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Attentional Biases in Social Anxiety: An Investigation of Rumination

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ATTENTIONAL BIASES IN SOCIAL ANXIETY: AN INVESTIGATION OF RUMINATION

by

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THESIS

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Abstract

Cognitive models of anxiety posit that socially anxious individuals' attention is disproportionally biased for threatening information in the environment. One component in the cognitive model of social anxiety that has not been examined, in terms of the attentional bias, is rumination (i.e., the dwelling on perceived inadequacies). The purpose of the present research was to examine the impact that rumination had on attentional biases in social anxiety as measured through the use of a Rapid Serial Visual Presentation (RSVP) stream. When two target stimuli (T1 and T2) are presented amongst distractor stimuli in rapid succession it is hard to process T2 within 500 ms of the presentation of T1; this is known as the attentional blink (AB). Given that previous research has extensively documented that the AB is attenuated when T2 is of relevance to the individual, it was hypothesized that participants high in social anxiety would have an attenuated AB when T2 was a social threat word, compared to a neutral word, and compared to participants low in social anxiety. The first study did not find support for this hypothesis – no attenuated AB was found for participants high in social anxiety (n = 15) for social threat words compared to those low in social anxiety (n = 20). Study 2 expanded upon Study 1 by examining the impact of rumination on the AB between participants high (n = 32) or low (n = 34) in social anxiety. It was hypothesized that participants high in social anxiety and in the rumination condition would have an attenuated AB for social threat words, compared to participants in the distraction condition, and participants low in social anxiety in either manipulation condition. No differences were found for accuracy identification rates between social anxiety groups and manipulation conditions. Limitations and implications of the results are discussed.

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And last, I would like to thank my parents for their unfailing support, advice, and for teaching me to be a strong woman. Thank you for loving me so much – this is for the both of you.

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Attentional Biases in Social Anxiety: An Investigation of Rumination

Social Anxiety

Social anxiety, also known as social phobia, is characterized by the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association [APA], 2000) as an irrational, intense fear of negative evaluation from others during social or performance situations. Social anxiety disorder (SAD) is the third most common psychiatric disorder, surpassed only by depression and substance abuse (Kessler et al., 1994), and has a lifetime prevalence estimated at 13-14% (Wittchen & Fehm, 2003). Epidemiologic studies have suggested that individuals with SAD suffer significant impairments across a multitude of domains (Kessler et al., 1994; Lipsitz & Schneider, 2000; Mendlowicz & Stein, 2000), with data showing individuals with SAD having received less education (Davidson et al., 1993), and higher unemployment rates (Wittchen & Beloch, 1996) when compared to individuals without SAD. Furthermore, individuals with SAD are more likely to have impaired functioning in social and romantic relationships; one study reported that only 34% of individuals with SAD were married, compared with 57% of individuals without SAD in the control group (Wittchen & Beloch, 1996). Thus, social anxiety is a debilitating and prevalent condition that can have a negative impact on an individual's emotional and social well-being. SAD is a complex condition, where a multitude of factors contribute to its etiology, perpetuation, and exacerbation. Cognitive models provide a framework for the maintenance and exacerbation of pathological levels of social anxiety.

Cognitive models of social anxiety suggest the existence of an attentional processing bias to information related to social threat. It is thought that the preferential

processing of social threat related stimuli serves to exacerbate and maintain the disorder. However, there appears to be a discrepancy in the literature as to the nature of the bias. Although some literature has found support for social phobics to have a hypervigilance towards social threat stimuli, other research has found evidence for avoidance of social threat stimuli. Adding to the confusion, the paradigms that have traditionally been used to investigate cognitive biases in social anxiety have fallen under criticism. Thus, the use of a different paradigm, such as the attentional blink, may help to elucidate previous discrepancies. The attentional blink is a cognitive paradigm that charts attentional processes across a small epoch of time. Stimuli are presented in a rapid sequential manner, with participants having to identify two targets. When two targets are placed within 500 ms of each other, the accuracy for identifying the second target decreases, which is known as the attentional blink period; the attentional blink, as well as other commonly used paradigms for examining attentional biases in social anxiety, will be described later in more detail.

Post-event processing, also known as rumination, is a component of social anxiety that is conceptualized in cognitive models as having a role in the maintenance and exacerbation of social anxiety. Rumination is defined as the constant dwelling on perceived negative attributes/failures; a person with social anxiety would typically ruminate about how they performed in a social interaction/performance situation. Despite the negative impact that rumination has on individuals with social anxiety, research examining how rumination affects cognitive biases has been sparse.

Thus, the purpose of this document is to explore the impact rumination has on the attentional bias in individuals with high and low levels of social anxiety, through the use

of a Rapid Serial Visual Presentation (RSVP) paradigm to assess the attentional blink. First, this document will review the different cognitive biases in social anxiety that have traditionally been examined by cognitive paradigms, such as the emotional Stroop task, and the dot probe task. Second, research on the attentional blink will be reviewed, with an examination of different theories of the attentional blink, and factors that influence the magnitude. Third, two experiments that were conducted will be discussed; the two experiments sought to address the following questions:

(I) How do high socially anxious participants respond to social threat words in an attentional blink paradigm compared to participants low in social anxiety?

(II) Can engaging in rumination affect the attentional bias to social threat words in high socially anxious individuals on an attentional blink task compared to participants high in social anxiety in a distraction condition, and compared to low socially anxious participants in either the rumination or distraction conditions?

Last, this document will endeavor to explain the results of the studies in relation to the implications for the literature on social anxiety and cognitive biases, as well as address potential future directions and limitations.

Cognitive Models of Social Anxiety

Cognitive models of social anxiety are well researched and provide a framework for the development and perpetuation of social anxiety (Clark & Wells, 1995; Rapee & Heimberg, 1997; Schlenker & Leary, 1982). These cognitive models are comprised of

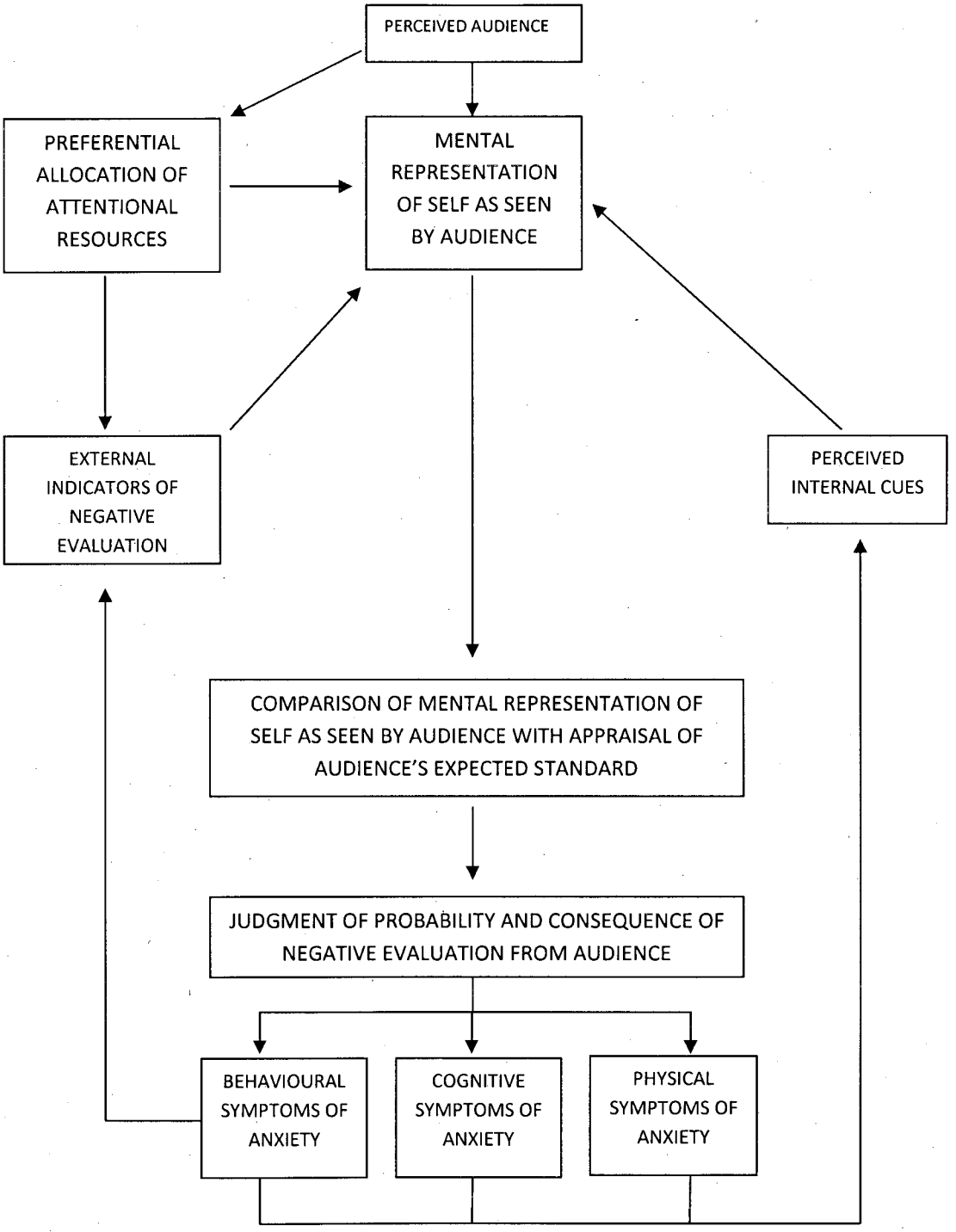
several components: beliefs about the self, anticipatory and post event processing, self-focused attention, and safety behaviours.

Rapee and Heimberg's (1997) cognitive model of social anxiety. A diagram of Rapee and Heimberg's (1997) model of social anxiety is presented as Figure 1. Rapee and Heimberg's cognitive model of social anxiety proposes a series of sequential processes that occur when an individual enters into an anxious state. Rapee and Heimberg note that the processes described in their model occur in a similar manner whether anxiety arises prior to (anticipatory processing), during, or after (post-event processing) a social/evaluative encounter. Rapee and Heimberg (1997) posit that individuals high in social anxiety hold the maladaptive belief that everyone is inherently critical. In support of this notion, previous research has found that people high in social anxiety fear they will be evaluated negatively because of the inherent critical nature of others, coupled with a fear of their own shortcomings in a social/evaluative situation (Leary, Kowalski, & Campbell, 1988). Despite fears of being evaluated negatively by their audience, Rapee and Heimberg believe that socially anxious individuals attach huge importance to, and crave positive appraisal from others.

Upon entering a social situation, Rapee and Heimberg (1997) believe that socially anxious individuals form a mental representation of their external appearance and behaviours based upon how they believe the audience will perceive them. This mental representation of the self is formed from an amalgamation of inputs coming from sources such as long term memory (e.g., previous experience in similar situations, general appearance, etc), internal cues (e.g., proprioception, and physical symptoms such as sweating), and external cues (e.g., audience feedback). However, Rapee and Heimberg

Figure 1.

Rapee and Heimberg's (1997) Cognitive Model of Social Phobia



note that this mental representation that socially anxious individuals form of themselves is a distorted image based upon how they perceive an audience views them, and does not represent an internal photograph. In fact, the mental image is conceptualized to be fluid in nature, and thus can change depending upon what the individual is most anxious to receive negative evaluation on. Thus, Rapee and Heimberg suggest that attentional resources are directed towards more salient information, and the saliency subsequently causes high socially anxious individuals to exaggerate those features in their mental representation of themselves. Therefore, the attentional resources of the socially anxious individual are partially directed inwards, and are focused on monitoring for the assessment of mistakes made during the social/evaluative situation.

Not only are attentional resources directed inward on the construction of this mental representation, but attentional focus is also allocated for external signs of threat in the environment. Rapee and Heimberg (1997) define an external threat as any indicator of possible negative evaluation, such as frowns, yawning, and general signs of boredom. Rapee and Heimberg believe that during the social-evaluative situation socially anxious individuals compare how they believe the audience perceives them (the mental image the socially anxious individual constructs) and the standard at which the audience is evaluating their performance, appearance, and behaviour. Rapee and Heimberg theorize that the larger the discrepancy between the mental representation and the perceived standard of audience evaluation, the higher the anxiety stemming from the belief that they are failing to meet standards, and thus being negatively evaluated. The fear of judgment subsequently leads to behavioural, cognitive, and physical symptoms of anxiety. In turn,

these symptoms of anxiety cause the socially anxious individual to alter the mental representation of the self s/he believes is seen by the audience.

