ANXIOUS ANTICIPATION: THE CONSEQUENCES OF ANTICIPATORY PROCESSING ON COGNITIVE SYMPTOMS OF SOCIAL ANXIETY

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CHAPTER I

INTRODUCTION

Social anxiety disorder (SAD) is a debilitating psychological condition characterized by intense fear in social-evaluative situations. SAD is one of the most common psychological disorders, with a lifetime prevalence between 3% and 13% (American Psychiatric Association, 2000), and it is associated with poor psychosocial, economical and health outcomes (Ghaedi, Tavoli, Bakhtiari, Melyani, & Sahragard, 2010; Patel, Knapp, Henderson & Baldwin, 2002; Wittchen, Fuetsch, Sonntag, Müller, & Liebowitz, 2000). Recent advances in the SAD literature have informed comprehensive cognitive theories of the development and maintenance of the disorder. Most components of cognitive models (e.g., attention, memory, interpretation) have been relatively well-studied. However, anticipatory processing, a component of Clark and Wells' (1995) comprehensive cognitive model of SAD, has been somewhat ignored. Therefore, the current study attempted to examine how anticipatory processing interacts with cognitive and emotional processes associated with SAD.

Clark and Wells (1995) suggested that individuals with social anxiety engage in maladaptive cognitive behaviors prior to (e.g., anticipatory processing), during (e.g., self-focused attention), and following (e.g., post-event rumination) a social situation. Before the interaction begins, socially-anxious individuals are posited to anticipate the worst that

could happen and shift their attention inward in order to intensely monitor their behaviors, physiology, and appearance. This excessive internal attention limits external attention to signs of approval or disapproval from others, leaving individuals with only ambiguous information with which to evaluate the quality of the interaction. As a result, these evaluations can be biased by the individual's negative and distorted views of themselves. Research has suggested that there is a relationship between attentional processes and social anxiety (e.g., Amir et al., 1996; Williams, Mathews, & MacLeod, 1996). However, it is still unclear whether attention is biased toward internal information (e.g., their physiology, perceived appearance, and sound of their voices), external information (e.g., facial expressions and body language of other people), both (Rapee & Heimberg, 1997; Schultz, 2009; Schultz & Heimberg, 2008), or if attentional biases represent avoidance away from threat (Mansell, Clark, Ehlers, & Chen, 1999). Research on interpretation biases suggests that individuals with social anxiety endorse negative interpretations of ambiguous social stimuli at a disproportionately higher rate relative to non-anxious individuals (Amir, Foa, & Coles, 1998; Kanai, Sasagawa, Chen, Simada & Sakano, 2010). However, other studies have found that SAD is better characterized by fewer *positive* interpretations of social stimuli (Hirsch & Mathews, 2000; Huppert, Foa, Furr, Filip, & Mathews, 2003).

Inconsistencies in the cognitive bias literature underscore the importance of examining additional factors that may influence cognitive processes in SAD. As Clark and Wells (1995) describe it, anticipatory processing precedes anxiety and self-focused attention. Specifically, Clark and Wells (1995) described anticipatory processing as an anxiety-related thought style in which individuals review in detail what they believe may

happen in an upcoming social situation. They also experience vivid images of past social failures (accurate or distorted), envision distorted perceptions of themselves, and/or imagine worst-case scenarios for the upcoming social situation. These thoughts/images are intrusive and difficult to resist (Vassilopoulos, 2004). As a result of these images, individuals with social anxiety begin to feel increasingly anxious, have difficulty concentrating, and shift their attention inward in order to better monitor their physical appearance and social behaviors (Clark & Wells, 1995).

At present, only four studies have examined the specific effects of anticipatory processing on cognitive processes. Broadly, research suggests that those who anticipate prior to social events tend to have memory biases toward self-referent words (Mansell & Clark, 1999), negative predictions of their appearance (Vassilopoulos, 2005), and higher standards for themselves (Wong & Moulds, 2011). Studies also have found that those who anticipate have higher state anxiety (Hinrichsen & Clark, 2003; Vassilopoulos, 2004; Vassilopoulos, 2005; Wong & Moulds, 2011) than those who do not. Although these studies have found links between anticipatory processing and correlates of social anxiety, none of them appear to be direct tests of Clark and Wells' (1995) model, which suggests that anticipatory processing precedes increases in 1) anxiety, 2) self-focused attention, 3) negatively-biased interpretations of the event, and 4) avoidance. All of these factors have been empirically implicated in the literature as mechanisms that maintain social anxiety, but no study has examined them simultaneously with anticipatory processing. Furthermore, within this literature, the definition of anticipatory processing and the methodology used to study it have widely varied. As a result, the body of literature is promising, but conclusions are limited.

Thus, the current study attempted to address this gap in the literature by simultaneously testing the components of Clark and Wells' model (1995). Participants high (HSA) and low (LSA) in social anxiety symptoms engaged in an anticipatory processing or a distraction thinking task prior to a social interaction in order to determine how the anticipation process affected anxiety, desire to avoid, focus of attention, and negative interpretations. It was expected that those who anticipated would report higher levels of anxiety, have more desire to avoid the future social task, have higher internal attentional focus, and would endorse a higher level of negative interpretations of social events than those who engaged in distractive thinking. Additionally, it was expected that the effects of anticipation would be more pronounced for HSA participants than LSA participants.

CHAPTER II

METHODOLOGY

Participants

The initial pool of participants included 190 undergraduate students in psychology courses at a large Midwestern university. Participants were recruited from the undergraduate psychology subject pool and were given extra credit for their participation in the study. Forty-six participants did not exceed the cutoffs for HSA (SIAS score $\geq$ 30) or LSA (SIAS score $\leq$ 18) and were removed from analyses. In order to ensure the LSA group represented a nonanxious, nondepressed sample, five LSA participants were removed for having elevated ($\geq$ 1 *SD*; $\geq$ 23 on the CES-D) depressive symptoms and 16 LSA participants were removed for having elevated worry ($\geq$ 61 on the PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). The final sample consisted of 66 LSA and 57 HSA participants (N = 123). The sample was predominately female (72.4%), Caucasian (80.5%), and the mean age was 19.52 (SD = 3.3). Additional participant information is presented in Table 1.

Measures

The following measures were completed by participants prior to the manipulation:

Demographics (Appendix E). Demographic information was collected from participants, including sex, age, ethnicity, year in school, high school and college GPA, family income, and parental education.

Social Interaction Anxiety Scale (SIAS) and Social Phobia Scale (SPS); Mattick & Clarke, 1998; Appendix F). The SIAS and SPS are complimentary 20-item self-report questionnaires that measure social anxiety symptoms. The SIAS is primarily focused on the severity of fears of general social interactions (e.g., "I become tense if I have to talk about myself or my feelings") and the SPS is primarily focused on anxiety related to social performance situations (e.g., giving a speech, using a public bathroom, etc.). Responses for both scales are rated on a Likert-type scale ranging from 0 (*Not at all characteristic or true of me)* to 4 (*Extremely characteristic or true of me)* with total scores ranging from 0 to 80. Both instruments correlate with other measures of social anxiety and can distinguish between individuals with social anxiety disorder, specific phobia, and agoraphobia (Mattick & Clarke, 1998). The SIAS ($\alpha = .94$) and SPS ($\alpha = .94$) have been shown to have good internal consistency (Mattick & Clarke, 1998). In the current study, internal consistency of the SIAS ($\alpha = .95$) and SPS ($\alpha = .94$) were both strong.

Anticipatory Social Behaviours Questionnaire (ASBQ; Hinrichsen & Clark, 2003; Appendix G). The ASBQ is a 12-item measure which assesses cognitive strategies used by individuals prior to social situations, including rehearsal for the upcoming situation, catastrophizing, and thinking about past social situations. The ASBQ was developed from items that distinguished individuals with high social anxiety from those with low social anxiety. Items include "I imagine the worst that could happen," "I try to picture how I will appear to others," and "I think about similar situations in which I have failed in the past." Each item is rated on a 1 (*Never*) to 4 (*Always*) scale, and higher scores indicate more use of maladaptive cognitive strategies.

The internal consistency of the ASBQ is high (α = .88; Hinrichsen & Clark, 2003). In the current study, the reliability of the ASBQ was high (α = .91).

Center for Epidemiological Studies - Depression Scale (CES-D; Radloff, 1977; Appendix H). The CES-D is a 20-item self-report questionnaire which measures the severity of depressive symptoms during the previous week. Responses range from 0 *(Rarely or none of the time*) to 3 (*Most or all of the time*). Total scores range from 0 to 60, with higher scores indicating more severe depressive symptoms. Research has demonstrated that the CES-D has good internal consistency (α = .85 for general population and .90 for clinical sample), modest test-retest reliability (8 weeks; *r* = .57), and can be used with clinical and non-clinical samples (Locke & Putnam, 1971). The internal consistency of the CES-D in the current study was high (α = .90).

Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990; Appendix I). The PSWQ is a 16-item questionnaire that assesses the extent to which the participant worries about various situations. Items are scored on a 1 (*Not at all typical*) to 5 (*Very typical*) scale, with higher scores indicating higher levels of worry. The PSWQ has excellent internal consistency (α = .95) and test-retest reliability (8 to 10 weeks; *r* = .92; Meyer et al., 1990). In the current study, the internal consistency of the PSWQ was high (α = .95).

Ruminative Responses Scale (RRS; Nolen-Hoeksema & Morrow, 1991; Treynor et al., 2003; Appendix J). This revised measure contains 10 of the original items and assesses the frequency of ruminative thoughts. The revised RRS has demonstrated good internal consistency (α = .90; Treynor et al., 2003). For the current

study, the measure was adapted to assess rumination following social situations. Internal consistency of this version of the RRS was high (α = .89).

Subjective Anxiety Level (Appendix K). Participants were asked to report a baseline current anxiety level ranging from 0 (*No anxiety at all*) to 100 (*The worst anxiety I have ever felt*).

The following measures were completed by participants after the manipulation:

Manipulation check (Appendix L). In order to assess whether participants were engaging in the instructed behaviors during the manipulation period, they were given a manipulation check questionnaire that asked them to 1) describe what they thought about during the manipulation, 2) estimate the percentage of time during the manipulation that they were following the prompts on the screen (0% - 100%), 3) estimate the time during the manipulation they spent thinking about the social interaction (0% - 100%), 4) estimate the degree to which they typically think about the stimuli in the prompts (on an 11-point scale ranging from "never" to "many times a day"), and 5) record the vividness of the imagery they experienced while thinking about the prompts (on an 7-point scale ranging from "no image present at all" to "perfectly clear and as vivid as the actual experience").

Subjective anxiety level (Appendix M). Participants were asked to provide their anxiety level immediately prior to the social interaction using the same 0 to 100 scale that was used prior to the manipulation.

Behavioral avoidance (Appendix M). Participants were asked three questions to assess their desire to avoid the upcoming social interaction. The first question assessed the degree to which they would rather fill out additional questionnaires instead of engage

in the social interaction, which was conceptualized as avoidance at a low cost (e.g., they do not have to sacrifice a lot to get out of the interaction). The second avoidance question asked them to what degree they would be willing to sacrifice one-half of their extra credit points in order to skip the social interaction. This question attempted to assess whether or not they would make a substantial sacrifice in order to avoid the interaction. Both of these questions are scored on a 0 (*Definitely no*) to 10 (*Definitely yes*) scale. The final question assessed their overall desire to engage in the interaction on a scale ranging from 0 (*I do not want to do it at all*) to 10 (*I am excited for it*).

Focus of Attention Questionnaire (FAQ; adapted from Woody, 1996; Appendix N). The FAQ is a 10-item questionnaire designed to assess the stimuli on which an individual is focusing during a speech task. The FAQ has a subscale that measures an individual's level of focus on his or her own thoughts, anxiety, behavior, and physiology (Self-Focus) and a subscale that measures an individual's level of focus on the social partner and/or the environment (Other-Focus). The FAQ was originally developed for participants to fill out *after* a speech task has been completed. However, in the current study, participants filled out the measure *before* a social task. Therefore, minor changes were made to the wording of items in order to adapt it for a future social interaction. For example, the item "I was focusing on the impression I was making on the other person" was changed to "I am focusing on the impression I am going to make on my interaction partner and/or the researchers." Internal consistency for the subscales in the FAQ in its original form was modest for both scales (Self-Focus $\alpha = .76$, Other-Focus $\alpha = .72$). In the current study, the reliability for the Self-Focus scale was modest ($\alpha = .79$), but the Other-Focus scale had poor reliability ($\alpha = .58$).

Self-Report Measure of Interpretation Bias (SMIB; Huppert, Pasupuleti, Foa, & Mathews, 2007; Appendix O). The SMIB is a 32-item questionnaire that asks participants to rate how likely specific outcomes are in various social situations. There are 16 social situations in the questionnaire; each situation ends with a positive outcome or a negative outcome, and participants are instructed to rate the likelihood of each on a 0 (*Not likely at all*) to 10 (*Definitely likely*) scale. For example, the phrase "Your supervisor calls you into her office to tell you that you did something…" ends with "awful" at one point in the questionnaire and "impressive" at another point. The positive items had adequate reliability (α = .69), but the negative items (the focus of this study) had excellent reliability (α = .93; Huppert et al., 2007). In the current study, the reliability of the Positive Interpretation scale was adequate (α = .81) and the reliability of the Negative Interpretation Scale was good (α = .90).

Belief in Interaction. After participants were informed there was not going to be a social interaction, they were asked to rate how much they believed a social interaction was actually going to take place in this study. This rating ranged from 0 (*I was completely convinced there would not be an interaction*) to 10 (*I was completely convinced there would be an interaction*).

Procedure

Participants were recruited from the university's subject pool system. The SPS, as part of a larger project (Grant, et al., in preparation), was used in order to recruit subjects. Subjects high ($\geq$ 30) and low ($\leq$ 18) in SPS scores were invited to participate in a study about thoughts and emotions during anxious situations. After recruitment, the SIAS was used in order to categorize participants as HSA or LSA because the SIAS

assesses social interaction anxiety, which was more consistent with the nature of the social threat used in the procedure. The cutoff score for HSA individuals was determined by calculating 1 standard deviation above the mean SIAS score for nonclinical undergraduate students (M = 19.0, SD = 10.1) reported in Mattick and Clarke (1998). Therefore, HSA individuals were defined by a score of 30 or higher on the SIAS. LSA individuals are defined by having a score below the mean from Mattick and Clarke (1998; 18 or lower).

Participants were randomly assigned to either the Anticipation or Distraction condition using a random number generator. Next, they completed trait measures (demographics, SIAS, ASBQ, CES-D, PSWQ, RRS, and Time 1 [Baseline] Subjective Anxiety) on *www.kwiksurveys.com*, an online questionnaire site. After completing the initial measures, researchers told participants that they will be engaging in a social interaction with a research assistant. The researcher told participants that the interaction will be filmed with a video camera, and the tape would be viewed by other researchers at a later time. A social interaction task was used in this study instead of a speech task because an interaction task realistically simulates anxiety-provoking situations that individuals with social anxiety encounter daily. Similar instructions have been found to elicit moderate, but not overwhelmingly high, levels of anxiety in participants (e.g., Beck, Davila, Farrow, & Grant, 2006).

