The majority of accepted estimates of prevalence rates are obtained from two large, national epidemiological studies, the Epidemiologic Catchment Area (ECA) study and National Comorbidity Study (NCS). The ECA assessed the prevalence of psychological disorders based on the DSM-III criteria using the Diagnostic Interview Schedule (DIS) whereas the NCS utilized the Composite International Diagnostic Interview (CIDI). The CIDI is considered to be much more thorough than the DIS as it evaluates all types of social fears as opposed to assessing social fears as a part of the simple phobia section of the module (Brunello et al. 2000; Kessler et al., 1994; Magee, Eaton, Wittchen, McGonagle, & Kessler, 1996). The difference in prevalence rates is reflected accordingly. Results from the ECA study show lifetime prevalence rates of social phobia to be approximately 3% of the general population (Regier, Narrow, & Rae, 1990; Schneier, Johnson, Hornig, Liebowitz, & Weissman, 1992). Comparatively, results from the NCS study report lifetime prevalence rates around 13% and 12-month prevalence rates at about 8% (Kessler et al., 1994). As reported by the NCS, major depression and alcohol dependence were the only psychiatric disorders more common than social and simple phobias (Kessler et al., 1994). In conducting a community survey in Canada, Stein et al. (2000) found the 12-month prevalence rate to be just above 7%. Although lower than the prevalence rate reported by the NCS, this rate is within the overall range and further supports the finding that social phobia is a common disorder affecting many individuals.

Ethnic distribution. Epidemiological studies also have looked at prevalence rates of social phobia across different races, primarily African Americans and Caucasians. With respect to overall anxiety disorders, these studies have reported mixed results. The ECA found higher rates of anxiety disorders among African Americans as compared to Caucasians and Hispanics (Regier et al., 1990) while the NCS did not (Kessler et al., 1994). Moreover, when focusing specifically on social phobia, a difference in prevalence rates has not been supported. Indeed even the ECA did not find differences between rates of social phobia in African American and Caucasian populations (Schneier et al., 1992). However, these findings should be interpreted cautiously due to the overrepresentation of lower socio-economic groups (Regier et al., 1994). Beyond differences in prevalence rates, it is also important to understand differences in clinical presentation and treatment outcome across races. Although research in this area is limited, preliminary studies (e.g., Ferrell, Beidel, & Turner, in press) have failed to find differences between African American and Caucasian children. More specifically, the study found that African American and Caucasian children did not differ with respect to symptoms and severity, social skill levels, anxiety ratings, response to treatment, and maintenance of improvement. Based on these findings, there is no support for differentiating identification of symptoms or treatment based on racial identity.

Gender distribution. Prevalence studies do not always agree with respect to the gender distribution for social phobia. According to the ECA data (Schneier et al., 1992), females are more likely to have social phobia than are males. This is also consistent with the findings of the NCS data (Kessler et al., 1994) where the lifetime

prevalence rate for social phobia was 11.1% male and 15.5% female. However, in a community sample (Stein et al., 2000) there was no difference in the prevalence rate between males and females. Comparatively, Amies, Gelder, and Shaw (1983) found significantly more males in a clinical study. This is consistent with other reports of more males with social phobia in treatment settings (Mannuzza, Fyer, Liebowitz, & Klein, 1990). One theory for this discrepancy is that females are more likely to have social phobia, however, males who have social phobia are more likely to seek treatment (Weinstock, 1999). This could have implications for possible gender differences in the pathology and treatment of social phobia.

D. Age of onset

The age of onset for social phobia is typically adolescence. One study found onset of social phobia to occur at age 19 (Amies et al., 1983). Using data from the ECA study, Schneier et al. (1992) found a mean reported age at onset to be 15.5 years with onset occurring after the age of 25 years to be uncommon. However, over one-third of individuals with social phobia reported that their disorder had been present prior to age 10. As noted by Rapee (1995) most accounts of age of onset are measured by retrospective self-report and are thus subject to inaccuracies. Even though retrospective reports may be prone to inaccurate recall, this does not rule out the possibility that those who endorsed social phobia symptoms at young ages were in fact already suffering from social phobia. Indeed, social phobia has been detected in children as young as eight years of age (Beidel & Turner, 1998).

E. Comorbidity

Social phobia is associated with a high lifetime comorbidity rate with various disorders. Epidemiological studies have reported that 70- 80% of individuals with social phobia have had an additional disorder at some point in their lifetimes (Magee, 1996; Schneier et al., 1992). In the majority of cases (76.8%), social phobia has preceded the onset of the additional diagnosis (Schneier, 1992). However, it is unclear whether this is attributable to the earlier age of onset of social phobia as compared with other diagnoses or an indication that social phobia may contribute to the development of other psychiatric disorders. Among the Axis I disorders, anxiety disorders, affective disorders, and substance abuse are most commonly comorbid with social phobia (Magee, 1996; Schneier et al., 1992). More specifically, within anxiety disorders, simple phobia, agoraphobia, and generalized anxiety disorder seem to be particularly prevalent in individuals with social phobia. Of individuals with social phobia, comorbidity rates of simple phobia have ranged from 11.11 – 23.8% in clinical samples (Mennin, Heimberg, & MacAndrew, 2000; Turner, Beidel, Borden, Stanley, & Jacob, 1991) to 59.0% in a community sample (Schneier et al., 1992). Comorbidity rates of agoraphobia and generalized anxiety disorder have been reported as 44.9% and 33.33%, respectively (Schneier et al., 1992; Turner et al., 1991). As for affective disorders, lifetime occurrence of a major depressive episode has been reported in 16.6 – 48.8% of those with social phobia (Lecrubier & Weiller, 1997; Schneier et al., 1992). The additive effects of these comorbid disorders can cause greater distress in the individuals. Indeed, Schneier and colleagues (1992) reported that individuals with social phobia with or without a comorbid diagnosis

41

were more likely to experience suicidal ideation as compared to those without social phobia. However, those with comorbid social phobia were more likely than those with uncomplicated social phobia to have attempted suicide.