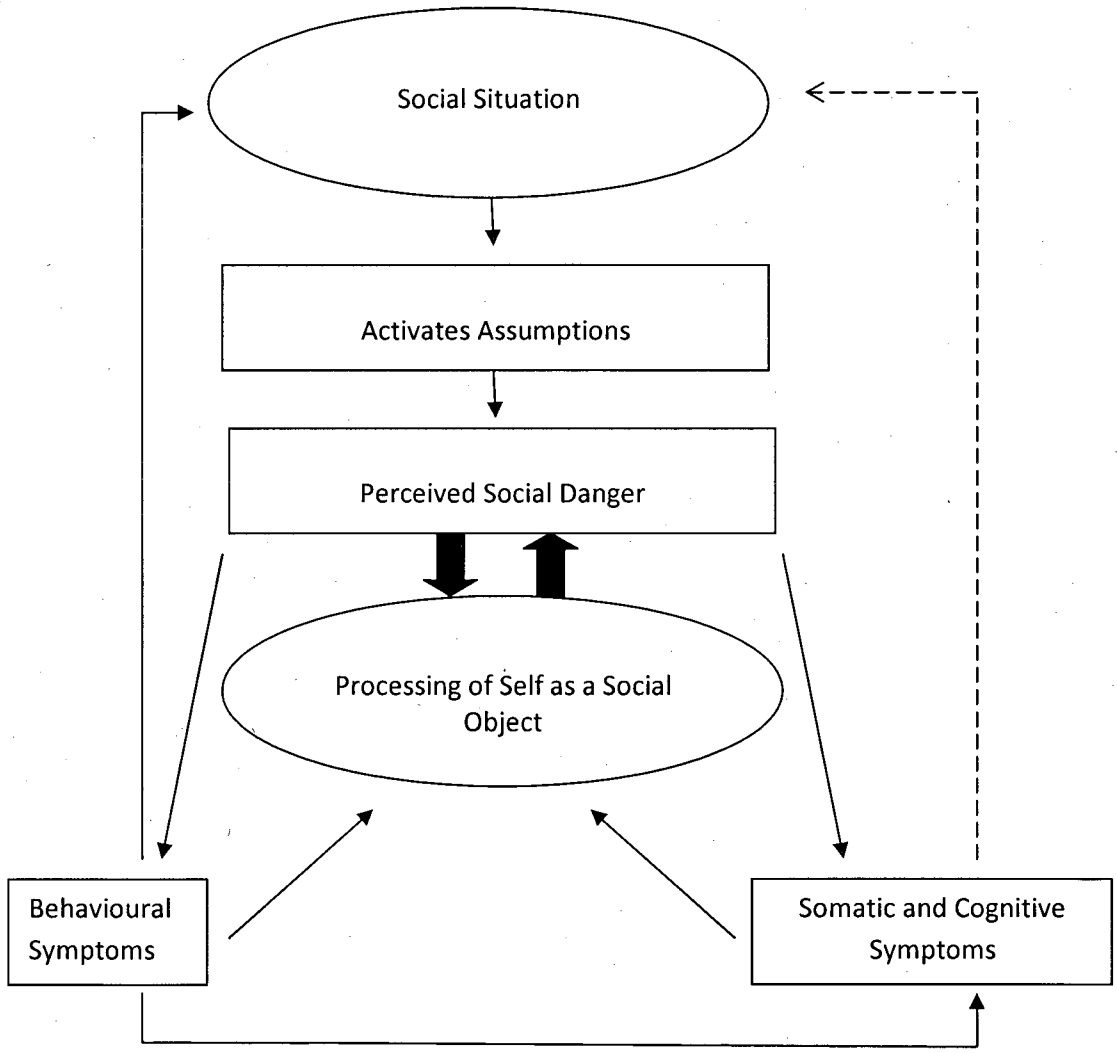
Clark and Wells' (1995) cognitive model of social anxiety. A diagram of Clark and Wells' (1995) cognitive model of social anxiety is presented as Figure 2. Clark and Wells' cognitive model is similar to Rapee and Heimberg's (1997) model, in that social anxiety is theorized to be perpetuated by maladaptive beliefs about the self, as well as having attentional biases towards threatening external stimuli, coupled with an internal self-focused attention. Clark and Wells believe that when socially anxious individuals enter a social situation two things happen: first, these individuals believe that they are inept and that they will behave/perform inadequately or unfavourably. Second, these individuals believe that this inept behaviour will cause them to be negatively evaluated by the audience.

Clark and Wells (1995) outline four main processes that perpetuate negative beliefs about socially anxious individuals that serve to maintain anxiety. Three of these processes occur during a socially threatening situation; the fourth process involves what the socially anxious individual does prior to (anticipatory processing), and after (post-event processing) the threatening situation.

Clark and Wells (1995) posit that when individuals high in social anxiety enter a feared/ anxiety provoking situation their attentional focus is shifted inwards. The focus is on monitoring and observing themselves so that they will be aware of any perceived flaws in their performance that the audience may critique. Previous research also supports this notion, as it has been found that individuals high in social anxiety become more self focused in social situations (Perowne & Mansell, 2002; Stopa & Clark, 2003), with the

Figure 2.

Clark and Wells' (1995) Cognitive Model of Social Phobia.



processing of emotional and physical information taking precedent over external cues and events. The inward focus of attention serves to maintain socially anxious behaviour because it forces individuals to engage in post-event processing by reviewing their perceived inadequacies. The reviewing of perceived flaws further creates anxiety because a socially anxious individual longs to come across in an unrealistically flawless light (Rapee & Heimberg, 1997). Clark and Wells believe that this inward attentional shift is problematic because it enhances the awareness of feared anxiety response and interferes with processing the situation and other's behaviour accurately. Furthermore, the authors believe that this inward focus of attention is problematic because individuals high in social anxiety make the assumption that what they feel reflects what other people notice and think about them. For example, a socially anxious person would equate feeling humiliated with actually being humiliated. This processing style is maladaptive and Clark and Wells offer two potential explanations why social phobics continue to utilize this style.

First, Clark and Wells (1995) suggest that social phobics are so concerned with how others perceive them, that they are strongly motivated to look for how others perceive them. This motivation also stems from the fact that social phobics are greatly threatened by the potential negative evaluation from others. Second, Clark and Wells suggest that the way in which non social phobics gather information regarding others' perceptions/evaluations of them is too threatening for social phobics to utilize because of the potential for negative evaluation. For example, non social phobics will utilize a myriad of ways to gather information about how others view them, such as using increased eye contact, explicitly asking for reactions to what was said, and disclosing

more personal information. Although the use of increased eye contact would help social phobics to be able to gauge the level of interest the other person has in what they are saying/doing, prolonged eye contact is difficult for social phobics because it makes them feel vulnerable, and thus is typically avoided.

Clark and Wells (1995) also maintain that in order to reduce their anxiety, social phobics will engage in self-protective behaviours. Self protective behaviours serve as safety mechanisms for socially anxious individuals, and consist of lack of eye contact, withdrawal, and avoidance of future social anxiety provoking situation/interactions. Although these self protective behaviours may help to reduce anxiety in a situation, they are associated with high levels of anxiety and provide merely a band-aid solution to anxiety reduction. Furthermore, Clark and Wells suggest that by using these safety behaviours in an anxiety provoking situation, social phobics do not have the opportunity for disconfirming their unrealistic beliefs about the consequences of these behaviours. In fact, the authors also suggest that in certain situations, the safety behaviour can make the feared behaviour more likely to occur. Supporting this notion, previous research suggests that exposure to situations while refraining from engaging in safety behaviours is associated with a decrease in anxiety (Scholing & Emmelkamp, 1993).

Clark and Wells (1995) also suggest that social phobics find situations to be threatening as a result of the dysfunctional assumptions they hold about themselves. Clark and Wells break down the different assumptions in to three categories: excessively high standards, conditional beliefs, and unconditional beliefs. Social phobics have excessively high standards for social performance, which creates anxiety because they are concerned that they will fail to convey their desired impression to their audience, and as a

result be negatively evaluated. Social phobics also have conditional beliefs about themselves, where they are concerned with how negatively others will view them; they believe that they will be viewed/evaluated negatively because they are worthless, stupid, unattractive, etc. Last, Clark and Wells argue that social phobics hold unconditional beliefs about the self, where these negative beliefs are centered on their value and worth. Clark and Wells argue that social phobics have unstable self-schemata, so when in a social/threatening situation, they view themselves negatively, but when alone or in a non-threatening situation, they have a more positive view of themselves.

Clark and Wells (1995) also highlight the importance of anticipatory and post event processing in the maintenance of social anxiety. Anticipatory processing consists of thoughts and feelings that are experienced prior to a social event. Hinrichsen and Clark (2003) found that during the anticipatory processing stage, socially anxious individuals were more likely than controls to recall past failures and the potential for negative consequence in an impending social interaction. Although some research postulates that this could potentially serve as a negative self fulfilling prophecy (Vassilopoulos, 2004), other research suggests that anticipatory processing may also have beneficial aspects. Brown and Stropa (2006) examined whether anticipatory processing would have a negative effect in socially anxious and non-socially anxious individuals. Participants were divided into a non-anticipatory processing condition or a 10 minute anticipatory processing condition prior to giving a speech. Although results indicated that socially anxious individuals in the anticipatory processing condition were found to have greater anxiety, both socially anxious and non-socially anxious individuals gave better speech performance ratings for themselves on their speeches following the anticipatory

processing period. One potential reason for this finding could be that during the anticipatory period participants were able to organize their thoughts regarding the impending speech, and to mentally prepare themselves for the stressful situation. It is possible that this preparation time helped participants to feel more confident in the quality of their speech. Brown and Stropa did not have judges rate the speeches, so although participants in the anticipatory processing condition gave themselves better speech performance ratings, the actual quality of their speech performance may not have improved. Although the Brown and Stropa study provides some evidence as to the potential beneficial nature of anticipatory processing, such positive gains may be qualified. For instance, Vassilopoulos (2004) found that individuals were most likely to avoid a situation if they had engaged in anticipatory processing. Thus, anticipatory processing may have some benefits (whether actual or perceived), but these gains may be useless if the anxiety is so severe that it causes the social phobic to avoid the situation altogether.

Another maladaptive cognitive process for socially anxious individuals is the tendency to review their performance in social situations. This review process has been given many different labels in the literature: 'post event processing' (Clark & Wells, 1995; Rachman, Gruter-Andrew, & Shafran, 2000), 'post-mortem' (Clark & Wells, 1995), 'retrospective brooding' (Rapee & Heimberg, 1997), and 'post-event rumination' (Abbott & Rapee, 2004). Throughout the social anxiety literature these terms are used interchangeably. However, for the purpose of consistency, hereafter this process will be referred to as rumination.

Rumination. Rachman et al. (2000) found that rumination recollections tend to be recurrent, intrusive, and interfere with concentration. Rachman and colleagues also found that engaging in rumination after a social anxiety provoking situation increased the likelihood of participants avoiding a similar social encounter in the future. However, not only will individuals with social anxiety be more likely to avoid a similar socially provoking situation in the future, but they will also continue to ruminate about the former occasion. For example, research has found that levels of rumination appear to be relatively stable across time, with levels of rumination on the day of a negative event predictive of levels of rumination the following day (Lundh & Sperling, 2002). Further support for the debilitating nature of rumination can be found in the literature that has examined the types of thoughts and situations that exacerbate the constant negative dwelling on perceived failures and inadequacies.

One study compared the thoughts of participants high versus low in social anxiety during a rumination period. Kocovski, Endler, Rector, and Flett (2005) had high and low socially anxious participants read scripts about two mildly embarrassing social situations that involved publically making mistakes. Following the reading of the vignettes, participants in the open-ended instruction condition were told to record any thoughts they were currently experiencing, while participants in a directive instructions condition were asked to produce counterfactual thoughts. Counterfactual thoughts consist of notions on how a situation may have turned out differently. Kocovski and colleagues found that participants in the high socially anxious group had more negative thoughts in both conditions compared to the low socially anxious group, and produced more upward

counterfactual thoughts ("if only" types of statements) compared to the low socially anxious participants.

Previous research on rumination has also found that it is unique to social situations, with participants, irrespective of social anxiety status, engaging in higher levels of rumination after a social event compared to a non-social event (Fehm, Schneider, & Hoyer, 2007). However, research has found mixed results when comparing the types of social situations that are associated with higher levels of rumination. Although previous research has found support that participants high in social anxiety engage in rumination following a performance situation (Abbott & Rapee, 2004; Edwards, Rapee, & Franklin, 2003), McEvoy and Kingsep (2006) found that higher levels of rumination were not associated with either social interaction or performance situations in a clinical sample with social anxiety disorder. McEvoy and Kingsep's finding are in contrast with Fehm and colleagues, who found that the type of social situation (e.g., social situation versus phobic situation) predicted the degree of rumination. Fehm et al. found that when participants recalled an interaction situation (i.e., social situation), they had greater levels of rumination compared to when these participants recalled a performance situation (i.e., phobic situation), and suggest that this result may be due to the ambiguity of interaction situations compared to performance situations. However, it is important to note that Fehm and colleagues did not specifically screen for levels of social anxiety, and it is possible that there are differences in the degree of rumination between clinical and non-clinical levels of social anxiety.

In contrast with Fehm et al.'s findings, Kocovski and Rector (2007) found that when participants completed a rumination questionnaire with a presentation situation in

mind, they engaged in significantly more rumination compared to participants who responded with a party situation in mind. However, the Kocovski and Rector study is limited in that participants in this study choose whether to respond with either a party situation or presentation situation in mind. Thus, it is possible that those who chose to respond with a presentation situation in mind were more likely to report higher levels of rumination in general.

Overall, the discrepancies in the literature regarding the type of social interaction situation that elicits the most rumination may be a result of methodological limitations regarding participant samples. It is possible that social phobics with clinical levels of social anxiety differ in the degree of rumination for social interaction situations compared to participants with non-clinical yet high levels of social anxiety. For instance, it is possible that having clinical levels of social anxiety is associated with high levels of anxiety for both presentation and social interaction situations. In contrast, a person with high levels of social anxiety may have lower levels of anxiety for presentation and social interaction situations.