Then, the researcher told the participant that the social interaction would begin in about ten minutes, but in the meantime, the participant was instructed to prepare for the interaction by following video thinking prompts. Participants viewed a 4 minute, 45 second online video that asked them to think about and/or imagine six different prompts.

Each prompt was presented individually for 45 seconds. In the Anticipation condition, participants viewed the six anticipation instructions developed by Hinrichsen and Clark (2003; Appendix C). In the Distraction condition, participants viewed six of the neutral stimuli used in Nolen-Hoeksema and Morrow's (1993) rumination paradigm (Appendix D). Everything related to the presentation of the prompts (e.g., color of the webpage, time of presentation, total time of task) was identical except the content of the prompts.

After the manipulation, the researcher told the participant to fill out additional questionnaires (i.e. Manipulation Check, SMIB, FAQ, Time 2 Anxiety, and Avoidance) before the interaction started. When the participant completed those questionnaires, they were informed that there would not be a social interaction. They were debriefed and informed that they were free to leave.

Hypotheses

Clark and Wells (1995) suggested that anticipatory processing could potentially-result in increased anxiety, avoidance, self-focused attention, and/or negative interpretations, and Hinrichsen and Clark (2003) found that anticipatory processing influences both HSA and LSA individuals. Therefore, we expected that those in the Anticipation condition would have higher mean scores for each of those variables, and we expected a significant interaction such that the effect would more pronounced for HSA participants (Figure 1). In other words, we expected anticipation to affect all participants, but we also expected it to especially affect HSA participants (Figure 1). Similarly, we expected lower mean scores for positive interpretations for those in the Anticipation condition, especially for HSA participants. Finally, we expected a mean increase in self-reported anxiety for those in the Anticipation condition, and especially

for HSA participants in the Anticipation condition (Figure 2).

Chapter III

RESULTS

Assumptions. No variables violated assumptions of skewness $\geq$ |2.0| (all < |1.74| for high-cost avoidance) or kurtosis $\geq$ |4.0| (all < |2.59| for high-cost avoidance). No values exceeded $z \geq {}^{+}/_{-}$ |3.29| on any variable for any participant (all < |3.01| for Other-Focused attention; Tabachnick & Fidell, 2007). Several DVs (high-cost avoidance, internal attention, external attention, negative interpretation biases, vividness of imagery, degree of belief in the upcoming interaction, degree to which they think about the stimuli in the prompts in a given day) had significant Levene's tests for heterogeneity of variances. However, because Levene's test can be too sensitive (Tabachnick & Fidell, 2007) and cell sample sizes were relatively equal (largest cell : smallest cell = 65:53 = 1.2), only F_{max} values exceeding 10 represented areas of concern (Tabachnick & Fidell, 2007). All F_{max} values were equal to or less than 5.09 (high-cost avoidance). Therefore, the analyses were robust to violations of homogeneity of variance and we examined unadjusted F values.

Participant characteristics. Those assigned to the Anticipation condition (N = 54) did not differ from those in the Distraction condition (N = 69) on trait social interaction anxiety symptoms (p = .22), worry (p = .27), anticipatory processing (p = .47), rumination (p = .28), or depressive symptoms (p = .08). Men and women were

proportionally represented in SA groups, $\chi^2(1) = .50$, $p = .48$. Additional participant information is presented in Table 1.

Group Assignment. HSA and LSA participants were proportionally assigned to each condition, $\chi^2(1) = 1.18$, $p = .28$. Men and women also were proportionally assigned to each condition, $\chi^2(1) = .54$, $p = .46$.

Manipulation Check. One-hundred percent of the participants endorsed that they understood the directions for the manipulation. After the manipulation, participants were asked to describe what they were doing during the manipulation. If participants explicitly described that they were thinking about the prompts, they were coded as "On Task." Approximately 91% of participants were coded as On Task, and there were no differences between Condition ($p = .75$) or SA Group ($p = 1.00$). Overall, participants estimated that they were thinking about the prompts for 65.3% ($SD = 23.74\%$) and the social interaction for 33.2% ($SD = 28.48\%$) of the manipulation. These values are consistent with similar studies (e.g., Behar, Vescio, Borkovec, 2005; McLaughlin, Borkovec, & Sibrava; 2007). Those in the Anticipation condition thought about the upcoming social interaction more ($M = 50.28\%$, $SD = 27.27\%$) than those in the Distraction condition ($M = 19.71\%$, $SD = 21.37\%$), primarily because those in the Anticipation group were specifically instructed to think about the upcoming interaction, $F(1, 118) = 46.48$, $p < .001$. There were no differences between HSA and LSA individuals in percentage thinking about the interaction ($p = .98$). HSA in the Anticipation condition reported that they typically think about the material in the prompts more often ($M = 4.07$, $SD = 1.76$) than LSA in the Anticipate condition ($M = 1.96$, $SD = .77$; $p < .001$). This suggests that the thoughts in the Anticipation condition were more

commonly experienced by HSA than LSA individuals. Finally, the Distraction group experienced more vivid imagery (M = 5.56, SD = .98) than the Anticipation group (M = 4.57, SD = 1.17), but a significant interaction (F[1, 118] = 6.85, p = .01) found that HSA in the Anticipation condition (M = 4.96, SD = 1.62) experienced more vivid imagery than LSA in the Anticipation condition (M = 4.15, SD = 1.74; p = .03), whereas HSA and LSA experienced equal vividness of imagery in the Distract condition (p = .33). This suggests HSA individuals do not experience more vivid imagery overall, but they do for social information during anticipatory processing.

Overall, participants appeared to believe that an interaction was going to take place (M = 8.67, SD = 1.97). There were no differences between those in different conditions (p = .11; η^2 = .02), nor was there a significant Condition X SA Group interaction (p = .36; η^2 = .01). However, LSA individuals had higher belief that the interaction was going to take place (M = 9.05, SD = 1.55) than HSA individuals (M = 8.23, SD = 2.31), F(1, 118) = 5.61, p = .01, η^2 = .05. A small (N = 15) pilot study (Grant, Lechner, Mills, & Judah, in preparation) found that those who had completed self-report questionnaires assessing anxiety, depression, and cognitive processes had equal scores on measures of trait anticipatory processing (p = .83), positive affect (p = .47),and negative affect (p = .59) than those who did not fill out questionnaires.

Anxiety. There were no differences in mean post-manipulation subjective anxiety levels between the Anticipation (M = 36.30, SD = 25.5) and Distraction (M = 36.69, SD = 26.50) conditions (F[1, 114] = .46, p = .50), nor was there a significant Condition X SA Group interaction (p = .81; Figure 3). HSA individuals (M = 50.93, SD

= 23.51) had significantly higher post-manipulation anxiety than LSA individuals (M = 24.36, SD = 21.38), $F(1, 114) = 41.18$, $p < .001$, $\eta^2 = .27$.

There was no overall increase in self-reported anxiety from Time 1 (Baseline; M = 36.42, SD = 27.69) to Time 2 (Post-Manipulation; M = 36.52, SD = 25.95), $F(1, 114)$ = .01, $p = .93$ (Figure 4). There were no Time X Condition, Time X SA Group, or Time X SA Group X SA Group interactions.

Avoidance. Those in the Anticipation condition (M = 6.26, SD = 3.12) had more desire to fill out questionnaires instead of participate in the social interaction than the Distraction group (M = 4.91, SD = 3.04), $F(1, 119) = 4.48$, $p = .04$, $\eta^2 = .04$ (Figure 5). Those in the Anticipation condition (M = 4.46, SD = 2.10) also had slightly less desire to engage in the social interaction overall than the Distraction group (M = 5.28, SD = 2.03), but this effect was only marginally significant, $F(1, 119) = 3.61$, $p = .06$, $\eta^2 = .03$ (Figure 6). There was no effect of condition on overt avoidance (accepting ½ credit in order to avoid the interaction; $p = .27$; Figure 7). HSA individuals had more desire to avoid by filling out questionnaires ($F[1, 119] = 20.64$, $p < .001$, $\eta^2 = .15$), more desire to avoid by taking ½ credit ($F[1, 119] = 21.85$, $p < .001$, $\eta^2 = .16$), and less desire to engage in the interaction ($F[1, 119] = 34.97$, $p < .001$, $\eta^2 = .23$) than LSA participants. There were no significant Condition X SA Group interactions for these analyses.

Focus of Attention. There was a significant Condition X SA Group interaction ($F[1, 119] = 5.56$, $p = .02$, $\eta^2 = .05$) such that HSA in the Anticipation condition had significantly higher Self-Focus scores (M = 14.86, SD = 3.64) than HSA in the Distract condition (M = 12.72, SD = 4.23; $p = .02$), but there were no differences between LSA individuals in either condition ($p = .34$; Figure 8). A similar pattern was observed for

Other-Focus, but this interaction was only marginally significant (F[1, 119] = 3.43, p = .07, η^2 = .06; Figure 9). HSA individuals had higher Self-Focus (F[1, 119] = 52.25, p < .001, η^2 = 31) and Other-Focus (F[1, 119] = 7.69, p = .01, η^2 = .06) scores than LSA individuals. There were no main effects of Condition for Self-Focus (p = .31) or Other-Focus (p = .45) scores.

Interpretation. Those in the Anticipation condition had slightly higher mean Negative Interpretation scores (M = 56.63, SD = 27.11) than those in the Distraction condition (M = 47.74, SD = 20.90), but this effect was only marginally significant, F(1, 119) = 3.28, p = .07, η^2 = .03 (Figure 10). There were no differences between Anticipation and Distraction for Positive Interpretations (p = .62), nor were there significant Condition X SA Group interactions for Negative or Positive Interpretations. HSA individuals had higher Negative Interpretation scores (F[1,119] = 71.26, p < .001, η^2 = .38) and lower Positive Interpretation scores than LSA individuals (F[1, 119] = 28.99, p < .001, η^2 = .20; Figure 11).

CHAPTER IV

DISCUSSION

The purpose of the current study was to examine the effect of anticipatory processing on anxiety, avoidance, interpretation, and attentional focus, all of which are factors that are hypothesized by Clark and Wells (1995) to maintain symptoms of SAD. Consistent with our expectations, the results of this study suggested that engaging in anticipatory processing increased an individual's desire to avoid the interaction and potentially can result in higher endorsement of negative interpretations of social events, although the latter result was marginally significant. Contrary to our hypotheses, these effects were not more pronounced for HSA individuals. We also found that HSA individuals who engaged in anticipation were more internally-focused and were potentially more externally-focused, although the latter result was marginally significant and based on a subscale with poor reliability. Although we expected to see the effect for internal self-focus, we did not expect that anticipation would increase external attention as well. Finally, contrary to our hypotheses, anticipatory processing did not result in increased anxiety after baseline and those who anticipated did not have higher anxiety than those in the distraction group prior to the interaction. Taken together, these results seem to offer some support for the Clark and Wells (1995) model that suggested anticipation may affect attention, interpretations, and may lead to avoidance. However,

the current study was not able to replicate previous findings that anticipation resulted in an increase in anxiety.

Clark and Wells (1995) suggest that anticipatory processing results in an increase in self-focused attention in socially-anxious individuals. The current study supports this hypothesis. However, we also found a potential difference in externally-focused attention for those who anticipated (although this finding should be interpreted with caution). If this finding is replicated in future research, this would be most consistent with Rapee and Heimberg's (1997) cognitive model of social anxiety, which suggested that HSA individuals show increased attention toward threatening (external) stimuli in addition to increased internal/self-focused attention. The influence of anticipatory processing may not be the solitary factor that could elucidate the research on attentional biases in social anxiety. However, future research should continue to examine the effects of anticipation on attentional processes in order to better understand the mechanisms associated with attentional biases, especially if anticipatory processing is consistently found to precede attentional biases.

Previous research on socially-anxious individuals has concluded that they evaluate neutral social events as negative (Kanai, Sasagawa, Chen, Simada, & Sakano, 2010; Stopa & Clark, 2010) and exaggerate the catastrophic nature of negative social interactions (Stopa & Clark, 2010). The current study found that anticipation potentially resulted in more endorsement of negative interpretations, although this effect was marginally significant. This raises the possibility that the degree to which an individual engages in anticipatory processing may influence their tendency to engage in negative interpretations. Specifically, this may suggest that individuals who go into a social

situation expecting the worst are more likely to perceive evidence that confirms those expectations. This finding also expanded on Hinrichsen and Clark (2003), which suggested LSA individuals can experience negative effects of anticipatory processing as well. Future research should examine the effects of anticipatory processing on interpretations of social behaviors (e.g., Kanai et al., 2010) and attempt to further examine the relationship between anticipation and interpretation.

This study also found that those who anticipated, regardless of social anxiety status, expressed more desire to avoid the social interaction. However, this finding was specific to low-cost avoidance (filling out questionnaires) and not to high-cost avoidance (sacrificing research credits). Participants who anticipated also were less enthusiastic about the social interaction.

Finally, this study did not replicate the rather-consistent findings of previous studies on anticipatory processing that anticipation results in an increase in (or lack of attenuation of) anxiety. It is possible that this lack of finding is more related to methodology than theory. Some studies have noted that anticipatory processing affects subjective anxiety (Hinrichsen & Clark, 2003), whereas others have found that anticipatory processing increases anxiety using physiological measures (e.g., skin conductance; Wong & Moulds, 2011) and well-validated measures of state anxiety (e.g., State-Trait Anxiety Inventory-State version; Mellings & Alden, 2000). Therefore, future studies should utilize multi-method assessment of anxiety in order to determine the specific effects of AP on anxiety severity.

Limitations

One limitation of this study was the use of self-report measures in order to study the constructs of interest. However, due to the exploratory nature of this study, the use of self-report measures allowed the researchers to examine a wide variety of constructs in a relatively short time (approximately 5 minutes). Future research should examine each of these constructs, along with others, using multi-method paradigms. For example, future studies could induce anticipatory processing and then have participants complete a dot-probe task in order to assess for attentional biases.

Another limitation was the use of an undergraduate sample. Although HSA participants did not receive a full assessment for SAD, the current sample of HSA individuals scored similarly to clinical samples on common measures of social anxiety symptoms (Mattick & Clarke, 1998). Similarly, SAD is relatively common in undergraduates (American College Health Association, 2008), which suggests this sample may have been adequately representative of the socially-anxious population.

The cross-sectional design in the current study provided the researchers information about a particular moment in time, but prospective studies would increase our understanding of the development of social anxiety symptoms and cognitive processes. For example, a prospective design could provide researchers with information about whether an individual's tendency to engage in anticipatory processing is a risk factor for developing SA symptoms or if the onset of SA symptoms results in an increase in anticipatory processing.