In addition to the Axis I disorders, there are Axis II disorders frequently associated with social phobia. Although the Axis II disorders were not included in the large epidemiological studies, other studies have looked at rates of various personality disorders. For example, Turner and colleagues (1991) reported that 43% of those with social phobia also met criteria for a personality disorder. Among these personality disorders, avoidant personality disorder and obsessive-compulsive personality disorder were most common with prevalence rates of 22.1% and 13.2% respectively. These two diagnoses accounted for over 70% of the Axis II diagnoses. This rate of avoidant personality disorder, which can range from 50-89% for the generalized subtype of social phobia to 21-23% for the specific subtype of social phobia, is consistent with previous studies (Rapee, 1995). The high rate of comorbidity between social phobia and avoidant personality disorder is not surprising given the similarity of the diagnoses. In fact, the disorders have been considered by some to consist more of quantitative differences as opposed to qualitative differences (Boone et al., 1999; Rapee, 1995). However, differences between the disorders have been found in areas such as social skill, amount of social avoidance, and level of distress (Turner, Beidel, Dancu, & Keys, 1986). These Axis I and II disorders that tend to be comorbid are consistent with the conceptualization of the disorder. The fear of negative evaluation that characterizes those with social phobia could understandably lead one to feel depressed, use alcohol or other substances to lessen

social pressures, or avoid situations altogether. Also, for those who experience

anxiety regarding certain situations, this anxiety could conceivably generalize to other

additional situations. Finally, these fears and anxieties could also influence

obsessional qualities.

F. Impairment

As the general understanding of social phobia has increased, so has the

awareness of how significantly social phobia can impact daily functioning. Those

with social phobia have reported a greater impairment in daily activities, a poorer

quality of well-being and a higher rate of suicidal ideation (Stein & Kean, 2000).

More specifically, social phobia can impact an individual's social, academic, and

work functioning, and these impairments are discussed below.

Social impairment. As stated previously, the onset of social phobia is middle

to late adolescence. This coincides with the time that individuals begin initiating

interactions with peers of same and opposite sex away from parental involvement. In

addition, peer groups are more important during adolescence compared to pre-

adolescence. Therefore, if an individual is experiencing social fears during this time,

these fears will most likely influence the relationships that could potentially be

formed. Indeed, individuals with social phobia are less likely to be married (Schneier

et al., 1992; Wittchen & Beloch, 1996) either due to never having married or being

divorced. Regarding unmarried individuals with social phobia, Turner, Beidel,

Dancu, and Keys (1986) found that 50% of unmarried socially phobic individuals

reported that social phobia affected their abilities to engage in social activities or

establish the intimacy needed for longterm relationships. Other studies have found

that individuals with social phobia endorsed impairment or significantly higher dissatisfaction in family relationships, friendships, and dating interactions (Magee et al., 1996; Schneier et al., 1994; Stein & Kean, 2000).

Academic impairment. In addition to social functioning, individuals with social phobia have also reported impairment in academic functioning (Schneier et al., 1994; Stein, Torgrud, & Walker, 2000; Wittchen & Beloch, 1996). Individuals with social phobia are more likely to either fail a grade or leave school early (Stein and Kean, 2000). Moreover, in one study, 83% of individuals with social phobia felt that their disorder inhibited academic functioning by limiting factors such as speaking in class or joining in class discussions which may have resulted in poorer grades, joining clubs or teams, or being elected to leadership positions (Turner, Beidel, Dancu, & Keys, 1986).

Occupational impairment. It seems credible that impairment in academic functioning can influence occupational functioning. Not surprisingly, individuals with social phobia also endorse work-related impairments (Schneier et al., 1994; Stein et al., 2000). Turner and colleagues (1986) reported that 92% of individuals with social phobia considered their occupational performance impaired. A couple of factors contributing to this included: inability to make suggestions in meeting or give presentations thus resulting in a lack of career advancement. Wittchen and Beloch (1996) found that individuals with social phobia missed more days of work due to self-reported symptoms of social phobia and experienced a 11.4 - 12.4% decrease in work productivity as assessed by the Work Productivity And Impairment questionnaire.

Impairment across subtypes and comorbid diagnoses. In considering the impact that social phobia has on life functioning, there are other aspects worth mentioning. First, as discussed previously, there are two subtypes of social phobia: generalized and nongeneralized. As the generalized subtype is classified as consisting of a greater number of fears, it follows that it is more impairing. Studies have found that those with the generalized subtype did report significantly higher impairment and/or greater dissatisfaction with areas such as: academic functioning, occupation functioning, interpersonal relationships, income, accomplishments, and daily activities (Stein & Kean, 2000; Stein, Torgrud, & Walker, 2000). Second, some studies are conducted using clinical samples where others utilize community samples. As individuals seeking treatment may be likely to be more severe than those who do not seek treatment, it is important to consider whether the samples differ in level of impaired functioning. Although to this author's knowledge, there is not a study comparing the level of impairment between these two groups, the studies previously discussed utilize an array of both clinical and community samples. Across the samples, the areas of impairment are consistent. Finally, as also stated previously, social phobia is highly co-morbid with a variety of disorders. Therefore, there is the question of the extent to which co-morbid diagnoses contribute to the level of impaired functioning. In an attempt to address this issue, Stein and Kean (2000) used an epidemiological study to compare those with social phobia with and without co-morbid major depression and those with major depression only. They found that even after adjusting for the presence of major depression, a large part of the impairment of functions could be attributed to social phobia. In conclusion, social phobia is a

disorder that leads to significant impairments in a variety of specific life areas as well as affecting general quality of life.

G. Treatment

In attempts to treat this impairing disorder, various approaches have been utilized such as pharmacological, cognitive-behavioral, and behavioral treatments.

