DANIELS, S. MICHAEL, Ph.D. Social Anxiety, Attention Control, and Performance Deficits. (2011)
Directed by Dr. Kari M. Eddington and Dr. Rosemery Nelson-Gray. 90 pp.

Theory and research link social anxiety with negative self-focused attention (i.e.,

heightened preoccupation with negative thoughts, observer-perspective images, and

somatic responses). Negative self-focused attention, in turn, is associated with

performance deficits on both social and non-social tasks. However, individual

differences in attention control have been linked with a reduction in attention biases

associated with *general* anxiety. Working memory capacity represents one construct

theoretically and empirically linked with individual differences in attention control. The

current study, therefore, tested a moderated mediation model in which negative self-

focused attention was proposed to mediate the relationship between social anxiety and

conversation performance deficits, and working memory capacity was proposed to

moderate the relationship between social anxiety and negative self-focused attention.

Results support the proposed model when verbal cognition (i.e., thoughts) is the target of

negative self-focused attention. Results were mixed for other targets of self-focus (i.e.,

observer-perspective images, somatic responses, and general self-focus). Clinical and

research implications for current and future study and treatment of social anxiety are

discussed.

SOCIAL ANXIETY, ATTENTION CONTROL,

AND PERFORMANCE DEFICITS

by

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A Dissertation Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
2011

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CHAPTER I

INTRODUCTION

Social Phobia is conceptualized as "a marked and persistent fear of social or performance situations in which embarrassment may occur" (American Psychiatric Association, 2000, p. 450). Although high levels of trait social anxiety may be associated with a DSM-IV diagnosis of Social Phobia, trait social anxiety can be conceptualized as existing on a continuum with persons throughout the population experiencing levels of social anxiety ranging from minimal to pathological. The types of social situations feared by persons with high levels of social anxiety generally fall into two broad categories: 1) social interaction situations (e.g., participating in conversations, dating, and attending parties) or 2) public performance situations (e.g., speaking, eating and writing in public; APA, 2000). Whereas the subjective experience of anxiety is often similar across different types of social situations, studies find more convincing evidence for observable performance deficits in interaction versus public performance situations (e.g., Alden & Wallace, 1995; Rapee & Lim, 1992; Stopa & Clark, 1993; Voncken & Bogels, 2008). Such findings corroborate descriptive data indicating that social anxiety in interaction situations is sometimes associated with substantial impairment in interpersonal functioning (e.g., successfully forming age-appropriate interpersonal relationships; e.g., Beidel, Turner, & Morris, 1999; La Greca & Lopez, 1998; Sanderson, DiNardo, Rapee, & Barlow, 1990).

Although a relationship exists between trait social anxiety and impairment in interpersonal situations, researchers continue to explore the specific cognitive mechanisms underlying this relationship. Several cognitive factors (e.g., biased appraisal, attention, memory, and interpretation) have been implicated in the relationship between trait social anxiety and interpersonal impairment (Hope, Rapee, Heimberg, & Dombeck, 1990; Mansell and Clark, 1999; Schofield, Coles, & Gibb, 2007; Stopa & Clark, 2000; Voncken, Bogels, & Peeters, 2007, see also Kimbrel, 2008 for review). Among these processes, however, Clark and Wells (1995) suggest that excessive self-focused attention plays a paramount role in the performance deficits often associated with trait social anxiety.

Self-Focused Attention

Self-focused attention has been defined as "an awareness of self-relevant, internally generated information that stands in contrast to an awareness of externally generated information" (Ingram, 1990; p. 156). Clark and Wells (1995) suggest that, for persons with high levels of social anxiety, self-focused attention is characterized by a heightened awareness of three distinct but highly related experiences: 1) negative thoughts about the self and the situation, 2) distorted images of how one appears to others (i.e., observer-perspective images), and 3) unpleasant somatic responses (e.g., perceived increases in heart rate, sweating, blushing). Clark and Wells (1995) propose that this heightened self-awareness may contribute to observable performance deficits during social encounters.

Studies examining the relationship between social anxiety and self-focused

attention generally fall into one of two categories: 1) studies examining *trait* self-focused

attention (i.e., self-consciousness) and 2) studies examining *state* self-focused attention

(i.e., self-awareness; see Bögels & Mansell, 2005 for review). Trait self-focused

attention can be defined as a dispositional tendency to focus attention on thoughts,

images, and other self-relevant stimuli. In general, trait self-focused attention is assessed

using the Self-Consciousness Scale (SCS, Fenigstein, Scheier, & Buss, 1975), which

assesses both public and private self-consciousness. Public self-consciousness, as

assessed by the SCS, is conceptualized as the awareness of the self as a social object.

Private self-consciousness is conceptualized as a general sensitivity to one's own

thoughts and feelings and a tendency to engage in self-reflective thinking. Using the

SCS, several studies have identified a positive relationship between social anxiety and

public, but not private, self-consciousness (e.g., Bögels, Alberts, & de Jong, 1996;

Fenigstein et al., 1975; Hope & Heimberg, 1988). Although these studies provide

evidence of a relationship between social anxiety and public self-focused attention, the

reported strength of this relationship among studies varies greatly. Specifically, reported

correlation coefficients between measures of social anxiety and the SCS-public subscale

range from $r = .26$ to $r = .71$ (e.g., Bogels, Alberts, & de Jong, 1996; Fenigstein et al.,

1975; Hope & Heimberg, 1988). Additionally, questions have been raised regarding the

factor structure and validity of the SCS, calling into question its utility as a measure of

dispositional self-focused attention (e.g., Ruiperez & Belloch, 2003; Silvia, 1999).

Whereas research using the SCS suggests a relationship between social anxiety and trait self-focused attention, the study of state self-focused attention (i.e., situational shifting of attention onto thoughts, images, and other self-relevant stimuli) may provide a more precise understanding of the attentional processes that occur *during* a social interaction. Studies in this area typically place participants in social-evaluative situations and examine the relationship between trait social anxiety and state self-focused attention. Findings generally indicate a relationship between social anxiety and state self-focused attention (e.g., Bogels & Lamers, 2002; Daly, Vangelisti, & Lawrence, 1989; Mahone, Bruch, & Heimberg, 1993; Mansell, Clark, & Ehlers, 2003; Perowne & Mansell, 2002; Stopa & Clark, 1993). For example, Stopa and Clark (1993) had participants provide spoken and written transcripts of their thoughts during a role-played social situation. Later coding of responses indicated that persons with a diagnosis of social phobia disorder reported a greater number of negative self-focused cognitions than participants with diagnoses of other anxiety disorders and non-anxious controls. Additionally, Mansell and colleagues (2003) used a novel paradigm to assess focus of attention for participants with either high or low levels of evaluation anxiety. In their study, participants were assigned to either a threat condition (i.e., anticipating giving a speech) or a no threat condition and then asked to complete an attention task in which they identified two types of stimuli. The external stimuli involved identifying the letter "E" superimposed over certain faces presented on a computer screen. The internal stimuli involved a vibration delivered to their fingertip that purportedly provided feedback regarding changes in sweating and heart rate. Results indicated a preferential detection of

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the internal stimuli for persons with high levels of evaluation anxiety in the threat condition.

The above-noted findings provide support for the proposed relationship between trait social anxiety and state self-focused attention. However, research examining the link between social anxiety and state self-focused attention often lacks specificity in assessing self-focus. Studies in this area generally: 1) induce heightened self-awareness using a mirror or video camera without directly assessing self-focus, 2) use thought-listing procedures and code reported thoughts into broad categories (e.g., internal versus external focus), or 3) only assess a single target of self-focus (e.g., thoughts or physiological responding). Whereas studies using these methods have established a relationship between social anxiety and a general tendency to self-focus, they have often failed to consider potential differences among the different targets of self-focus outlined in theoretical models.

Evidence suggests that verbal-linguistic cognition (i.e., thoughts), imagery, and somatic responding are distinct experiences that could potentially affect cognitive processing in unique ways. For instance, Hirsch, Clark, and Mathews (2006) suggest that imagery and interpretation (one form of verbal-linguistic cognition) represent distinct cognitive experiences that operate reciprocally for persons with high levels of social anxiety. Such a view of imagery and verbal-linguistic cognition as separable cognitive experiences is consistent with theory and research on the topic of pathological worry (cf., Borkovec, Alcaine, and Behar, 2004).

In addition, researchers suggest that: 1) imagery and verbal-linguistic cognition have differential effects on emotion (e.g., Borkovec & Inz, 1990; Freeston, Dugas, & Ladouceur, 1996; Holmes & Matthews, 2005), and 2) processing of imagery in visual short-term memory may differ from processing of language-based cognition in verbal short-term memory (Andrade, Kemps, Werniers, May, & Szmalec, 2002). Likewise, awareness of somatic responding is thought to represent a unique cognitive experience that often operates in a reciprocal manner with verbal-linguistic cognition (e.g., Borden et al., 1993; Hamilton, 1986; Ingram, 1990; Rachman, Levitt, & Lopatka, 1987; Stretton & Salovey, 1998). For example, Borden and colleagues (1993) found panic disorder is associated with a shift in the content of self-focus from physiological to verbal-linguistic targets as task requirements change. However, no known social anxiety research has simultaneously explored differential effects of negative thoughts, observer-perspective images, and somatic responses on performance in social interaction situations. In addition, studies have not examined how individual differences in attention control might impact self-focus on each of these three experiences. Consequently, the current study included exploratory analyses to examine separately the three targets of self-focus outlined by Clark and Wells (1995).

Effects of Self-Focus on Performance

Persons with high levels of social anxiety are likely to experience self-focused attention in social situations. However, self-focus alone may not impair performance. In fact, some studies suggest that self-focused attention can facilitate performance on a number of tasks (see Panayiotou & Vrana, 2004 for review). Specific individual and

situational characteristics such as task difficulty and self-perceived ability are important

determinants of whether or not self-focus impairs performance. For example, Burgio,

Merluzzi, and Prior (1986) used scores on the Social Anxiety and Distress Scale to recruit

a sample of "moderately socially anxious" males. They then informed participants that

the study involved participating in a getting-to-know-you telephone conversation with an

opposite-sex stranger. Using participants' ratings of self-confidence about how they

might perform on the conversation task, they classified participants as either high or low

in success expectancy. Finally, they assigned participants to either a high (i.e., video-

taped) or low (i.e., no video camera) self-focus condition. Data did not support a main

effect for self-focus condition on performance. However, the interaction of self-focused

attention and low expectancy for success negatively predicted observer-rated

effectiveness during the phone conversation.

On the surface, the findings of Burgio and colleagues (1986) seem to suggest a

tenuous link between social anxiety, self-focus, and performance deficits. However, a

closer examination of the sample characteristics in the study provides a somewhat

different picture. The mean social anxiety score for the low expectancy group was

significantly higher than the mean score for the high expectancy group. In other words,

social anxiety and low self-efficacy appear to have been highly related in that sample.

Other studies provide additional evidence of the negative relationship between levels of

social anxiety and levels of social self-efficacy (e.g., Gaudiano & Herbert, 2003; Kashdan

& Roberts, 2004; Laurenti, Bruch, & Haase, 2008). Researchers also suggest that

persons who experience high versus low levels of evaluation fears are more subject to

performance deficits associated with self-focus on laboratory task and academic

examinations (e.g., Ferrari, 2001; Kurosawa & Harackiewicz, 1995; Sarason, 1988). For

example, Sarason (1988) implicates self-focus on worrisome cognitions as the key factor

contributing to performance deficits among persons with high levels of test anxiety.