Future Directions

Clark and Wells (1995) suggest that anticipatory processing and other processes maintain social anxiety symptoms by interfering with social interactions. The current

study did not examine this, but future research should examine the effects of anticipatory processing on social performance. Three studies have attempted to explore this possibility (e.g., Brown & Stopa, 2006; Mellings & Alden, 2000; Wong & Moulds, 2011). None have found evidence that anticipation directly relates to decreased performance, but it is possible that anticipatory processing activates other mechanisms (e.g., anxiety, interpretation biases, desire to avoid) that may more directly result in social performance deficits. Wong and Moulds (2011) found that anticipation indirectly interfered with social performance through anxiety, supporting the interactive nature of these processes as suggested by Clark and Wells. The current study found a relationship between each of those variables except anxiety, but prior research suggests that this study was the exception with regards to that relationship. Therefore, although each of these variables was examined independently in the current study, future research should examine the interactions of these constructs and other potential maintaining factors of SAD. The Clark and Wells (1995) model does not explicitly hypothesize about the sequence of the constructs in the model. However, it is very likely that cognitive biases are influenced by each other and by anxious arousal, and prospective designs can attempt to examine this process in a larger context instead of examining one process at a time. Similarly, future research should also examine the relationship between anticipatory processing and other constructs of negative repetitive thinking, such as worry, rumination, and post-event processing. Early research in this area is promising. For example, Grant and Beck (2010) demonstrated that an individual's trait level of anticipatory processing seems to predict future rumination.

The current study suggests that anticipatory processing plays an important role in the larger cognitive model of social anxiety proposed by Clark and Wells (1995). Research should continue to examine the relationship between anticipatory processing and the constructs in the current study and examine how they interact to maintain social anxiety symptoms. If anticipatory processing directly influences processes that maintain social anxiety, interventions focused on reducing anticipation may prevent anxiety or cognitive biases from developing. This information may be vital to improve our understanding of how cognition specifically affects social anxiety.

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Table 1

Mean Participant Characteristics by SA Group and Condition.

	SA Group			Condition		
Variable	HSA ($N = 57$)	LSA ($N = 66$)	F	Anticipate ($N = 54$)	Distract ($N = 69$)	F
Age	19.76 (4.21)	19.25 (1.79)	.73	19.72 (4.66)	19.36 (1.64)	.37
SIAS	40.68 (9.42)	11.35 (5.32)	467.73**	27.00 (18.08)	23.33 (15.05)	1.51
CES-D	17.96 (10.69)	7.77 (5.55)	45.78**	14.24 (10.89)	11.13 (8.57)	3.14
ASBQ	31.88 (6.69)	22.48 (6.29)	64.33**	27.43 (8.18)	26.38 (7.85)	.52
PSWQ	60.72 (12.95)	42.03 (13.02)	63.33**	52.48 (16.19)	49.29 (15.77)	1.21
RRS	24.18 (5.85)	15.89 (4.91)	72.88**	20.48 (7.31)	19.14 (6.30)	1.19
	HSA	LSA	χ^2	Anticipate	Distract	χ^2
Sex (% female)	75.4%	69.7%	.50	79.6%	66.7%	2.55
Sex (% male)	24.6%	30.3%	.50	20.4%	33.3%	2.55
Caucasian	82.5%	78.8%	.26	79.6%	81.2%	.05
Non-Caucasian	17.5%	21.2%	.26	20.4%	18.8%	.05

Note: SIAS assessed social anxiety, CES-D assessed depression, ASBQ assessed anticipatory processing, PSWQ assessed worry, RRS assessed rumination. * $p < .05$, ** $p < .01$

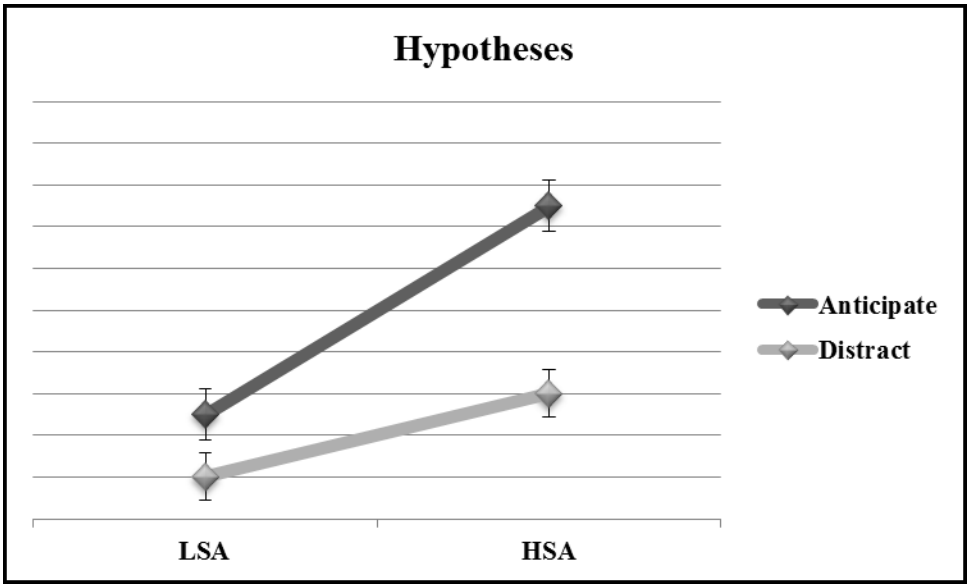

Figure 1. Hypothesized pattern of results for the 2 (SA Group: HSA, LSA) by 2 (Condition: Anticipate, Distract) between-groups ANOVA for self-focused attention, negative interpretations, subjective anxiety level, and behavioral avoidance score.

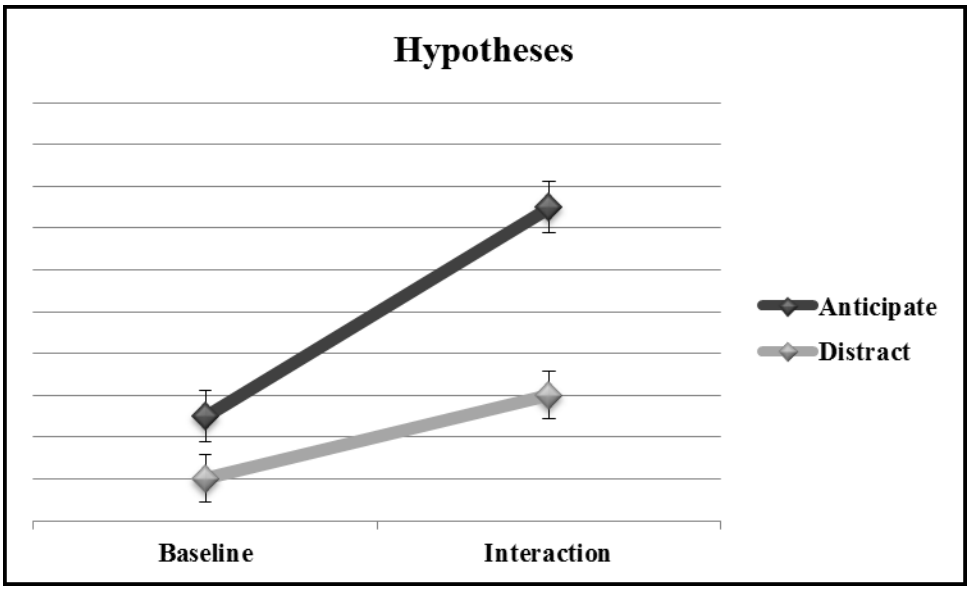

Figure 2. Hypothesized pattern of results for the 2 (Time: Baseline, Interaction) by 2 (Condition: Anticipate, Distract) mixed-groups ANOVA for subjective anxiety level.

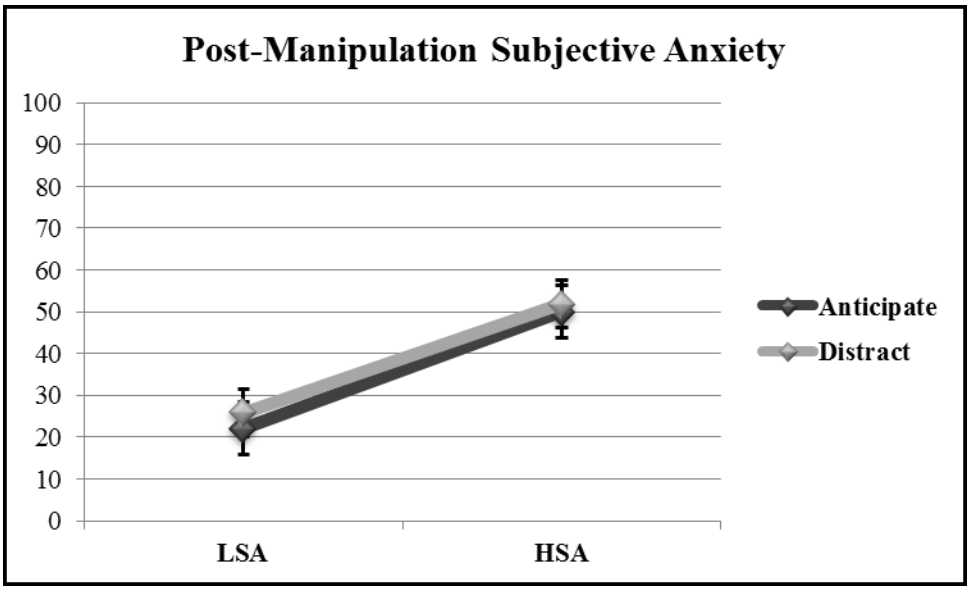

Figure 3. Pattern of results for the 2 (SA Group: HSA, LSA) by 2 (Condition: Anticipate, Distract) between-groups ANOVA for post-manipulation anxiety level.

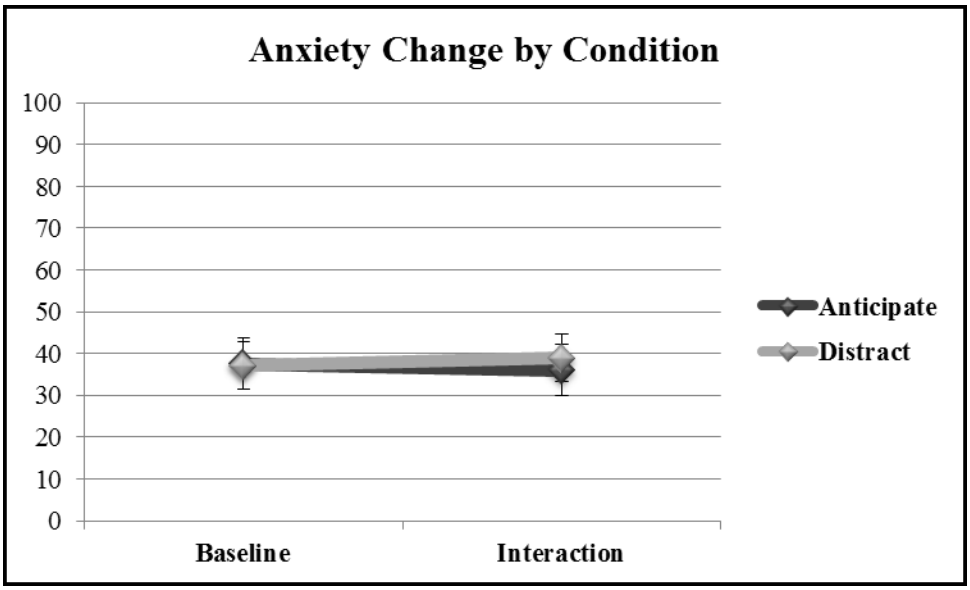

Figure 4. Pattern of results for the 2 (Time: Baseline, Interaction) by 2 (Condition: Anticipate, Distract) mixed-groups ANOVA for self-reported anxiety level.

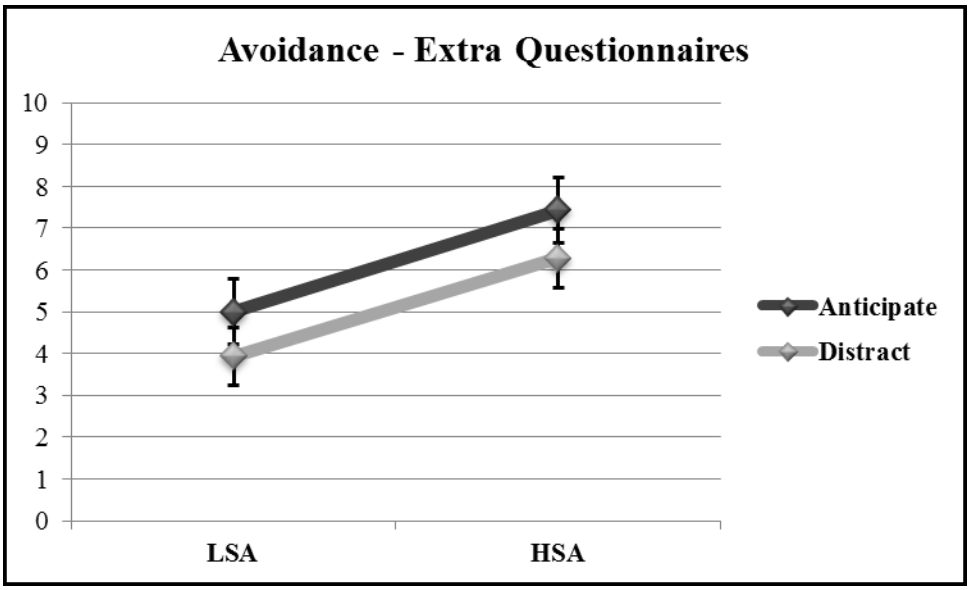

Figure 5 Pattern of results for the 2 (SA Group: HSA, LSA) by 2 (Condition: Anticipate, Distract) between-groups ANOVA for low-cost avoidance.

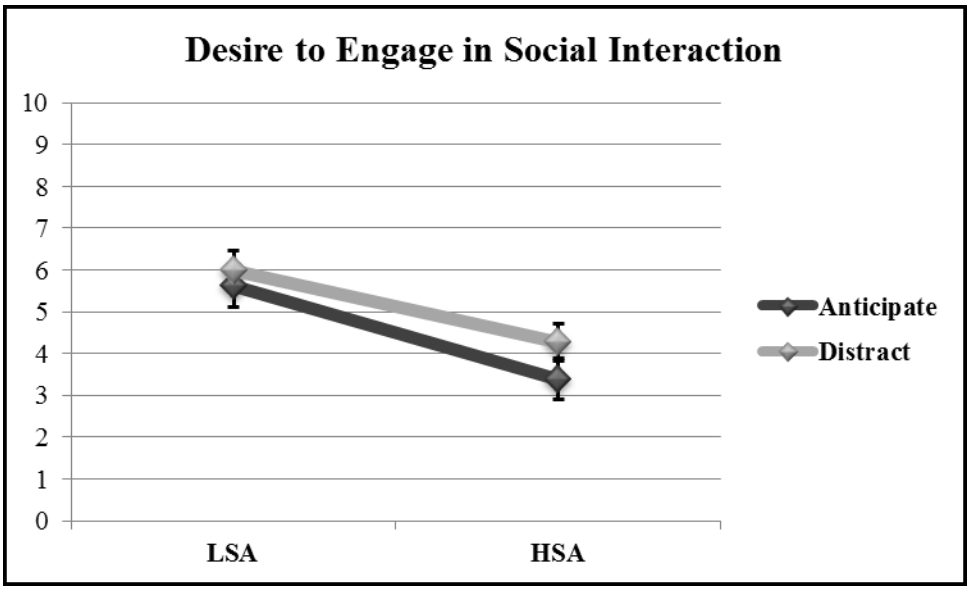

Figure 6. Pattern of results for the 2 (SA Group: HSA, LSA) by 2 (Condition: Anticipate, Distract) between-groups ANOVA for desire to engage in the interaction.