Pharmacological treatment. One primary intervention strategy has been through pharmacological treatment. Some of the classes of pharmacological agents that have been studied include monoamine oxidase inhibitors (MAOIs), benzodiazepines, and serotonin selective reuptake inhibitors (SSRIs). Phenelzine is probably the most extensively studied MAOI in the treatment of social phobia (Lydiard, 1998) and it has been successful at ameliorating symptoms of social phobia in adults (Heimberg et al., 1998; Liebowitz, Schneier, & Campeas, et al., 1992; Versiani, Nardi, Mundim, Alves, Liebowitz, & Amrein, 1992). However, MAOIs may have associated undesirable side effects such as insomnia, sexual dysfunction, weight gain, as well as requiring a restricted diet to avoid hypertensive crises (Lydiard, 1998). Another class of medications, benzodiazepines, has produced mixed results, although clonazepam appears more promising than alprazolam (Beidel & Turner, 1998). Irregardless, due to their contraindication in patients who abuse alcohol and their link with physical dependence in long-term use patients, benzodiazepines are not considered an optimal treatment for those with social phobia (Lydiard, 1998). Advantages of the SSRIs include the relatively benign side effects. In fact, most patients can be taken off the drug with relative ease (Beidel & Turner, 1998; Lydiard, 1998). Three SSRIs that have been reported to be efficacious in

treating social phobia include fluoxetine, fluvoxamine, and paroxetine (Schneier, Chin, Hollander, & Liebowitz, 1992; VanVliet, den Boer, & Westenberg, 1994; Mancini & Van Ameringen, 1996). However, many of these trials consisted of small sample sizes and improvement usually is gauged based on a single-item rating scale. Larger scale studies are necessary to determine if rates of improvement remain consistent.

Cognitive-behavior therapy and behavior therapy. Other major intervention strategies for the treatment of social phobia are cognitive-behavior therapy (CBT) and behavior therapy (i.e., exposure-only therapy). CBT focuses on both the physiological responses to anxiety as well as occurring maladaptive cognitions. There are different classes of CBT that have been used in treating social phobia including anxiety management or relaxation training, cognitive restructuring, exposure, and social skills training (Heimberg, 2002; Shear & Beidel, 1998). Anxiety management uses attention focusing and relaxation exercises to train the individual to feel more comfortable in situations that elicit anxiety. Cognitive restructuring involves identifying maladaptive cognitions and transforming them into more beneficial self-statements based on an objective analysis of the information presented in an anxiety evoking situation. Cognitive restructuring can also include an exposure component. Exposure consists of re-creating an anxiety-eliciting situation and exposing the individual to that situation repeatedly. Finally, social skills training addresses the behavioral deficits of individuals with social phobia in an attempt to improve the individual's skill when in social situations. Each of these classes theoretically can be conducted independently or in combination with another class.

For the treatment of anxiety disorders, behavior therapy concentrates on the exposure procedure explained above.

Exposure-only and CBT interventions have produced either equal or superior results when compared with pharmacotherapy (Gould, Buckminster, Pollack, Otto, & Yap, 1997; Heimberg et al., 1998; Turner, Beidel, & Jacob, 1994). Heimberg and colleagues (1998) compared phenelzine with cognitive behavioral group therapy and found phenelzine to have slightly greater immediate efficacy. Despite this, in a 6-month follow-up assessment, 50% of the responders to phenelzine had relapsed as compared to 17% of the responders to the CBGT (Liebowitz, Heimberg, Schneier, Hope, Davies, Holt, et al., 1999). This indicates that despite any initial superior results, the improvements due to pharmacotherapy may be dependant upon continuation of the drug, whereas, benefits of CBGT continue after the treatment is complete. Early studies have shown exposure-based treatments to be efficacious in treating social phobia. Butler and colleagues found patients to be less severe following treatments of both exposure and exposure with anxiety management (Butler, Cullington, Munby, Amies, & Gelder, 1984). Another study treating socially phobic individuals with imaginal and performance-based exposure, cognitive restructuring, and systematic homework assignments also found that patients improved on behavioral, physiological, and cognitive measures of anxiety (Heimberg, Becker, Goldfinger, & Vermilyea, 1985). However, these studies and others (e.g., Mattick & Peters, 1988; Mattick, Peters, & Clarke, 1989) have included components in addition to exposure, such as cognitive restructuring and anxiety management. In an attempt to address this issue, Turner, Beidel, and Jacob (1994) examined the

48

effects of flooding treatment alone. Flooding was found to be efficacious in treating

social phobia with 88.9% of participants at least moderately improved at post-

treatment as assessed by the Index of Social Phobia Improvement (ISPI). In addition

to these improvements, participants had significantly more positive thoughts and

fewer negative thoughts. These improvements were maintained over the 6-month

follow-up period. These results support the use of exposure treatment for social

phobia.

The literature indicates that exposure is the integral component of treating

social phobia. Indeed, treatments that ameliorate symptoms of individuals with social

phobia typically have some aspect of exposure incorporated whether it be the sole

focus or not. Based on this, it is worth considering if any additional effects are

achieved by adding the cognitive component of the treatment. In support of this idea

is a dismantling study comparing cognitive behavioral group therapy with exposure

only therapy (Hope, Heimberg, & Bruch, 1995) The results did not demonstrate any

additive effects of the cognition component. Interestingly, the exposure only group

demonstrated more broad-based change on measures of social phobia and cognition.

In addition, a meta-analysis comparing cognitive behavioral treatments with exposure

only treatments (Feske & Chambless, 1995) found that both strategies were equally

effective and the added cognitive component did not improve symptoms, mood, or

self-report of the patient. Feske and Chambless noted that although the benefits of

the therapies were significant, they were not optimal. Furthermore, they suggested

that adding other treatment components such as social skills training could yield more

powerful effects. A treatment developed by Turner, Beidel, and Cooley (1995) called

Social Effectiveness Therapy (SET) addresses this same issue by incorporating both exposure therapy and social skills training. Eighty-four per cent of subjects in an initial pilot study displayed moderate or high endstate functioning (Turner, Beidel, Cooley, Woody, & Messer, 1994). This is considerably greater than the 33% moderate or high endstate functioning that was found in a study using exposure therapy without the social skills component (Turner, Beidel, Long, Turner, & Townsley, 1993).

H. Social Skills

It has been determined that individuals with social phobia are not as adept in using social skills as individuals without social phobia. Indeed, the rationale behind the integration of behavior therapy and social skills training in both the SET and the Social Effectiveness Training for Children (SET-C) treatments is to focus on ameliorating these difficulties. However, this issue engenders the question of whether difficulties with social skills are due to a skills deficit (i.e. the individual truly has impaired social skills) or are a result of anxiety (i.e. the individual has adequate social skills but, when in an anxiety-evoking situation, is unable to use these skills). This question was examined in a study by Shackman (unpublished manuscript) where the social element of an interactive task was removed. More specifically, verbal content was compared in both a standard role-play task and a task where participants wrote responses to scripted conversation prompts without any social component. Although individuals with high social anxiety did not differ from those with low social anxiety in specific verbal content, they were rated as overall less skilled than those with low social anxiety on a global rating of the role play task.