Because social anxiety is associated with high levels of evaluation fears (cf., Watson &

Friend, 1969), along with low levels of social self-efficacy, persons with high levels of

social anxiety are likely to experience impairment related to self-focus.

Specificity of Self-Focus

Apart from social anxiety, state and trait self-focus has been linked to a number of

other psychopathological conditions including depression, panic, and alcohol abuse (e.g.,

Borden, Lowenbraun, Wolff, & Jones, 1993; see also Ingram, 1990 for review). The

purpose of the current investigation is to examine specifically state self-focused attention

in the context of social anxiety. However, due to the substantial comorbidity of social

anxiety and depression, some mention of research examining the link between self-focus

and depression is warranted. As with social anxiety, depression and dysphoria are

associated with state and trait self-focused attention (e.g., Edison & Adams, 1992; Ingram

& Wisnicki, 1999; Sloan, 2005). However, researchers suggest that depression is

associated with a tendency to self-focus across contexts, whereas self-focus in social

anxiety may occur mainly in relation to feared social or performance situations (e.g.,

Clark & Wells, 1995; Ingram & Wisnicki, 1999). In addition, researchers link depression

to "ruminative self-focus," which is characterized by self-focus specifically on symptoms

of depression and the implication of those symptoms (Nolen-Hoeksema, 1991).

Consequently, self-focused attention associated with social anxiety versus depression may differ in terms of situational specificity and distinctiveness of content.

Summary of Self-Focused Attention

Taken together, evidence suggest that persons with high levels of social anxiety possess specific characteristics (e.g., low-self-efficacy, high fear of evaluation) associated with state self-focus on negative experiences (i.e., negative self-focus). Negative self-focus, in turn, increase the likelihood of performance deficits related to self-focus in both social and non-social situations. However, Leary (1983) has noted that some persons with high levels of trait social anxiety do not exhibit noticeable performance deficits in social situations. If negative self-focused attention impairs the performance of persons with high levels of trait social anxiety, then individual differences in attention control could be associated with a reduction in negative self-focused attention and therefore fewer performance deficits during social interaction situations.

Attention Control

At any given time, a person can be exposed to multiple internal (e.g., thoughts, memories, physiological reactions) and external (i.e., sights, sounds, etc.) stimuli competing simultaneously for attention. For persons with high levels of trait anxiety, stimuli capturing attention are often associated with threat (see Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007 for review of attention biases associated with anxiety). Individual differences in attention control reflect variations in the ability to maintain focus on task-relevant information and/or resist attention capture by task-irrelevant information. Studies examining *general* anxiety

provide evidence of a negative relationship between attention control and threat-related

attention biases on laboratory tasks (e.g., Derryberry & Reed, 2002; Reinholdt-Dunne,

Mogg, & Bradley, 2009). For example, Derryberry and Reed used questionnaire

assessments of attention control (i.e., the Attention Control Scale) and trait anxiety (i.e.,

the State-Trait Anxiety Inventory) to divide participants into four groups (i.e., high

anxious, good attention control; high anxious, poor control; low anxious, good control;

and low anxious, poor control). Participants then completed a reaction time task

assessing attention biases for visually-presented threatening cues. Results indicated that

participants with high levels of trait anxiety and good attention control were better than

participants with high levels of trait anxiety and poor attention control at shifting visual

attention away from threatening locations.

Similarly, Reinholdt-Dunne and colleagues (2009) used an objective experimental

measure of attention control (i.e., the Attention network task; Fan, McCandliss, Sommer,

Taz, & Posner, 2002) to examine the relationships among *general* anxiety, attention

control, and attention bias on the emotional Stroop task using faces and words as stimuli.

Similar to the Derryberry and Reed (2002) results, Reinholdt-Dunne and colleagues

(2009) found that participants with high *general* anxiety and poor attention control

experienced significantly greater Stroop interference on the facial Stroop task than did

participants with high *general* anxiety and good attention control. However, level of

attention control was not related to lower interference for persons with high general

anxiety on the linguistic Stroop task. These findings suggest that greater attention control

may weaken the relationship between *general* anxiety and attention biases on laboratory

task. As such, individual differences in attention control might also influence the relationship between *social* anxiety and self-focused attention during social interaction tasks.

Working Memory Capacity and Executive Attention

As reviewed above, attention control can be assessed using several different methodologies (e.g., the Attention Control Scale, the Attention Network Task). However, a growing body of literature suggests that working memory capacity represents a theoretically and empirically promising construct for the study of individual differences in attention control (see Kane, Conway et al., 2007 for review). Current conceptualizations of working memory are linked to the seminal work of Baddely and Hitch (1974), who proposed a structural model of working memory accounting for both storage (via the phonological loop and viso-spatial sketchpad) and manipulation of information (via the central executive). Rather than focusing solely on storage functions (i.e., examining the number of items that can be held in short term memory), the executive attention theory of working memory capacity considers the role of the central executive in predicting higher-order cognitive functioning. Theoretically, two important tasks of the central executive are: 1) to maintain access to goal-relevant information, and 2) to inhibit attentional capture by distracting cognitive representations. Consequently, differential functioning of the central executive, as reflected in individual differences in working memory capacity, is thought to predict performance on complex cognitive tasks, particularly under conditions of interference or goal conflict (Engle & Kane, 2004).

To assess working memory capacity, researchers typically use complex span tasks (e.g., Daneman & Carpenter, 1980; Daneman & Green, 1986). Such tasks require short term storage of information and simultaneous processing of other information. For example, one version of the reading span task requires participants to read sentences and remember the last word of each sentence for later recall (Daneman & Carpenter, 1980). Such tasks are thought to reflect the dual functions of the Baddely and Hitch (1974) model (i.e., storage and executive control). Several studies using a variety of span tasks have found evidence supporting the proposed relationship between working memory capacity and attention control (e.g., Bleckley, Durso, Crutchfield, Engle, & Khanna, 2003; Conway, Cowan, & Bunting; 2001; Kane, Brown et al., 2007; McCabe, Roediger, McDaniel, Balota, & Hambrick, 2010; McVay and Kane, 2009; Poole & Kane, 2009; see also Kane, Conway et al., 2007 for review). Several such studies provide specific evidence for a relationship between working memory capacity and the inhibition of distracting stimuli (e.g., Conway, Cowan, & Bunting; 2001; Kane, Brown et al., 2007; McVay and Kane, 2009). For example, Conway and colleagues (2001) examined the relationship between working memory capacity and attentional control using a dichotomous listening task. Participants assessed as either high or low in working memory capacity were instructed to attend to words presented in their right ear while ignoring distractor words presented in their left ear. During the task, the participant's name was presented in the left (i.e., distractor) ear. Whereas previous studies using dichotomous listening tasks suggest that approximately 33% of participants report hearing their name, Conway and colleagues (2001) discovered that only 20% of their

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high versus 65% of low working memory capacity participants reported hearing their name.

McVay and Kane (2009) tested the WMC/attention control relationship using a sustained attention to response task (SART). The SART encouraged habituation of a response (i.e., pressing a space bar for frequently presented non-targets) and tested reaction time and accuracy when inhibition of this prepotent response was required (i.e., withhold bar pressing for infrequently presented targets). In addition, thought probes were presented after 60% of targets to assess focus of attention just prior to the presentation of the targets. Results indicated that WMC positively predicted accuracy and negatively predicted fluctuations in attention (i.e., reaction time variability) on the SART. Further, the relationship between WMC and performance was partially mediated by the proportion of task-unrelated thoughts reported on the thought probes.

Kane, Brown, and colleagues (2007) used an experience sampling method to assess the relationship between working memory capacity and attentional lapses (i.e., mind wandering) in everyday life. Undergraduate students were screened for levels of working memory capacity and then provided with palm pilots that allowed researchers to query participants regarding their activities and thoughts at random times throughout the day. Results indicated that high working memory capacity undergraduates experienced fewer lapses in attention during activities requiring concentration and effort.

Findings from these studies demonstrate a link between working memory capacity and attention control. In addition, Johnson and Gronlund (2009) provide evidence that individual differences in working memory capacity moderate the relationship between

trait *general* anxiety and performance on a laboratory task requiring attention control. Undergraduates were assessed for working memory capacity using the automated Operation Span Task and for trait anxiety using the State-Trait Anxiety Inventory. They then completed a dual-task requiring them to simultaneously complete short-term memory and tone-discrimination tasks. Results indicated that working memory capacity moderated the relationship between trait *general* anxiety and accurate discrimination of high- versus low-frequency tones on the auditory task. Johnson and Gronlund (2009) suggest that high working memory capacity may buffer the negative impact of trait *general* anxiety on performance. However, no extant studies have specifically examined the potential role of working memory capacity in the relationship between social anxiety and self-focused attention.

Summary

The previously reviewed literature suggest that: 1) persons with high levels of social anxiety are susceptible to state negative self-focused attention prior to and during social evaluative situations, 2) state negative self-focused attention is associated with performance deficits on social and non-social tasks, 3) higher levels of attentional control can reduce attention biases for persons with high levels of *general* anxiety, and 4) high versus low levels of working memory capacity are associated with greater attention control. However, no research to date has specifically examined the relationships among trait *social* anxiety, working memory capacity, state negative self-focused attention, and performance deficits during a social interaction task.

Goals and Hypotheses

The three main goals of the current study are to: 1) test the mediational role of negative self-focused attention in the relationship between social anxiety and performance deficits, 2) explore differences related to three different potential targets of self-focus (i.e., thoughts, observer-perspective images, and somatic responses) and 3) examine the possibility that high levels of working memory capacity might interact with trait social anxiety resulting in reduced negative self-focused attention during an opposite-sex social interaction. A hypothesized moderated mediation model predicts that negative self-focus will be the mechanism through which social anxiety is related to performance deficits during an opposite sex conversation. In addition, the model predicts that the strength of the relationship between social anxiety and negative self-focus, and consequently between social anxiety and performance, will be weaker as levels of working memory capacity increase (see Figure 1 for hypothesized model).

CHAPTER II

METHODS

Participants

Participants were undergraduate students between 18 and 25 years of age ($M =$ 18.97, $SD = 1.51$) in the psychology pool at the University of North Carolina at Greensboro. An a priori power analysis indicated that approximately 91 participants would be needed to detect a medium effect size for planned analyses with a power level of .8 and an alpha level of .05. Most participants (n = 95) self-selected for the study using the UNCG Experimetrix system. However, a sub-sample of participants (n = 11) was recruited to ensure a representative number of participants with moderate to high levels of social anxiety. Undergraduate students scoring at least one standard deviation above the mean on the Social Interaction Anxiety Scale administered during a mass screening procedure were contacted via telephone and invited to participate in the study. Of the students contacted, 11 agreed to participate and 8 completed both portions of the study.

Of the 106 participants who either self-selected or were recruited for the study, 10 did not complete the social interaction portion and were dropped from the study. An additional 4 participants were not included in the final data analyses: 1 due to a previous relationship with one of the research assistants, 2 due to self-reported technical difficulties with the computerized span tasks, and 1 due to a reading span error score

falling more than three standard deviations from the mean. The final sample was comprised of 67 females and 25 males, which is consistent with the pool of undergraduate psychology students from which the current sample was taken. The self-reported racial and ethnic composition of the sample included 61 Caucasians, 22 African Americans, 5 Asians, 1 Hispanic, and 4 who self-identified as "Other." This racial and ethnic composition is representative of the general undergraduate population at the University of North Carolina at Greensboro.