Previous research has also examined the relationship between attentional biases and rumination. Morrison and O'Connor (2008) wanted to examine whether rumination could affect an attentional bias towards negative and positive words, though not in the context of social anxiety. Morrison and O'Connor had two different manipulations, with two conditions: mood (negative or positive), and rumination (rumination or distraction). In the positive mood condition participants listened to uplifting music, alongside with statements such as, "I have complete confidence in myself". In the negative mood condition participants listened to slow, downbeat music that was paired with statements

such as, "Just when I think things are going to get better, something else goes wrong". For the rumination manipulation participants were instructed to visualize and concentrate on a series of 45 items during an 8 minute period. In the rumination condition the items were all related to symptoms, emotions, and the self (e.g., 'Think about: the physical sensations you feel in your body'). In the distraction condition items were externally focused away from the self, symptoms, and emotions (e.g., 'Think about: raindrops sliding down a window pane').

Morrison and O'Connor (2008) had participants tested three separate times. During time 1, participants completed self report measures of rumination, dysphoria, hopelessness, and suicidal ideation. Time 2 took place an average of four days later, where all participants completed a dot probe task to assess baseline measures of their attentional biases towards negative and positive words. Participants were then randomly assigned to one of four manipulation groups: negative rumination, positive rumination, negative distraction, positive distraction. After the experimental manipulations, participants then completed an additional dot probe task. At the final time point (three weeks later), participants completed the same self report measures as time 1.

Morrison and O'Connor (2008) found that only the negative rumination and negative distraction groups showed a significant difference from each other in change in attentional bias as measured by the dot probe task at pre-and post-manipulation times. Participants in the negative rumination condition had a decrease towards positive stimuli in the post-manipulation dot probe task compared to their pre-manipulation dot probe task results. In contrast, participants in the negative distraction condition showed an increased attentional bias towards positive stimuli from pre- to post-manipulations on the

dot probe task. Although Morrison and O'Connor did not screen for individuals with high and low levels of dysphoria, these results suggest that rumination takes attention away from positive words. In general, more research is warranted to investigate the potential role that rumination has in those with high and low levels of dysphoria, and other psychopathological conditions, such as social anxiety.

In sum, rumination has been examined using a variety of methods (e.g., self report, diary methods, social performance/evaluative situations, and experimental manipulations) and variables (e.g., attentional biases). Although the research is mixed on whether more rumination follows a performance or interaction situation, researchers agree that rumination is recurrent, intrusive, and a key component in maintaining social anxiety.

Overall, these cognitive models help to provide a framework for social anxiety by describing how factors, such as beliefs about the self, anticipatory and rumination, self-focused attention, and safety behaviours, serve to maintain and exacerbate social phobia. The conceptualization of cognitive models also helps to explain cognitive biases that have been found in social anxiety.

Cognitive Biases

Attentional biases in social anxiety disorder have been investigated through the use of different cognitive paradigms, namely the Stroop task, and the dot probe task. This section will examine the three different cognitive biases (hypervigilance, avoidance, and vigilance-avoidance) that have been found in social phobia through the use of cognitive paradigms.

Stroop task. The classic Stroop paradigm requires participants to identify the ink colour of a word that is presented, while ignoring the word meaning. On some of the trials, the words are colour names that are incongruent with their ink colour (e.g., the word red printed in green ink). Since word reading is thought to be an automatic process, it is very difficult to avoid reading the colour name. Therefore, on incongruent trials response times are considerably longer than neutral (e.g., the word table in green ink) or congruent (e.g., the word green in green ink) trials for most individuals (Stroop, 1935).

The emotional Stroop task (Gotlib & McCann, 1984) is a variant of this classic paradigm. In the emotional Stroop task emotional words are presented in coloured font, and participants have to identify the ink colour while ignoring the word. Hypervigilance refers to selective attention towards threat related stimuli compared to neutral stimuli. In the emotional Stroop task, hypervigilance towards threat is thought to be reflected by an increased reaction time (i.e., slower response time) to naming the colour of the threat related word. Several studies have shown that those who are high in social anxiety are slower at naming the colour of social threat words compared to non-threat words (Becker, Rinck, Margraf, & Roth, 2001; Hope, Rapee, Heimberg, & Dombeck, 1990; Lundh & Ost, 1996; Mattia, Heimberg, & Hope, 1993). However, other studies have not found support for a hypervigilance towards social threat words (e.g., Amir et al., 1996).

Given the discrepant findings in terms of the cognitive bias with the emotional Stroop, several studies have focused on the specificity of words that can create an emotional Stroop interference, with the goal of trying to understand the nature of the cognitive bias. Spector, Pecknold, and Libman (2003) found that patients with generalized social phobia were slower to name colours of social threat words describing

negative evaluation (e.g., criticize) and words denoting observable characteristics of anxiety (e.g., blushing), compared to anxiety words not visible to others (e.g., palpitations), and compared to non-anxious controls. In another study on specificity, McNeil et al. (1995) examined the effects of subtype of social phobia on the emotional Stroop task. They found that only patients with generalized social phobia (not those with specific speech-related social phobia) showed greater interference for words relating to generalized social fears (e.g., party, conversation). However, both groups of patients had greater interference for words relating to speeches and to negative evaluation. Taken together, both of these studies provide support for the notion that the cognitive bias for individuals high in social anxiety may be highly specific.

Over the years, the efficacy of the emotional Stroop as a test to measure cognitive biases has been questioned, with the following factors serving as alternative explanations for longer colour naming latencies. First, some researchers believe that threatening words may create an emotional reaction which inhibits any response and thus leads to longer reaction times (Cloitre, Heimberg, Holt, & Liebowitz, 1992). Second, other researchers believe that the emotional Stroop may be capturing 'cognitive avoidance'; it is possible that the longer colour naming latencies may reflect attempts to suppress the threatening meaning of the word (de Ruiter & Brosschott, 1994). Third, it is possible that the emotional Stroop effect is a result of mental preoccupation with themes related to the emotional words, which in turn produces longer colour naming latencies (Wells & Matthews, 1994). Fourth, Holle, Neely, and Heimberg (1997) found that the manner in which words are presented in the emotional Stroop accounts for the bias. Holle and colleagues presented the emotional Stroop to socially anxious participants in either a

block format, or a randomized format. In a block format, words of the same category are presented one after the other, and Holle and colleagues found slower response times to naming the social threat words. However, when words were presented to the socially anxious participants in a randomized manner, they found no difference between the social threat and neutral word response times. Holle and colleagues argued that priming was the reason why slower response times are found when words of the same category are presented sequentially, as opposed to in a random manner.

Dot probe paradigm. This paradigm circumvents many of the problems of the emotional Stroop test, and has many advantages: (1) Because two classes of stimuli (e.g., threatening and neutral) are presented on the screen simultaneously, it can be said to truly measure selective attention towards one class of stimuli; (2) an attentional bias is indexed by a faster response to the probe, therefore factors like mental preoccupation that slow down a response can be discounted as an explanation for the effect; (3) the paradigm can assess selective attention towards (hypervigilance) and away (avoidance) from a threat stimulus.

The dot probe task is a computerized paradigm that first has participants focus their eyes on a central fixation cross that appears on the screen for 1000 ms. The cross is then replaced with two stimuli, which are presented one on top of the other for 500 ms. In the case of social anxiety experiments, one word that is presented would be related to social threat, such as 'loser', while the other word is neutral, such as 'chair'. Immediately after the words disappear, a dot appears on the screen in the location where one of the words previously appeared. The aim of the task is for participants to press the button that corresponds to the location where the dot appears on the screen.

Despite the promising appeal of the design of the modified dot-probe task, several studies have failed to find clear evidence for selective attention to social threat words in social phobia (Amir, Elias, Klumpp & Przeworski, 2003; Asmundson & Stein, 1994; Horenstein & Segui, 1997) and social anxiety (Mansell, Ehlers, Clark, & Chen, 2002). Some studies have found support for a hypervigilance towards social threat stimuli, however their results are qualified. For example, Asmundson and Stein (1994) found support for a hypervigilance towards social threat words for patients with generalized social phobia, but only when the social threat word cue was read aloud. However, when the social threat word was not read out loud (i.e., the neutral word it was paired with was read), the hypervigilance for probe identification was not found. This finding has lead some researchers (e.g., Bögels & Mansell, 2004) to suggest that this study does not represent a hypervigilance resulting from an attentional bias; rather this study best exemplifies a hypervigilance that was primed because attention was only preferentially allocated when the social phobic patients were primed. If hypervigilance was stemming from an attentional bias, then the expected results would have been faster accuracy identification times when the probe was paired with the social threat word cue, regardless of whether the word cue was read aloud. In contrast to a primed hypervigilance, Amir and colleagues (2003) found that social phobic patients took longer to respond to the probe when a social threat word occurred in the opposite spatial location, but were no faster to detect the probe when it occurred in the same location as the social threat word. Amir and colleagues concluded that their results were indicative of a reduced ability to disengage from social threat cues (as suggested by Rapee & Heimberg, 1997). Musa, Lepine, Clark, Mansell, and Ehlers (2003) found a hypervigilance to social threat words,

but only when those with depression were excluded; they found that patients with depression showed avoidance of social threat words similar to the control group. They also found that the hypervigilance was specific for social threat words, and not physical threat words, but only in patients without other comorbid anxiety disorder (e.g., generalized anxiety disorder, panic disorder, or obsessive compulsive disorder). Musa and colleagues' study suggests that hypervigilance towards social threat cues may only be possible to identify in 'pure' social anxiety samples.

Other research has found support for a vigilance-avoidance attentional bias. Vassilopoulos (2005) investigated the nature of the attentional biases in socially anxious participants in a dot probe task at different time intervals. Vassilopoulos found that participants high in social anxiety attended to all emotional words (positive, social threat, and physical threat) when presented for 250 ms. However, when the words were presented for 500 ms, Vassilopoulos found that the high socially anxious participants avoided all of the emotional words. These findings support the vigilance-avoidance hypothesis, although not specific to social threat words. The vigilance-avoidance theory posits that initially socially anxious individuals will be vigilant towards social threat cues, but after a certain time period will become avoidant of these cues.

Within the literature researchers noticed that none of the studies examining cognitive biases were assessing these biases in relation to a social context, and hypothesized that this could be one of the reasons causing such discrepant findings. Thus, to address the omission, Mansell et al. (2002) tested whether high and low socially anxious participants attended to social threat words and positive social words, with and without the presence of social evaluation (i.e., the threat of a speech). No effect of social anxiety was found,

but trait general anxiety was associated with attention towards negative relative to positive social words. The threat of a speech increased attention to positive and negative social words, but this effect was not specific for those high in social anxiety. Ononaiye, Turpin, and Reidy (2007) also examined the attentional bias to social threat words by examining attention to words relating to negative social evaluation with words relating to anxiety symptoms under conditions of social threat (a speech) or no threat. They found that high socially anxious participants showed a hypervigilance to social evaluative words in the no threat condition, and a hypervigilance towards somatic words (anxiety symptoms) in the speech condition. One potential reason why a hypervigilance was found for somatic words in the threat condition could be because those with social anxiety are most concerned with physically displaying signs of anxiety, such as blushing and sweating. However, when there is no immediate threat the concerns of socially anxious individuals may be more focused on social evaluative concerns. Each of these effects remained when accounting for general trait anxiety and depression. This finding supports the notion presented by Clark and Wells (1995) that attention may be directed towards internal threat cues when a real-life social threat is thought to be imminent. In contrast, it is possible that attention is preferentially allocated externally when the threat stage has passed, and the socially anxious individual is trying to assess others evaluative concerns of his/her performance/interaction.

Overall, the modified dot-probe task using words finds only tentative support for the vigilance-avoidance hypothesis, with a multitude of factors obscuring a clear interpretation of the findings, such as problems with disengagement from threat stimuli, the presence of comorbidity, the timing of presentation, the nature of the social threat

words, and the presence of a real social threat. Many researchers have suggested that measuring attention to visually presented words may have limited ecological validity given that in real social situations the social threat stimuli consist of other people's responses (e.g., facial expressions and verbal comments). Thus, several studies have examined selective attention to images of facial expressions using the dot-probe task.

Some research has found evidence for a hypervigilance towards threat (Mogg & Bradley, 2002; Mogg, Philippot, & Bradley, 2004). For example, Mogg et al. (2004) presented social phobia patients and normal controls with happy-neutral, and angry-neutral face pairs at display times of 500 and 1250 ms. Results were similar to Vassilopoulos' (2005) findings, where they found that at the display time of 500 ms, social phobia patients selectively attended to the angry faces in contrast to the normal control participants. However, in support of a vigilance-avoidance model, there was a non-significant tendency at the display time of 1250 ms for social phobic patients to negatively, rather than positively, attend to angry faces.