This suggests that those with high social anxiety probably possess the knowledge of appropriate verbal content in a non-social situation, but, despite this, appear less socially skilled when actually engaged in a social situation.

To date, most studies have conceptualized deficits primarily in terms of verbal skills and a few non-verbal elements such as eye contact and voice volume. One potential deficit that has not received much attention is facial affect recognition. In a study with socially phobic children, Simonian and colleagues (2001) found that children made more errors in identifying facial expression than children without social phobia. Having a deficit in facial affect recognition would likely impact a person's social experiences. For example, if an individual is exhibiting a flat affect, or an unhappy expression, it may not be an appropriate time to approach this individual. Someone with this social skills deficit may not accurately determine facial expressions that represent different emotions. This could conceivably lead to rejection by an individual not wanting to be approached. To date, the ability of socially phobic adults to accurately perceive facial affect has yet to be examined.

I. Facial Affect

Facial affect recognition in other psychiatric populations. Deficits in the ability to accurately recognize facial affect have been found in other adult psychiatric populations. The literature on schizophrenia contains numerous studies that have consistently found that individuals with schizophrenia have considerable disturbances in facial affect recognition (David & Cutting, 1990; Edwards, Jackson, & Pattison, 2002; Feinberg, Rifkin, Schaffer, & Walker, 1986; Mueser et al., 1996; Novic, Luchins, & Perline, 1984; Zuroff & Colussy, 1986). These studies have found

deficits in facial affect recognition using various tasks such as emotion-labeling, identity-matching, or emotion-matching, but as yet there is no consensus on which specific emotional expressions the disturbances exist or on the mechanisms behind these deficits. Proposed reasons for the inconsistencies in the data have included poor control groups, different phases of illness, differing variables of emotion categories, response times, response formats, and stimulus complexities (Edwards et al., 2002). Similar to the outcome for those with schizophrenia, studies with individuals suffering from depression have also found that those who are depressed are worse at accurately identifying facial affect than those who are not depressed (Feinberg, Rifkin, Schaffer, & Walker,1986; Gur et al., 1992; Rubinow & Post, 1992; Zuroff & Colussy, 1986). These studies have varied regarding task utilizing facial stimuli and the specific affects used. Although there is consensus that those with depression exhibit deficits in identifying facial affect, again, there lacks a consensus on the which specific valence expressions are impaired and on any mechanism behind the impairment.

    <u>Cognitive biases in social phobia.</u> In the social phobia literature, there have been a substantial number of studies using facial affect to determine potential cognitive biases of individuals with social phobia. The facial affect tasks used in these studies differ from the facial affect recognition tasks used with schizophrenia and depression populations described above. The stimuli for the affect recognition tasks previously described typically consist of presenting a series of single faces and asking the participant to name the affect portrayed. In contrast, the social phobia literature has concentrated on potential cognitive biases. These tasks have typically

<div align="center">52</div>

presented facial stimuli in groups or in the context of a social task (i.e. a speech presentation or interaction) in an effort to identify cognitive biases such as overattention to negative facial affect. This raises two issues. First, the tasks investigating a potential bias rely on the assumption that the individual is recognizing the emotion of the person or picture accurately. However, if individuals with social phobia are unable to accurately identify facial expression of emotion, the results of these studies would be invalid. Second, the tasks also include other socially-relevant stimuli such as other faces or other individuals. As social stimuli are known to produce anxiety in those with social anxiety, the cognitive bias results may be due to a heightened state of anxiety, not an actual skill deficit.

Among the hypothesized biases that have been investigated are memory bias and attentional bias. Within this literature, the majority of studies have used lexical stimuli, typically threat-relevant words. However, in the interest of ecological validity, there has been a shift towards using pictures of faces to determine if relevant attentional and cognitive biases exist in those with social phobia (Foa, Gilboa-Schechtman, Amir, & Freshman, 2000; Heinrichs & Hofmann, 2001). Memory bias has to do with which stimuli an individual recalls. In a recent review of the literature, Heinrichs and Hofmann (2001) concluded that support for a memory bias in tasks using lexical stimuli (individual words) has not been found. Indeed, one study failed to find support of a memory bias for threat-relevant information in free and cued recall, recognition and word-stem completion tasks. Furthermore, the study failed to find evidence of a memory bias in both hypothetical and real-life experiences (Rapee, McCallum, Melville, Ravenscroft, & Rodney, 1994). While Wenzel and Holt (2002)

agree with the review's conclusion, they suggested that a single word stimulus might not be sufficient to activate relevant fear structures perhaps necessary to elicit a bias in information processing. Wenzel and Holt used neutral and threat passages rather than individual words and found that those with social phobia remembered a smaller percentage of units from the threat passages than the non-anxious individuals. While these results may support the hypothesis that a passage (a more complex stimulus) is more likely to reveal a bias in information processing than a single word, more research comparing the two is needed before a conclusion can be drawn.

In contrast to findings using semantic material, studies using facial expressions have some support for a memory bias. For example, individuals with social phobia recognized more critical faces than accepting faces (Lundt & Ost, 1996). In another investigation, those with social phobia demonstrated a better memory for all facial expressions and exhibited enhanced recognition of negative as compared to nonnegative facial expressions (Foa et al., 2000). However, Perez-Lopez and Woody (2001) reported results that are inconsistent with the above outcome; social phobics did not have a memory bias toward threatening facial expressions and actually found a small bias towards reassuring faces. However, individuals with social phobia were less accurate than controls at recognizing previously seen photographs. Therefore, although there may be a memory bias towards negative expressions, a decision should await further studies. In addition, if individuals with social phobia are deficient in accurately recognizing facial affect, these findings would need to be re-addressed.