Measures

   Reading Span and Spatial Span Tasks (*RSPAN & SSPAN*). Working memory capacity was assessed using computerized versions of the reading and spatial span tasks (*RSPAN & SSPAN*). These tasks require participants to maintain access to memory items while completing unrelated processing tasks. In RSPAN, the processing task requires participants to verify the semantic accuracy of simple sentences. In SSPAN, the processing task requires participants to verify whether or not black-and-white matrix patterns are symmetrical. In both tasks, participants must respond to the verification task prior to a response deadline calculated from each participant's performance during practice trials. The response deadline reduces the possibility that participants will use extra time during the verification task to engage in mnemonic strategies (e.g., repetition) for the memory task.

   In RSPAN, a capital letter (randomly selected among 12) appears for 250 ms, 200 ms after the reading verification or response deadline. After 3–7 sentence-letter pairs, all 12 letters appear onscreen and participants use the mouse to identify the presented

letters in serial order. In SSPAN, one square of a 4 x 4 grid is shaded red for 650 ms, 200

ms after either symmetry verification or response deadline. After 2–5 symmetry–grid

pairs, subjects recall the locations of the colored squares in serial order by mouse clicking

on an empty grid. The tasks present each set length (3–7 in RSPAN; 2–5 in SSPAN)

three times, randomly ordered across participants. The span score on each task is the sum

of items recalled in serial position (Conway et al., 2005).

Social Phobia Scale (*SPS;* Mattick & Clarke, 1998). The SPS is a well-validated

self-report questionnaire designed to measure anxiety in public performance situations.

The SPS contains 20 items that assess fears of being observed by others during various

routine activities (e.g., writing in front of others, eating in front of a stranger at a

restaurant). Items are rated on a five-point Likert scale from 0 ("Not at all") to 4

("Extremely"). The SPS demonstrates high internal consistency (.87 to .94) and 4 to 12

week test-retest reliability (*r* ranging from .66 to .93; Heimberg, Meuller, Holt, Hope, &

Liebowitz, 1992; Mattick & Clarke, 1998). In the current study, the SPS was combined

with the Social Interaction Anxiety Scale and the Fear of Negative Evaluation Scale to

form a composite social anxiety score.

Social Interaction Anxiety Scale (*SIAS*; Mattick & Clark, 1998). The SIAS is a

well-validated measure that assesses anxiety in social interaction situations. The SIAS

contains 20 items that assess fears of interacting with others (e.g., meeting people at

parties, mixing with co-workers). Items are rated on a five-point Likert scale from 0

("Not at all") to 4 ("Extremely"). The SIAS demonstrates high internal consistency (.86

to .94) and 4 to 12 week test-retest reliability (*r* ranging from .86 to .99; Heimberg et al.,

1992; Mattick & Clarke, 1998). In the current study, the SIAS was combined with the

Social Phobia Scale and the Fear of Negative Evaluation Scale to form a composite social

anxiety score.

Fear of Negative Evaluation Scale (*FNE*; Watson & Friend, 1969). The FNE is a

well-validated measure that assesses the fear of being negatively evaluated by others.

The FNE contains 30 items rated as "True" or "False." Example items include "I am

afraid that others will not approve of me" and "When I am talking to someone, I worry

about what they may be thinking about me." The FNE demonstrates excellent internal

consistency and good test-retest reliability over a one-month period ($r = .78$). In the

current study, the FNE was combined with the Social Phobia Scale and the Social

Interaction Anxiety Scale to form a composite social anxiety score.

Focus of Attention Scale. Clark and Wells (1995) highlight three separate targets of

negative self-focused attention associated with social anxiety. Specifically, they suggest

that persons with high levels of social anxiety, when faced with a social encounter, will

become preoccupied with: 1) somatic responses, 2) negative thoughts, and 3) distorted

observer-perspective images. Although verbal cognition, imagery, and somatic

responding constitute unique cognitive and physiological processes, persons with high

levels of social anxiety are thought to have an increased awareness of all three

experiences during social situations. Because no gold-standard measures of state self-

focused attention exist, the current investigation used a visual-analogue assessment of

self-focus patterned after previous studies examining self-focus in social anxiety (e.g.,

George & Stopa, 2008). Unlike previous single-item assessments, the instrument used in

the current study specifically assessed each of the foci of self-focused attention outlined by Clark and Wells (1995).

Immediately following the social interaction task, participants responded to items assessing their self-consciousness and awareness of positive and negative thoughts, images of how they appeared to others, and bodily sensations. Participants rated these items using a visual analogue scale with anchors at 1 (Not at all) and 100 (Extremely). Both negatively- and positively-worded items were included to reduce possible demand characteristics of including only negatively-worded items. However, because the literature suggests that both social anxiety and performance deficits are associated with negative versus positive self-focused attention, only the scores for the negatively-worded items were included in main analyses (e.g., Panayiotou & Vrana, 2004). The structure of the FAS allows for assessment of the individual components of the Clark and Wells (1995) conceptualization of self-focus as it relates to social anxiety (i.e., preoccupation with negative thoughts, negative observer-perspective images, and unpleasant somatic sensations). In addition, two factor scores can be generated to respectively assess both positive and negative general self-focus; see Appendix A for a copy of the Focus of Attention Scale).

Social Performance Rating Scale (SPRS; Fydrich, Chambless, Perry, Buergener, & Beazley, 1998)*.* The SPRS is a rating system for behavioral assessment of social skills associated with social phobia. The SPRS was designed for use in rating participants' social skills during role-played interactions with an opposite-sex confederate. Raters assess participants using a five-point scale ranging from 1 (Very Poor) to 5 (Very Good)

across five social skills domains: 1) Gaze, 2) Vocal Quality, 3) Length, 4) Discomfort, and 5) Conversation Flow. Example rating anchors from the *Length* domain include: "Monosyllabic ('hmmm,''yeah,''OK') speech turns; or responses so long that partner must interrupt or cannot utter reply." (Very Poor) and "At most times, participant's utterances are two or more sentences long. Participant acknowledges partner's remarks without taking over and monopolizing the conversation" (Very Good). Similar anchors are provided for the remaining four domains. In the original Fydrich and colleagues (1998) study, results of the SPRS were analyzed using individual domain scores and an overall summary score obtained by combining the five domain scores. For the current investigation, Length and Conversation Flow domains were used to assess *conversation* performance during the social interaction task. Fydrich and colleagues (1998) report good- to excellent inter-rater reliability for domains on the SPRS (see Appendix A for SPRS Length and Flow coding schemes).

Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The BDI is a 21-item questionnaire used to assess symptoms of depression in adults. Each item offers four possible responses of increasing severity ranging in value from zero to three. For each item, participants identified the statement that most closely matches their feelings over the past two weeks. Item responses are summed to achieve an overall score ranging from 0 to 63, with higher scores representative of more severe depression. A score of 12 or higher is often considered to be indicative of moderately elevated symptoms of depression. The BDI is widely used in clinical practice and research and has very good reliability and validity. In the current study, the original

intent for the BDI was to screen-out participants with high levels of depressive symptoms. However, due the substantial overlap of social anxiety and depressive symptoms, scores for the BDI instead were used in supplemental analyses to determine the relative contributions of depressive symptoms and social anxiety in the prediction of negative self-focused attention and conversation performance deficits.

Procedure

Data collection was completed in two parts to avoid detrimental effects on span tasks performance by anticipatory anxiety regarding the social interaction task. At the onset of the study, a research assistant (RA) obtained informed consent only for completion of working memory tasks and the BDI. The RA then walked the participant through the instructions and demonstration portions of the first span task. Span tasks were counterbalanced across participants, and instructions were provided separately for each task. Participants completed the span tasks alone while the RA waited outside of the room. Once the participant completed both span tasks, the RA administered the BDI.

Informed consent for the second part of the study was obtained immediately following completion of the span tasks and questionnaires. After obtaining consent, the RA administered the SPS, SIAS, and FNE. Order of questionnaires was counterbalanced across participants. Next, the RA informed the participant that the final part of the study involved participation in a brief role play with another research participant. The RA then called another office in the building and requested that the "participant" (i.e., confederate) be sent over for the second portion of the study. Confederates were always the opposite-sex of the participants. When the confederate arrived, the participant and

confederate were seated in chairs facing each other at a 45º angle. The RA proceeded to read the following script to the participant and confederate:

> You are going to participate in a brief video-taped role-play of a typical social situation that might occur between two college students. We want you to pretend as if you are two college students meeting for the first time at a party or similar social gathering. Your goal is to carry on a good conversation that would be typical of two strangers meeting for the first time.

The RA next asked the participant and confederate to choose a number between one and ten to determine who would initiate the conversation. The participant was always chosen to initiate. The RA then informed the participant and confederate that the role-play would last four minute, started the video camera, and left the room. Confederates were trained to respond to participants in a neutral manner and to allow the participant to initiate conversation topics as much as possible. Additionally, confederates were trained to break silences of more than approximately seven seconds with a new topic of conversation.

After four minutes, the RA returned and directed the confederate back to his or her experiment. The RA then provided the participant with the Focus of Attention Scale (FAS) to complete. After the participant completed the FAS the RA provided a debriefing to explain the background and purposes of the study and to ask that the participant not discuss the details of the study with other UNCG undergraduate students. The RA also administered an oral manipulation check to assess whether or not the participant believed that the confederate was another study participant.

Video-tape Coding. Two undergraduate research assistants (RAs) were independently trained to code the video-taped interactions using the Social Performance Rating Scale (SPRS; Fydrich et al., 1998). Training involved first reviewing the coding scheme with the principal investigator and then practice coding of interactions from a previous study. Once agreement was reached between the coders and the principal investigator on practice tapes, the first coder began rating interactions from the current study. Throughout coding, interactions were periodically randomly selected by the principal investigator and reviewed with the RA. Discrepancies between the principal investigator and the RA were corrected and re-training occurred as necessary. After the first rater coded all tapes, the second rater was trained and re-coded all tapes. The second rater was blind to the coding of the first rater.

CHAPTER III

RESULTS

Data Preparation

   Manipulation check and confederate effects. No participants responded to the

manipulation check by expressing disbelief that their conversation partner had been

another study participant. To assess for potential demand characteristics related to

differences among the four confederates, the means of 1) observer-rated performance

(Performance) and 2) negative self-focused attention (NSFA) were compared across the

four confederates. Welch and Brown-Forsythe statistics were calculated due to the

imbalance in sample sizes across the four confederates ($n's$ = 12, 13, 33, and 34). No

significant differences among confederates were detected for either of the test variables

(Welch(Performance): $F(3, 33.02)$ = .34, p > .05; Welch(NSFA): $F(3, 32.64)$ = .69,

p > .05; Brown-Forsythe(Performance): $F(3, 57.41)$ = .38, p > .05; Brown-

Forsythe(NSFA): $F(3, 51.83)$ = .73, p > .05).

   Social anxiety scores. Cronbach's Alphas were computed for the three measures

of social anxiety. Alphas were excellent for the Social Interaction Anxiety Scale (α =

.94), the Social Phobia Scale (α = .93), and the Fear of Negative Evaluation Scale (α =

.93). Zero-order correlations among the three measures of social anxiety were high

(SIAS/SPS: r = .81; SIAS/FNE: r = .73; SPS/FNE: r = .62). The three social anxiety

measures were subsequently standardized and averaged to form the social anxiety composite variable used for all subsequent analyses.

Means and standard deviations for the three measures of social anxiety used in the study are listed in Table 1. Means and standard deviations are comparable to descriptive statistics reported elsewhere (c.f., Brown et al., 1997; Mattick & Clarke, 1998; Watson & Friend, 1969). The standardized composite of the three social anxiety measures was analyzed to assess the distribution of social anxiety scores. Sixteen percent of the final sample scored at least one standard deviation above the mean on the social anxiety composite, with five participants scoring at least two standard deviations above the mean and an additional ten scoring at least one standard deviation above the mean. Skew (1.04) and Kurtosis (.73) for the social anxiety composite were acceptable.