Other studies have found support of avoidance of faces using the modified dot-probe task. In attempts to mimick the two types of contrasting stimuli which a socially anxious person may attend to in a real-life situation, Mansell, Clark, Ehlers and Chen (1999) presented participants with a negative, neutral, or positive face next to an everyday object (e.g., a chair) for 500 ms. High and low socially anxious participants were in one of two situations: social-evaluative threat (expecting to give a speech) or no social evaluative threat. Mansell et al. found that high socially anxious participants in the social evaluative threat condition attended away from (i.e., avoided) the negative and positive facial expressions relative to the low socially anxious individuals. No effects of social anxiety

in the no threat condition were found, but general trait anxiety was associated with vigilance to negative faces. Chen, Ehlers, Clark, and Mansell (2002) administered the same paradigm to patients with social phobia and non social phobic controls. Social phobic patients were found to avoid the facial expressions relative to the control group, without the presence of an explicit social threat condition. Mansell, Clark, and Ehlers (2003) examined high to low speech anxious participants by comparing their attention to external cues (images of faces) with attention to internal cues (a vibration of the finger thought to indicate changes in the participants' levels of arousal). They found that high speech anxious participants directed their attention away from external threat and towards internal cues, but only within the context of expecting to give a speech. No effects were found in the no-threat condition.

In sum, the modified dot-probe tasks using facial stimuli have found more promising findings in relation to the word versions. The studies that have found support for hypervigilance tend to present the images for brief periods of times, or display two faces simultaneously, and tend to not have a social threat (e.g., speech). In contrast, studies that have found support for an avoidance of faces tend to display their stimuli for longer periods of time, or display a face opposite a non-social cue (e.g., object), or tend to use a real-life social threat. Taken together, these findings suggest that vigilance may result when the situation is ambiguous as to whether a real social threat is present, and may occur very quickly. Avoidance may present as a defensive mechanism when the individual feels as though he/she is being negatively evaluated, and when there is a neutral non-social threatening stimulus on which to focus attention. Unlike vigilance, avoidance may take longer to develop.

Overall, the literature on cognitive paradigms and social anxiety suggests that there is evidence for hypervigilance, avoidance, and vigilance-avoidance towards socially threatening stimuli in socially anxious participants. The discrepancy of findings in the literature may indicate that it is time a different cognitive paradigm is used to assess cognitive biases in social anxiety. One cognitive paradigm that targets attentional processes across a small epoch of time is the attentional blink.

The Attentional Blink

The attentional blink (AB) is a task that is used to target attentional processes across time through using a Rapid Serial Visual Presentation (RSVP) paradigm. In an RSVP paradigm, a series of stimuli (i.e., words, letters, numbers, and pictures) are presented in rapid succession in the same location for very brief periods of time, with participants having to identify one (or more) of the stimuli, which is known as a target. Although each target is only presented for roughly 100 ms, research has shown that any single target can be reported accurately (Lawrence, 1971). The distance between targets in a RSVP stream can be varied, so that researchers can investigate the attentional costs on identifying the second target (T2) when having to pay attention to the first target (T1). Raymond, Shapiro, and Arnell (1992) discovered that when two targets are placed in a temporal proximity of 200-500 ms of each other, there is a marked decrease in the accurate identification of T2. Thus, Raymond and colleagues appropriately named this phenomenon the AB, for it is like an eye-blink of attention during the presentation of T2, which makes it difficult to identify the second target stimulus. The focus of this section will be on the AB deficits, and manipulations in AB performance that limits these deficits.

Original AB study and model. Raymond and colleagues (1992) based their original study of the AB on findings from Broadbent and Broadbent (1987), and Weichselgartner and Sperling (1987), who found that participants displayed a post-target processing deficit in the identification of stimuli presented after the first target. In the study by Weichselgartner and Sperling, participants were presented with stimuli in an RSVP stream and asked to report the lone white letter and the 3 items that immediately followed the white letter. They discovered that items which were presented 2-4 positions after the white letter were rarely reported accurately, but items 6-8 positions later were often reported correctly.

Based on these findings, Raymond and colleagues (1992) wanted to investigate three main ideas: first, if the post-target processing deficits found in previous research were due to perceptual or attentional factors. They wanted to see if these deficits were resulting because individuals did not have the time to see them, or if there was an attentional disruption preventing them from remembering the stimuli. Second, Raymond et al. hypothesized that the task Weichselgartner and Sperling (1987) had participants do was too difficult. Thus, Raymond and colleagues wanted to determine if such large processing deficits would still be present in a simple detection task, compared to the relatively difficult task of identifying three items after the target. Last, they wanted to investigate how items in a close proximity to the target in the RSVP stream contributed to identification deficits.

Raymond et al. (1992) used the same T1 identification task that Weichselgartner and Sperling (1987) used, but created a more simplistic T2 task, where participants had to detect the presence of a black 'X', which was presented 50% of the time after T1 at

varying lags. For instance, T1 and T2 could be separated anywhere among 1-8 items (see Figure 3 for presentation of stimuli in a lag 2 trial). Raymond and colleagues also included a control condition to see if T2 accuracy would improve if not having to focus on T1. Results in the control condition showed improved accuracy, with an identification of T2 greater than 85% at all lags. However, in the experimental condition, where participants had to identify both T1 and T2, results showed that T2 accuracy was reduced when T2 was 2 to 5 items after T1 (see Figure 4). Thus, the results obtained from this study suggested that the AB was attentional, and not due to visual limitations.

Theories of the AB.

Early selection model of the AB. The early selection model of the AB was proposed by Raymond et al. (1992) and theorizes that when attention is focused on identifying T1, the presence of a distractor immediately following T1 causes confusion to arise amongst features. This confusion causes a theoretical attentional 'gate' to close, thus only allowing T1 and the item immediately following T1 to enter in to this first attentional window. Raymond and colleagues believed that the AB period represents the amount of time that is required to resolve the interference to allow the attentional 'gate' to be re-opened. In support of the early selection model theory, Raymond et al. (1992) found that when a blank space was inserted immediately following T1, the AB was greatly attenuated. Thus, because a distractor did not immediately follow T1, no confusion arose that would have created interference, thus leaving the attentional window open. In other words, when a blank space was inserted after T1, competition between T1 and the following distractor was reduced, thus keeping the attentional 'gate' open for T2. However, when Raymond and colleagues inserted a blank space two positions after T1

Figure 3.

Illustration of RSVP Stimuli used by Raymond et al. (1992).

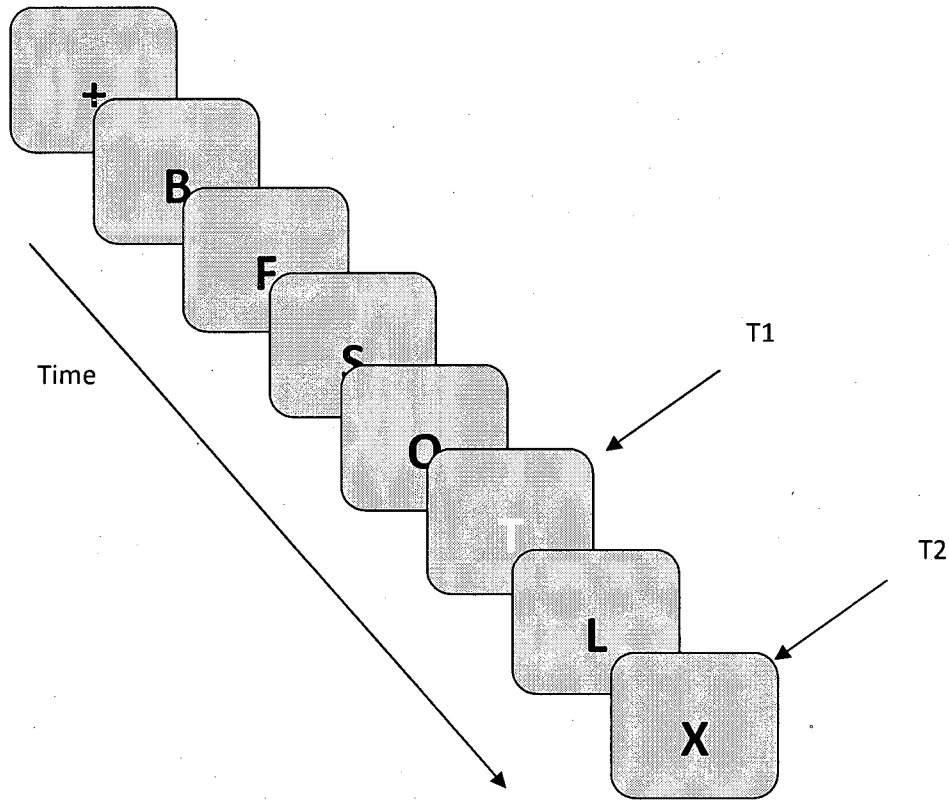
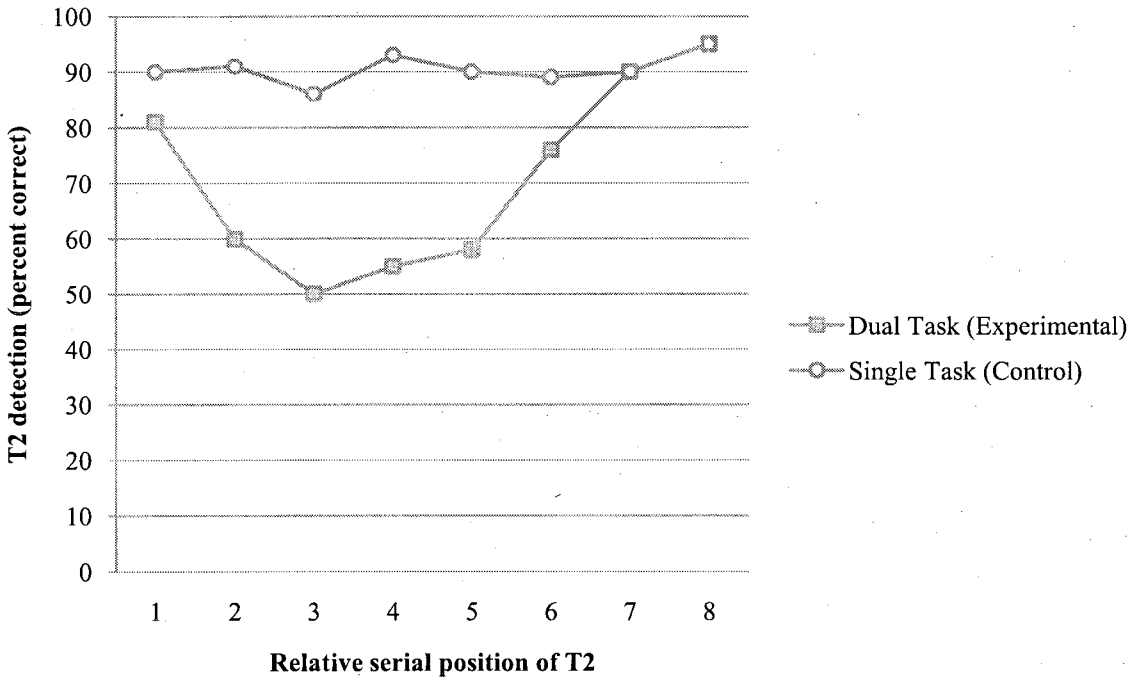


Figure 4.

Sample AB Pattern Displaying T2 Accuracy When T1 is Correct (Shapiro, Arnell, & Raymond, 1997).



(i.e. T1 + 2 position), the AB deficit occurred as usual. Raymond and colleagues theorized that the distractor immediately following T1 created interference causing the attentional 'gate' to shut.

More recently, Olivers, van der Stigchel, and Hulleman (2007) found support for this theory by using four different targets in a RSVP paradigm to investigate the AB. Olivers and colleagues found that when the four targets were presented sequentially without any intervening distractors, accuracy for all four targets was high. However, when a distractor was inserted between the two targets, then the typical AB deficit occurred. Olivers et al. suggested that the AB period reflects the time required for attentional processes to put the filter back in place that differentiates targets from distractors.

Late selection interference model of the AB. This model was proposed by Shapiro, Arnell, and Raymond (1994), and Raymond, Shapiro, and Arnell (1995). This model posits that we create templates matching target features to discriminate targets from distractors. In order for targets to enter conscious awareness, they must be consolidated in to visual short-term memory (VSTM). Due to limitations in capacity, processing depends upon both the similarity of the stimuli to the template, as well as presentation order. Therefore, T1 receives priority because it matches the template and is presented first. Post-target items that immediately follow T1 are admitted to this consolidation stage due to the proximity to T1. The reason why T2 is not admitted with T1 into the consolidation stage when presented in the AB window is because T2 receives heavy interference from previous distractors and does not receive priority. When T1 and T2 are separated for more than 500 ms, T1 has been consolidated in to VSTM, and the

distractors immediately following T1 have been rejected, allowing for T2 to proceed into VSTM consolidation with little interference. This model requires that T2 receive a high level of semantic representation before binding.

In support of this model, Shapiro, Driver, Ward, and Sorenson (1997), found that even when T2 could not be reported, T2 was processed beyond visual features. Shapiro and colleagues also found that T2s that were not accurately identified primed later items. Luck, Vogel, and Shapiro (1996) examined Event-Related Potentials (ERPs) and found that blinked T2s during the AB period received perceptual and semantic processing. Luck and colleagues suggested that while individuals do not show conscious awareness of blinked T2s, they still have semantically processed T2.

Bottleneck models of the AB. Chun and Potter (1995) examined how interference from distractors during the AB period may be attributed to any visual event. To investigate this, Chun and Potter created two experimental conditions, one where distractors were similar to targets (e.g. digits as distractors and letters as targets) and the other condition where distractors were dissimilar to targets (e.g. keyboard symbols as distractors and letters as targets). They found that when distractors were highly dissimilar from targets, the AB was eliminated, compared to when the distractors were similar to targets, which produced a modestly attenuated AB. Based on these findings Chun and Potter proposed a two stage model of the AB, where the AB results from limited capacity in the second stage of processing.