The existence of an attentional bias has also been studied. This focus addresses the question of where attention of the individual is directed. Again, many of these studies (e.g., Amir et al., 1996; Hope, Rapee, Heimberg, & Dombeck, 1990; Mattia, Heimberg, & Hope, 1993) have used semantic stimulus material which may produce different results than facial stimuli (Clark & Wells, 1995). In reviewing the literature, Heinrichs and Hofmann (2001) reported similar findings. Specifically, they concluded that with semantic stimulus material, individuals with social phobia display an attentional bias towards socially threatening information, whereas, for facial cues, individuals exhibit an attentional bias away from the source of information. One study that found supporting results for this generalization used a dot-probe task to ascertain where individuals direct their attention (Chen, Ehlers, Clark, & Mansell, 2002). Those with social phobia directed their attention away from facial stimuli and towards stimuli of household objects. This was consistent for all emotional valences. This similarity across all valences is, however, inconsistent with other studies utilizing facial stimuli. Using a face-in-the-crowd paradigm, Gilboa-Schechtman, Foa, and Amir (1999) found that those with social phobia are faster at detecting angry expressions. Since further investigation found that these individuals were not better at recognizing angry expression and did not exhibit a response bias, the authors concluded that individuals with social phobia have an attentional bias towards angry expressions. This is consistent with previous studies (Hansen & Hansen, 1988; Hampton, Purcell, Bersine, Hansen, & Hansen, 1989; Purcell, Stewart, & Slov, 1996). However, these studies rest on the assumption that the individuals

were accurate at identifying each of the emotions shown to them and this has not been demonstrated.

Facial affect recognition in social phobia. There is an abundant literature using facial expressions to examine cognitive biases in those with social phobia. However, these studies have focused on how individuals with social phobia attend to different stimuli within the experimental task rather than the accuracy of their ability to recognize facial affect. As noted above, one study has addressed the question of accuracy in identifying facial affect in children with social phobia (Simonian, Beidel, Turner, Berkes, & Long, 2001). This study differed from many others because there were no other socially-relevant aspects to the study (i.e. giving a speech, seeing a crowd of faces presented). The children viewed facial expressions and recorded their judgment of the expression shown. The results showed that the children with social phobia made more identification errors than the children without social phobia. More specifically, the socially phobic children were worse at identifying the emotions of happiness, sadness, and disgust. However, in the adult literature, no study has investigated if individuals with social phobia are accurate at identifying facial expression.

In addition, these studies investigating cognitive biases have typically been designed to simulate some situation that in everyday life could elicit anxiety. Therefore, the outcome is potentially influenced by the level of anxiety aroused or lack of anxiety aroused during the task. Furthermore, the level of the individual's anxiety in these studies has not been controlled. No study has attempted to determine

whether any impairment in ability is due to the heightened anxiety or is also present when the individual is feeling little or no anxiety.

Given that those with social phobia experience a range of social skill deficits, it is possible that the inability to accurately determine facial affect of others represents an additional and as yet undetermined skill deficit. This difficulty may result from a true skill deficit or a temporary impairment that is activated when in an anxiety-evoking situation. Determining the reason for the deficit has important implications in how to best ameliorate any difficulties. If there is a true deficit in ability to accurately recognize facial affect regardless of the external environment, then treatment should focus on teaching differences in expression to the person with social phobia. However, if the deficit is only present in situations eliciting anxiety, the individual would be better served by treatment strategies focusing on the anxiety and learning how to best respond in the social situation.

This study will compare the performance of those with high social anxiety and low social anxiety in determining facial expressions. In order to determine if any true deficits in this ability are present the two groups will be compared in a baseline situation. In order to then determine if any impairment may be due to a heightened state of anxiety, the two groups will be compared in the same task after being exposed to a social situation which is expected to evoke anxiety in those with high social anxiety but not those with low social anxiety.

References

Alden, L.E., Wallace, S.T. (1995). Social phobia and social appraisal in successful and unsuccessful social interactions. <u>Behaviour Research and Therapy, 33(5),</u> 497-505.

Amies, P.L., Gelder, M.G., & Shaw, P.M. (1983). Social phobia: A comparative clinical study. <u>British Journal of Psychiatry, 142,</u> 174-179.

American Psychiatric Association. (1994). <u>Diagnostic and statistical manual of mental disorders</u> (4th ed.). Washington, DC: American Psychiatric Association.

Amir, N., McNally, R.J., Riemann, B.C., Burns, J., Lorenz, M., & Mullen, J.T. (1996). Suppression of the emotional stroop effect by increased anxiety in patients with social phobia. <u>Behaviour Research and Therapy, 34,</u> 945-948.

Andrews, G. & Peters, L. (1998). The psychometric properties of the Composite International Diagnostic Interview. <u>Social Psychiatry & Psychiatric Epidemiology, 33,</u> 80-88.

Baker, S.R. & Edelmann, R.J. (2002). Is social phobia related to lack of social skills? Duration of skill-related behaviours and ratings of behavioural adequacy. <u>British Journal of Clinical Psychology, 41,</u> 243-257.

Battaglia, M., Ogliari, A., & Zanoni, A. (2005). Influence of the Serotonin Transporter Promoter Gene and Shyness on Children's Cerebral Responses to Facial Expressions. <u>Archives of General Psychiatry, 62(1),</u> 85-94.

Beidel, D.C., Borden, J.W., Turner, S.M., & Jacob, R.G. (1989). The Social Phobia and Anxiety Inventory: concurrent validity with a clinic sample. <u>Behaviour Research and Therapy, 27(5),</u> 573-576.

Beidel, D.C. & Turner, S.M. (1998). <u>Shy children, phobic adults: Nature and treatment of social phobia.</u> Washington, DC: American Psychological Association Books.

Beidel, D.C., Turner, S.M., & Cooley, M.R. (1993). Assessing reliable and clinically significant change in social phobia: Validity of the Social Phobia and Anxiety Inventory. <u>Behaviour Research and Therapy,</u> 31(3), 331-337.

Beidel, D.C., Turner, S.M., & Dancu, C.V. (1985). Physiological, cognitive and behavioral aspects of social anxiety. <u>Behaviour Research and Therapy, 23(2),</u> 109-117.

Beidel, D.C., Turner, S.M., & Jacob, M.D. (1989). Assessment of social phobia: Reliability of an impromptu speech task. <u>Journal of Anxiety Disorders, 3,</u> 149-158.

Beidel, D.C., Turner, S.M., Stanley, M.A., & Dancu, C.V. (1989). The Social Phobia and Anxiety Inventory: concurrent and external validity. <u>Behaviour Therapy, 20,</u> 417-427.

Bleuler, E. (1950). Dementia Praecox or the Group of Schizophrenics. New York: International Universities Press.