Working memory scores. Zero-order correlations and descriptive data for reading and spatial span tasks were examined. Reading and spatial span were moderately correlated ($r = .42, p < .001$). Means and standard deviations for RSPAN ($M = 52.97, SD = 11.84$) and SSPAN ($M = 27.73, SD = 7.65$) were comparable to those from a larger sample of 2908 participants previously collected (RSPAN: $M = 46.77, SD = 15.20$; SSPAN: $M = 26.70, SD = 7.93$; J. McVay, personal communication, March 15, 2010). Span scores were standardized and averaged to produce a working memory capacity composite score (WMC) that was normally distributed (skew = -0.51; kurtosis = -0.14).

Negative self-focused attention scores. Descriptive statistics and zero-order correlations for items on the Focus of Attention Scale (FAS) are presented in Tables 3 and 4. Consistent with expectations, general self-consciousness and the three negatively-

worded items correlated moderately-to-highly with each other. Similarly, the three

positively-worded items correlated moderately-to-highly with each other. In general,

negatively-worded items were not significantly correlated with positively-worded items.

However, awareness of negative thoughts correlated weakly but significantly with

awareness of positive thoughts ($r = -.21$). In addition, awareness of negative somatic

sensations correlated weakly but significantly with awareness of positive somatic

sensations ($r = .26$). The positive correlation between these two items suggests that they

may reflect a general somatic awareness in addition to assessing self-focus related

specifically to social anxiety.

To generate indices of general self-focus (both positive and negative), items on

the FAS were subjected to a principal component analysis with Varimax rotation.

Although the current sample size is small for a principle component analysis, the

relatively small number of items on the FAS (7) allowed for 13 observations per variable.

Bartlet's Test of Sphericity ($\chi^2(21) = 301.56$, $p < .001$) and KMO (.73) were both

acceptable. Two components with eigenvalues greater than one accounting for 42.23 and

29.06 percent of the variance respectively were extracted and rotated. Items assessing

general self-consciousness and awareness of negative thoughts, images, and somatic

sensations correlated highly with Component 1 ($ev = 2.97$), whereas items assessing

awareness of positive thoughts, images, and somatic sensations correlated highly with

Component 2 ($ev = 2.03$; see Figure 2 for Rotated Component Plot). The two items

assessing awareness of somatic responses also loaded onto a third component. However,

because the eigenvalue was below one ($ev = .72$), this component was not extracted and

the somatic items were allowed to load onto the respective positive and negative self-focus factors.

   Conversation performance scores. Length and Flow domains for each rater were combined to form a *performance* composite for each rater. Intraclass correlation for the performance composites was calculated as a measure of inter-rater reliability. The intraclass correlation was acceptable (.63), but lower than expected based on inter-rater reliability reported by Fydrich and colleagues (1998). Consequently, ratings for the Length and Flow domains for each rater were examined to identify participants for which the raters disagreed by more than one rating point. The principal investigator, serving as an expert rater, re-coded video-taped conversations for 15 participants for whom either the Flow or Length ratings were discrepant by two or more points. The author's rating replaced both research assistants' ratings and intraclass correlation for the re-coded composites was calculated. The intraclass correlation for the re-coded data (.82) was analogous to values reported by Fydrich and colleagues (1998). Corrected performance composites for each rater were then averaged to form the overall performance composite for all analyses. The overall performance composite was normally distributed (skew = -.56, kurtosis = -.15).

Descriptives and Zero-Order Correlations

   Means, standard deviations, ranges, skew, and kurtosis for all relevant measures are presented in Tables 1, 2, 3, and 5. All measures demonstrated acceptable skew and kurtosis with the exception of the Social Phobia Scale, which was somewhat leptokurtic (kurtosis = 3.21). However, the social anxiety composite score demonstrated acceptable

skew (1.04) and kurtosis (.73). Because the Social Phobia Scale was not used for any analysis apart from its contribution to the social anxiety composite, no steps were taken to correct for the elevated kurtosis.

Individual Focus of Attention Scale (FAS) items assessing awareness of negative thoughts, awareness of negative observer-perspective images, and awareness of negative somatic responses all demonstrated positive skew, although skew for each of these variables fell within the acceptable range (see Table 3). In addition, visual inspection of FAS data revealed that participants generally reported higher awareness of positive versus negative items (see Table 3). A paired-samples t-test was therefore conducted to examine differences in the mean scores of each positive/negative FAS item. Results indicated significantly higher means for awareness of: 1) positive versus negative thoughts (t (91) = -7.85, $p <$ .001), 2) positive versus negative images (t (91) = -5.18, $p <$ .001), and 3) pleasant versus unpleasant somatic responses (t (91) = -2.22, $p <$ .05). These results, considered in conjunction with the correlations between social anxiety and the three FAS negative items, suggest that much of the variation in FAS negative item scores occurred in the upper portion of the social anxiety distribution.

Zero-order correlations are presented in Tables 4 (self-focused attention items) and 6 (main study variables). Most notable among the zero-order correlations, social anxiety and working memory were not significantly correlated ($r = $ -.04), suggesting that attempts to reduce evaluative anxiety during the working memory assessments were successful. Because positive self-focus items were not included in main study analyses, correlations are not included in Table 6. However, self-focus on positive thoughts

demonstrated a non-significant positive relationship with conversation performance (r =

.18, p > .05), and self-focus on positive images demonstrated a significant positive

relationship with performance (r = .24, p < .05).

Hypotheses Tests

Before testing moderation and mediation, a regression analysis was conducted to

assess the direct effect of social anxiety on conversation performance (see Table 7). In

Step One of this analysis, the social anxiety composite was entered as a predictor with the

working memory composite entered in Step Two. In Step Three, the interaction term

calculated by multiplying the social anxiety and working memory composites was

entered. In the full model, only social anxiety contributed significantly to the prediction

of conversation performance (t (88) = -2.32, p < .05), suggesting a direct effect of social

anxiety on observer-rated performance. The significant negative relationship suggests

that as levels of social anxiety increase, ratings of conversation performance decrease.

After establishing a direct effect of social anxiety on conversation performance, a

separate set of regression analyses was conducted for each of the negative self-focus

components (i.e., preoccupation with negative thoughts, negative observer-perspective

images, and unpleasant somatic sensations). In addition, the analysis was repeated using

the negative self-focus factor score as a measure of general self-focus.

The first analysis tested the moderating effect of working memory capacity on the

relationship between social anxiety and negative self-focused *thoughts*. The raw score

for negative self-focused thoughts was entered in a regression equation as the criterion

variable with social anxiety, working memory capacity, and the social anxiety/working

memory interaction term entered as predictors in separate steps (see Table 8). Results

indicated that the interaction term contributed significantly to the prediction of negative

self-focused thoughts (t (88) = -2.00, p < .05), suggesting that working memory capacity

moderated the relationship between social anxiety and self-focus on negative *thoughts*. A

follow-up simple slope analysis revealed that the strength of the association between

social anxiety and self-focus on negative *thoughts* increases as levels of working memory

decrease. Figure 3 provides a graphical representation of this moderation effect.

The next analysis examined self-focus on negative *thoughts* as a mediator in the

relationship between social anxiety and conversation performance. Conversation

performance was entered as the dependent variable in a regression equation with social

anxiety, working memory capacity, the social anxiety/working memory interaction term,

and self-focus on negative *thoughts* entered as independent variables in separate steps

(see Table 9). The addition of self-focus on negative *thoughts* to the model reduced the

effect of social anxiety on conversation performance to non-significance (t (87) = -.01, p

> .05) leaving self-focus on negative *thoughts* as the sole significant predictor in the full

model (t (87) = -2.19, p < .05) and suggesting a full mediation of the social

anxiety/conversation performance relationship. A follow-up analysis of the indirect

effect using bootstrapping methods outlined by Preacher and Hayes (2004) also detected

a significant indirect effect (p < .05), providing additional evidence for mediation.

Regression analyses testing moderation and mediation were repeated with the

remaining individual negative self-focus items (i.e., preoccupation with negative

observer-perspective images, preoccupation with unpleasant somatic responses) and with

the rotated factor score for general negative self-focus. Results of these analyses are summarized in Tables 10-15. Individual regression analyses testing moderation failed to reach significance for models examining self-focus on negative observer-perspective images, self-focus on unpleasant somatic responses, and general negative self-focus (see Tables 10, 12, and 14) suggesting that in the current sample the moderating effect of working memory was specific to the relationship between social anxiety and self-focus on negative *thoughts*. However, self-focus on negative images and general self-focus both mediated the relationship between social anxiety and conversation performance (see Tables 11 and 15). Only the regression analysis examining negative self-focused somatic awareness as a mediator of the social anxiety/conversation performance relationship failed to detect a significant indirect effect (see Table 13).

Theory and research suggest differential effects on performance for positive versus negative self-focused attention (see Panayiotou & Vrana, 2004 for review). To verify the specificity of effects detected in main study analyses, four additional regression analyses were conducted. In these analyses, the effect of positive self focus items on conversation was examined while controlling for the effects of social anxiety (see Tables 16-19). The four positive self-focus items were: 1) awareness of positive thoughts, 2) awareness of positive observer-perspective images, 3) awareness of pleasant somatic responses, and 4) general positive self-focus. Results of these analyses varied across predictors. In three of the four analyses, the positive self-focus items (i.e., awareness of positive thoughts, awareness of positive images, and general positive self-focus) demonstrated a positive relationship with conversation performance, although, only

heightened awareness of positive images significantly predicted conversation performance (t (89) = 2.00, $p < .05$; see Table 17). In contrast, awareness of positive somatic responses demonstrated a non-significant negative relationship with conversation performance (t (89) = -.53, $p > .05$; see Table 18).

Depressive Symptoms. Consistent with previous research (e.g., Carter & Wu, 2010; Trew & Alden, 2009), the social anxiety composite correlated highly with depressive symptoms ($r = .57$, $p < .001$) in the current sample. Original plans to exclude participants with high levels of depressive symptoms from final data analyses were deemed to be unfeasible due to the substantial overlap of social anxiety and depressive symptoms at the high end of the social anxiety distribution. Specifically, 4 of 5 participants scoring 2 standard deviations above the mean and an additional 4 of 10 scoring 1 standard deviation above the mean on the social anxiety composite scored greater than 12 on the BDI. Consequently, participants were not excluded from data analysis based on high BDI scores. Instead, supplemental analyses were conducted in which BDI scores were included as a covariate in regression analyses testing social anxiety's prediction of negative self-focused attention and conversation performance. BDI scores were not included as covariates in tests of the main study hypotheses due to the above noted high correlations of social anxiety and depressive symptoms (r = .57), and the notable overlap of these constructs at high levels of social anxiety. The supplemental analyses were conducted to explore the relative contributions of social anxiety and depressive symptoms given the above-noted limitations.

The first supplemental analysis controlled for depressive symptoms while testing the prediction of self-focus on negative thoughts by social anxiety (see Table 20). BDI scores were entered in Step 1 of a regression equation predicting self-focus on negative thoughts. Social anxiety was then entered in Step 2. In the full model, only social anxiety (t (89) = 7.93, $p < .05$) contributed significantly to the prediction of negative self focused attention. This analysis was repeated in three separate regression equations with self focus on negative observer perspective images, self-focus on unpleasant somatic responses, and the negative self focus factor score serving as the respective dependent variables (see Tables 21-23). In the final model of each analysis, social anxiety, but not depressive symptoms, significantly predicted negative self-focus.