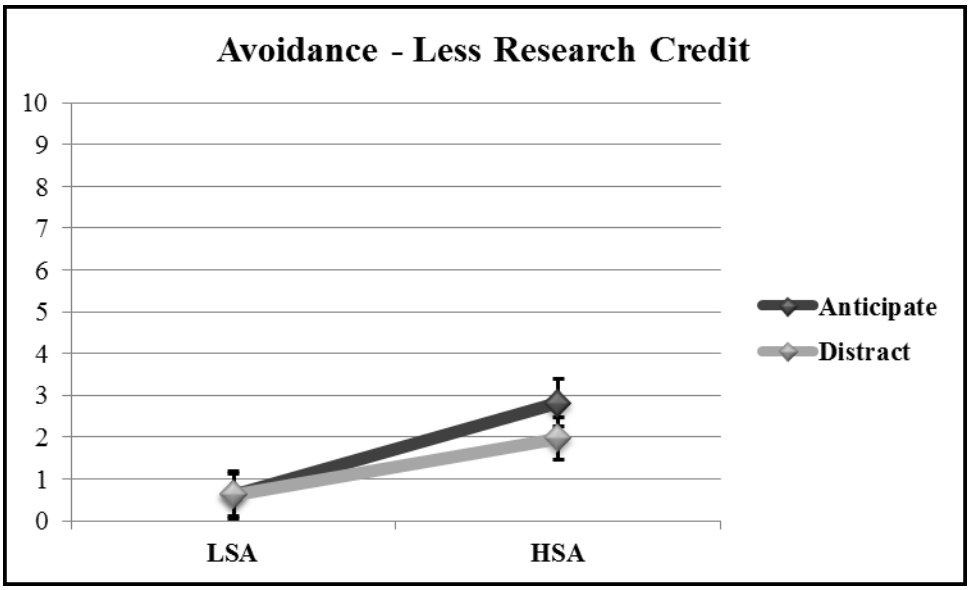

Figure 7. Pattern of results for the 2 (SA Group: HSA, LSA) by 2 (Condition: Anticipate, Distract) between-groups ANOVA for high-cost avoidance.

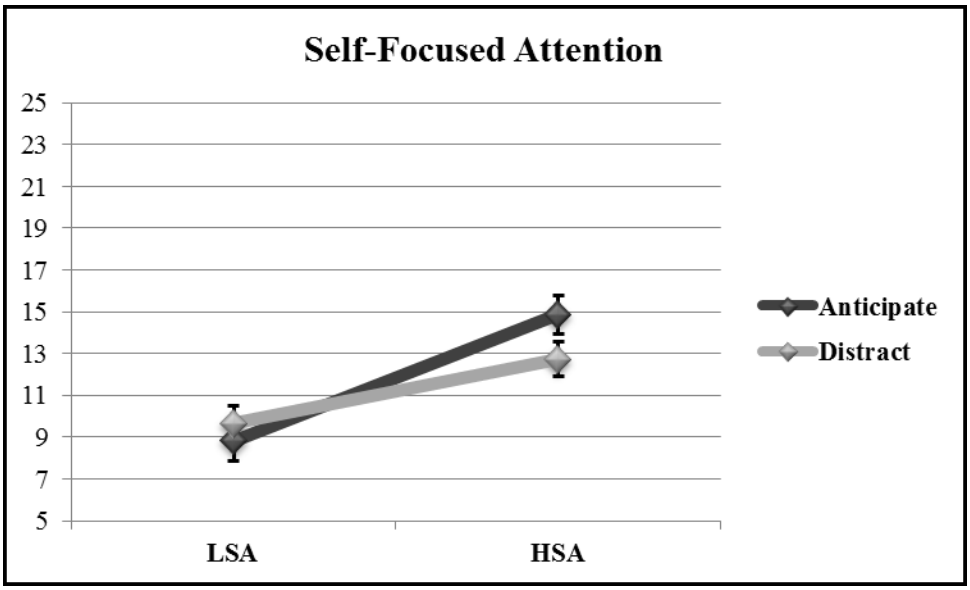

Figure 8. Pattern of results for the 2 (SA Group: HSA, LSA) by 2 (Condition: Anticipate, Distract) between-groups ANOVA for Self-Focused Attention (FAQ).

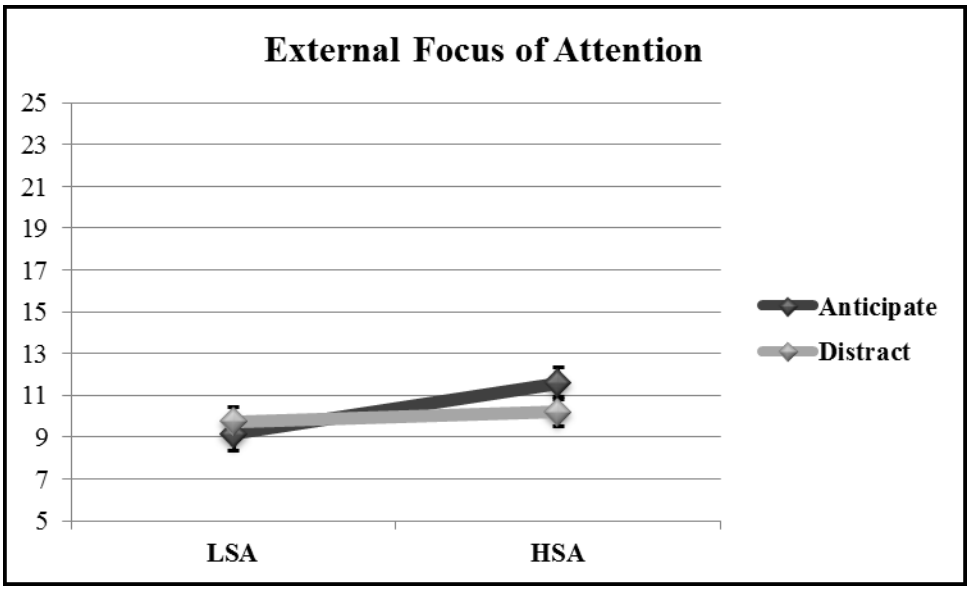

Figure 9. Pattern of results for the 2 (SA Group: HSA, LSA) by 2 (Condition: Anticipate, Distract) between-groups ANOVA for Other-Focused Attention (FAQ).

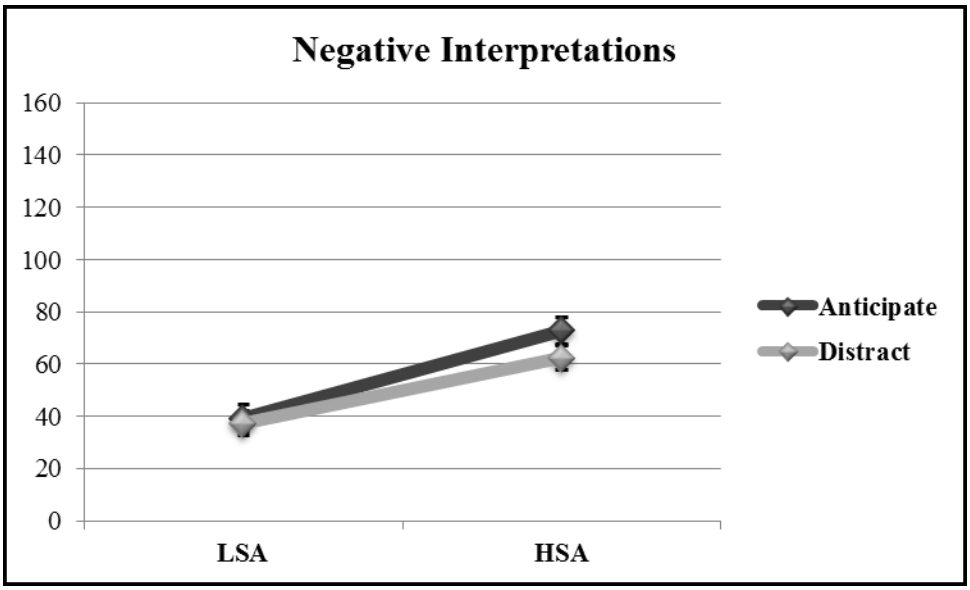

Figure 10. Pattern of results for the 2 (SA Group: HSA, LSA) by 2 (Condition: Anticipate, Distract) between-groups ANOVA for Negative Interpretations (SMIB).

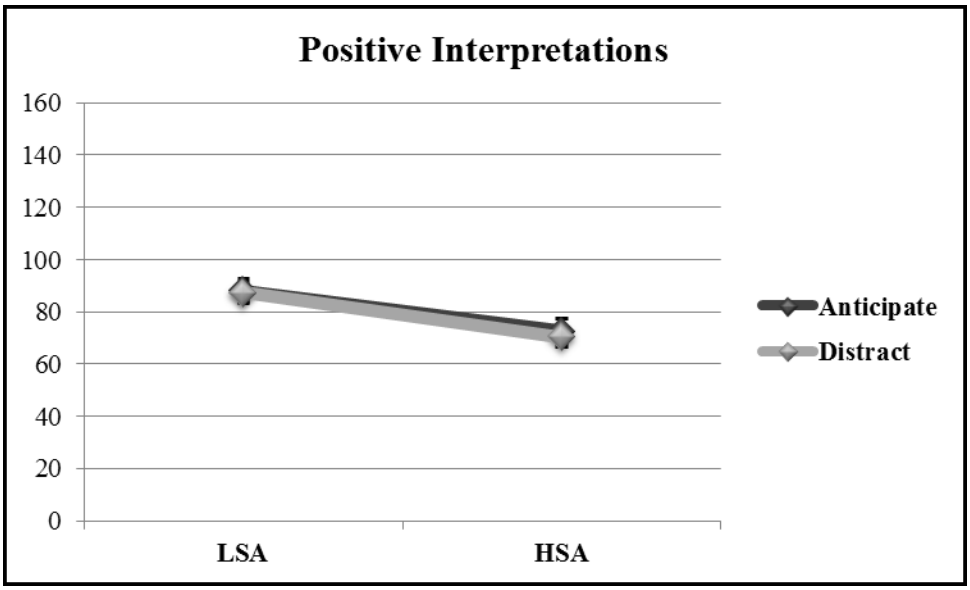

Figure 11. Pattern of results for the 2 (SA Group: HSA, LSA) by 2 (Condition: Anticipate, Distract) between-groups ANOVA for Positive Interpretations (SMIB).

APPENDIX A

REVIEW OF THE LITERATURE

Social Anxiety Disorder

Social anxiety disorder (SAD) is a psychological condition characterized by unreasonable anxiety that is cued by situations involving social interaction (e.g., speaking with a stranger) or social performance (e.g., giving a speech). The core fear of SAD is exposure to situations in which one is being evaluated by others. In order to be eligible for a diagnosis of SAD in the current Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association [*DSM-IV-TR*], 2000), an individual needs to meet the following criteria: A) a marked fear of situations in which the individual is exposed to unfamiliar people or evaluative situations, B) anxiety when exposed to such feared social situations, C) acknowledgement that the fear is excessive or unreasonable, D) avoidance of such situations (or anxious endurance when avoidance is not possible), and E) significant impairment caused by the avoidance, anxiety, or distress related to the feared social situations.

According to *DSM-IV-TR* (APA, 2000), the lifetime prevalence of SAD is between 3% and 13%, which makes it one of the most common anxiety disorders. SAD typically develops in adolescence and may be more common in women than men (*DSM-IV-TR*, 2000). SAD has a particularly high level of comorbidity with other anxiety and mood disorders. Studies have found that 80% of individuals with SAD also meet criteria

for another Axis I disorder (Merikangas & Angst, 1995), with the most common comorbid disorders being another anxiety disorder (59%; Kessler et al., 2003) or major depressive disorder (20%; Merikangas & Angst, 1995; Ohayon & Schatzberg, 2010). Because social interactions occur multiple times a day in a variety of contexts, SAD can become particularly debilitating and impairing. For example, individuals with SAD report lower overall quality of life, lower levels of social functioning and satisfaction, poorer mental health functioning, and lower ratings of physical health (Ghaedi, Tavoli, Bakhtiari, Melyani, & Sahragard, 2010; Wittchen, Fuetsch, Sonntag, Müller, & Liebowitz, 2000). Other research suggests that individuals with social anxiety have lower rates of employment, lower work productivity, lower socioeconomic status, have lower household income, and higher levels of drug dependency than individuals without a psychological disorder (Patel, Knapp, Henderson & Baldwin, 2002; Wittchen et al., 2000). Due to the high prevalence rate, the high comorbidity rate, the high frequency with which social interactions occur, and the significant impairment associated with SAD, research on the disorder has greatly increased in recent years, and theories from a variety of perspectives have emerged to explain the development and maintenance of the disorder.

Theories of Social Anxiety

The following is a brief overview of various theories related to the development and maintenance of SAD. Although the theories are presented below in separate sections, the most well-accepted and supported models of SAD integrate elements from many of these perspectives.

Behavioral/Conditioning. Behavioral researchers have argued that there are a

variety of ways for phobic anxiety to be learned. Classical fear-acquisition models (e.g., Watson, & Rayner, 1920) and even more recent studies have supported a direct conditioning model in which a traumatic experience serves as the impetus for the development of a phobia. Öst and Hugdahl (1981) found 58% of participants with social phobia identified a traumatic conditioning experience as a cause for their social anxiety, and these results were replicated in a later study (56%; Öst, 1985). Harvey, Ehlers, and Clark (2005) found that individuals with social anxiety self-reported that direct conditioning experiences were only somewhat influential in developing SAD. Instead, they attributed their symptoms to shyness, lack of social skill training, and genetics. However, the same sample reported that their social fears began to develop at the same time as many social stressors, including being introduced into new social groups, experiencing problems with peer groups, receiving criticism, or being ostracized from a social group. Therefore, the Harvey et al. (2005) participants appear to be either poor reporters of the etiology of their symptoms, or they considered other factors (e.g., lack of skills, being shy) as being more influential in the development of their disorder.

Recently, more attention has been given to vicarious or observational learning, in which the phobic individual develops a phobia by observing another person's fears to particular stimuli or by hearing information about why they should fear a particular stimulus. Öst (1985) reported that around 18% of participants attributed their social anxiety symptoms to modeling or from receiving information from others. This additional perspective adds to the validity of the behavioral perspective because a significant proportion of individuals with phobias do not attribute the development of their symptoms to a particular traumatic experience (Öst, 1985; Öst & Hugdahl, 1981).

Although the behavioral perspective has received solid empirical support, there are still limitations. Primarily, although conditioning appears to be related to the development of SAD, not everyone with SAD reports a conditioning experience, and not everyone who experiences (or witnesses) traumatic social situations develops SAD. Therefore, there must be other factors that explain how some people develop the disorder and others do not.

Additionally, typical conditioning history research relies on self-report from individuals who are notoriously susceptible to memory and interpretive biases (e.g., Amir & Foa, 2001). In other words, people with anxiety disorders are likely not the most accurate reporters of their anxiety histories because of their increased vulnerability to cognitive distortions and biases. As research has progressed, more models of anxiety have evolved to supplement conditioning models with biological, affective, interpersonal, and cognitive theories. Together, these perspectives have created an integrative model of SAD. Some of said models are further discussed below.