Boone, M.L., McNeil, D.W., Masia, C.L., Turk, C.L., Carter, L.E., Ries, B.J., & Lewin, M.R. (1999). Multimodal comparisons of social phobia subtypes and avoidant personality disorder. <u>Journal of Anxiety Disorders, 13(3),</u> 271-292.

Brunello, N., den Boer, J.A., Judd, L.L., Kasper, S., Kelsey, J.E., Lader, M., Lecrubier, Y., Lepine, J.P., Lydiard, R.B., Mendlewicz, J., Montgomery, S.A., Racagni, G., Stein, M.B., & Wittchen, H.-U. (2000). Social phobia: diagnosis, and

epidemiology, neurobiology and pharmacology, comorbidity and treatment. Journal of Affective Disorders, 60, 61-74.

Butler, G., Cullington, A., Munby, M., Amies, P., & Gelder, M. (1984). Exposure and anxiety management in the treatment of social phobia. Journal of Consulting and Clinical Psychology, 52(4), 642-650.

Chen, Y.P., Ehlers, A., Clark, D.M., & Mansell, W. (2002). Patients with generalized social phobia direct their attention away from faces. Behaviour Research and Therapy, 40, 677-687.

Clark, D.M. & Wells, A. (1995). A cognitive model of social phobia. In: Heimberg, R., Liebowitz, M., Hope, D.A., Schneier, F.R., (eds.) Social phobia: Diagnosis, assessment, and treatment. New York: Guilford Press, 69-93.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

David, A.S. & Cutting, J.C. (1990). Affect, affective disorder and schizophrenia: A neuropsychological investigation of right hemisphere function. British Journal of Psychiatry, 156, 491-495.

Davidson, J.R., Foa, E.B., Connor, K.M., & Churchill, L.E. (2002). Hyperhidrosis in social anxiety disorder. Progress in Neuro-Psychopharmacology & Biological Psychiatry, 26, 1327-1331.

Davidson, J.R., Hughes, D.L., & George, L.K. (1993). The epidemiology of social phobia: Findings from the Duke Epidemiological Catchment Area Study. Psychological Medicine, 23(3), 709-718.

Edwards, J., Jackson, H.J., & Pattison, P.E. (2002). Emotion recognition via facial expression and affective prosody in schizophrenia: A methodological review. Clinical Psychology Review, 22, 789-832.

Ferrell, C.B., Beidel, D.C., & Turner, S.M. (in press) Assessment and treatment of socially phobic children: A cross cultural comparison.

Feske, U. & Chambless, D. (1995). Cognitive behavioral versus exposure only treatment for social phobia: A meta-analysis. Behavior Therapy, 26, 695-720.

Foa, E.B., Gilboa-Schechtman, E., Amir, N., & Freshman, M. (2000). Memory bias in Generalized Social Phobia: Remembering negative emotional expressions. Journal of Anxiety Disorders, 14(5), 501-519.

Gerlach, A.L., Wilheim, F.H., Gruber, K., & Roth, W.T. (2001). Blushing and physiological arousability in social phobia. Journal of Abnormal Psychology, 110(2), 247-258.

Gilboa-Schechtman, E., Foa, E.B., & Amir, N. (1999). Attentional biases for facial expressions in social phobia: The face-in-the-crowd paradigm. Cognition and emotion, 13(3), 305-318.

Goetsch, V.L. & Adams, H.E. (1990). A multicomponent investigation of the interaction of generalized anxiety and phobia. Journal of Psychopathology & Behavioral Assessment, 12(4), 329-344.

Gorman, J.M. & Gorman, L.K. (1987). Drug treatment of social phobia. Journal of Affective Disorders, 13(2), 183-192.

Gould, R.A, Buckminster, S., Pollack, M.H., Otto, M.W., & Yap, L. (1997). Cognitive behavioral and pharmacological treatment of generalized anxiety disorder:

A preliminary meta-analysis. <u>Clinical Psychology: Science & Practice, 4(4),</u> 291-306

Gur, R.C., Erwin, R.J., Gur, R.E., Zwil, A.S., Heimberg, C. & Kraemer, H.C. (1992). Facial emotion discrimination: II. Behavioral findings in depression. <u>Psychiatry Research, 42,</u> 241-251.

Hampton, C., Purcell, D.G., Bersine, L., Hansen, C.H., & Hansen, R.D. (1989). Probing "pop-out": Another look at the face-in-the-crowd effect. <u>Bulletin of the Psychonomic Society, 27(6),</u> 563-566.

Hansen, C.H. & Hansen, R.D. (1988). Finding the Face in the Crowd: An Anger Superiority Effect. <u>Journal of Personality and Social Psychology, 54(6),</u> 917-924.

Heimberg, R.G. (2002). Cognitive-behavioral therapy for social anxiety disorder: Current status and future directions. <u>Biological Psychiatry, 51(1),</u> 101-108.

Heimberg, R.G., Becker, R.E., Goldfinger, K., & Vermilyea, J.A. (1985). Treatment of social phobia by exposure, cognitive restructuring and homework assignments. <u>Journal of Nervous & Mental Disease, 173(4),</u> 236-245.

Heimberg, R.G., Hope, D.A., Dodge, C.S. & Becker, R.E. (1990). DSM-III-R subtypes of social phobia: comparison of generalized social phobics and public speaking phobics. <u>The Journal of Nervous and Mental Disease, 178(3),</u> 172-179.

Heimberg, R.G., Liebowitz, M.R., Hope, D.A., Schneier, F.R., Holt, C.S., Welkowitz, L.A., Juster, H.R., Campeas, R., Bruch, M.A., Cloitre, M., Gallon, B., & Klein, D.F. (1998). Cognitive behavioral group therapy vs phenelzine therapy for social phobia. <u>Archives of General Psychiatry, 55,</u> 1133-1141.

Heinrichs, N. & Hofmann, S.C. (2001). Information processing in Social

Phobia: A critical review. Clinical Psychology Review, 21(5), 751-770.

Hope, D.A., Heimberg, R.G., & Bruch, M.A. (1995). Dismantling cognitive-

behavioral group therapy for social phobia. Behaviour Research & Therapy, 33(6),

637-650.

Hope, D.A., Rapee, R.M., Heimberg, R.G., & Dombeck, M.J. (1990).