The next set of regression analyses again controlled for depressive symptoms while testing the direct effect of social anxiety on conversation performance (see Table 24). With conversation performance serving as the dependent variable, BDI scores were entered in Step 1 and scores for the social anxiety composite were entered in Step 2. In the full model, depressive symptoms failed to account for significant variance (t (89) = -.35, $p = .73$), whereas social anxiety (t (89) = -1.71, $p = .09$) demonstrated a non-significant trend. This finding suggests that some of the relationship between social anxiety and conversation performance may be accounted for by variance shared with depressive symptoms.

CHAPTER IV

DISCUSSION

The current study tested a moderated mediation model in which: 1) negative self-focused attention was proposed to mediate the relationship between social anxiety and conversation performance, and 2) working memory capacity was proposed to moderate the relationship between social anxiety and negative self-focused attention. In addition, three key targets of self-focused attention (i.e., negative thoughts, negative observer-perspective images, and unpleasant somatic responses) were considered separately as well as in combination. This strategy allowed for the exploration of potential differences related to negative self-focus on different types of cognitive and physiological experiences.

The direct effect of social anxiety on conversation performance was supported. Results for tests of mediation indicated that self-focus on negative thoughts, self-focus on negative observer-perspective images, and general negative self-focus all mediated the relationship between social anxiety and performance. Only self-focus on unpleasant somatic responses failed to mediate. Tests of moderation indicated that working memory capacity moderated the relationship between social anxiety and self-focus on negative thoughts. However, significant moderation effects by working memory capacity were not detected for the relationships between social anxiety and self-focus on negative observer-perspective images, self-focus on unpleasant somatic responses, or general

negative self-focus. Supplemental analyses indicated that: 1) the mediating effect is specific to self-focus on negative, but not positive, cognitive experiences and 2) symptoms of depression may contribute to the relationship between social anxiety and performance.

Self-Focused Attention as a Mediator

Using the conceptualization of self-focused attention suggested by Clark and Wells (1995), the current investigation considered three possible targets of self-focused attention: 1) thoughts, 2) observer-perspective images, and 3) somatic responses. In addition, effects related to a general negative self-focus factor score were also examined. The hypothesized mediation of the social anxiety/conversation performance relationship by self-focused attention received mixed support across the separate targets of self-focus and the negative self-focus factor score.

Social anxiety demonstrated a significant negative relationship with objectively-rated performance during a four-minute opposite-sex social interaction. This finding is consistent with previous studies linking social anxiety to performance deficits (e.g., Alden & Wallace, 1995; Rapee & Lim, 1992; Stopa & Clark, 1993; Voncken & Bogels, 2008). However, negative self-focused attention mediated the effect of social anxiety on performance in the current study. This finding suggests that the more aware a person is of negative thoughts and observer-perspective images, the more performance during a conversation may suffer.

Of the three targets of self-focus examined in the current study, only heightened awareness of negative somatic responses failed to mediate the relationship between social

anxiety and performance. On the surface, this finding may seem directly contrary to the suggestions of Clark and Wells (1995) that somatic responses are a primary target of self-focused attention for persons with high levels of social anxiety. In fact, among the three targets of self-focused attention assessed in the current study, awareness of unpleasant somatic responses demonstrated the weakest correlation with social anxiety.

Why did the results of the current study fail to support the role of self-focus for unpleasant somatic responses as a mediator of the social anxiety/performance relationship? Theoretically, awareness of unpleasant somatic responses may not be as essential to the experience of social anxiety as are the negative thoughts and images that follow somatic responses. Clark and Wells (1995) suggest that people with high levels of social anxiety use their awareness of somatic responses (e.g., blushing, shaking, sweating) to construct exaggerated negative images of how others perceive them (i.e., they imagine themselves as sweating profusely). In turn, somatic responses and negative images contribute to increases in negative cognitions about how one is performing (i.e., "everyone can see me sweating," "I'm going to humiliate myself"). Whereas anyone might be aware of their own negative somatic responses, persons with high levels of social anxiety use information gathered from somatic responses as fuel for the negative thoughts and observer-perspective images that ultimately interfere with their performance. A similar pattern has been noted in panic disorder, wherein focus has been shown to shift from physiological responses to awareness of behaviors during a cognitive stressor (Borden et al., 1993). Consequently, results of the current study suggest that

images and thoughts resulting from somatic responses impact performance more so than the somatic responses alone.

A second explanation for the failure to detect a mediating effect of self-focus on somatic responding is methodological. Results of the current study revealed a small but significant positive relationship between awareness of pleasant and unpleasant somatic sensations. Although heightened awareness of negative somatic sensations is likely an important component of the social anxiety experience, the relationships among social anxiety, negative somatic awareness, and performance deficits may have been weakened by items on the Focus of Attention Scale (FAS) that captured a general somatic awareness, regardless of the valence of somatic experiences. Future examinations of self-focus on somatic responses may need to assess more specifically somatic responses linked with social anxiety (e.g., blushing, sweating, trembling hands).

Although the intent of the current study was to explore the effects of *negative* self-focused attention on performance, supplemental analyses examining positive self-focus were conducted to verify that detrimental effects on performance are specific to *negative* self-focus. Past studies have demonstrated that self-focus may only interfere with performance when individual and situational characteristics (e.g., low social self-efficacy and high fear of evaluation during social interactions) are present (e.g., Burgio et al., 1986). Results indicated that positive self-focus did not negatively impact performance during the opposite-sex conversation task. In fact, heightened awareness of positive observer-perspective *images* significantly predicted higher performance ratings after controlling for levels of social anxiety. In other words, given equivalent levels of

social anxiety, self-focus on positive observer-perspective images predicted better performance during an opposite-sex conversation task. Such a finding suggests that performance is not impaired simply as a result of self-focus. Instead, effects on performance appear to be specific to the valence of the experiences that capture attention.

What specific mechanism might contribute to performance deficits when persons experience negative, but not positive, self-focused attention? The findings presented here, as well as in previous studies, do not support an explanation of performance impairment based solely on increased cognitive load. In fact, Pontari and Schlenker (2000) found that increasing cognitive load can sometimes improve performance on social interaction tasks. They had introverts participate in a social interaction task and asked them to adopt an extraverted self-presentational style. They found that asking the introverts to keep an 8-digit number in mind during the interaction task decreased negative self-awareness and actually improved their ability to effectively adopt an extraverted self-presentation. Such findings support the assertions of Clark and Wells (1995) that performance impairment is directly related to the negative valence of cognitive and physiological experiences upon which persons with high levels of social anxiety focus (i.e., negative self-focused attention).

One explanation for the specific effects of negative self-focus is that negative self-focus may initiate other cognitive processes that interfere with performance. In the current study, participants were asked to report their awareness of negative thoughts about *themselves* ("In the past four minutes, how much were you aware of negative

thoughts about yourself?").   Although this method assessed for self-focus, it did not probe for other cognitive processes that may be associated with negative self-focus.

A possible process that could be associated with negative self-focus is worry. Worry is characterized by predominately negatively-valenced verbal thought focused on preparing for potentially negative future consequences of common situations. Notably, worry is typically not focused on the self, but rather on potential negative consequences related to a given situation. As such, the measure of self-focus used in the current study would not necessarily assess for worry. Studies have demonstrated evidence for a relationship between social anxiety and worry during social situations (Morris, Harris, & Rovins, 1981). In addition, researchers examining test anxiety have long implicated worry as a mechanism associated with performance deficits (e.g., Keogh, Bond, French, Richards, & Davis, 2004). Although the relationship between negative self-focus and performance is likely multidetermined, worry may represent a key mechanism through which negative self-focus affects performance.

Working Memory Capacity as a Moderator

The previous section details support for the role of negative self-focused attention as a mediator in the relationship between social anxiety and performance deficits. However, executive attention theory suggests that differences in working memory capacity reflect, among other things, differences in the control of attention (e.g., Kane, Conway et al., 2007). A key hypothesis of the current study, therefore, was that differences in working memory capacity could impact the strength of the relationship between social anxiety and negative self-focused attention.

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As with tests of mediation, tests of moderation in the current study provided mixed results. Working memory capacity significantly moderated the relationship between social anxiety and negative self-focused *thoughts*. Follow-up analyses of this significant moderation effect suggest that as levels of working memory capacity increase, the strength of the relationship between social anxiety and awareness of negative thoughts decreases. In other words, although preoccupation with negative thoughts is substantially linked with social anxiety, persons with higher levels of working memory capacity may be less susceptible to heightened awareness of negative thoughts, across all levels of social anxiety. Given the links among social anxiety, self-focus on negative thoughts, and performance deficits, higher working memory capacity could represent a substantial advantage for persons with high levels of trait social anxiety.

The results related to working memory's influence on the link between social anxiety and preoccupation with negative thoughts is promising. However, results for the moderating effect of working memory capacity across other targets of negative self-focus were not consistent with hypotheses. Working memory did not significantly moderate the relationships between social anxiety and self-focus on negative observer-perspective images or somatic responses. Nor did it moderate the relationship between social anxiety and negative self-focus composite.

The executive attention factor associated with measures of working memory capacity is proposed to be domain-general (e.g., Kane, Conway et al., 2007). Although no a priori hypotheses were made regarding differences among the three targets of self-focus, the failure to detect significant moderation across different targets of self-focus

was not entirely expected. However, as noted previously, researchers suggest that

cognitive processing may be different for thoughts versus imagery versus somatic

responses (e.g., Borkovec, Alcaine, and Behar, 2004; Hamilton, 1986; Hirsch, Clark, &

Matthews, 2006; Ingram, 1990).   The current findings suggest that these experiences

(i.e., thoughts, observer-perspective images, and somatic responses) may each respond in

unique ways to the process of executive attention. Kane, Conway, and colleagues (2007)

suggest that working memory capacity reflects the ability to maintain task-relevant

information in an active state thereby inhibiting capture by task-irrelevant information. If

so, then perhaps the ability to inhibit attention capture by irrelevant information is

specific to verbal-linguistic cognitions, particularly during a social interaction task like

the one used in the current study. Future studies examining self-focused attention in

social anxiety would benefit from a more explicit investigation of the differential effects

of working memory capacity on verbal thoughts versus imagery versus somatic

responses.

Summary: Negative Self-Focused Thoughts and Moderated Mediation

Results revealed a differential pattern of moderation for self-focus on negative

thoughts, images, and somatic responses. Although these variables were moderately-to-

highly correlated, they appear to each represent distinct cognitive content and may affect

other aspects of information processing in unique ways (e.g., Hamilton, 1986; Hirsch,

Clark, and Matthews, 2006). Among the three targets of self-focused attention examined

in the current investigation, results for self-focus on negative *thoughts* were most

consistent with the hypothesized moderated mediation model. Conversely, results failed

to support either aspect of the hypothesized model for self-focus on unpleasant somatic responses. Subsequent sections of the current paper present implications for these findings and suggestions for future studies to further clarify the relationships among social anxiety, self-focused attention, performance deficits, and working memory capacity.

Findings Regarding Symptoms of Depression

The current study did not make a priori predictions regarding any contributions of depressive symptoms to the hypothesized model. However, a previous research provides evidence for a relationship between depression and negative self-focused attention (e.g., Edison & Adams, 1992). Consequently, a measure of depressive symptoms (i.e., BDI) was included in the study for supplemental analyses.