Similar to Shapiro et al. (1994), and Raymond et al. (1995), Chun and Potter (1995) believe that all information in the RSVP stream is semantically processed. They propose that at stage one all information is semantically processed, while at stage two, the

identification and stimulus consolidation into working memory is performed. This second stage is demanding on attention as it has a limited capacity, which creates a bottleneck on processing information in to awareness. The model proposed by Chun and Potter differs from the model proposed by Shapiro and colleagues in that the competition of items for stage 2 consolidation creates a bottleneck. Chun and Potter posit that if T1 is in stage 2, then T2 has to wait until T1 consolidation is complete before it can undergo Stage 2. During this waiting period T2 is vulnerable to decay, causing it to be unavailable for stage 2 consolidation once the bottleneck has cleared. When T1 and T2 are separated by a long lag, T1 consolidation is completed before T2 is presented; thus T2 does not have to wait at a bottleneck, which results in higher T2 accuracy identification.

The temporary loss of control (TLC) model. The TLC model was proposed by Di Lollo, Kawahara, Ghorashi, and Enns (2005), and posits that the attentional system selects target items for further processing through the use of input filters, also known as an attentional set. Di Lollo and colleagues believe that while T1 is being processed, attentional resources are focused on the processing of T1, which leaves the input filters vulnerable and creates a temporary loss of control over incoming stimulus selection. If T2 is in the T1 + 1 position, then accuracy is spared because T2 matches the attentional set. If a distractor is in the T1 + 1 position, the input filter becomes biased towards the distractor features and subsequent T2s will not be selected for further attentional processing because T2 no longer matches the attentional set. Once T1 processing is complete, the attentional set template regains attentional control and is corrected to match the target set, causing increased T2 accuracy.

To support this theory, Di Lollo et al. (2005) found that when stimuli with the same defining features (e.g. all were letters presented amongst digits) were presented sequentially, there was no observed AB deficit on the third item. However, when the second and third items did not share the same target features (e.g. letter, digit, letter), the typical AB deficit pattern was observed.

Factors that influence AB performance. Ever since the AB was discovered, researchers have been manipulating various variables in attempts to attenuate, or enlarge, the AB. Previous research suggests that there are many ways in which the AB can be manipulated, ranging from individual differences, such as working memory (Colzato, Spape, Pannebakker, & Hommel, 2007), to using personally salient stimuli (Shapiro, Caldwell, & Sorensen, 1997).

Researchers have found that personally relevant stimuli affects the AB. Shapiro et al. (1997) found what they termed the 'visual cocktail party' effect in the AB. For the second target, participants saw nouns, their own names, and other names. Shapiro and colleagues found that when a participant's own name was presented as T2 within the attentional blink window, the participant did not show an AB. However, participants did show an AB for nouns and other names. The findings of this study suggest that highly salient material, such as one's own name, can override the AB, but that names in general are not salient enough material. These findings led researchers to examine other highly salient material in the AB, such as emotional words.

Emotional words and the AB. Emotional words have been found to attenuate the AB, supporting the notion that emotionally arousing information is preferentially selected from the temporal stream. Keil and Ihssen (2004) examined the effect that emotional

words have on the AB paradigm, with T2 words either being pleasant (e.g., love), negative (e.g., murder), or neutral (e.g., browse). They found that compared to neutral words, pleasant and unpleasant words had an attenuated AB, but that there was no difference in AB sparing between pleasant and unpleasant words. Keil and Ihssen also found that the emotional words that were not rated high in terms of arousal did not show an attenuated AB compared to emotional words that were rated highly in terms of arousal. These findings suggest that it is not the emotional content of words that is preferentially selected, but rather how arousing the words themselves are that captures attention.

Anderson (2005) also conducted a series of experiments to examine the AB when T2 were emotional words. Anderson compared T2 stimuli that were either negative words (e.g., murder), to taboo words (e.g., lesbian), and neutral words (e.g., browse). Anderson found that taboo words produced the greatest AB sparing, with negative words having a slightly attenuated AB, while neutral words displayed the typical AB pattern. In support of Keil and Ihssen's (2004) findings, Anderson found that it was the arousal ratings of the words, and not the valence ratings, that accounted for this AB sparing. For example, if a word was either highly pleasant or highly unpleasant, but not arousing, the AB would only be slightly attenuated for that word compared to if the word was rated as highly arousing. Anderson suggests that this occurs because T2 that are highly arousing require less attention for correct identification, which makes them less vulnerable to attentional limitations that underlie the AB. More recent research, conducted by Mathewson, Arnell, and Mansfield (2008) confirms that arousal, and not valence ratings, predicts accuracy identification levels. Mathewson et al. found that compared to

negative, positive, and neutral words, that taboo words created the largest AB when presented as T1, which the authors suggest is due to the arousal level of taboo words.

The AB and psychopathology/mood. There have also been a few studies that have investigated psychopathology, specifically dysphoria, and the AB. Rokke, Arnell, Koch, and Andrews (2002) examined the AB amongst non-dysphoric, mild-dysphoric, and moderate to severe dysphoric undergraduate students. Similar to the original AB study done by Raymond et al. (1992), Rokke and colleagues used black letters as distractors, with T1 as a white letter, and T2 as identifying the presence of a black 'x'. Rokke and colleagues found that there was no difference in the size of the AB deficit for non-dysphoric compared to mild-dysphoric participants. However, participants that experience moderate to severe levels of dysphoria were found to have a longer and larger AB deficit. Rokke et al. suggested that one possible reason for this could be that these participants who experienced moderate to severe levels of dysphoria may have had difficulty disengaging attention from the T1 stimulus, thus taking longer to consolidate T1 into short term memory. Despite the deficits experienced by moderate to severe dysphoric participants on the dual task, no difference was found amongst the groups for accuracy levels when participants were instructed to only pay attention to identifying the presence or absence of the 'x'. While Rokke and colleagues did not use emotional stimuli, this study suggests that individuals who experience moderate to severe levels of dysphoria may have attentional impairments that are exaggerated in dual task conditions.

A recent study by Koster, De Raedt, Verschuere, Tibboel, and de Jong (2009) found support for the notion that dysphoric individuals have an impaired ability to disengage from stimuli. Koster et al. examined the AB for emotional words in dysphoric

and non-dysphoric undergraduate students. Targets were green words that were presented amongst white neutral distractor words. T1 was always an emotional word (either positive or negative), while T2 was always a neutral word. Koster and colleagues found that when negative words were presented as T1, T2 identification was significantly impaired for the dysphoric participants compared to the non-dysphoric participants. Thus, having a negative word as T1 created a larger AB in the dysphoric participants. These findings suggest problems with the dysphoric participants' ability to disengage from a negative stimulus. No difference in AB deficits was found when comparing positive words between the dysphoric and non-dysphoric participants.

Social anxiety and the AB. To date, there have only been three studies that have looked at social anxiety and the AB. Arend and Botella (2002) found that individuals high in trait social anxiety showed an attenuated AB for emotionally valenced words compared to participants low in trait social anxiety. Arend and Botella had participants identify a white word (T1) and detect if a probe word (T2) was present. The white word used as T1 was presented as either a social threat word (e.g., fear), or neutral word (e.g., tree). Participants that were high in trait anxiety had a higher correct T2 detection rate when T1 was a threat word, compared to when T1 were neutral words, and compared to low trait anxious participants. The authors suggest that the presence of a threat T1 caused an attenuated AB due to the automatic processing of threat related material in high trait anxious individuals. Thus, participants who were high in trait social anxiety were more accurate in identifying T2 when T1was a threat word because TI could be processed with less attentional resources, which would create less of a processing bottleneck to form. Arend and Botella's findings support a hypervigilance towards social threat words for

high trait anxious participants. If threat related material caused individuals high in anxiety to avoid the stimulus, then no attenuated AB would have been found. An avoidance of a T1 threat stimulus would be indicative of reduced scores regardless of lag position. If a participant was engaging in the avoidance of a T1 stimulus, then it would be expected that accuracy identification scores for T1 would be very low. Given that trials are only counted as 'accurate' if both T1 and T2 words are correctly identified, low identification scores at T1 would subsequently affect overall accuracy scores. In terms of limitations for Arend and Botella's study, it is important to note that participants in this study were only assessed for trait levels of social anxiety, and it may be possible that state levels are also important in determining the nature of the cognitive bias in social anxiety. Although Arend and Botella investigated how threat words would impact detecting a word as T2, it is possible that detecting a word requires less cognitive effort than identifying a word. Furthermore, it has yet to be examined if low and high socially anxious participants differ on identifying both T1 and T2 words, where T2 is a threat related word.

The second study done with socially anxious participants and the AB was by de Jong and Martens (2007), who presented participants with happy and angry faces as stimuli in an AB task. Both T1 and T2 could be happy or angry faces, which produced four different combinations of T1 and T2 stimuli. Distractions amongst the two targets consisted of neutral faces. Participants were instructed to press a button for the emotional face(s) they saw in each stream. Results indicated that all participants showed an increased identification rate for T2 when T1 was an angry face. However, this AB attenuation was not significantly different between those high in social anxiety compared

to those low in social anxiety. The authors also found a "backwards blink" where a happy T1 deficit was present when an angry T2 was presented. Once again, this finding was not especially pronounced in the high socially anxious participants. A limitation of the study was that the authors only used happy and angry faces for targets, and did not use neutral faces as either T1 or T2. Thus, it is unclear as to whether the interfering effect of angry faces at T2 on T1 happy face identification was due to preferential processing of angry faces overall, or to a superior identification of angry faces as T1.

Thus, the third study examining social anxiety and the AB was an extension of the previously mentioned study, whereby de Jong, Koster, van Wees, and Martens (2009) wanted to address these concerns through the inclusion of neutral non-facial stimuli (i.e., letters containing circular, face-shape properties, like the letter 'p') at T1, and neutral, angry, and happy facial stimuli at T2. De Jong and colleagues found that the AB was attenuated for emotional faces, but this finding was irrespective of social anxiety, and suggests that in general, emotional expressions are processed more efficiently compared to neutral expressions. Perhaps one reason why the authors did not find any difference between social anxiety groups for identification of angry faces was because participants were not subjected to a social threat (i.e., a speech). It is possible that the cognitive bias only asserts itself when a socially anxious individual is in a threatening situation/environment, such as having to give a speech, or interact with a stranger.

Although the three studies that have looked at social anxiety with an AB paradigm provide some encouraging results, further investigation is required. Arend and Botella (2002) found support for a hypervigilance towards threat related stimuli in an AB paradigm; however, in their study they presented their threat stimuli as T1, as opposed to

at T2. Thus, their study is limited in that it did not measure how socially anxious individuals are able to attend to threatening stimuli when they are being forced to pay attention to another stimulus in their environment. Furthermore, their study was not done within the context of a socially threatening environment. Although de Jong and colleagues (2007; 2009) did compare high and low anxious participants with facial stimuli at both T1 and T2, no difference was found between the high and low socially anxious participants in either study. Once again, neither of their studies was conducted within the context of a socially threatening environment, which may account for their lack of differentiation between social anxiety groups. Although some researchers may argue that within the context of social anxiety, facial stimuli are more ecologically valid to use, the current research sought to first compare threat related words between high and low socially anxious participants on an AB task before using facial stimuli. Given that the only study on social anxiety and the AB to find differences between high and low socially anxious participants used words, it was deemed an appropriate starting place.

The past studies on social anxiety and the AB are also limited in that they did not assess the cognitive bias under a threatening social environment. This is an important limitation, given that previous research examining social anxiety and attentional biases has found the presence of a threat to have an impact on the attentional bias (e.g., Mansell et al., 2002; Ononaiye et al., 2002). Another important limitation of the previous social anxiety and AB studies is that none of them took into account any factors of the cognitive model of social anxiety that are hypothesized to exacerbate and maintain anxiety, such as rumination. Given that previous research (Morrison & O' Connor, 2008) has found rumination to have an impact on attentional biases, albeit not in the context of social

anxiety, it seems logical to explore the effect rumination may have on the biases in social anxiety.

Present Research

Cognitive models of anxiety disorders suggest the existence of an attentional processing bias to information related to anxiety. It is hypothesized that such preferential processing serves to exacerbate and maintain the disorder. However, there appears to be a discrepancy in the literature as to the nature of the bias. For example, some research has shown that anxious individuals show a hypervigilance bias to threatening material in their environment (e.g., Mogg & Bradley, 2002; Rapee & Heimberg, 1997). In contrast, other research has found that anxious individuals avoid threatening material (e.g., de Ruiter & Brosschot, 1994). Adding to the confusion, the traditional paradigms used to assess biased attention in social anxiety have fallen under criticism, namely the emotional Stroop and the dot-probe tasks (Amir et al., 1996; Asmundson & Stein, 1994). Thus, the use of a different cognitive paradigm, such as the AB, may help clarify previous findings. Therefore, the current studies examined how socially anxious individuals responded to social threat stimuli in an AB paradigm, and if their AB was attenuated for social threat words. Because rumination is thought to play a key role in the maintenance of social anxiety (Clark & Wells, 1995), and previous research has found rumination to affect cognitive biases (Morrison & O'Connor, 2008), the current research also examined the effect that rumination had on the AB.