Evolutionary. The evolutionary model of social anxiety is an extension of the preparedness concept of anxiety disorders. Seligman (1971) noted that while fear can be acquired and extinguished quite easily in the laboratory, it is more difficult to extinguish phobias in the naturalistic world. He argued that this is the case because humans are innately prepared to learn to fear certain objects. This preparedness is evolutionarily adaptive, as fear serves the function of protecting humans from potential harm. This notion is supported in the literature. For example, Öhman and Mineka (2001) reviewed a variety of research that found that both humans and other primates more easily acquire phobias to traditionally-threatening stimuli (e.g., snakes, spiders) compared to

unintuitively threatening stimuly (e.g., plants). This suggests that primates and humans are hard-wired to acquire fear for stimuli that have an evolutionary history of causing harm.

Öhman, Dinberg, and Öst (1985) extended the idea of preparedness to include social phobia. They argued that social fears are rooted in the desire to maintain social dominance hierarchies and membership in social groups. In other words, instead of experiencing an exaggerated fear response toward stimuli that could lead to physical harm (e.g., spiders, heights, germs), individuals with social anxiety fear situations that involve negative evaluation from others. Whereas animal fear (and other similar phobias) facilitates escape as the primary means to short-term survival, the function of social fear appears to serve a dual purpose of submission to social threat while simultaneously maintaining group membership, thus increasing the probability of continued group membership and long-term survival (Öhman, 2009).

Interpersonal. The interpersonal model of social anxiety suggests that social interactions that occur early in development shape interpersonal patterns later on in life, and an individual's sense of self develops primarily based on how others react to them (Alden & Taylor, 2010; Meleshko & Alden, 1993). Alden and Taylor (2010) suggested that individuals with social anxiety are timid and socially-avoidant in childhood, which potentially increases the probability of negative social experiences. These negative experiences shape their interpersonal styles and senses of self. Due to their impaired ability to form close relationships, socially-anxious individuals feel the need to remain close to others while simultaneously attempting to avoid rejection or negative evaluation (Alden, 2001; Alden & Taylor, 2010). As such, when individuals with social anxiety

perceive the potential for negative evaluation, they strategically engage in behaviors that attempt to maintain interpersonal closeness (Alden & Taylor, 2010). However, because individuals with social anxiety assume that their true self is undesirable, the behaviors they choose are typically self-protective, such as avoiding emotional expression, avoiding conflict, being unassertive, and engaging in excessive interpersonal dependency (Davila & Beck, 2002). These behaviors tend to inhibit interpersonal closeness instead of fostering it, which maintains the cycle of dysfunctional interpersonal interactions (Alden & Taylor, 2010).

For example, research has shown that in order to protect themselves, socially-anxious individuals will minimize disclosure, restrict emotional expression, and increase their focus on their own physiology and emotions during social interactions (Alden, 2001). The anxious individual believes these behaviors reduce the risk of negative evaluation because they feel that the less others know about them, the less others can negatively evaluate them. However, to others, the socially-anxious individual appears indifferent and/or disinterested, which leads to negative evaluation. Specifically, research has found that shy individuals are rated negatively on a variety of dimensions by friends and strangers. For example, studies have found that shy and/or socially-anxious individuals are rated lower than their nonanxious counterparts on likability, attractiveness, assertiveness, warmth, and friendliness. Socially-anxious individuals also are rated as more anxious, more sensitive to demands, more self-pitying, and more moody (Alden & Wallace, 1995; Creed & Funder, 1998; Heerey & Kring, 2007; Meleshko & Alden, 1993; Pilkonis, 1977).

According to this model, social anxiety is maintained because the socially-anxious individual continues to use the self-protective interpersonal style in new social situations. As a result, others feel that the socially-anxious individual is too distant and dissimilar to them, and they no longer want to pursue the relationship (Alden & Taylor, 2010).

Cognitive. Instead of conceptualizing a standalone perspective, cognitive theories, such as Clark and Wells (1995) and Rapee and Heimberg (1997), built on elements from the behavioral and interpersonal approaches. Research on cognitive theories of anxiety has demonstrated that anxiety is associated with attentional biases toward threat stimuli, negative interpretations of stimuli, and memory biases toward threat-related information (Amir & Foa, 2001; Coles & Heimberg, 2002; Ledley & Heimberg, 2006). At normal levels, each of these cognitive processes is evolutionarily adaptive; if a stimulus is threatening, it is beneficial for the individual to be able to quickly notice the stimulus and identify it as threatening. It also is beneficial for the individual to encode information about the threatening stimulus into long-term memory so that future encounters with the stimulus can be processed more quickly. When individuals with social anxiety perceive that they are in evaluative situations, they react to the situation by engaging in safety behaviors (e.g., restricting the expression of emotion, intensely self-monitoring, drinking alcohol to loosen up) or escaping/avoiding (e.g., cancelling social plans, spending time isolated at a party) the threatening situation, and their anxiety eventually decreases. To the individual, the decrease in anxiety, which is a positive outcome, is attributed to their preparative cognitive and safety behaviors, and therefore those behaviors are reinforced. In other words, the individual engaged in safety

behaviors and/or cognitive preparation and avoided the catastrophic outcome that they believed would occur, which increases the use of said behavior. However, in reality, the high-anxiety individual was never in actual danger, and the probability of the catastrophic outcome was minimal. In the end, the high-anxiety individual learned that the danger is real and that avoidance makes them feel better, thus maintaining their anxiety symptoms.

Primary Cognitive Models and Their Components

Researchers have implemented these biases and other cognitive behaviors into integrative cognitive models. The two primary cognitive models of social phobia were proposed by Clark and Wells (1995) and Rapee and Heimberg (1997), and both models were fundamentally similar. The core component of each model is that individuals with social phobia create mental representations of how they appear to others, and they assume that these representations accurately portray how others see them. The individual with social anxiety puts significant credence into this self-perception, even when confronted with observable disconfirmatory evidence from others. For example, if an individual feels that he is giving a boring speech, yet the audience appears engaged and interested, he may conclude that the audience only looks interested in order to make him feel better, because they can tell he is nervous and unprepared.

The Clark and Wells (1995) and Rapee and Heimberg (1997) models both discussed cognitive distortions such as dysfunctional beliefs, attentional biases, memory biases and interpretation biases. Below is a discussion about each concept in the context of the two models, as well as evidence of support of each concept from more recent literature. In both models, these components are hypothesized to interact with each other and interfere with social performance. Also included below is a discussion about safety

behaviors and anticipatory processing, which only appear in the Clark and Wells (1995) model.

Dysfunctional beliefs. Both models identify a number of dysfunctional beliefs that individuals with social anxiety report having about themselves and others. Individuals with social anxiety assume that other people are naturally critical, hold consistently high standards, are constantly judging them, and any perceived unacceptable behavior will be met with rejection from others (Rapee & Heimberg, 1997; Turk, Lerner, Heimberg, & Rapee, 2000). They also believe that everyone must like them, and in order to achieve this, they must not show any weaknesses or signs of anxiety. According to socially-anxious individuals, physical signs of anxiety represent incompetence and abnormality, and they overestimate the degree to which their anxiety symptoms are visible to others (Turk et al., 2000). However, these high standards for social behavior are extremely difficult to achieve, resulting in frequent failure to meet these standards, which in turn reinforces their dysfunctional beliefs about their social inadequacy and maintains their anxiety (Rapee & Heimberg, 1997).

Because they believe that any social interaction is an evaluative situation, individuals with social anxiety are on constant alert for others who may evaluate them. In the presence of these evaluators, individuals with social anxiety feel that they must intently monitor themselves in order to ensure that they are not behaving or appearing in such a way that can result in negative evaluation and social rejection (Clark & Wells, 1995; Rapee & Heimberg, 1997).

Attention. Clark and Wells (1995) hypothesized that when individuals with social anxiety perceive that they are in a situation in which they could be evaluated, they

engage in self-focused attention, which involves closely monitoring internal information, such as physiology, posture, and tone of voice. If they notice anything that may be perceived as unacceptable to others while monitoring themselves, their anxiety increases. For example, if an individual notices that his hand is trembling, he imagines what he looks like from the audience's perspective. The individual likely assumes that the audience can see that he is trembling and they find it unattractive or strange. As a result, the individual's anxiety increases and he may begin to tremble more, thus maintaining the cycle. Ironically, this cycle can continue to the point where the distorted beliefs and assumptions may become accurate. For example, the individual can become so nervous and upset about trembling, that he may start to tremble enough that others *do* notice. To prevent this (and potential social rejection), the individual may abruptly excuse himself from the social encounter, leaving the others to wonder why he did so (and potentially leading to actual social rejection).

Rapee and Heimberg (1997) agreed with Clark and Wells (1995) that individuals with social anxiety engage in self-focused attention while in evaluative situations. However, they argued that individuals with social anxiety only focus their attention on the internal features that are the *most likely to be noticed* and perceived as negative by others, which may vary depending on the current situation. Then, in contrast to Clark and Wells (1995), they argued that individuals also focus their attention toward *external* cues for threat.

As a result, Rapee and Heimberg (1997) argued that individuals with social anxiety also are likely to have an attentional bias toward external stimuli. They suggested that individuals with social anxiety are more likely to notice negative external

information than positive information because negative information is more threatening to them. For example, if a dozen people in the crowd are smiling at the speaker and only one is frowning, Rapee and Heimberg (1997) suggested that individuals with social anxiety are more likely to notice and focus on the frowning person than the others because the frowning person represents a threat.

Rapee and Heimberg (1997) suggested that attentional focus is cyclical. When individuals with social anxiety perceive negative external cues, self-focused attention increases, which results in increased vigilance to internal anxious feelings. Then, they shift their attention *back* to the audience in order to assess whether the audience can perceive their anxiety symptoms and social discomfort. Whether such information exists or not, individuals with social anxiety will often interpret the audience's behavior in such a way as to confirm their fears, thus continuing the cycle.

Clark (2001) clarified the Clark and Wells (1995) hypothesis about the role of external attention by arguing that when engaging in self-focused attention, individuals with social anxiety do not *ignore* external information, but they significantly decrease their external attention. Clark (2001) noted that whatever external information they *do* notice is likely to be biased toward negative information. Therefore, the primary difference between the models is that Clark and Wells (1995) and Clark (2001) argued that attention was primarily self-focused, with some negative external information occasionally being processed, whereas Rapee and Heimberg (1997) argued that attention shifts back and forth from internal to external attention, and that these two processes may interact.

Research utilizing the emotional Stroop (Williams, Mathews, & MacLeod, 1996) and probe-detection (MacLeod, Mathews, & Tata, 1986) paradigms has found evidence of attentional biases toward external social stimuli. The emotional Stroop is a procedure in which participants are shown a variety of words in a variety of colors and asked to name the color of each word. Some of the words are neutral and others are emotionally charged or threat words (e.g., for social anxiety, "rejection," "speech," "fail," "mock"). Individuals high in social anxiety symptoms (HSA) are consistently slower at naming the color of the social-threat words than individuals low in social anxiety symptoms (LSA) because the social-threat words engage their attention better than neutral words, and HSA individuals appear to have particular difficulty disengaging from the content of the word in order to complete the task (Amir et al., 1996; Becker, Rinck, Margraf, & Roth, 2001; Hope, Rapee, Heimberg, & Dombeck, 1990; Williams et al., 1996).

In the probe-detection paradigm (MacLeod, Mathews, & Tata, 1986), participants are required to locate a visual stimulus that appears in place of one of two simultaneously-presented visual stimuli (e.g., words, images, or faces). One of the stimuli is threatening and the other is neutral. Theoretically, high-anxiety individuals should have faster reaction times to probes that appear in place of the threatening image, suggesting that they are hypervigilant to threat, as well as slower reaction times responding to the probe that appears in place of the neutral image, suggesting that they have difficulty disengaging from the visuospatial region previously occupied by the threatening image (MacLeod et al., 1986). Studies have found evidence for both hypervigilance (Asmundson & Stein, 1994; Klumpp & Amir, 2009; Mueller et al., 2009)

and difficulty disengaging from threat (Amir, Elias, Klumpp, & Przeworski, 2003; Koster, Crombez, Verschuere, de Houwer, 2004).

More recent research has studied attentional biases for facial expressions, which are considered more ecologically-valid threat stimuli to individuals with social anxiety (Amir & Foa, 2001). Studies using facial expression paradigms have typically found that HSA individuals tended to respond faster to probes that replaced threatening (e.g., angry) faces compared to neutral faces and LSA individuals (e.g., Pishyar, Harris, & Menzies, 2004). Dimberg (1997) found that, in general, participants reacted more negatively to angry facial expressions than to happy ones (as measured by facial electromyographic activity), and that individuals high in public speaking fear gave more pronounced negative reactions than the low-fear group. Additionally, the high-fear group rated happy faces as less friendly and less happy than the low-fear group, which provides further evidence for interpretation biases in this population. There is empirical support for both internal and external attentional biases during social threats, but few studies test the cognitive models directly by examining these processes simultaneously.

The rare empirical attempts to simultaneously evaluate the internal/external attention hypotheses of both models have been inconclusive. For the most part, most of the research has supported enhanced internal attention, but not enhanced external attention. For example, Pozo, Carver, Wellens, and Scheier (1991) measured participants' reactions to facial expression changes in interaction partners, and found that LSA individuals were equally as adept at noticing these changes as HSA individuals, suggesting that the HSA individuals did not have enhanced attention for the facial expressions. While this does not support Rapee and Heimberg's (1997) assertion that

external attention is enhanced, it also does not support Clark and Wells' (1995) assertion that external attention is reduced because there were no differences between the groups. Similarly, Schultz (2009) had HSA and LSA individuals give a speech to positive and negative confederate audiences, expecting that HSA individuals would report higher rates of negative self-focused cognitions and negative audience-focused cognitions than LSA individuals. Again, the results did not support either model over the other. HSA participants reported equal levels of audience-focused cognitions for negative and positive audiences, suggesting that the threatening stimulus of the negative audience did not enhance or reduce externally-focused attention.

Mellings and Alden (2000) also tested both types of attentional focus, but in the context of a memory paradigm. They instructed HSA and LSA individuals to interact with a confederate, and then they tested their memory for the interaction the next day. They found that socially-anxious individuals recalled significantly less external information (i.e., information about their partners and the setting) and recalled significantly more self-related information than the LSA participants. Although this seems to support Clark and Wells (1995), it should be noted that *memory* biases for external information are different than *attentional* biases for external information.

Schultz and Heimberg (2008) attempted to answer this question with a review of the available literature examining internal or external attention processes in social threat paradigms. Clear conclusions could not be drawn from this review, mostly because 1) not enough studies examined internal and external attention simultaneously, and the ones that did had questionable methods and/or ecological validity, and 2) the results were mixed. The research that they evaluated found evidence for self-focused attention in

socially-anxious individuals, which provided support for both models. They also reported that some studies have found evidence for biased attending to external threat cues (supporting Rapee and Heimberg, 1997), whereas others have supported evidence for biased *avoidance* of external threat cues (contradicting Rapee and Heimberg, 1997). Cognitive models and subsequent research have clearly shown the importance of attentional biases in SAD, so further research needs to be done in order to better inform researchers about the role attention plays.