Representations of the self in social phobia: Vulnerability to social threat. Cognitive

Therapy & Research, 14(2), 177-189.

Kessler, R.C., McGonagle, K.A., Zhao, S., Nelson, C.B., Hughes, M.,

Eshleman, S., Wittchen, H.-U., & Kendler, K.S. (1994). Lifetime and 12-month

prevalence of DSM-III-R psychiatric disorders in the United States: results from the

National Comorbidity Survey. Archives of General Psychiatry, 51, 8-19.

Lecrubier, Y. & Weiller, E. (1997). Comorbidities in social phobia.

International Clinical Psychopharmacology, 12(suppl 6), S17-S21.

Liebowitz, M.R., Schneier, F., Campeas, R., Hollander, E., Hatterer, J., Fyer,

A., Gorman, J., Papp, L., Davies, S., Gully, R., & Klein, D.F. (1992). Phenelzine vs

atenolol in social phobia: A placebo-controlled comparison. Archives of General

Psychiatry, 49, 290-300.

Liebowitz, M.R. (1999). Update on the diagnosis and treatment of social

anxiety disorder. Journal of Clinical Psychiatry, 60(suppl 18), 22-26.

Liebowitz, M.R., Heimberg, R.G., Schneier, F.R., Hope, D.A., Davies, S.,

Holt, C.S., Goetz, D., Juster, H.R., Lin, S.H., Bruch, M.A., Marshall, R.D., & Klein,

D.F. (1999). Cognitive-behavioral group therapy versus phenelzine in social phobia:

long-term outcome. Depression and anxiety, 10 (3), 89-98.

Lundt, L.-G. & Ost, L.-G. (1996). Recognition bias for critical faces in social

phobics. Behaviour Research and Therapy, 34(10), 787-794.

Lydiard, R.B. (1998). The role of drug therapy in social phobia. Journal of

Anxiety Disorders, 50, S35-S39.

Magee, W.J., Eaton, W.W., Wittchen, H.-U., McGonagle, K.A., & Kessler,

R.C. (1996). Agoraphobia, simple phobia, and social phobia in the National

Comorbidity Survey. Archives of General Psychiatry, 53, 159-168.

Mancini, C. & Van Ameringen, M. (1996). Paroxetine in social phobia.

Journal of Clinical Psychiatry, 57(11), 519-522.

Mannuzza, S., Fyer, A.J., Liebowitz, M.R., & Klein, D.F. (1990).

Delineating the boundaries of social phobia: Its relationship to panic disorder and

agoraphobia. Journal of Anxiety Disorders, 4, 41-59.

Mannuzza, S., Schneier, F.R., Chapman, T.F., Liebowitz, M.R., et al. (1995).

Generalized social phobia: Reliability and validity. Archives of General Psychiatry,

52, 230-237.

Mattia, J.I., Heimberg, R.G. & Hope, D.A. (1993). The revised Stroop color-

naming task in social phobics. Behaviour Research and Therapy, 31(3), 305-13.

Mattick, R.P. & Peters, L. (1988). Treatment of Severe Social Phobia: Effects

of Guided Exposure With and Without Cognitive Restructuring. Journal of

Consulting and Clinical Psychology, 56(2), 251-260.

Mattick, R.P., Peters, L. & Clarke, J.C. (1989). Exposure and cognitive restructuring for social phobia: A controlled study. Behavior Therapy, 20(1), 3-23.

Mennin, D.S., Heimberg, R.G., & MacAndrew, S.J. (2000). Comorbid generalized anxiety disorder in primary social phobia: symptom severity, functional impairment, and treatment response. Journal of Anxiety Disorders, 14(4), 325-343.

Mueser, K.T., Doonan, R., Penn, D.L., Blanchard, J.J., Bellack, A.S., Nishith, P., & DeLeon, J. (1996). Emotion recognition and social competence in chronic schizophrenia. Journal of Abnormal Psychology, 105(2), 271-275.

Perez-Lopez, J.R. & Woody, S.R. (2001). Memory for facial expressions in social phobia. Behaviour Research and Therapy, 39, 967-975.

Peters, L., Clark, D., & Carroll, F. (1998). Are computerized interviews equivalent to human interviewers? CIDI-Auto versus CIDI in anxiety and depressive disorders. Psychological Medicine, 28, 893-901.

Purcell, D.G., Stewart, A.L., & Skov, R.B. (1996). It takes a confounded face to pop out of a crowd. Perception, 25(9), 1091-1108.

Rapee, R.M. (1995). Descriptive psychopathology of social phobia. In: Heimberg, R.G., Liebowitz, M.R., Hope, D.A., & Schneier, F.R. (eds.). Social phobia: Diagnosis, assessment, and treatment. New York: Guilford Press, 41-66.

Rapee, R. M. & Heimberg, R.G. (1997). A cognitive-behavioral model of anxiety in social phobia. Behaviour Research and Therapy, 35, 741-756.

Rapee, R.M., McCallum, S.L., Melville, L.F., Ravenscroft, H., & Rodney, J.M. (1994). Memory bias in social phobia. Behaviour Research and Therapy, 32(1), 89-99.

Rapee, R. M. & Spence, S. H. (2004). The etiology of social phobia: Empirical evidence and an initial model. <u>Clinical Psychology Review, 24,</u> 737-767.

Regier, D.A., Narrow, W.E., & Rae, D.S. (1990). The epidemiology of anxiety disorders: The Epidemiologic Catchment Area (ECA) Experience. <u>Journal of Psychiatric Research, 24(2),</u> 3-14.

Rubinow, D.R. & Post, R.M. (1992). Impaired recognition of affect in facial expression in depressed patients. <u>Biological Psychiatry, 31,</u> 947-953.

Schneier, F.R., Chin, S.J., Hollander, E., & Liebowitz, M.R. (1992). Fluoxetine in social phobia. <u>Journal of Clinical Psychopharmacology, 12(1),</u> 62-64.

Schneier, F.R., Heckelman, L.R., Garfinkel, R., Campeas, R., Fallon, B.A., Gitow, A., Street, L., Del Bene, D., & Liebowitz, M.R. (1994). Functional impairment in social phobia. <u>Journal of Clinical Psychiatry, 55,</u> 322-331.