Results supported a direct effect of depressive symptoms on all four measures of negative self-focus. However, in all models tested, depression failed to predict negative self-focus after accounting for the effects of social anxiety. Conversely, social anxiety predicted negative self-focus after accounting for the effects of depression in all analyses. Similarly, depression failed to predict conversation performance deficits, although inclusion of depressive symptoms in a model predicting conversation performance reduced the effect of social anxiety to non-significant. These findings suggest that social anxiety, rather than depression, accounts for both negative self-focused attention and performance deficits during a situation with high potential for social evaluation, although some shared variance between social anxiety and depression may be important in predicting how one's performance during a conversation is perceived by an objective

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observer. However, given the substantial overlap of depression and social anxiety in this

and other samples (e.g., Carter & Wu, 2010; Trew & Alden, 2009), persons with high

levels of "pure" social anxiety unaffected by symptoms of depression are likely a rare

breed.

Limitations

The current investigation integrated constructs and methodologies from the fields

of clinical, cognitive, and social psychology to examine the link between social anxiety

and performance during an opposite-sex social interaction. Although this integration

produced some promising results, it also provided some methodological challenges.

Reliable sampling of moment-to-moment cognitive experiences during an ongoing social

interaction is difficult. Previous studies examining the relationship between working

memory capacity and mind wandering have utilized in-the-moment thought sampling

strategies (e.g., McVay & Kane, 2009). However, maintaining the ecological validity of

the conversation task used in the current study required a retrospective report of cognitive

experiences after the conclusion of the social interaction. This measurement strategy

somewhat limits the interpretability of mediation analyses because a temporal link from

negative self-focus to performance can not be verified. Retrospective reporting of

cognitive experiences, even occurring only minutes after a task, may be susceptible to

memory biases and other sources of inaccurate reporting. However, use of such

retrospective assessment techniques may be one of the best methods currently available

for ecologically valid assessment of self-focus during a social interaction.

Clinical Implications

Whereas typical cognitive-behavioral treatments emphasize the importance of disputing dysfunctional thoughts, they do not address attention control skills. Current findings support a substantial role of negative self-focused attention in the relationship between social anxiety and performance deficits. As such, people with high levels of social anxiety will likely benefit from treatment techniques aimed at redirecting the focus of attention away from negative thoughts and images. Consequently, clinicians may consider including attention control training in CBT treatments for social anxiety. For example, mindfulness techniques may help clients learn to redirect attention away from negative thought content and focus instead on present-moment experiences. For persons with high levels of social anxiety, maintaining focus on an ongoing conversation could reduce observable performance deficits. Results of the current study also suggest a specific role of working memory capacity in weakening the relationship between social anxiety and self-focus on negative thoughts. Recent work examining automated working memory training programs has produced promising results (e.g., Jaeggi, Buschkuehl, Jonides, & Perrig, 2008; McNab et al., 2009). Clinicians could include such training programs in treatment packages for social anxiety.

Research Implications

One key research implication of the current study relates to the potential impact of social anxiety on the assessment of working memory capacity. Previous studies have found evidence supporting a negative relationship between social anxiety and working memory capacity during social-evaluative threat conditions (Wenzel & Holt, 2003), but

researcher should use caution when assessing and interpreting any relationship between social anxiety and working memory capacity. One explanation for a relationship between social anxiety and working memory capacity may be inherent in the main findings of the current study. Negative self-focused attention (particularly heightened awareness of negative thoughts and observer-perspective images) mediated the relationship between social anxiety and conversation performance. As such, increases in state anxiety could negatively impact performance on working memory assessments for persons with high levels of social anxiety.

Several precautions were taken to decrease the impact of negative self-focused attention on working memory assessment in the current study. First, participants were not informed of the social interaction task until after they completed the span tasks. In addition, participants worked alone in a room completing automated reading and spatial span tasks. Investigators examining the relationship between social anxiety and working memory capacity should consider including similar precautions to increase the chances of obtaining accurate assessments of "true" working memory capacity.

Future Directions

A strength of the current investigation was an assessment of self-focus that: 1) mapped on to the theoretically-defined experience of self-focused attention outlined by Clark and Wells (1995), and 2) allowed for the analysis of differential effects related to specific positive and negative foci of attention (i.e., thoughts, images, and somatic responses). Results supported a moderating effect of working memory capacity in the relationship between social anxiety and self-focus on negative *thoughts*. However, this

effect was not replicated when the dependent variable was either self-focus on negative observer perspective images, self-focus on unpleasant somatic responses, or general negative self-focus. Future investigations could benefit from in-depth investigations of the targets of self- and external focused attention and the differential effects of those targets on outcome variables of interest. One start for such research could be further development of methods for assessing self-focused attention. For example, the Focus of Attention Scale (FAS) used in the current study could be refined to include multiple items for each target of self focus (i.e., multiple items assessing respectively thoughts, images, and somatic responses). In addition, the FAS could benefit from the inclusion of items assessing external focus of attention and specific cognitive processes (e.g., worry) to provide additional insight into the mechanisms underlying the relationship between negative self-focus and performance deficits.

Social anxiety has been linked with biased attention toward potentially threatening external stimuli (e.g., Amir, Freshman, & Foa, 2002; Hope, Rapee, Heimberg, & Dombeck, 1990). The current model could be tested using external stimuli in place of self-focused attention. Stroop and dot probe designs could allow for an exploration of the moderating role of working memory capacity when biased attention is directed outward instead of inward. Eventually, comprehensive models could be developed accounting for the specific contributions of self- and external focused attention to the maintenance of social anxiety.

Summary and Conclusion

Clark and Wells (1995) theorize that persons with high levels of social anxiety experience negative self-focused attention (i.e., heightened awareness of negative thoughts, observer-perspective images, and somatic responses) during social encounters. Further, they suggest that negative self-focused attention negatively impacts performance of appropriate social skills. Results of the current study are consistent with the growing body of research supporting the links between social anxiety, negative self-focused attention, and performance deficits during interpersonal encounters. Results also add a potentially important new finding to previous social anxiety research. Specifically, individual differences in working memory capacity demonstrated a moderating effect in the relationship between social anxiety and self-focus on negative thoughts. As such, working memory capacity may represent an important construct for consideration in future information processing models of social anxiety

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APPENDIX A: CODING FOR SOCIAL PERFORMANCE RATING SCALE

LENGTH

1) Very Poor: Monosyllabic ('hmmm,''yeah,''OK') speech turns; or responses so long that partner must interrupt or cannot utter reply.

2) Poor: Participant makes mostly short statements with very long pauses; or speaks in long phrases that monopolize the conversation

3) Fair: Participant mostly speaks one sentence at a time with occasional long pauses between sentences; or s/he tends to talk excessively (or tangentially) most of the time but allows some responses from the partner

4) Good: Participant mostly speaks in statements of one or two sentences without any major pauses, but there are other occasions where speech is short or excessive or tangential

5) Very Good: At most times, participant's utterances are two or more sentences long. Participant acknowledges partner's remarks without taking over and monopolizing the conversation.

CONVERSATION FLOW

1) Very Poor: Participant makes few attempts to initiate the conversation. Even when prompted by the partner, participant cannot maintain the conversation. Participant uses almost no open-ended questions, or is intrusive in questions and shows no empathy. Participant does not attend to information provided by partner

2) Poor: Participant tries to initiate the conversation but is only successful about half the time. The conversation does not flow smoothly, but is more like an interview than a conversation (participant does not follow up on topics and does not provide free information about him/herself). Participant sometimes forgets factual information provided by the partner (repeats questions)

3) Fair: For the most part, the participant is able to maintain the conversation with little help from the partner, although the conversation is still somewhat awkward and stalls at times. Participant asks some open-ended questions. Participant provides little free information and may forget the partner's comments.

4) Good: Participant is able to maintain the conversation with little to no help from the partner. The conversation flows smoothly (given partner's responses), the participant discloses something about the self, and then asks partner a related question (e.g., open-ended questions). Shows interest in partner, and follows up appropriately on partner's remarks. No obvious deficits.

5) Very Good: Participant easily maintains the conversation and responds smoothly to pauses in the conversations, often by following up on previous information provided by the partner or providing free information about the self on a related topic. Participant introduces new topics fluidly and frequently uses open-ended questions. Participant shows genuine interest in the partner and follows up on the partner's remarks with warmth or enthusiasm.

APPENDIX B: FOCUS OF ATTENTION SCALE

For each question below, please circle the number on the scale that best represents your response. You may circle a number either above or below the line on the scale, but you may only circle ONE number.

1) In the past four minutes, how self-conscious were you?
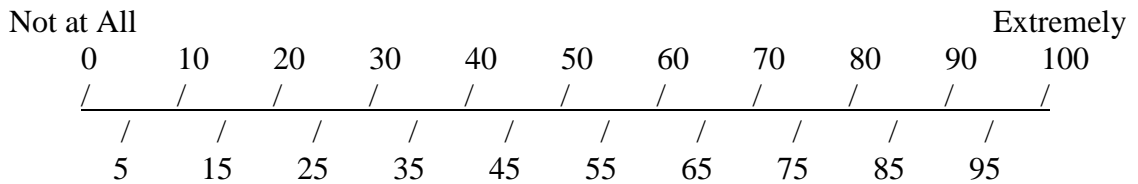
Not at All   Extremely
0   10   20   30   40   50   60   70   80   90   100
/   /   /   /   /   /   /   /   /   /   /
    /   /   /   /   /   /   /   /   /   /
    5   15   25   35   45   55   65   75   85   95

2) In the past four minutes, how much were you aware of negative thoughts about yourself?

Not at All   Extremely
0   10   20   30   40   50   60   70   80   90   100
/   /   /   /   /   /   /   /   /   /   /
    /   /   /   /   /   /   /   /   /   /
    5   15   25   35   45   55   65   75   85   95
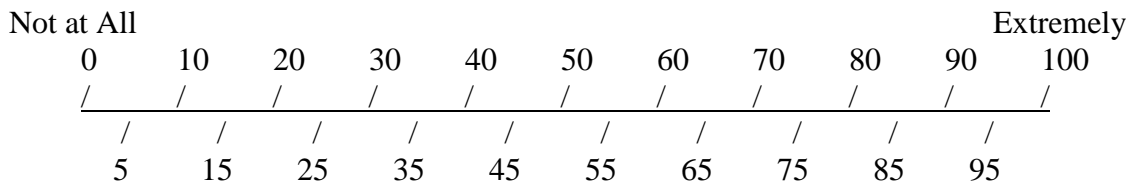
3) In the past four minutes, how much were you aware of positive thoughts about yourself?

Not at All   Extremely
0   10   20   30   40   50   60   70   80   90   100
/   /   /   /   /   /   /   /   /   /   /
    /   /   /   /   /   /   /   /   /   /
    5   15   25   35   45   55   65   75   85   95
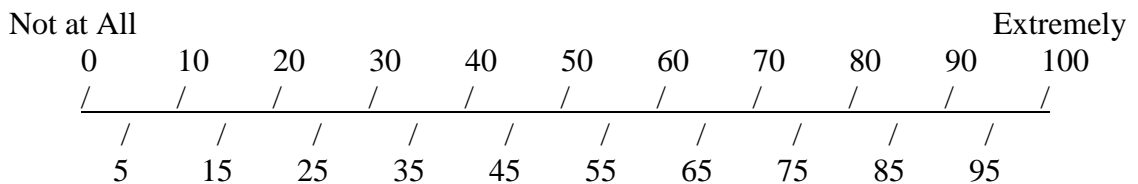
4) In the past four minutes, how much were you aware of negative images of how you appeared to others?