Taken together, the research strongly supports that individuals with social anxiety display marked biases in their cognitive processing, which may interact with each other and influence anxious arousal and behavioral responding to maintain SAD. However, the biased attention is only one step in a maladaptive cognitive cycle that maintains social anxiety symptoms. Although individuals with social anxiety are attentive to threat, social stimuli are almost always ambiguous, so evaluating these stimuli requires a significant degree of interpretation. However, as with attention, individuals with social anxiety show biases in this process.

Interpretation biases. Research supports that individuals with anxiety disorders, including SAD, disproportionately attribute negative interpretations to neutral social stimuli, exaggerate the consequences of mildly negative experiences, and overestimate the probability of negative events occurring (Amir & Foa, 2001; Clark & Wells, 1995; Rapee & Heimberg, 1997; Voncken, Bögels, & Peeters, 2007). This bias appears to apply only to social situations (Amir, Foa, & Coles, 1998; Stopa & Clark, 2000).

Cognitive models (Clark and Wells, 1995; Rapee and Heimberg ,1997) hypothesized that because the individual focused cognitive resources internally, he or she

has little evidence available to evaluate how the social event went. As a result, the individual attempts to review the event in detail (a process called *postevent processing*), but this review is likely to be negatively biased, distorted, incomplete, and inaccurate. The individual most likely spent the duration of the social encounter engaging in catastrophic thinking (e.g., "they hate me," "they can tell I'm nervous") and feeling anxious and tense; as a result, the entire experience is recollected through a negative lens. Therefore, *even if the experience was positive or neutral,* social phobics add this experience to their mental list of past failures, providing themselves with more evidence of their lack of social prowess. Similarly, Clark and Wells (1995) note research that shows that when given ambiguous social situations to evaluate, individuals with social anxiety are more likely than control participants to choose a negative interpretation of the event as opposed to a neutral interpretation.

Amir and colleagues (1998) demonstrated this by providing socially-anxious, obsessive-compulsive, and nonanxious controls with a variety of ambiguous social scenarios and asking them to endorse one of three (negative, positive, or neutral) interpretations. For example, one scenario stated "You see a group of friends having lunch [and] they stop talking when you approach" and participants chose between 1) "They are saying negative things about you," 2) "They are just about to ask you to join them," or 3) "They just ended their conversation" (p. 948). They found that socially-anxious individuals endorsed the negative interpretation at a higher rate than the other two groups, but this bias was only for social, self-referent situations.

Stopa and Clark (2000) had participants read various social (e.g., "you host dinner at your house, but your friends leave much earlier than expected") and nonsocial (e.g.,

"you receive a letter in the mail marked 'urgent'") scenarios that ended with "Why?" Participants were instructed to write an open-ended response to the scenario and then rank-order three experimenter-provided scenarios. Results showed that HSA individuals produced more negative evaluations of the social situations than the high-anxious and nonanxious controls, and there were no differences between the groups for nonsocial situations. They also found that HSA individuals evaluated mildly negative scenarios (e.g., "your friend appears disinterested in what you are saying") more catastrophically (e.g., "I am a boring person") than the control groups. This study responded to a major criticism of prior interpretation bias research, which was that having participants select from experimenter-generated interpretations was not ecologically valid. Stopa and Clark (2000) addressed this by having participants provide open-ended interpretations and select from researcher-generated interpretations, and the results showed biases for both types, which seems to lend support to both paradigms. In a similar study, Vassilopoulos (2006) found that HSA individuals were more likely than LSA individuals to interpret mildly negative scenarios catastrophically. Results also showed that HSA individuals were more likely than LSA individuals to discount the positive scenarios (e.g., by providing interpretations such as, "he does not like me, but he smiled at me to be polite").

Kanai, Sasagawa, Chen, Simada, and Sakano (2010) applied these ideas to a social interaction. They used pilot studies to identify five behaviors that were rated as emotionally neutral and common (e.g., clearing one's throat, scratching one's head, etc.). They had confederates engage in these behaviors during an interaction with participants and found that the HSA individuals rated the behaviors as more negative and threatening

than the LSA individuals. This study was particularly important at applying results of earlier, questionnaire-based studies to an actual social interaction.

Rapee and Heimberg (1997) provided a similar theory of interpretation biases. They argued that HSA individuals display a response bias that disproportionately predicts a high probability of negative evaluation in social situations and severe consequences if negative evaluation occurs relative to nonanxious individuals. In support of this, Foa, Franklin, Perry, and Herbert (1996) found that HSA participants rated negative social events as more likely to occur, and they overestimated the potential negative consequences of the negative event compared to LSA individuals. Similarly, Vassilopoulos (2006) found that HSA individuals rated neutral/positive outcomes to ambiguous social events as less probable than LSA individuals.

Rapee and Heimberg (1997) also suggested that the individual's mental representation is susceptible to interpretation biases, especially when the individual is in a threatening situation and experiencing physiological symptoms. In support of this, research has found that the socially-anxious individuals highly exaggerate how visible their physiological and/or anxiety symptoms are to other people, report higher use of anxious-behaviors, and provide lower ratings of their appearance (Rapee & Abbott, 2006; Vassilopoulos, 2005)

The Clark and Wells (1995) and Rapee and Heimberg (1997) models almost exclusively hypothesized about off-line interpretation biases, which are the explicit, retrospective interpretations of scenarios or behaviors that are discussed above. However, a more recent line of research is attempting to determine if interpretation biases may actually (or also) occur on-line, or at the same time the ambiguous information is

presented. On-line interpretation biases in SAD are typically measured by implicit cognitive tasks. The assumption with these is that it takes individuals longer to respond to stimuli that do not match their automatic assumptions. In other words, on-line interpretation biases in social anxiety are represented by slow response times to positive or neutral interpretations of social events presented during word tasks (Hirsch & Mathews, 2000). For example, Hirsch and Mathews (2000) had individuals with SAD and nonanxious individuals read vignettes that included word probes that were either positive or negative interpretations. They found that socially-anxious participants could be differentiated from nonanxious controls by a *lack of positive* interpretation bias, but not by the presence of a negative interpretation bias. The lack of positive interpretation bias has been demonstrated in one other study using a similar methodology (Moser, Hajcak, Huppert, Foa, & Simons, 2008), as well as in one study examining off-line interpretation biases (Huppert, Foa, Furr, Filip, & Mathews, 2003).

At this time, the majority of interpretation bias research examines off-line, negative interpretation biases, which appear to be consistently supported in the literature. Future research in this domain could focus more on on-line and positive interpretation biases, each of which can further inform theories of information processing.

Memory biases. Based on the Clark and Wells (1995) and Rapee and Heimberg (1997) models, it seems that memory biases would fit well into cognitive models of social anxiety. As mentioned previously, a large body of literature has concluded that individuals with social anxiety are hypervigilant to social threat, so it would make sense that socially-threatening information would be more likely to be encoded into memory for these individuals than for nonanxious individuals. Similarly, individuals with social

anxiety should be better and faster at retrieving social memories. However, although the research on attentional and interpretation biases has consistently demonstrated biased information processing, research on memory biases has been riddled with inconsistencies in methods, paradigms, and results (Amir & Foa, 2001; Mitte, 2008; Morgan, 2010).

Rapee, McCallum, Melville, Ravenscroft, and Rodney (1994) used a variety of paradigms to test for memory biases in individuals with social anxiety. The paradigms included recall of socially-threatening words (implicitly and explicitly), recall of negative feedback after a speech task, and recall of socially-threatening memories. They found that HSA and LSA individuals recalled an equal number of social-threat-related stimuli in every paradigm, so they concluded that there was no evidence for memory biases in individuals with social anxiety. Some studies have replicated these results (Becker, Roth, Andrich, & Margraf, 1999; Lundh & Öst, 1996), but others have found evidence that individuals with social anxiety have enhanced memory for facial expressions (Foa, Gilboa-Schechtman, Amir, & Freshman, 2000) and quicker retrieval of social memories (Wenzel & Cochran, 2006) relative to nonanxious controls, suggesting that differences in stimuli and paradigms may be responsible for differences in results.

In a meta-analytic study of the relationship between anxiety disorders and memory biases, Coles and Heimberg (2002) concluded that the results of memory bias research in anxiety disorders appears to be very inconsistent. The results are conflicting, even for studies using consistent paradigms and recruiting participants with consistent symptom profiles. Coles and Heimberg (2002) suggested that memory biases may be specifically-related to some anxiety disorders and not others. For example, memory biases may play a role in panic disorder, posttraumatic stress disorder, and obsessive-

compulsive disorder, but there was no evidence of a similar relationship in generalized anxiety disorder and social phobia. Overall, Coles and Heimberg (2002) noted that the literature was limited and full of methodological inconsistencies, and many studies and/or paradigms had limited ecological validity.

Amir and Foa (2001) performed a similar meta-analysis on memory research specific to social anxiety. Specifically, Amir and Foa (2001) contended that attempting to study memory in SAD by testing participants' memory of threatening *words* is not necessarily the most valid procedure for activating the mechanisms responsible for memory biases. Instead, recent research has supported a memory bias for *facial expressions*, such that HSA individuals showed greater recall for faces than nonanxious controls, as well as a disproportionately high recall of negative faces compared to neutral faces (Foa, Gilboa-Schectman, Amir, & Freshman, 2000).

Another way memory bias research in social anxiety could be improved is to increase the focus on autobiographical memory. Autobiographical memory is a form of episodic memory which includes 1) memory for a particular episode/event, as well as cues memory for other information such as 2) knowledge about the particular time in one's life that the event occurred, 3) memory of similar events, and/or 4) very vivid sensory information (Morgan, 2010). A meta-analysis of autobiographical memory biases in social anxiety by Morgan (2010) concluded that the research supports that individuals with social anxiety show enhanced memory for threatening and highly emotional autobiographical memories. Despite significant variability in methods, paradigms, and results, Morgan (2010) concluded that the autobiographical memories recalled by HSA individuals contained more self-referential information, more

descriptions of anxiety symptoms, and less sensory information. The latter finding appears to support Clark and Wells' (1995) contention that self-focused attention is so dominant that external information, including sensory information, is not attended to.

Despite the recent, promising research on autobiographical memory, the variability in methods and results leaves many questions unanswered. Further research should continue to examine autobiographical and facial-expression memory instead of threat-word memory, and methods should attempt to be as theory-driven as possible.

Safety behaviors. As stated previously, when individuals with social anxiety feel nervous, they believe that others can perceive their nervousness as well. Clark and Wells (1995) suggested that some individuals may engage in safety behaviors in order to counteract what they assume are visible signs of anxiety. For example, a man who is sweating might attempt to cover sweaty spots on his clothes with his hands, or a woman with a shaky hand may try to hold an object tighter in order to keep from dropping it. As a result, the individual is even *more* focused on his or her anxiety, and s/he is now drawing attention to it by engaging in behaviors that may not appear entirely natural. Therefore, these behaviors may increase the probability of the feared consequence. On the other hand, if the feared consequence does not occur (which is a high-probability outcome, considering the feared consequence was based on distorted assumptions and beliefs), individuals with social anxiety may attribute their social "success" or "survival" to the safety behavior, and they may engage in that behavior in the future (Clark, 2001).

Research has found that individuals with social anxiety engage in such behaviors as reduced and quiet talking, avoidance of eye contact, emotional suppression, attempts to hide blushing, among others, in order to minimize the potential of social evaluation

(Cuming et al., 2009; Stevens et al., 2010). These behaviors may interfere with social performance (Stevens et al., 2010), and others may rate the individual as unfriendly or arrogant (Alden & Wallace, 1995).

Taylor and Alden (2011) assigned participants with SAD to either a safety behavior reduction exposure group (which received exposure therapy and safety behavior reduction training) or a control exposure group (which only received exposure therapy) prior to a social interaction with a stranger. In the safety behavior reduction group (SBR), participants were given a rationale as to why they should decrease the use of safety behaviors that they endorsed using. After the interaction, participants in the SBR group perceived that they had had a more positive interpersonal interaction than those in the control group. More importantly, their objective partners felt the same way. The partners who interacted with the SBR group rated them as more interpersonally positive than the partners who interacted with participants in the control group.

Taylor and Alden (2011) explained that this effect was mediated by a significant increase in social approach behavior. In other words, the intentional decrease in safety behaviors led to an increase in social approach behaviors, which are associated with facilitating friendship growth in first encounters. These behaviors include appearing friendly, engaged, and interested, as well as talking openly about oneself, all of which are restricted in individuals with social anxiety (Alden & Taylor, 2010).

Introduction to anticipatory processing. Both models argued that individuals with social anxiety engage in various cognitive behaviors that overwhelm their attentional processes and bias their processing of information, and this biased information is used to construct how they view themselves (Amir & Foa, 2001; Clark & Wells, 1995;

Rapee & Heimberg, 1997). This distorted view of the self is maladaptive, creating a cycle of dysfunctional thoughts and behaviors which maintain social anxiety symptoms (Clark & Wells, 1995; Rapee & Heimberg, 1997). Most components of the Clark and Wells (1995) model have been either heavily (e.g., attentional and interpretation biases) or modestly (e.g., dysfunctional beliefs, safety behaviors, etc.) researched. However, literature about a process called anticipatory processing, which is only mentioned in the Clark and Wells (1995) model, has only emerged very recently. Clark and Wells (1995) theorized that this process may influence the individual's attention and anxiety, and may lead to avoidance, which makes the absence of anticipatory processing research even more perplexing.

Description of anticipatory processing. Clark and Wells (1995) hypothesized that prior to a social situation, individuals with social anxiety engage in anticipatory processing, in which they review the potential social situation in detail, rehearse what they will say or do, imagine how they will look to others, imagine worst-case scenarios, and recall past social failures. This anticipatory processing results in a considerable increase in anxiety, and they may decide to avoid the social event altogether. As they are engaging in anticipatory processing, Clark and Wells (1995) suggested that their attention starts to shift inward, and by the time they are in the social situation, "[they are] likely to already be in a self-focused processing mode, to expect failure, and to be less likely to notice any signs of being accepted by other people" (p. 74). In other words, Clark and Wells (1995) suggested that the anticipation period increases anxiety, activates dysfunctional assumptions (e.g., "they will be watching me intently," "if I mess up, they will reject me," etc.), and activates self-focused processing so individuals begin to

excessively monitor themselves.

The absence of research on anticipatory processing is particularly interesting given the potential causal and temporal importance of this process. According to the Clark and Wells (1995) model, it appears that anticipatory processing is the beginning stage of the eventual anxiety cycle that surrounds a social event. Anticipatory processing may even serve as the mechanism that activates processes such as increased anxiety, self-focused attention, and cognitive biases. However, much of the research on anticipatory processing has only studied anxiety as an outcome variable.