Schneier, F.R., Johnson, J., Hornig, C.D., Liebowitz, M.R., & Weissman, M.M. (1992). Social phobia: comorbidity and morbidity in an epidemiologic sample. <u>Archives of General Psychiatry, 49,</u> 282-288.

Shackman, D. A. (2002). <u>Social skills deficits versus social skill inhibition in socially anxious individuals.</u> Unpublished doctoral dissertation, University of Maryland, Maryland.

Shear, M.K. & Beidel, D.C. (1998). Psychotherapy in the overall management strategy for social anxiety disorder. <u>Journal of Clinical Psychology, 59(suppl 17),</u> 39-44.

Simonian, S.J., Beidel, D.C., Turner, S.M., Berkes, J.L., & Long, J.H. (2001). Recognition of facial affect by children an adolescents diagnosed with social phobia. Child Psychiatry and Human Development, 32(2), 137-145.

Stein, M.B., Goldin, P.R., Sareen, J., Zorrilla, L.T.E., & Brown, G.G. (2002). Increased amygdale activation to angry and contemptuous faces in generalized social phobia. Archives of General Psychiatry, 59, 1027-1034.

Stein, M.B., & Kean, Y.M. (2000). Disability and quality of life in social phobia: Epidemiologic findings. American Journal of Psychiatry, 157, 1606-1613.

Stein, M.B., Torgrud, L.J., & Walker, J.R. (2000). Social phobia symptoms, subtypes, and severity: Findings from a community survey. Archives of General Psychiatry, 57, 1046-1052.

Streit, M., Wolwer, W., Brinkmeyer, J., Ihl, R., & Gaebel, W. (2000). Electrophysiological correlates of emotional and structural face processing in humans. Neuroscience Letters. 278, 13-16.

Tottenham, N., Borscheid, A., Ellertsen, K., Marcus, D.J., & Nelson, C.A. (April 2002). Categorization of facial expressions in children and adults: Establishing a larger stimulus set. Poster presented at the Cognitive Neuroscience Society annual meeting, San Francisco, CA.

Turner, S.M., Beidel, D.C., Borden, J.W., Stanley, M.A., & Jacob, R.G. (1991). Social phobia: Axis I and II correlates. Journal of Abnormal Psychology, 100(1), 102-106.

Turner, S.M., Beidel, D.C., & Cooley-Quille, M.R. (1995). Case histories and shorter communications: Two-year follow-up of social phobics treated with Social Effectiveness Therapy. Behaviour Research and Therapy, 33(5), 553-555.

Turner, S.M., Beidel, D.C., Cooley, M.R., Woody, S.R., & Messer, S.C. (1994). A multicomponent behavioral treatment for social phobia: Social Effectiveness Therapy. Behaviour Research and Therapy, 32 (4), 381-390.

Turner, S.M., Beidel, D.C., Dancu, C.V., & Keys, D.J. (1986). Psychopathology of social phobia and comparison to avoidant personality disorder. Journal of Abnormal Psychology, 95(4), 389-394.

Turner, S.M., Beidel, D.C., Dancu, C.V., & Stanley, M.A. (1989). An empirically derived inventory to measure social fears and anxiety: The Social Phobia and Anxiety Inventory. Journal of Consulting and Clinical Psychology, 1(1), 35-40.

Turner, S.M., Beidel, D.C., & Jacob, R.G. (1994). Social phobia: A comparison of behavior therapy and atenolol. Journal of Consulting and Clinical Psychology, 62(2), 350-358.

Turner, S.M., Beidel, D.C., & Larkin, K.T. (1986). Situational determinants of social anxiety in clinic and nonclinic samples: Physiological and cognitive correlates. Journal of Consulting and Clinical Psychology, 54(4), 523-527.

Turner, S.M., Beidel, D.C., Long, P.J., Turner, M.W., & Townsley, R.M. (1993). A composite measure to determine the functional status of treated social phobics: The Social Phobia Endstate Functioning Index. Behavior Therapy, 24, 265-275.

Turner, S.M., Beidel, D.C., & Townsley, R.M. (1992). Social phobia: A comparison of specific and generalized subtypes and avoidant personality disorder. Journal of Abnormal Psychology, 101(2), 326-331.

VanVliet, I.M., den Boer, J.A., & Westenberg, H.G.M. (1994). Psychopharmacological treatment of social phobia; a double blind placebo controlled study with fluvoxamine. Psychopharmacology, 115, 128-134.

Versiani, M., Nardi, A.E., Mundim, F.D., Alves, A.B., Liebowitz, M.R., & Amrein, R. (1992). Pharmacotherapy of social phobia: A controlled study with moclobemide and phenelzine. British Journal of Psychiatry, 161, 353-360.

Ward, C. & Salter, C. A. (1974). The effects of trait and state anxiety on verbal learning. Psychology: A Journal of Human Behavior, 11(3), 56-62.

Weinstock, L.S. (1999). Gender differences in the presentation and management of social anxiety disorder. Journal of Clinical Psychiatry, 60(suppl 9), 9-13.

Wenzel, A. & Holt, C.S. (2002). Memory bias against threat in social phobia. British Journal of Clinical Psychology, 41, 73-79.

Wittchen, H. –U. (1994). Reliability and validity studies of the WHO-Composite International Diagnostic Interview (CIDI): A critical review. Journal of Psychiatric Research,28(1), 57-84.

Wittchen, H.-U. & Beloch, E. (1996). The impact of social phobia on quality of life. International Clinical Psychopharmacology, 11(suppl 3), 15-23.

Wittchen, H.U., Robins, L.N., Cottler, L.B., Sartorius, N., Burke, J.D., & Regier, D. (1991). British journal of psychiatry, 159, 645-653.

Yerkes, R. M. and Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit-formation. <u>Journal of Comparative Neurology and Psychology,</u> <u>18,</u> 459-482.

Young, J.E., Weinberger, A.D., & Beck, A.T. (2001). Cognitive therapy for depression. In D.H. Barlow (Ed.), <u>Clinical Handbook of Psychological Disorders: A</u> <u>step-by-step treatment manual</u> 3rd edition (pp. 264-308). New York: Guilford Press.

Zuroff, D.C. & Colussy, S.A. (1986). Emotion recognition in schizophrenic and depressed inpatients. <u>Journal of Clinical Psychology, 42,</u> 411-416.