Not at All   Extremely
0   10   20   30   40   50   60   70   80   90   100
/   /   /   /   /   /   /   /   /   /   /
    /   /   /   /   /   /   /   /   /   /
    5   15   25   35   45   55   65   75   85   95
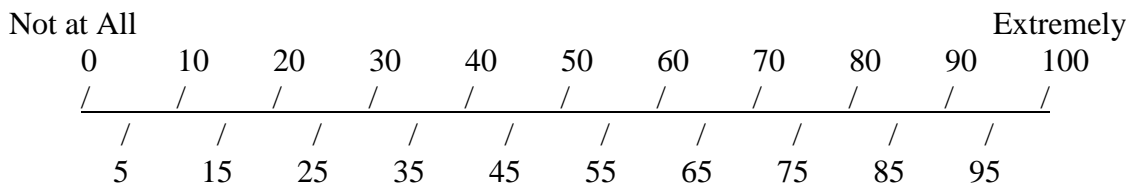
5) In the past four minutes, how much were you aware of positive images of how you appeared to others?

Not at All   Extremely
    0   10   20   30   40   50   60   70   80   90   100
    /   /   /   /   /   /   /   /   /   /   /
        /   /   /   /   /   /   /   /   /   /
        5   15   25   35   45   55   65   75   85   95
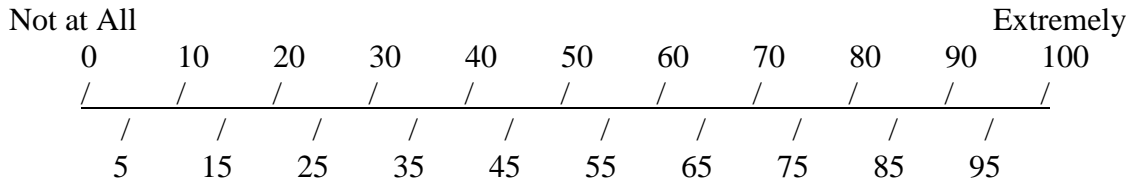
6) In the past four minutes, how much were you aware of unpleasant bodily sensations?

Not at All   Extremely
    0   10   20   30   40   50   60   70   80   90   100
    /   /   /   /   /   /   /   /   /   /   /
        /   /   /   /   /   /   /   /   /   /
        5   15   25   35   45   55   65   75   85   95
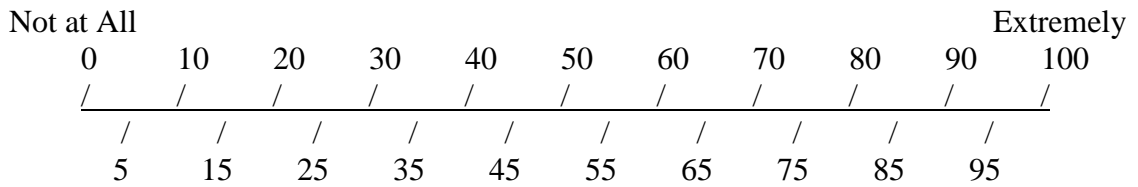
7) In the past four minutes, how much were you aware of pleasant bodily sensations?

Not at All   Extremely
    0   10   20   30   40   50   60   70   80   90   100
    /   /   /   /   /   /   /   /   /   /   /
        /   /   /   /   /   /   /   /   /   /
        5   15   25   35   45   55   65   75   85   95
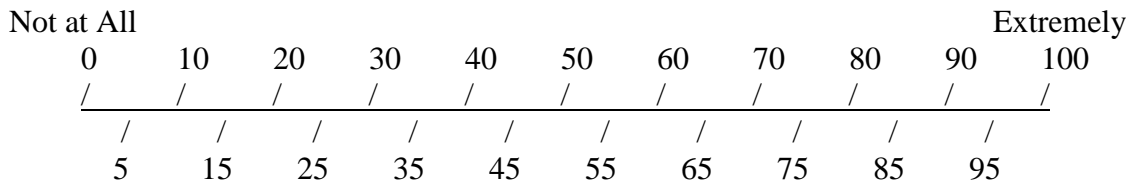
APPENDIX C: TABLES

Table 1

Descriptive Statistics for Social Anxiety Measures

			Range			
Measure	Mean	S.D.	Min	Max	Skew	Kurtosis
SPS	17.29	13.91	0.00	72.00	1.68	3.21
SIAS	24.01	14.87	0.00	69.00	.90	.39
FNE	13.70	8.21	0.00	30.00	.35	-1.07
SATOT	0.00	.90	-1.51	2.86	1.04	.73

SPS = Social Phobia Scale; SIAS = Social Interaction Anxiety Scale; FNE = Fear of Negative Evaluation

Scale; SATOT = Average of Standardized Scores for SPS, SIAS, and FNE

Table 2

Descriptive Statistics for Working Memory Capacity Measures

Measure	Mean	S.D.	Range Min	Max	Skew	Kurtosis
RSPAN	52.97	11.84	23.00	75.00	-.51	-.38
SSPAN	27.73	7.65	6.00	41.00	-.27	-.34
RSPERR	5.40	3.51	0.00	17.00	.93	.70
SSPERR	3.12	6.25	0.00	13.00	1.55	2.93
WMC	0.00	.84	-2.19	1.46	-.51	-.14

RSPAN = Reading Span; SPAN = Spatial Span; RSPERR = Reading Span Error; SSPERR =

Spatial Span Error; WMC = Average of Standardized Scores for RSPAN and SSPAN

Table 3

Descriptive Statistics for Self-Focused Attention Measures

Measure	Mean	S.D.	Range		Skew	Kurtosis
			Min	Max		
Self Cons.	34.84	27.22	0.00	100.00	.42	-.76
Neg. Thoughts	17.45	24.53	0.00	100.00	1.55	1.60
Pos. Thoughts	52.07	29.78	0.00	100.00	-.18	-.84
Neg. Images	24.02	29.06	0.00	100.00	.91	-.56
Pos. Images	47.55	29.26	0.00	100.00	.04	-.95
Neg. Somatic	18.86	25.68	0.00	90.00	1.32	.43
Pos. Somatic	26.36	27.58	0.00	100.00	.91	-.11
Gen. Neg. S.F.	0.00	1.00	-1.16	2.59	.97	-.10

Note. Self Cons. = General Self-Consciousness; Neg. Thoughts = Awareness of negative thoughts; Pos. Thoughts = Awareness of positive thoughts; Neg. Images = Awareness of negative images of the self; Pos. Images = Awareness of positive images of the self; Neg. Somatic = Awareness of unpleasant body sensations; Pos. Somatic = Awareness of pleasant body sensations; Gen. Neg. S.F. = Negative self-focus attention factor score from principle component analysis for Focus of Attention Scale

Table 4

Zero-Order Correlations Between Focus of Attention Scale Items

Measures	1	2	3	4	5	6	7
1. Self Cons.	___	.68**	-.14	.67**	-.09	.51**	-.06
2. Neg. Thoughts		___	-.21*	.86**	-.12	.49**	.03
3. Pos. Thoughts			___	-.16	.68**	-.07	.46**
4. Neg. Images				___	-.12	.48**	.06
5. Pos. Images					___	-.06	.42**
6. Neg. Somatic						___	.26*
7. Pos. Somatic							___

Note. Self Cons. = General Self-Consciousness; Neg. Thoughts = Awareness of negative thoughts; Pos. Thoughts = Awareness of positive thoughts; Neg. Images = Awareness of negative images of the self; Pos. Images = Awareness of positive images of the self; Neg. Somatic = Awareness of unpleasant body sensations; Pos. Somatic = Awareness of pleasant body sensations; Gen. Neg. S.F. = Negative self-focus attention factor score from principle component analysis for Focus of Attention Scale

*p < .05; **p < .01.

Table 5

Descriptive Statistics for Corrected Observer Ratings of Role-Plays (Social Performance Rating Scale)

			Range			
Measure	Mean	S.D.	Min	Max	Skew	Kurtosis
FLOW1	3.38	1.11	1.00	5.00	-.36	-.42
FLOW2	3.43	1.07	1.00	5.00	-.57	-.12
LGTH1	3.54	0.91	1.00	5.00	-.22	-.30
LGTH2	3.54	0.83	2.00	5.00	-.02	-.51
PER1	3.46	0.88	1.50	5.00	-.44	-.34
PER2	3.49	0.87	1.50	5.00	-.53	-.02
PERFORM	3.48	0.83	1.50	5.00	-.56	-.15

Note. Flow 1 = SPRS Flow Domain for Rater One after correction by expert rater; Flow 2 = SPRS Fow Domain for Rater Two after correction; LGTH1 = SPRS Length Domain for Rater One after correction; LGTH2 = SPRS Length Domain for Rater Two after correction; PER1 = Average of SPRS Flow and Length Domains for Rater One after correction; PER2 = Average of SPRS Flow and Length Domains for Rater Two after correction; PERFORM = Average of Performance composites across raters

Table 6

Zero-Order Correlations Between Main Study Variables

Measures	1	2	3	4	5	6	7	8
1. Social Anxiety	___	-.04	.71**	.64**	.53**	.74**	-.20**	-.24*
2. Working Memory		___	.00	.08	.04	.08	-.01	.02
3. Neg. Thoughts			___	.86**	.49**	.90**	-.15	-.33**
4. Neg. Images				___	.48**	.90	-.12	-.32**
5. Neg. Somatic Response					___	.72	.08	-.15
6. General Neg. Self-Focus						___	-.01	-.34**
7. General Pos. Self-Focus							___	.17
8. Performance								___

Note. Social Anxiety = Social Anxiety Composite; Working Memory = Working memory composite; Neg. Thoughts = Focus of Attention Scale (FAS) item assessing awareness of negative thoughts; Neg. Images = FAS item assessing awareness of negative observer-perspective images; Neg. Somatic Response = FAS item assessing awareness of unpleasant somatic responses; General Neg. Self-Focus = Rotated factor score for negative self-focus items from FAS; General Pos. Self-Focus = Rotated factor score for positive self-focus items from FAS; Performance = Composite of Flow and Length domains from Social Performance Rating Scale (SPRS) averaged across raters after correction by expert rater

*p < .05; **p < .01.

Table 7

Hierarchical Regression Analysis Testing Prediction of Conversation Performance by Social Anxiety

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.06*	
Social Anxiety	-.22	.10	-.24*		
Step 2				.06	.00
Working Memory Capacity	.01	.10	.01		
Step 3				.06	.00
SAxWMC	.02	.13	.02		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; Working Memory Capacity = Composite of Spatial Span and Reading Span; SAxWMC = Interaction of Social Anxiety and Working Memory Composites

*p < .05.

Table 8

Hierarchical Regression Analysis Testing Moderation of Relationship between Social Anxiety and Negative Self-Focused Thoughts by Working Memory Capacity

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.50*	
Social Anxiety	19.57	2.00	.72**		
Step 2				.50	.00
Working Memory Capacity	.38	2.15	.01		
Step 3				.52	.02*
SAxWMC	-5.37	2.68	-.15*		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; Working Memory Capacity = Composite of Spatial Span and Reading Span; SAxWMC = Interaction of Social Anxiety and Working Memory Composites

*p < .05, **p < .001.

Table 9

Hierarchical Regression Analysis Testing Mediation of Relationship between Social Anxiety and Conversation Performance by Negative Self-Focused Thoughts

_____

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.06*	
Social Anxiety	-.01	.14	-.01		
Step 2				.06	.00
Working Memory Capacity	.01	.10	.01		
Step 2				.06	.00
SAxWMC	-.04	.13	-.03		
Step 3				.11	.05*
Negative Self-Focused Thoughts	-.27	.12	-.32*		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; Working Memory Capacity = Composite of Spatial Span and Reading Span; SAxWMC = Interaction of Social Anxiety and Working Memory Composites; Negative Self-Focused Attention = Item from Focus of Attention Scale Assessing Awareness of Negative Thoughts

p < .05.