Research on Anticipatory Processing in Social Anxiety Disorder

As mentioned, there is a limited, but growing body of research examining the direct consequences of anticipatory processing. Research on anticipatory processing should be differentiated from research that uses a social threat task to elicit anxiety or stress. The latter research, although abundant, utilizes social fears, which are common, in order to measure stress or anxiety responses generally. This is in contrast to anticipatory processing (and other social anxiety) research, which is interested in very specific processes likely unique to social anxiety that are hypothesized to maintain symptoms of SAD. At this point, seven studies have examined anticipatory processing as described by adult social anxiety models, with a variety of methodologies and results.

Mansell and Clark (1999) examined differences in memory biases between individuals who were threatened with a speech task and those who were not threatened. Participants high and low in social anxiety were tested on differences in recall for three types of stimuli: public self-referent (how someone else would describe you), private self-referent (how you would describe yourself), and other-referent (how you would

describe someone else). The results showed that the HSA individuals who were threatened with (and therefore anticipated) the upcoming speech recalled fewer positive public self-referent words than the LSA participants. These results suggested that those with high social anxiety have a bias against recalling positive words that others may use to describe them, but only when anticipating an upcoming social event. This seems to support the notion that increases in anxiety tend to activate cognitive biases for individuals high in social anxiety symptoms.

Brown and Stopa (2006) had participants high and low in social anxiety give a speech in front of a video camera. Participants were told that the speech would be rated by psychologists. After the first speech, they told participants that they would be doing a second speech, and were given ten minutes to anticipate the upcoming speech. They concluded that HSA participants who engaged in anticipation experienced higher levels of anxiety and more negative images about the upcoming social event than LSA participants. They also found that HSA individuals who anticipated used the observer perspective (seeing themselves from a third-person perspective) more often than when they did not anticipate and more often than LSA individuals. Finally, they found that both groups rated their second speech, which was preceded by an anticipation period, as more positive than their first (unanticipated) speech, which seemed to suggest that anticipation led to a more positive social experience. However, the researchers noted that these effects were possibly due to practice effects that were carrying over from the first speech. Also, the participants were instructed to "prepare themselves mentally" for the speech, but given no instructions on how to do so. Therefore, it is possible that the anticipation time was spent preparing for the speech instead of anxiously anticipating it.

Because of these limitations, no firm conclusions should be drawn regarding those findings.

Vassilopoulos (2004) created and psychometrically-evaluated a measure of anticipatory processing that was developed from the Clark and Wells (1995) model and studies of post-event rumination/post-event processing (Anticipatory Processing Questionnaire; Vassilopoulos, 2004). There was a moderate correlation between anticipatory processing and social anxiety ($r = .49$, $p < .001$), which remained significant when controlling for depression and trait anxiety. These results suggested that individuals with social anxiety have intrusive thoughts about an upcoming social situation in which they spend time and effort attempting to predict how others will react to them, and this process interferes with the individual's concentration and increases the individual's anxiety. Although Grant and Beck (2010) did not explicitly study anticipatory processing in a social anxiety context, the results added valuable information to the study of anticipatory processing. They examined the trajectory of rumination in undergraduate students following a midterm exam, which is considered to be a universally anxiety-provoking situation. They found that those who engaged in anticipatory processing tended to have higher levels of rumination after the exam than those who did not anticipate, suggesting that anticipatory processing prolonged rumination.

In other words, Grant and Beck (2010) found that anticipatory processing, a process hypothesized to maintain social anxiety, seems to interact with post-event rumination, which is another cognitive process that is hypothesized to maintain social anxiety. These findings would fit neatly into social anxiety paradigms. For example,

Clark and Wells (1995) suggested a period of anticipatory processing occurs prior to the event and a period of post-event rumination occurs after the event. The findings of Grant and Beck (2010) suggested that these processes may exacerbate each other to the point of maintaining an almost constant anxiety cycle. Furthermore, Grant and Beck (2010) even found a spike in rumination at the last time point for those who anticipated, which the authors attributed to the upcoming announcement of the exam grades. This supports the notion of an interrelation between pre-and post-event processing that may be almost continuously maintaining a high-anxiety cycle.

Although Grant and Beck (2010) found evidence of a relationship between anticipatory processing and post-event rumination, Mellings and Alden (2000) did not. They had participants engage in a social interaction with a confederate, and then had them return a day later to engage in a second interaction. Some of the participants were told that they would be engaging in the second interaction and that an audience would be rating their performance (anticipation condition), while others were only told that there was one more part of the study to complete (control condition). They found that socially anxious participants engaged in more self-focused attention, had more negative self-judgments, remembered more negative self-related information, remembered less information about their partner, and engaged in more post-event processing than control participants. They also found that those who engaged in negative, self-focused attention tended to have higher rates of judgment biases, especially for the socially-anxious group. However, none of these findings were influenced by whether or not the participant engaged in anticipation prior to the second interaction. It may have been beneficial to have participants engage in anticipation prior to the *first* interaction along with (or instead

of) the second interaction. The anticipatory processing process may not have been as effective in this case because the participants had just experienced a non-catastrophic social interaction that may have served as an exposure exercise that reduced apprehensive anxiety for the upcoming interaction.

Hinrichsen and Clark (2003) "trained" participants to engage in anticipatory processing by instructing them to engage in cognitive behaviors that distinguished HSA from LSA individuals. These behaviors included recalling past social failures, imagining the worst that could happen during the upcoming event, planning ways to escape or avoid the situation, imagining how the individual would appear to others, and planning and rehearsing conversations, (see Appendix B for the instructions used in Hinrichsen & Clark, 2003). Overall, individuals who engaged in anticipatory processing experienced higher levels of anxiety prior to the speech, as well as higher peak anxiety during the speech than those who did not anticipate. Interestingly, LSA individuals who were instructed to anticipate experienced the same level of anxiety as HSA individuals, suggesting that instructing nonclinical individuals to think like socially-phobic individuals can result in clinically elevated levels of social anxiety. These results also suggested that the main difference between HSA and LSA individuals may not be the level of anxiety they experience during the social interaction, but instead may be the type of cognitive processes that automatically occur prior to the interaction.

Vassilopoulos (2005) then examined the effects of anticipatory processing on memory and predictions about the individual's behavior and appearance. Researchers informed participants that they would be giving a speech to a video camera and then had them complete a memory encoding task. Then, participants either engaged in

anticipatory processing or a distraction task. The anticipation group was informed that they would be given a speech and were instructed to predict how they will perform and remember similar situations that they have experienced in the past. Results showed that HSA individuals who engaged in anticipatory processing had increased anxiety ratings throughout the study, whereas HSA individuals in the distraction condition experienced a slight decrease in anxiety. Similarly, HSA individuals who engaged in anticipatory processing predicted that they displayed a greater number of negative social behaviors and a more negative appearance compared to the HSA individuals in the distraction group.

However, there were no differences on any outcome variable between the LSA individuals who were in the anticipation or distraction groups, which did not replicate Hinrichsen and Clark's (2003) results. This may be because the anticipation instructions given by Vassilopoulos (2005) were less specific and neutral relative to those in the Hinrichsen and Clark (2003; Appendix B) study. The instructions in the Vassilopoulos (2005) study only made participants aware of the upcoming social interaction, whereas the instructions in the Hinrichsen and Clark (2003) study instructed participants to think negatively about the upcoming (and past) social interactions. Therefore, the LSA participants in the Vassilopoulos (2005) study most likely approached the social event neutrally, whereas the LSA individuals in the Hinrichsen and Clark (2003) study approached the social event similar to the ways that HSA do (e.g., imagining worst case scenarios, remembering past failures, etc.). This distinction is important, and together, it appears that these two studies suggested that 1) when given similar instructions, HSA and LSA individuals anticipate in qualitatively different ways, and 2) when instructed to

anticipate in the same way as HSA individuals, LSA individuals are indistinguishable from HSA individuals with regards to anxiety level during a speech. The results of these two studies are also important with regards to defining anticipatory processing within a social anxiety context. For individuals with social anxiety, anticipatory processing is not simply a process of making predictions, preparing for various outcomes, and remembering similar scenarios from the past, but instead anticipatory processing appears to involve making negative and worst-case scenario predictions, preparing to avoid or escape the situation, and remembering (perhaps inaccurately) similar scenarios that went poorly. It is these negative memories, predictions, and preparations that may maintain the social anxiety symptoms.

Some studies have provided promising results, but more research must be done. Although the above studies show some consequences of anticipatory anxiety, the literature is limited enough that no strong conclusions can be drawn from the results. A few studies consistently suggested that individuals who anticipate experience an increase in anxiety (Brown & Stopa, 2007; Hinrichsen & Clark, 2003; Vassilopoulos, 2005). Is increased anxiety sufficient to cause a decrease in social performance and lead to social rejection? Or are there other mechanisms that may result from anticipating that may have effects on social performance as well?

Proposed Study

The social anxiety literature has consistently found that HSA individuals 1) engage in more anticipatory processing (e.g., Hinrichsen & Clark, 2003; Vassilopoulos, 2004), and 2) display more cognitive biases than LSA individuals (Amir & Foa, 2001; Mellings & Alden, 2000), but limited research has attempted to study the relationship

between the anticipatory processing and cognitive biases. Mellings and Alden (2000) potentially identified an interrelationship between the cognitive biases, as selective attention appeared to lead to biased judgments and recollections, but the relationship between anticipatory processing and these biases was nonexistent. However, the anticipation paradigm in Mellings and Alden (2000) was different than paradigms used in studies that did find effects of anticipatory processing (e.g., Hinrichsen & Clark, 2003; Vassiloupolos, 2005), suggesting that inconsistencies in methods may have contributed to inconsistencies in results. Also, results have been based on a very limited body of research. Grant and Beck (2010) found a relationship between anticipatory processing and post-event rumination, also suggesting an interrelationship between cognitive processes, as well as showing that there are potential consequences of anticipatory processing on at least one of these processes.

Both cognitive models suggested that both self-focused attention and interpretation biases are responsible for maintaining social anxiety, but no research has examined whether or not anticipatory processing has any influence on either process. This is particularly surprising given the promising research in anticipatory processing, as well as the research that suggests that self-focused attention and interpretation biases can influence social performance (Furukawa et al., 2009; Johnson & Glass, 1989; Stevens et al., 2010) and increase behavioral avoidance (Lange et al., 2010).

Clark and Wells (1995) appeared to suggest that anticipatory processing precedes the anxiety process that occurs prior to a social event, suggesting the possibility that anticipatory processing may have a role in "activating" cognitive biases that occur at the same time. The goal of the proposed study is to test the cognitive consequences of

anticipatory processing. This study is particularly interested in seeing if individuals who engage in anticipatory processing prior to a social situation will report greater self-focused attention and/or report more biased interpretations of neutral social stimuli compared to individuals who do not engage in anticipation. It also would be interesting to determine if HSA individuals are specifically susceptible to negative outcomes of anticipatory processing, or if the anticipation process is anxiety-provoking enough to activate cognitive biases in LSA individuals as well.

To test the effects of anticipatory processing, HSA and LSA will be told that they will be engaging in a social interaction that will be evaluated by researchers. They will then be instructed to engage in anticipatory processing based on the instructions used in Hinrichsen and Clark (2003; Appendix B; Appendix C) or they will engage in a distraction task. It is hypothesized that HSA individuals who engage in anticipatory processing prior to a threatened social interaction will report the highest levels of 1) self-focused attention, 2) negative interpretations of social scenarios, 3) avoidance, and 4) self-reported anxiety compared to the other groups. LSA individuals who are instructed to anticipate and HSA individuals who are given a distraction task will show increased levels of those four variables relative to LSA individuals who are distracted.

APPENDIX B

Anticipatory Processing Instructions (Hinrichsen & Clark, 2003)

I would like you to prepare for the upcoming speech by following the steps below. Please spend a few minutes on each of the steps and make sure you go through all of them in the order in which they are given. Please make sure you follow all of the steps.

1. Try to think of a particular social situation that you felt did not go well, where you felt uncomfortable or felt that others formed an unfavorable impression of you.

2. Try to imagine how you appeared in that situation: how do you think you looked to others?

3. Now, try to imagine how you are going to appear in the speech you are about to give. Try to think about how you will appear to others. What will they see?

4. Try to analyze in as much detail as possible what could go wrong while you are giving the speech.

5. Try to anticipate the worst thing that could happen while you are giving the speech.

6. Try to think about what you would have to do if you made a fool of yourself.

If you have finished the task before the end of the 20-min period, please go back to the beginning, and try to think of another social situation that you felt did not go well.

APPENDIX C

Anticipatory Processing Instructions for Current Study (based on Hinrichsen & Clark, 2003)

We want you to prepare for the upcoming social interaction by responding to the prompts on the next page.

The following page will have a video which contains some thinking/imagining prompts. As you read the prompts, use your imagination and concentration to focus your mind on each of the ideas. Spend a few moments visualizing and concentrating on each item. When you hear a tone, that means it is time to move on to the next prompt. Later, we will ask you about your thoughts during this time.

Try to think of a particular social situation that you felt did not go well, where you felt uncomfortable or felt that others formed an unfavorable impression of you.

Try to imagine how you appeared in that situation: how do you think you looked to others?

Now, try to imagine how you are going to appear during the upcoming social interaction. Try to think about how you will appear to the person you interact with and the researchers who view the video tape. What will they see?

Try to analyze in as much detail as possible what could go wrong during the social interaction.

Try to anticipate the worst thing that could happen during the social interaction.

Try to think about what you would have to do if you made a fool of yourself.

APPENDIX D

Distraction Instructions for Current Study (from Nolen-Hoeksema & Morrow, 1993)

We want you to prepare for the upcoming social interaction by responding to the prompts on the next page.

The following page will have a video which contains some thinking/imagining prompts. As you read the prompts, use your imagination and concentration to focus your mind on each of the ideas. Spend a few moments visualizing and concentrating on each item. When you hear a tone, that means it is time to move on to the next prompt. Later, we will ask you about your thoughts during this time.