The first study examined whether participants high in social anxiety differed from those low in social anxiety in AB magnitude to social threat words at T2. Social threat words were placed as T2, in contrast to Arend and Botella (2002) who placed their threat

stimuli at T1, because of the desire to examine attentional costs in the attentional bias when a participant is forced to pay attention to a non-threatening stimulus. It was hypothesized that participants who were high in social anxiety would have an attenuated AB for social threat words, compared to participants low in social anxiety, and compared to control words. Given that previous research has found avoidance of threat stimuli to set in after periods of 1250 ms (Mogg et al., 2004), a hypervigilance, indexed by an attenuated AB, was hypothesized given that the AB period occurs within 200-500 ms. At the end of the first study participants were provided with a list of target and probe words, and were asked to rate how anxiety provoking each word was on a 7-point Likert scale. It was hypothesized that participants high in social anxiety would find the social threat probe words to be more anxiety provoking than participants low in social anxiety.

The second study investigated the role of rumination on the AB in participants that were either high or low in social anxiety. Upon completion of a 5-minute impromptu speech, all participants were given standardized negative feedback. After examining their feedback, participants were divided into either a rumination or a distraction condition. In the rumination condition, participants answered questions based on their feedback that were geared towards having them engage in rumination. In the distraction condition participants completed a visual distraction task. Following the rumination/distraction condition, participants then completed an AB task similar to the one utilized in Study 1. It was hypothesized that participants high in social anxiety, and in the rumination condition, would show the greatest attenuated AB for social threat words compared to participants high in social anxiety and in the distraction condition, and compared to participants low in social anxiety in either the rumination or distraction condition. In comparison to Study

1, it was hypothesized that the attenuation of the AB for social threat words for participants high in anxiety in the rumination condition would exceed any attenuation found for high socially anxious participants for threat words in Study 1.

Study 1 – The Effects of Threatening Stimuli Words in an Attentional Blink Paradigm with Socially Anxious Individuals

This study examined the effects of socially threatening words on participants with high and low levels of social anxiety in an AB paradigm. It was hypothesized that participants with high levels of social anxiety would show an attenuated AB when a threat related word was placed as a second target in a RSVP paradigm, compared to participants that were low in social anxiety. It was also hypothesized that participants high in social anxiety would rate the social threat words as more anxiety provoking, compared to participants low in social anxiety.

Method

Participants

Participants consisted of 38 students at Wilfrid Laurier University (WLU) in Ontario, who were recruited for the study based on their social anxiety scores obtained through the 3 item Miniature Social Phobia Interaction scale (Mini-SPIN; Connor, Kobak, Churchill, Katzelnick, & Davidson, 2001; see Appendix B). Participants, who on the Mini-SPIN scored below 3, or above 6, were invited to participate in the study. The decision to use cutoff scores of 3 and 6 was based on previous literature that found these scores to be the optimal cutoff point for sensitivity (i.e., the percentage of cases of social anxiety disorder that were correctly identified), specificity (i.e., the percentage of patients without social anxiety disorder correctly identified), and diagnostic efficiency (i.e.,

overall hit rate) for social anxiety (Connor et al., 2001). Twenty participants with scores under 3, and 18 participants with scores over 6 participated. The participants' ages ranged from 18 to 25, and the majority of participants reported their ethnicity as Caucasian. For participation in the study participants received $11 compensation (see consent form in Appendix A).

Social anxiety group classification. Participants whose Mini-SPIN scores fell under 3 were considered to be low in social anxiety, and those with scores over 6 were considered as high in social anxiety. Initially, the Mini-SPIN identified 19 participants as low in social anxiety and 19 participants as high in social anxiety. However, upon examination of anxiety scores, it was revealed that two participants were identified by the Mini-SPIN with scores under 3, yet their scores on the Social Interaction Anxiety Scale (SIAS) and Social Phobia Scale (SPS), which were the in lab measures of social anxiety, indicated that they were high, not low, in social anxiety. Thus, these two participants were placed in the high social anxiety group because there is greater support for the validity of the SIAS/SPS for undergraduate samples compared to the Mini-SPIN and both the SIAS and SPS scores were measured on the day participants came into the lab. Thus, participants' scores on the day of testing revealed that they were exhibiting signs of high, opposed to low, social anxiety, and were grouped accordingly. Four participants had Mini-SPIN scores above 6, but their scores on the SIAS and SPS measures indicated that they were average to low in social anxiety, and were therefore categorized as low in social anxiety. Thus, a decision was made to categorize participants as high in social

anxiety if their SIAS score was 26 or greater, or low in social anxiety if their score was 24 or below[1].

Data was screened for outliers; three English-second-language (ESL) participants were excluded from analyses due to poor accuracy on the RSVP task. According to both the Mini-SPIN and the SIAS, two of the ESL participants were identified as high in social anxiety, and the other ESL participant was identified as low in social anxiety. With the elimination of the three ESL participants, the following analyses are based on a sample of 20 participants low in social anxiety, and 15 participants high in social anxiety. See Table 1 for demographic information.

Measures

Demographic questionnaire. A demographic questionnaire was administered to participants asking them to provide information about their age, highest level of education, current living situation, marital and occupational status and ethnicity in a closed-ended format (see Appendix C).

Social anxiety. For the prescreening of social anxiety, the Mini-SPIN was administered via a telephone conversation with potential participants. Identification information of potential participants was acquired through an online data base of WLU students who expressed interest in participating in research studies over the summer for monetary compensation. The Mini-SPIN (Connor et al., 2001) is a three-item measure that was derived from the 17-item Social Phobia Inventory (SPIN; Connor et al., 2000),

[1] Analyses were run excluding participants whose Mini-SPIN scores were not consistent with their SIAS scores (i.e., participants who were identified as low or high in social anxiety on the Mini-SPIN, and then identified as the opposite on the in lab SIAS). Analyses run with these participants excluded found the same pattern of results on the 2 x 3 x 2 ANOVA with a main effect of lag, a main effect of word, and a lag by word interaction. This provides support for the classification of participants with SIAS scores below 24 as low in social anxiety, and above 26 as high in social anxiety.

Table 1

Demographic Information by Condition for Study 1 (N = 35)

	HSA $n = 15$		LSA $n = 20$	
	Frequency	%	Frequency	%
Gender				
Female	8	53.3	12	60.0
Male	7	46.7	8	40.0
Education				
Completed Part of High school	1	6.7	0	0.0
Graduate High school	2	13.3	2	10.0
Completed Part of University	10	66.7	15	75.0
Graduated from University:				
Undergraduate Degree	1	6.7	2	10.0
Master's Degree	1	6.7	1	5.0
Marital Status				
Single	14	93.3	18	90.0
Married	0	0.0	1	5.0
Cohabiting	0	0.0	1	5.0
Separated	1	6.7	0	0.0
Occupational Status				
Unemployed	1	6.7	2	10.0
Employed Full – Time	0	0.0	1	5.0
Employed Part – Time	1	6.7	0	0.0
Student Full – Time	12	80.0	13	65.0
Student Part – Time	1	6.7	3	15.0
Other	0	0.0	1	5.0
Ethnicity				
White/ Caucasian	9	60.0	15	75.0
Asian	3	20.0	5	25.0
Hispanic	1	6.7	0	0.0
Other	2	13.3	0	0.0

and is used to identify the levels of generalized social anxiety that a person possesses. Similar to the SPIN, the Mini-SPIN asks participants to indicate the degree that the statement is characteristic or true of the person, ranging on a 5-point Likert scale from 0 (not at all) to 4 (extremely) characteristic (see Appendix B). Weeks, Spokas, and Heimberg (2007) did a psychometric evaluation of the Mini-SPIN on a treatment seeking sample of social phobics. Weeks and colleagues found the Mini-SPIN to have strong internal consistency, convergent validity, and discriminant validity. Although the Mini-SPIN has been found to demonstrate good psychometric properties, it should be noted that psychometric properties have not been assessed in a non-clinical, undergraduate population.

Two standardized measures of social anxiety were used in the lab to assess the different aspects of social anxiety. Social anxiety is characterized by fears of being negatively observed by others, and showing physical signs of distress. The SPS (Mattick & Clarke, 1998) is a 20 item scale that assesses fears of being observed by others during routine activities, such as becoming self conscious when using public toilets. Participants are given statements, such as "I worry about shaking or trembling when I'm watched by other people", and are asked to indicate the degree they feel the statement is characteristic or true of them based on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely) characteristic (see Appendix D). The SIAS (Mattick & Clarke, 1998) is a 20 item scale that was developed in conjunction with the SPS, and is used to assess anxiety in social interaction situations. Participants are given statements, such as "I feel I'll say something embarrassing when talking", and are asked to indicate the degree they feel the statement is characteristic or true of them based on a 5-point Likert scale ranging from 0 (not at all)

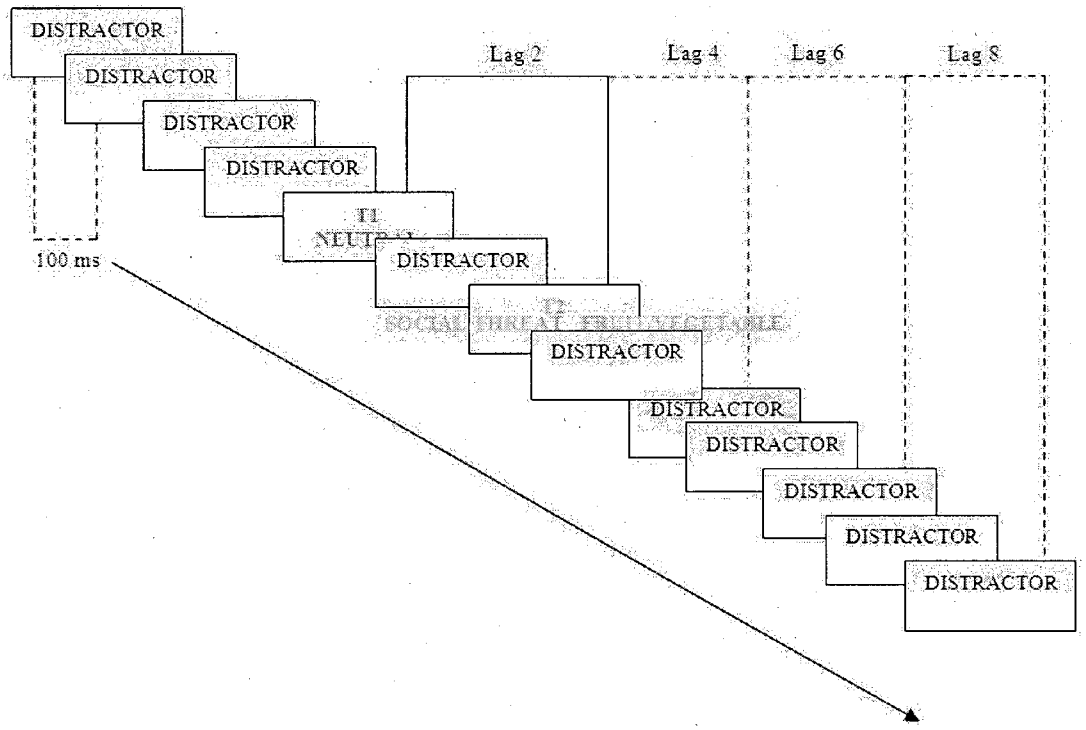
to 4 (extremely) characteristic (see Appendix E). Research has found both the SIAS and SPS to have excellent internal consistency (Heimberg, Mueller, Holt, & Hope, 1992) and good validity (Mattick & Clarke, 1998).

Depression. Social anxiety is often accompanied by depression, and a standardized measure of depression was used to assess the severity of depressive symptoms in the past week. The measure of depression was included so that it could be used as a covariate in analyses. The widely used and validated Beck Depression Inventory (BDI-II: Beck, Steer, & Brown, 1996; see Appendix F) was used for this purpose. This 21-item scale is comprised of items relating to symptoms of depression including hopelessness, irritability, guilt, punishment, fatigue, weight loss, and lack of interest in sex. This scale consists of groups of statements where participants are asked to indicate the statement for each question that best describes the way they have felt in the past week. The statements range on a scale of 0 to 3, with higher numbers indicating a higher degree of depressive symptoms. Beck et al. (1996) have shown that this scale is valid and reliable to use across various populations.

RSVP stimuli. The RSVP task was programmed using the experimental software SuperLab Pro by Cedrus, Version 4.0. The list of words contained one red word, which was the target stimulus (T1), and one green word, which was the probe stimulus (T2), that were presented among a series of black words (see Figure 5). The green words were presented in one of eight positions in relation to the red target word; this is known as stimulus onset asynchrony (SOA) and allows for the charting of attention availability (Raymond et al., 1992). Each participant was presented with a total of 256 trials (128 trials per experimental and control blocks). In the original AB study letters were

Figure 5.

Representation of RSVP Stimuli.



presented for 15 milliseconds on an inter-stimulus interval of 75 milliseconds (Raymond et al., 1992). However, because the word stimuli in the present studies ranged in length from three to 11 letters, it required a longer presentation rate. Thus, the presentation rate for the words in each trial was 15 milliseconds, with an inter-stimulus interval of 100 milliseconds. Neutral words were presented in red font as target one (T1), and probe words, which consisted of either social threat words or vegetables, were presented in green font as the second target (T2; see Figure 6). The target words were matched on word length and frequency (Francis & Kucera, 1982).