Table 10

Hierarchical Regression Analysis Testing Moderation of Relationship between Social Anxiety and Negative Self-Focused Images by Working Memory Capacity

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.41**	
Social Anxiety	20.85	2.62	.65**		
Step 2				.42	.01
Working Memory Capacity	3.22	2.81	.09		
Step 3				.42	.00
SAxWMC	-2.64	3.50	-.06		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; Working Memory Capacity = Composite of Spatial Span and Reading Span; SAxWMC = Interaction of Social Anxiety and Working Memory Composites

*p < .05, **p < .001.

Table 11

Hierarchical Regression Analysis Testing Mediation of Relationship between Social Anxiety and Conversation Performance by Negative Self-Focused Images

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.06*	
Social Anxiety	-.06	.12	-.07		
Step 2				.10	.04*
Negative Self-Focused Attention	-.23	.11	-.27*		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; Negative Self-Focused Attention = Factor Score from Principle Component Analysis of Focus of Attention Negatively Worded Items

*p < .05.

Table 12

Hierarchical Regression Analysis Testing Moderation of Relationship between Social Anxiety and Negative Body Sensations by Working Memory Capacity

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.28**	
Social Anxiety	15.28	2.57	.54**		
Step 2				.28	.00
Working Memory Capacity	1.58	2.76	.05		
Step 3				.28	.00
SAxWMC	-1.47	3.43	-.04		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; Working Memory Capacity = Composite of Spatial Span and Reading Span; SAxWMC = Interaction of Social Anxiety and Working Memory Composites

*p < .05, **p < .001.

Table 13

Hierarchical Regression Analysis Testing Mediation of Relationship between Social Anxiety and Conversation Performance by Negative Somatic Responses

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.06*	
Social Anxiety	-.21	.11	-.23		
Step 2				.06	.00
Negative Somatic Responses	.02	.10	-.03		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; Negative Somatic Responses = Focus of Attention Scale (FAS) item assessing awareness of negative somatic responses

p < .05.

Table 14

Hierarchical Regression Analysis Testing Moderation of Relationship between Social Anxiety and General Negative Self-Focus Factor by Working Memory Capacity

_____

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.54*	
Social Anxiety	.82	.08	.75**		
Step 2				.55	.01
Working Memory Capacity	.11	.08	.09		
Step 3				.56	.01
SAxWMC	-.14	.11	-.10		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; Working Memory Capacity = Composite of Spatial Span and Reading Span; SAxWMC = Product of social anxiety and working memory composite scores

*p < .05, **p < .001.

Table 15

Hierarchical Regression Analysis Testing Mediation of Relationship between Social Anxiety and Conversation Performance by General Negative Self-Focus Factor

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.06*	
Social Anxiety	.03	.14	.03		
Step 2				.11	.06*
General Negative Self-Focus	-.30	.12	-.36*		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; General Negative Self-Focus = Factor Score from Principle Component Analysis of Focus of Attention Negatively Worded Items

p < .05.

Table 16

Hierarchical Regression Analysis Testing Prediction of Conversation Performance by Awareness of Positive Self-Focused Thoughts and Social Anxiety

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.06*	
Social Anxiety	-.19	.10	-.21		
Step 2				.07	.02
Positive Self-Focused Thoughts	.11	.09	.13		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; Positive Self-Focused Thoughts = Awareness of positive thoughts item from Focus of Attention Scale

*p < .05.

Table 17

Hierarchical Regression Analysis Testing Prediction of Conversation Performance by Awareness of Positive Self-Focused Images and Social Anxiety

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.06*	
Social Anxiety	-.19	.10	-.20		
Step 2				.10	.04*
Positive Self-Focused Images	.17	.09	.21*		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; Positive Self-Focused Images = Awareness of positive observer-perspective images item from Focus of Attention Scale

*p < .05.

Table 18

Hierarchical Regression Analysis Testing Prediction of Conversation Performance by Awareness of Pleasant Somatic Responses and Social Anxiety

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.06*	
Social Anxiety	-.22	.10	-.24*		
Step 2				.06	.00
Positive Somatic Responses	-.05	.09	-.05		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation

Scale; Positive Somatic Responses = Awareness of pleasant body sensations item from Focus of Attention Scale

*p < .05.

Table 19

Hierarchical Regression Analysis Testing Prediction of Conversation Performance by General Positive Self-Focus Factor and Social Anxiety

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.06*	
Social Anxiety	-.20	.10	-.22*		
Step 2				.07	.02
Positive Self-Focused Attention	.11	.09	.13		

Note. Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale; Positive Self-Focused Attention = Factor Score from Principle Component Analysis of Focus of Attention Positively Worded Items

*p < .05.

Table 20

Hierarchical Regression Analysis Testing Prediction of Self-Focus on Negative Thoughts by Social Anxiety and Depressive Symptoms

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.15**	
BDI	-.62	2.24	-.03		
Step 2				.50	.35**
Social Anxiety	19.67	2.48	.72**		

Note. BDI = Beck Depression Inventory; Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale

**$p < .001$.

Table 21

Hierarchical Regression Analysis Testing Prediction of Self-Focus on Negative Observer-Perspective Images by Depressive Symptoms and Social Anxiety

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.12*	
BDI	-.91	2.88	-.03		
Step 2				.41	.30**
Social Anxiety	21.19	3.20	.66**		

Note. BDI = Beck Depression Inventory; Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale

**$p < .001$.

Table 22

Hierarchical Regression Analysis Testing Prediction of Self-Focus on Unpleasant Somatic Responses by Depressive Symptoms and Social Anxiety

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.17**	
BDI	3.91	2.78	.15		
Step 2				.30	.13**
Social Anxiety	12.67	3.08	.45**		

Note. BDI = Beck Depression Inventory; Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia Scale, and Fear of Negative Evaluation Scale

**$p < .001$.

Table 23

Hierarchical Regression Analysis Testing Prediction of General Negative Self-Focus Factor by Social Anxiety and Depressive Symptoms

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.21**	
BDI	.06	.09	.06		
Step 2				.55	.33**
Social Anxiety	.78	.10	.70**		

Note. BDI = Beck Depression Inventory; Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia

Scale, and Fear of Negative Evaluation Scale

**$p < .001$.

Table 24

Hierarchical Regression Analysis Testing Prediction of Conversation Performance by Social Anxiety and Depressive Symptoms

Step and Predictor Variable	B	SEB	ß	R^2	ΔR^2
Step 1				.03	
BDI	-.04	.11	-.04		
Step 2				.06	.03
Social Anxiety	-.20	.12	-.22		

Note. BDI = Beck Depression Inventory; Social Anxiety = Composite of Social Interaction Anxiety Scale, Social Phobia

Scale, and Fear of Negative Evaluation Scale

**$p < .001$.

Figure 1

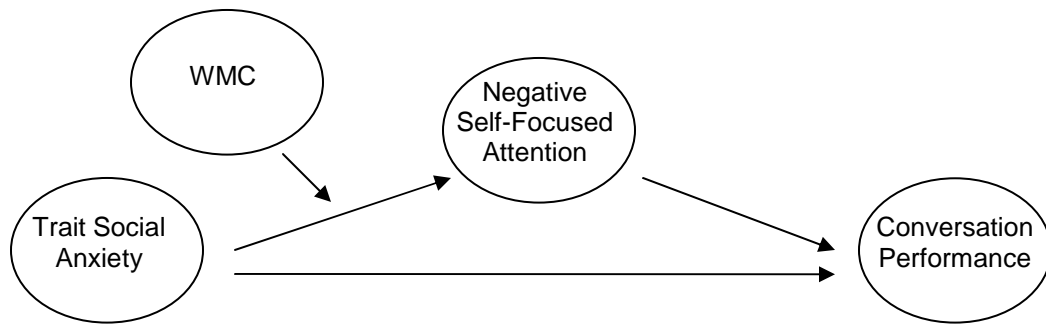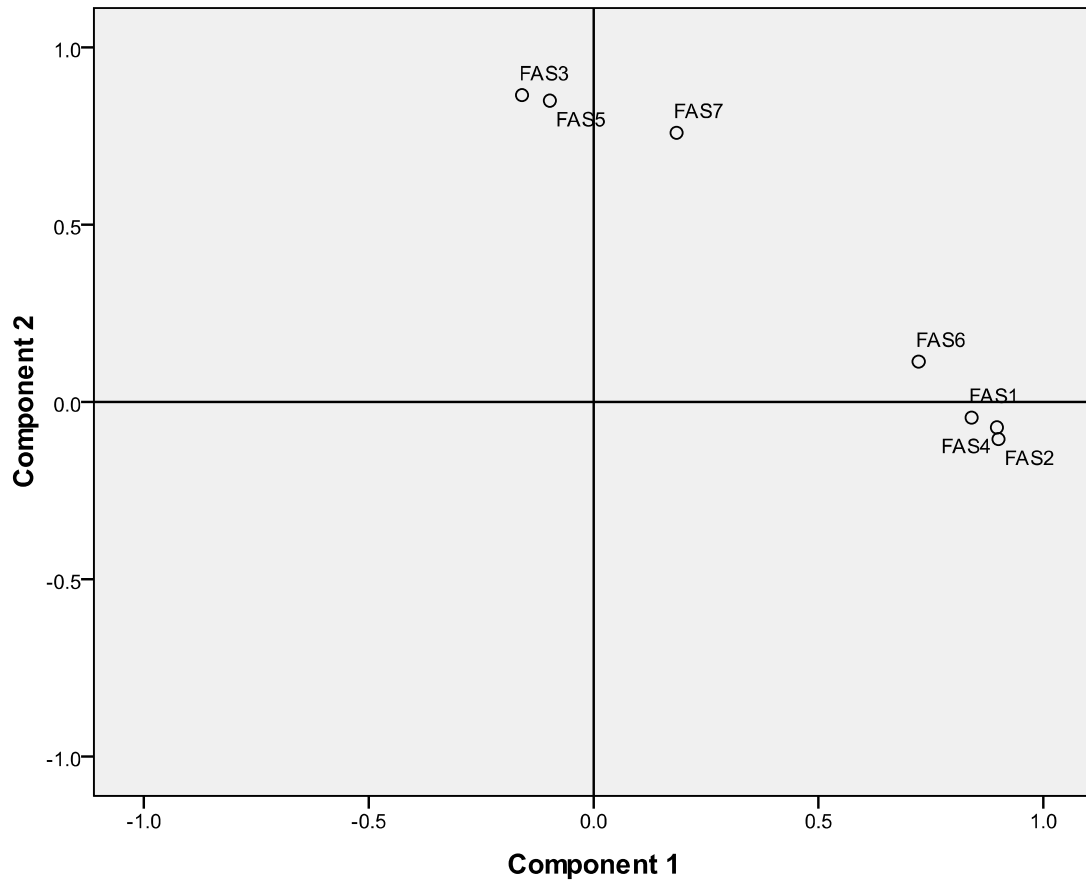*Hypothesized Moderated Mediation Model*

Figure 2

Rotated Component Plot for Focus of Attention Scale Items

Note. FAS1 = General self-consciousness; FAS2 = Awareness of negative thoughts; FAS3 = Awareness of positive thoughts; FAS4 = Awareness of negative observer-perspective images; FAS5 = Awareness of positive observer-perspective images; FAS6 = Awareness of unpleasant somatic sensations; FAS7 = Awareness of pleasant somatic sensations.

Figure 3

Interaction of Social Anxiety and Working Memory Predicting Negative Self-Focused Thoughts