Think about/imagine the layout of a typical classroom

Think about/imagine raindrops sliding down a windowpane

Think about/imagine the shape of the continent Africa

Think about/imagine a gas station on the side of a highway

Think about/imagine clouds forming in the sky

Think about/imagine the baggage claim at the airport

APPENDIX E

Demographics Form

Sex: F M **Age**: _____

Ethnicity: _____ Caucasian _____ Latino/Latina
_____ African American _____ Chicano/Chicana
_____ Asian _____ Middle Eastern
_____ Pacific Islander _____ Native American
_____ Other (Please specify: _____)

Place of Birth: _____ **Primary Language**: _____

High School GPA: _____ **College GPA:** _____

Year in School: _____ Freshman
_____ Sophomore
_____ Junior
_____ Senior
_____ Graduate student

Mother's Education: _____ high school graduate
_____ college graduate
_____ master's degree
_____ PhD, JD, MD
_____ other
(please specify: _____)

Father's Education: _____ high school graduate
_____ college graduate
_____ master's degree
_____ PhD, JD, MD
_____ other
(please specify: _____)

Approximate *family* income:
____ < $10,000 ____ $10, 000-$20,000 ____ $21,000-$30,000
____ $31,000-$40,000 ____ $41,000-$50,000 ____ $51,000-$60,000 ____ > $61,000

Parents' Marital Status: _____ married _____ separated _____ divorced
_____ mother passed away ____ father passed away _____ never married

APPENDIX F

Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998)

For each question, please circle a number to indicate the degree to which you feel the statement is characteristic or true of you. The rating scale is as follows:

0 = Not at all characteristic or true of me
1 = Slightly characteristic or true of me
2 = Moderately characteristic or true of me
3 = Very characteristic or true of me
4 = Extremely characteristic or true of me

1. I get nervous if I have to speak with someone in authority (teacher, boss, etc.)	0	1	2	3	4
2. I have difficulty making eye-contact with others.	0	1	2	3	4
3. I become tense if I have to talk about myself or my feelings.	0	1	2	3	4
4. I find difficulty mixing comfortably with the people I work with.	0	1	2	3	4
5. I find it easy to make friends of my own age.	0	1	2	3	4
6. I tense-up if I meet an acquaintance on the street.	0	1	2	3	4
7. When mixing socially, I am uncomfortable.	0	1	2	3	4
8. I feel tense if I am alone with just one person.	0	1	2	3	4
9. I am at ease meeting people at parties, etc.	0	1	2	3	4
10. I have difficulty talking with other people.	0	1	2	3	4
11. I find it easy to think of things to talk about.	0	1	2	3	4
12. I worry about expressing myself in case I appear awkward.	0	1	2	3	4
13. I find it difficult to disagree with another's point of view.	0	1	2	3	4
14. I have difficulty talking to an attractive person of the opposite sex.	0	1	2	3	4
15. I find myself worrying that I won't know what to say in social situations.	0	1	2	3	4
16. I am nervous mixing with people I don't know well.	0	1	2	3	4
17. I feel I'll say something embarrassing when talking.	0	1	2	3	4
18. When mixing in a group, I find myself worrying I will be ignored.	0	1	2	3	4
19. I am tense mixing in a group.	0	1	2	3	4
20. I am unsure whether to greet someone I know only slightly.	0	1	2	3	4

APPENDIX G

Anticipatory Social Behaviours Questionnaire (Hinrichsen & Clark, 2003)

The following items ask you about behaviors, thoughts, and mental images that some people have prior to engaging in a social situation. Read each item below and select the option that best characterizes what you do prior to a social situation.

1	2	3	4
Never			Always

1. I think about similar situations in which I have failed in the past _____
2. I try to think of everything that could happen _____
3. I imagine the worst that could happen _____
4. I go over in detail what might happen _____
5. I try to picture how I will appear to others _____
6. I try to plan what I am going to say _____
7. I rehearse conversations in my mind _____
8. I remind myself of things I should not do _____
9. I think about ways in which I could put things right if I make a fool of myself _____
10. I think about ways in which I could avoid having to face the situation _____
11. I think about ways in which I could escape from the situation if it gets too embarrassing _____
12. I make a conscious effort not to think about the situation _____

APPENDIX H

Center for Epidemiological Studies - Depression Scale (CES-D; Radloff, 1977)

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way in the past week.

DURING THE PAST WEEK

Rarely or none of the time (less than 1 day)	Some or a little of the time (1 – 2 days)	Occasionally or a moderate amount of time (3 – 4 days)	Most or all of the time (5 – 7 days)
0	**1**	**2**	**3**

_____ 1. I was bothered by things that usually don't bother me.
_____ 2. I did not feel like eating; my appetite was poor.
_____ 3. I felt that I could not shake off the blues even with help from my family or friends.
_____ 4. I felt I was just as good as other people.
_____ 5. I had trouble keeping my mind on what I was doing.
_____ 6. I felt depressed.
_____ 7. I felt that everything I did was an effort.
_____ 8. I felt hopeful about the future.
_____ 9. I thought my life had been a failure.
_____ 10. I felt fearful.
_____ 11. My sleep was restless.
_____ 12. I was happy.
_____ 13. I talked less than usual.
_____ 14. I felt lonely.
_____ 15. People were unfriendly.
_____ 16. I enjoyed life.
_____ 17. I had crying spells.
_____ 18. I felt sad.
_____ 19. I felt that people dislike me.
_____ 20. I could not get "going."

APPENDIX I

Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990)

Enter the number that best describes how typical or characteristic each item is of you, putting the number next to the item.

1	2	3	4	5
Not at all typical		Somewhat typical		Very typical

_____ 1. If I do not have enough time to do everything, I do not worry about it.

_____ 2. My worries overwhelm me.

_____ 3. I do not tend to worry about things.

_____ 4. Many situations make me worry.

_____ 5. I know I should not worry about things, but I just cannot help it.

_____ 6. When I am under pressure, I worry a lot.

_____ 7. I am always worrying about something.

_____ 8. I find it easy to dismiss worrisome thoughts.

_____ 9. As soon as I finish one task, I start to worry about everything else I have to do.

_____ 10. I never worry about anything.

_____ 11. When there is nothing more I can do about a concern, I do not worry about it anymore.

_____ 12. I have been a worrier all my life.

_____ 13. I notice that I have been worrying about things.

_____ 14. Once I start worrying, I cannot stop.

_____ 15. I worry all the time.

_____ 16. I worry about projects until they are all done.

APPENDIX J

Ruminative Response Scale (Treynor, Gonzalez, & Nolen-Hoeksema, 2003; modified for current study)

People think and do many different things after social situations. Please read each of the items below and indicate whether you never, sometimes, often, or always think or do each one following social situations. Please indicate what you *generally* do, not what you think you should do.

1	2	3	4
Almost Never	Sometimes	Often	Almost Always

1. Think "What am I doing to deserve this?" _____
2. Analyze recent events to try to understand why you feel anxious during social situations _____
3. Think "Why do I always react this way?" _____
4. Go away by yourself and think about why you feel this way _____
5. Write down what you are thinking and analyze it _____
6. Think about a recent situation, wishing it had gone better _____
7. Think "Why do I have problems other people don't have?" _____
8. Think "Why can't I handle things better?" _____
9. Analyze your personality to try to understand why you feel anxious during social situations _____
10. Go someplace alone to think about your feelings _____

APPENDIX K

Subjective Anxiety Level, Pre-Manipulation

On a scale of 0 – 100, what would you rate your current anxiety _____

(0 = no anxiety, 100 = the worst anxiety you have ever felt)

APPENDIX L

Manipulation Check

You just finished watching a video with thinking prompts.

1. Please briefly describe what you were thinking about/doing during this time period.

   _____

   _____

2. What percentage (0% - 100%) of the time period allotted did you spend thinking about the prompts on the video as instructed? (for example: 0% = did not spend any time thinking about the prompts, 50% = spent half of the time thinking about the prompts, 100% = spent the entire time thinking about the prompts) _____%

3. What percentage (0% - 100%)of the time period did you spend thinking about the upcoming social interaction? (for example, 0% = spent no time thinking about the social interaction, 50% = spent half of the time thinking about the social interaction, 100% = spent the entire time thinking about the social interaction) _____%

4. In your day-to-day life, how often to you spend time thinking about/imagining the things you were asked to think about (or imagine) in the video. Circle a number below.

0	1	2	3	4	5	6	7	8	9	10
Never					Sometimes				Many times a day	

5. When reading and thinking about the on-screen prompts, how vivid was the imagery you were experiencing? Circle the number that corresponds to the images you may have been seeing in your mind.

	RATING
No image present at all	1
So vague and dim as to be hardly discernible	2
Vague and dim	3
Not clear or vivid, but recognizable	4
Moderately clear and vivid	5
Very clear and comparable in vividness to the actual experience	6
Perfectly clear and as vivid as the actual experience	7

APPENDIX M

Subjective Anxiety and Behavioral Avoidance Measures

Anxiety

On a scale of 0 – 100, what would you rate your current anxiety _____

(0 = no anxiety, 100 = the worst anxiety you have ever felt)

Behavioral Avoidance

Please circle a number to answer each question.

1) If given the opportunity to do additional questionnaires instead of the interaction, I would consider choosing to complete the questionnaires

0 1 2 3 4 5 6 7 8 9 10

Definitely No — Maybe — Definitely Yes

---

2) If given the opportunity to skip the interaction, but only get 1 SONA credit instead of 2, I would consider skipping the social interaction

0 1 2 3 4 5 6 7 8 9 10

Definitely No — Maybe — Definitely Yes

---

3) How much are you looking forward to the interaction?

0 1 2 3 4 5 6 7 8 9 10

I do not want to do it at all — I don't care either way — I want to do it / I'm excited for it

APPENDIX N

Focus of Attention Questionnaire (Woody, 1996)

While speaking some people focus on exactly what they are doing, while others find themselves focusing on other things such as feelings in their body, or objects in the room. We're interested in what you are focusing on **right now, as you wait for the social interaction to begin.** Please read the items below and indicate what you are concentrating on and thinking about.

Please use the following rating scale:

1	2	3	4	5
Not at all	Somewhat	Moderately	A lot	Totally

_____1. I am focusing on the other person's appearance or dress

_____2. I am focusing on the features or conditions of the physical surroundings (e.g., appearance, temperature)

_____3. I am focusing on what I should say or do during the social interaction

_____4. I am focusing on the impression I am going to make on my partner and/or the researchers

_____5. I am focusing on how my interaction partner might feel about himself/herself

_____6. I am focusing on what I will think of my interaction partner and/or what I think about the researchers

_____7. I am focusing on my level of anxiety

_____8. I am focusing on what the researchers are saying/doing

_____9. I am focusing on my internal bodily reactions (e.g., heart rate, sweating)

_____10. I am focusing on past social failures

APPENDIX O

Self Reported Measure of Interpretation Biases (Huppert et al., 2007)

As you read each sentence, imagine yourself in the scene. Please rate on a 0-10 scale how likely each sentence would apply to you.

0	2	4	6	8	10
Not at all	unlikely	possibly	likely	very likely	definitely

1. As you finish your performance, you see that the audience thinks you are fantastic.
2. Someone looks at you standing in the elevator because they think you look weird
3. As you are riding on the train, the person next to you looks at you because you are smiling
4. You walk into a party and someone looks in your direction because you are friendly
5. Your supervisor calls you into her office to tell you that you did something impressive
6. When you ask someone to be quiet in a movie theater, people think you are rude
7. Your colleague attributes a mistake to you and you do not confront him because you are easygoing
8. Someone is looking at you while you are typing an email because you are struggling
9. As you are delivering a joke in your presentation, your peers laugh because they think that you are funny
10. As you are jogging in the park, you feel that people think that you look silly
11. While you are making a speech at your relative's wedding, you look foolish
12. You make a joke at a party and then find yourself thinking about it because you thought you were amusing
13. As you speak to the person standing next to you, they look at you in a way that suggests that you are boring
14. After you buy lunch, you drop a bag of chips in front of everyone, which makes you feel generous
15. Someone looks at you standing in the elevator because they think you look attractive
16. Someone is looking at you while you are typing an email because you are fast
17. While you are delivering a speech, you notice that your voice sounds weak
18. While you are talking, the store clerk thinks that you are stupid
19. While you are delivering a speech, you notice that your voice sounds enthusiastic
20. As you finish your performance, you see that the audience thinks you are horrible.
21. As you are jogging in the park, you feel that people think that you look confident
22. As you speak to the person standing next to you, they look at you in a way that suggests that you are smart
23. As you are delivering a joke in your presentation, your peers laugh because they think that you are awkward
24. When you ask someone to be quiet in a movie theater, people think you are assertive
25. As you are riding on the train, the person next to you looks at you because you are annoying

26. You walk into a party and someone looks in your direction because you are crazy
27. Your supervisor calls you into her office to tell you that you did something awful
28. You make a joke at a party and then find yourself thinking about it because you thought you were inappropriate
29. After you buy lunch, you drop a bag of chips in front of everyone, which makes you feel clumsy
30. While you are talking, the store clerk thinks that you are likeable
31. While you are making a speech at your relative's wedding, you look composed
32. Your colleague attributes a mistake to you and you do not confront him because you are ashamed

APPENDIX P

Copy of IRB Approval Letter

Oklahoma State University Institutional Review Board

Date:	Monday, August 22, 2011
IRB Application No	AS1178
Proposal Title:	Thoughts and Feelings

Reviewed and Processed as:

Status Recommended by Reviewer(s): Approved Protocol Expires: 8/21/2012

Principal Investigator(s):

Adam Mills
309 N. Murray
Stillwater, OK 74078

DeMond Grant
205 N. Murray
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Shelia H. Kennison

Shelia Kennison, Chair
Institutional Review Board

VITA

Adam Charles Mills

Candidate for the Degree of

Master of Science

Thesis: ANXIOUS ANTICIPATION: THE CONSEQUENCES OF ANTICIPATORY PROCESSING ON COGNITIVE SYMPTOMS OF SOCIAL ANXIETY

Major Field: Clinical Psychology

Biographical:

Education:

Completed the requirements for the Master of Science in Clinical Psychology at Oklahoma State University, Stillwater, Oklahoma in July 2012.

Completed the requirements for the Master of Arts in Clinical Psychology at Minnesota State University, Mankato, Minnesota in May 2010.

Completed the requirements for the Bachelor of Arts in Psychology at the University of Nebraska, Lincoln, Nebraska in December, 2007.

Experience:

Laboratory of Emotion and Psychophysiology (DeMond Grant, Ph.D.), Department of Psychology, Oklahoma State University, 2010 to Present.

Anxiety and Phobia Research Laboratory (Barry Ries, Ph.D.), Department of Psychology, Minnesota State University, Mankato, 2008 to 2010.

Anxiety Disorders Clinic (Debra Hope, Ph.D.), Department of Psychology, University of Nebraska, Lincoln, 2006 to 2007.

Legal Decision Making Lab (Richard Wiener, Ph.D., M.L.S.), Department of Psychology, University of Nebraska, Lincoln, 2005 to 2007.

Name: Adam Charles Mills Date of Degree: July 2012

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: ANXIOUS ANTICIPATION: THE CONSEQUENCES OF ANTICIPATORY PROCESSING ON COGNITIVE SYMPTOMS OF SOCIAL ANXIETY

Pages in Study: 97 Candidate for the Degree of Master of Science

Major Field: Clinical Psychology

Scope and Method of Study:

Undergraduate participants high (HSA; $N = 57$) and low (LSA; $N = 66$) in social anxiety symptoms were instructed to engage in anticipation or distraction prior to a social interaction. Anticipation instructions were based upon Clark and Wells' (1995) cognitive model of social anxiety and Hinrichsen and Clark's (2003) anticipation paradigm. Distraction instructions were based on Nolen-Hoeksema and Morrow's (1993) distraction paradigm. Hypotheses were that those who anticipate would have 1) higher self-reported anxiety, 2) more desire to avoid the social interaction, 3) more internally-focused attention and 4) more negative interpretations of social information. An interaction was expected such that scores would be highest for HSA in the Anticipation condition relative to the other groups.

Findings and Conclusions:

Participants who engaged in participation had more desire to avoid ($p = .04$) and slightly more endorsement of negative interpretations ($p = .07$) than those in the distraction condition, regardless of social anxiety status. A significant interaction ($p = .02$) suggested that HSA in the Anticipation condition was more internally focused than HSA in the Distraction condition. There were no effects of anticipation on self-reported anxiety. Future research should explore these and other variables posited to maintain social anxiety using multi-method assessment in order to better determine how anticipatory processing influences social anxiety symptoms.

ADVISER'S APPROVAL: DeMond M. Grant, Ph.D.