Procedure

A procedural diagram outlining the main steps for Study 1 is presented in Figure 7. Participants whose scores on the mini-SPIN were below 3 or above 6 were invited to participate in the current study. Participants were run individually with one experimenter in the laboratory with them. Upon arrival participants first completed the informed consent (see Appendix A), which outlined the important aspects of the current study. Following the informed consent, participants were given a questionnaire package, which included the demographic questionnaire, the SPS, the SIAS, and the BDI. Next participants were seated at a computer and presented with the following instructions for the experimental block of the RSVP task: "You will be presented with a series of words. Among them will be one red word, and one green word". They were then instructed to press the space bar to continue on to the next screen, which contained the following information: "At the end of each trial your task is to type the red word and the green word that you saw". At the end of each trial participants were prompted by a screen with information telling them to type in the red word they saw, and then to press the space bar

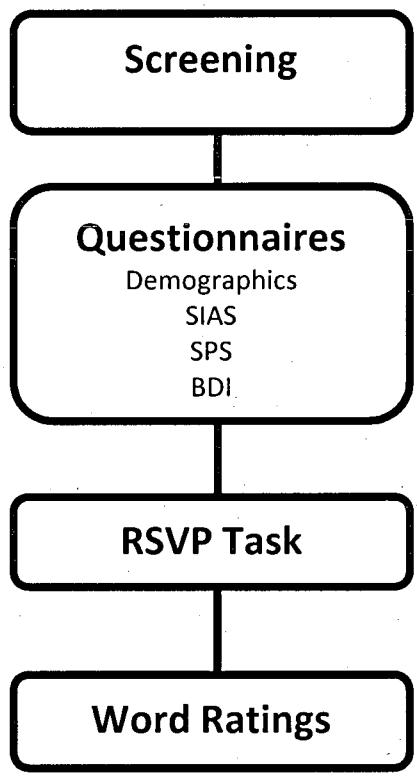
Figure 6.

Word Pairings of RSVP Stimuli for Study 1.

Target Words		Probe Words	
		Threat	Control
address	collect	anxious	pumpkin
journal	bargain	ashamed	parsley
created	laundry	awkward	peaches
annual	shovel	boring	orange
television	dressmaker	criticized	strawberry
registrar	fragrance	disgraced	mushrooms
said	chin	dull	pear
test	curb	dumb	lime
maintenance	grandfather	embarrassed	cranberries
quarter	shelter	failure	lettuce
contact	garment	foolish	cabbage
population	economical	humiliated	vegetables
researching	consolidate	incompetent	cauliflower
think	towel	inept	apple
vacation	umbrella	inferior	radishes
videos	thread	judged	grapes
confirm	lottery	jittery	coconut
media	infer	loser	melon
determine	advertise	mortified	pineapple
program	leather	nervous	spinach
sun	pot	odd	pea
swimming	decorate	rejected	tomatoes
relay	eagle	shaky	lemon
cat	fox	shy	fig
everything	translator	stammering	blackberry
intern	dealer	stupid	pepper
imagine	dresser	stutter	carrots
sweet	cloud	tense	fruit
finish	remedy	uneasy	celery
options	florist	uptight	raisins
news	golf	weak	corn
event	seize	weird	beans

Figure 7.

Procedural Diagram Outlining the Main Steps of Study 1.



to continue on to the next screen. This next screen prompted participants to type in the green word they saw. Each trial was initiated by the participant by pressing the space bar, and beginning with a row of fixation crosses (+++++) that were presented at the center of the screen. Participants were then given 10 practice trials.

For the control block participants were instructed to type only the green (probe) words they saw, even though the red (target) words were still present. The computerized trials were identical, with only the instructions differing. For the control block, participants were instructed to only focus on identifying the green (probe) words. The purpose of this control block was to confirm the presence of the AB period. Because attention is only being directed towards processing one target (the green word), this should be a relatively easy task with a low error identification rate.

The instructions for the control block were: "This second half of the experiment is different. Now focus on identifying only the green words". A second screen of instructions presented the following information: "Once again, we will begin with practice trials". Lastly, participants were instructed to: "Remember. Ignore the red words. Please identify and type only the green words". As with the experimental block, participants were prompted at the end of each trial with a screen that asked them to type out the green word they saw. Consistent with the experimental block, each trial was initiated by the participant pressing the space bar, and began with a row of fixation crosses (+++++) that were presented at the center of the screen. Similar to the experimental block, participants were given 10 practice trials.

Word ratings. Upon completing the RSVP task participants were given a list of 96 alphabetically organized words, and asked to rate how anxiety provoking they found

each word to be on a 7-point Likert scale ranging from 1 (not at all) to 7 (extremely) anxiety provoking. This list contained the target (red) words, and the probe (green) words that were used in the RSVP task (see Appendix H).

Data Analysis

To test the hypothesis that participants with high levels of social anxiety would show an attenuated attentional blink when a threat related word is placed as a second target in a RSVP paradigm compared to participants that are low in social anxiety, a repeated measures 2 Word (threat vs. control) X 3 Lag (2 vs. 3 vs. 8) X 2 Group (high vs. low socially anxious) analysis of variance was carried out. Comparison of word accuracy at lags 2, 3, and 8 were selected based on previous studies that have examined these lags (i.e., de Jong & Martens, 2007). To test the hypothesis that participants high in social anxiety would rate the social threat words as more anxiety provoking, compared to participants low in social anxiety, a *t*-test was run to compare the mean scores for the high socially anxious group to the mean scores of the low socially anxious group. A *t*-test was also run to test the hypothesis that threat words were more anxiety provoking compared to control words.

Results

Descriptive Statistics

Table 2 provides a summary of the means and standard deviations for the measures of social anxiety and depression across the high and low social anxiety conditions. In order to ensure that the HSA and LSA group significantly differed on these measures, independent sample *t*-tests were conducted. These analyses resulted in

Table 2

Social Anxiety and Depression Measures by Social Anxiety Group for Study 1 (N = 35)

	HSA $n = 15$		LSA $n = 20$		*t*	*Alpha*
	M	*SD*	*M*	*SD*		
Mini – SPIN	6.54	1.98	3.12	1.90	4.80**	
SIAS	39.73	10.31	15.10	5.35	9.19**	.94
SPS	26.93	9.97	10.30	5.11	6.44**	.89
BDI	15.33	6.84	8.90	5.69	3.04*	.84

Note. HSA = High Social Anxiety; LSA = Low Social Anxiety; Mini-SPIN = Miniature Social Phobia Interaction Scale; SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; BDI = Beck Depression Inventory

* $p < .05$
** $p < .001$

significant *t*-values, which indicated that participants in the HSA condition differed on social anxiety and depression measures from participants in the LSA condition.

Word Ratings

Participants were instructed to indicate how anxiety provoking they found a list social threat and control words on a 7-point Likert scale ranging from 1 (not at all) to 7 (extremely) anxiety provoking. It was hypothesized that participants high in social anxiety would rate the social threat words as more anxiety provoking, compared to participants low in social anxiety. To assess this, an independent *t*-test was conducted, with the results indicating that HSA participants rated threat words as more anxiety provoking compared to LSA participants ($t_{(33)} = 2.71, p < .05$). An independent *t*-test was also conducted on the control words to examine if participants differed in how anxiety provoking they found neutral words. The groups did not differ in how anxiety provoking they found the control words to be ($t_{(33)} = -1.24, p = .22$). See Table 3. Taken together these results provide validity that our social threat words were more threatening to those who were high in social anxiety than those low in social anxiety.

Anxiety ratings for each word that was presented as T1 are displayed in Table 4, and anxiety ratings for each threat and control word presented as T2 are displayed in Tables 5 and 6, respectively. As denoted by ampersands in Table 5, 18 threat words were added to the word rating list after 24 participants had completed the study. These additional threat words were added to the word rating list because preliminary analysis of threat words revealed that participants did not find some of the original threat words (e.g., dull) to be very anxiety provoking. Thus, the additional words were added so that the words rated the most anxiety provoking could be used as threat word stimuli for Study 2.

Table 3

t-Test Comparing HSA to LSA Groups on Threat and Control Word Ratings for Study 1 (N = 35)

	HSA $n = 15$		LSA $n = 20$		*t*	*p*
	M	*SD*	*M*	*SD*		
Threat Words	4.02	1.39	2.79	1.29	2.71	< .05
Control Words	1.06	0.09	1.26	0.64	-1.24	.22

Note. HSA = High Social Anxiety; LSA = Low Social Anxiety

Table 4

Anxiety Ratings for Target 1 Words for Study 1 (N = 35)

	HSA $n = 15$		LSA $n = 20$	
	M	*SD*	*M*	*SD*
Advertise	1.47	1.06	1.70	1.22
Bargain	1.73	1.22	1.79	1.36
Chin	1.07	0.26	1.25	0.55
Cloud	1.00	0.00	1.00	0.00
Collect	1.67	1.11	1.65	1.04
Consolidate	1.80	1.21	2.15	1.14
Curb	1.33	0.82	1.20	0.41
Dealer	1.87	1.30	1.90	1.07
Decorate	1.40	0.83	1.35	0.81
Dresser	1.20	0.56	1.35	0.88
Dressmaker	1.33	0.82	1.70	1.30
Eagle	1.27	0.80	1.20	0.70
Economical	1.80	1.21	1.90	1.29
Florist	1.00	0.00	1.05	0.22
Fox	1.13	0.35	1.15	0.67
Fragrance	1.23	0.78	1.25	0.44
Garment	1.00	0.00	1.25	0.55
Golf	1.53	1.13	1.05	0.22
Grandfather	1.47	1.55	1.50	1.19
Infer	1.33	0.82	2.00	1.49
Laundry	1.20	0.56	1.35	0.99
Leather	1.07	0.26	1.20	0.52
Lottery	1.13	0.52	1.35	0.67
Pot	1.40	1.12	1.40	0.73
Remedy	1.47	1.55	1.30	0.57
Seize	1.73	1.10	1.75	1.25
Shelter	1.67	1.45	1.15	0.37
Shovel	1.07	0.26	1.15	0.37
Thread	1.07	0.26	1.20	0.52
Towel	1.00	0.00	1.05	0.22
Translator	1.40	0.91	1.25	0.44
Umbrella	1.00	0.00	1.30	0.92

Note. HSA = High Social Anxiety; LSA = Low Social Anxiety

Table 5

Anxiety Ratings for Threat Words for Study 1 (N = 35)

	HSA $n = 15$		LSA $n = 20$	
	M	*SD*	*M*	*SD*
Anxious	5.00	1.85	3.25	1.62
Ashamed	5.13	1.41	3.20	1.51
Awkward	5.20	1.21	3.40	1.60
Boring	2.47	1.77	2.35	1.46
Clumsy*	2.67	1.21	1.75	0.89
Criticized	4.93	2.19	3.35	1.93
Despise*	3.17	1.94	3.88	2.10
Disgraced	4.87	1.19	3.20	1.67
Disgust*	3.83	2.23	2.75	1.49
Disliked*	4.17	1.33	4.63	1.51
Dull	2.27	1.67	1.85	1.14
Dumb	3.60	1.92	2.80	1.79
Embarrassed	5.10	1.44	3.10	1.62
Failure	5.73	1.28	4.30	1.75
Foolish	3.60	1.96	2.55	1.54
Humiliated	4.93	1.58	3.40	1.82
Hurtful*	2.83	1.47	3.13	1.64
Idiot*	3.50	1.38	3.75	1.91
Inadequate*	4.17	1.83	4.13	1.96
Incompetent	4.87	1.81	3.55	1.61
Inept	3.60	2.10	3.00	1.82
Inferior	4.20	2.01	3.25	1.68
Insecure*	3.83	1.72	3.88	1.73
Jittery	3.47	2.13	2.20	1.64
Judged	4.73	1.58	2.95	1.99
Lonely*	3.67	1.21	4.75	1.39
Loser	4.00	2.17	2.75	1.62
Mortified	3.40	2.23	2.55	1.79
Nervous	4.60	1.96	2.85	1.73
Odd	3.13	2.07	2.25	1.41
Outcast*	4.17	1.17	4.13	1.46
Rejected	4.60	1.84	3.60	1.88
Repulsive*	3.83	1.72	3.50	1.41
Ridicule*	3.50	1.76	2.88	1.55
Shaky	3.20	1.47	2.35	1.60
Shunned*	3.00	1.41	3.38	2.26
Shy	3.67	2.16	1.95	1.28
Stammering	2.33	2.02	2.50	2.12
Stupid	3.60	1.99	2.70	1.81

Stutter	3.27	2.09	2.75	2.10
Tense	4.33	2.02	2.45	1.61
Ugly*	3.67	0.82	4.25	2.37
Uneasy	3.93	1.71	2.10	1.12
Unloved*	5.00	1.26	5.50	2.07
Unsuccessful*	4.67	1.21	4.50	1.77
Unworthy*	4.67	1.75	4.13	1.81
Upright	3.53	1.92	2.20	1.36
Weak	3.40	2.20	2.30	1.22
Weird	3.93	2.19	2.20	1.44
Worthless*	4.83	1.72	4.88	1.96

Note. * = Words added (HSA $n = 6$; LSA $n = 8$); HSA = High Social Anxiety; LSA = Low Social Anxiety

Table 6

Anxiety Ratings for Control Words for Study 1 (N = 35)

	HSA $n = 15$		LSA $n = 20$	
	M	*SD*	*M*	*SD*
Apple	1.33	0.62	1.15	0.49
Beans	1.13	0.52	1.15	0.37
Blackberry	1.07	0.26	1.30	0.57
Cabbage	1.13	0.35	1.40	0.88
Carrots	1.13	0.35	1.25	0.72
Cauliflower	1.07	0.26	1.40	0.99
Celery	1.00	0.00	1.30	0.80
Coconut	1.00	0.00	1.15	0.67
Corn	1.00	0.00	1.30	1.13
Cranberries	1.00	0.00	1.15	0.49
Fig	1.07	0.26	1.30	0.92
Fruit	1.20	0.77	1.20	0.70
Grapes	1.07	0.26	1.15	0.49
Lemon	1.00	0.00	1.15	0.49
Lettuce	1.00	0.00	1.20	0.70
Lime	1.00	0.00	1.20	0.62
Melon	1.00	0.00	1.50	1.28
Mushrooms	1.27	0.80	1.30	0.86
Orange	1.00	0.00	1.10	0.31
Parsley	1.00	0.00	1.40	1.10
Pea	1.00	0.00	1.15	0.67
Peaches	1.00	0.00	1.10	0.31
Pear	1.00	0.00	1.25	0.64
Pepper	1.07	0.26	1.15	0.49
Pineapple	1.07	0.26	1.20	0.52
Pumpkin	1.00	0.00	1.25	0.79
Radishes	1.07	0.26	1.35	0.93
Raisins	1.00	0.00	1.45	1.23
Spinach	3.67	2.16	1.35	1.18
Strawberry	1.00	0.00	1.25	0.79
Tomatoes	1.00	0.00	1.35	0.99
Vegetables	1.07	0.26	1.55	1.50

Note. HSA = High Social Anxiety; LSA = Low Social Anxiety

Threat and Control Word Ratings Across Lags 2, 3, and 8

To ensure that words were found to be equally anxiety provoking across the lags that were examined in the current study, a 2 Anxiety (high vs. low) by 3 Lag (2, 3, 8) ANOVA was conducted for both threat and control words. For threat words, a main effect was found for Lag ($F_{(2, 66)} = 10.22, p < .001$), with simple effects tests revealing that threat words at lags 2 ($M = 3.41$, $SD = 1.49$) and 8 ($M = 3.37$, $SD = 1.52$) were significantly more anxiety provoking compared to threat words at lag 3 ($M = 3.07$, $SD = 1.42$). There was no difference between anxiety ratings for threat words at lag 2 compared to threat words at lag 8. An interaction between social anxiety group and lag was also found for threat word ratings ($F_{(2, 66)} = 4.84, p < .01$). Simple effect tests revealed that for participants high in social anxiety, ratings for threat words at lags 2 ($M = 4.24$, $SD = 1.40$) and 8 ($M = 4.08$, $SD = 1.42$) were rated as significantly more anxiety provoking compared to threat words at lag 3 ($M = 3.58$, $SD = 1.52$). No difference was found amongst anxiety provoking ratings for threat words at lags 2, 3, and 8 for participants low in social anxiety. See Figure 8.

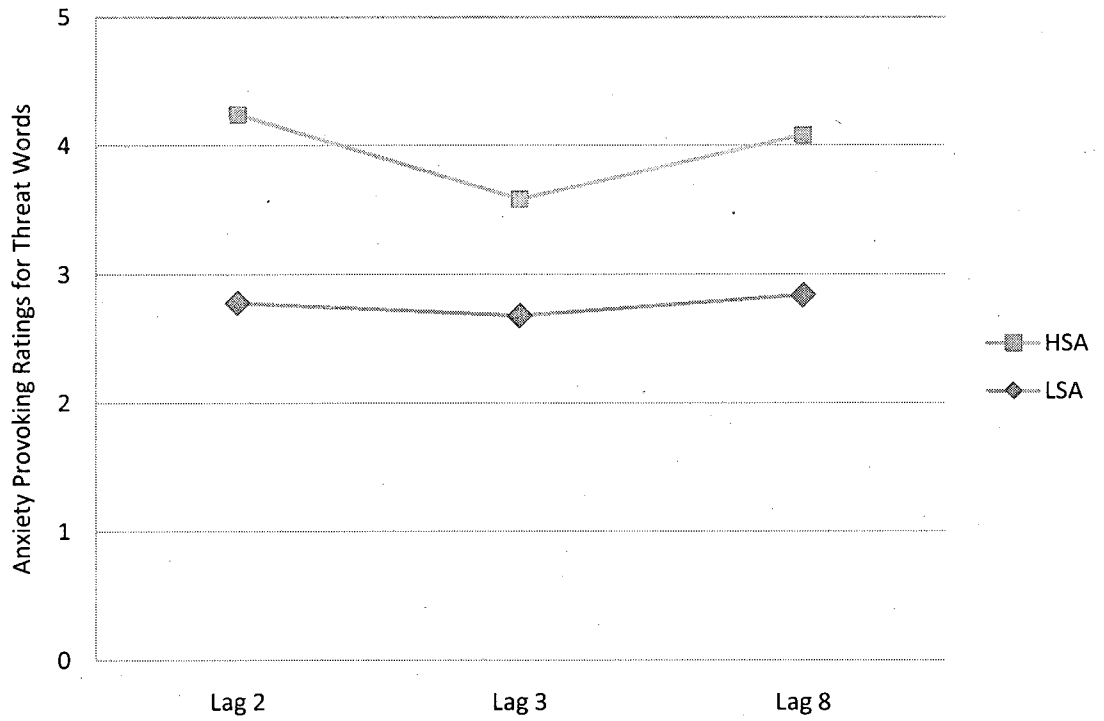
A 2 Anxiety (high vs. low) by 3 Lag (2, 3, 8) ANOVA was also conducted to determine if the control words differed in anxiety provoking ratings across the lags. No significant differences emerged – participants did not differ in how anxiety provoking they found the control words to be at lags 2, 3, or 8.

Overall Accuracy on AB for the Experimental Condition

For the experimental condition, participants were presented with neutral red font stimuli (T1) and a green font word (either a social threat word, or fruit vegetable word; T2). Participants were instructed to pay attention to both the red and green words, and to

Figure 8.

Anxiety Ratings for Threat Words Across the Lags for Participants High vs Low in Social Anxiety



identify them both at the end of each trial. Overall, the accuracy rate for correct identification of T2 across all lags was within expected ranges for both threat ($M = 65.49$, $SD = 15.59$) and control ($M = 74.25$, $SD = 13.72$) words.

Overall Accuracy on the AB for the Control Condition

For the control block condition, participants saw the same stimuli as in the experimental condition; however participants were instructed to only pay attention to the green word (T2). Thus, participants were instructed to ignore the red word (T1), and only pay attention to identifying the green word at the end of each task. To determine if there were any attentional impairments in identifying stimuli, a 2 social anxiety group (high, low) x 2 word (threat, control) ANOVA was performed. A significant main effect of word was found ($F(1, 33) = 23.30$, $p < .001$), with control words having significantly higher accuracy identification rates ($M = 91.25$, $SD = 9.39$) compared to threat words ($M = 84.77$, $SD = 12.38$). Social anxiety was not found to have any impact on identification of words.

Overall, participants had a higher accuracy identification rate for both threat and control words in this control block compared to the experimental block. This was expected given that the control condition is a single task, compared to the more cognitively demanding dual task in the experimental condition.

Hypotheses

Effect of social anxiety on the AB. It was hypothesized that participants with high levels of social anxiety would show an attenuated AB when a threat related word was placed as a second target in a RSVP paradigm compared to when T2 was a control word, and participants low in social anxiety. To assess this, a 2 (condition) x 3 (lag) x 2 (word type)

ANOVA was conducted. Depression has also been found to influence the attentional bias in social anxiety. Musa et al. (2003) found that social phobic patients with comorobid depression showed an avoidance of social threat words. When Musa and colleagues removed these patients from their analyses a hypervigilance specific for social threat words emerged. Given the findings that depression can alter the attentional bias in social phobia, it was used as a covariate. The BDI was used as a covariate and was not found to be significant, and thus, was eliminated for subsequent analyses. Anxiety level ratings across the lags was also used as a covariate, given that analyses revealed participants found threat words at lags 2 and 8 to be significantly more anxiety provoking compared to threat words at lag 3. Anxiety level ratings were not found to be significant covariates, and thus were not used for subsequent analyses. Descriptive statistics for these variables are presented in Table 7, and are graphed in Figure 9. The hypothesized three-way interaction among condition, lag, and word type was not significant. Main effects were found for lag ($F_{(2, 66)} = 36.80, p < .001$), and word type ($F_{(1, 33)} = 30.20, p < .001$). The main effect for word type revealed that threat words ($M = 65.49$, $SD = 15.59$) had significantly lower accuracy scores compared to control words ($M = 74.25$, $SD = 13.72$), overall. An interaction between lag and word was also found ($F_{(2, 66)} = 7.22, p < .05$). Simple effects tests on lag position revealed that all of the lags significantly differed from each other. Lag 2 had significantly lower accuracy compared to accuracy at lag 3 ($t_{(34)} = -6.40, p < .001$), and at lag 8 ($t_{(34)} = -8.33, p < .001$). Lag 3 also had significantly lower accuracy compared to accuracy at lag 8 ($t_{(34)} = -2.27, p = .03$). See Table 8 for descriptive statistics.

Table 7

Mean Accuracy Scores for HSA and LSA Participants for Threat and Control Words at the Different Lags for Study 1 (N = 35)

	HSA $n = 15$		LSA $n = 20$	
	M	*SD*	*M*	*SD*
Threat at Lag 2	50.40	24.61	48.45	20.08
Control at Lag 2	43.80	23.41	54.45	25.65
Threat at Lag 3	54.20	22.40	66.65	23.78
Control at Lag 3	67.53	19.73	73.60	20.37
Threat at Lag 8	60.20	25.95	61.45	22.89
Control at Lag 8	81.00	21.60	85.15	22.34

Note. HSA = High Social Anxiety; LSA = Low Social Anxiety

Figure 9.

Condition by Lag by Word Type Interaction for the Experimental Block in Study 1

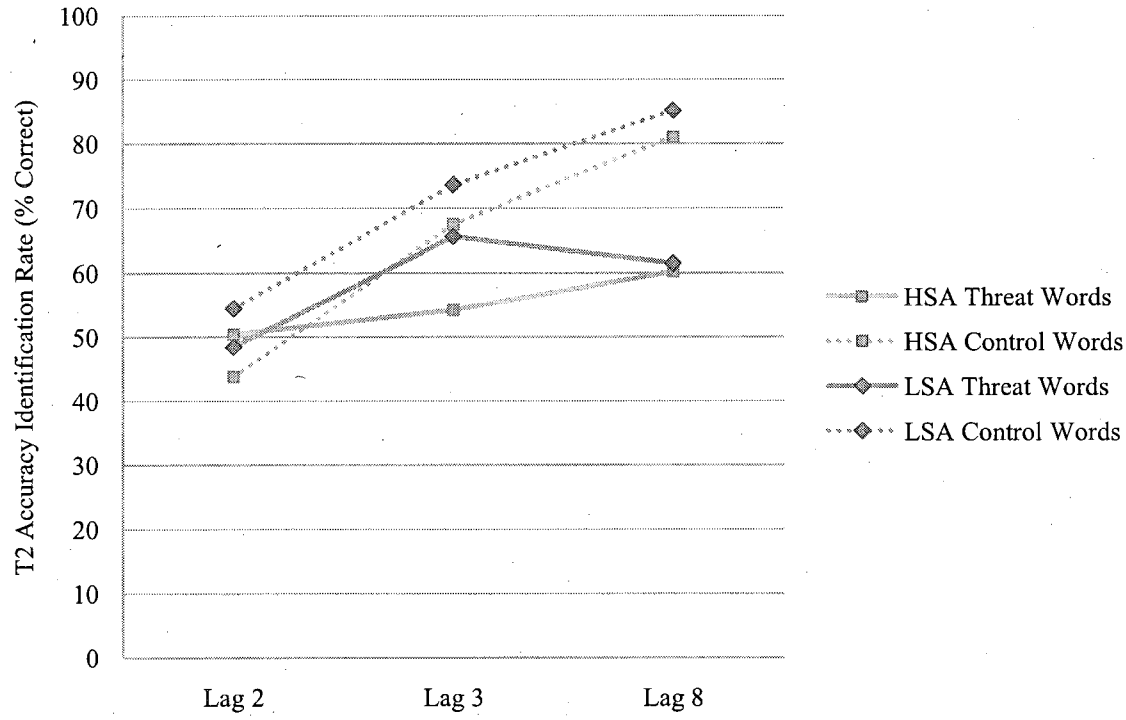


Table 8

Mean Accuracy Scores Across the Different Lags for Study 1 ($N = 35$)

	M	*SD*
Lag 2	49.59[a]	20.99
Lag 3	65.87[b]	17.67
Lag 8	72.14[c]	19.89

Note. Means with differing subscripts are significantly different at the $p < .001$ level

Simple effect tests on the lag by word interaction revealed that there were significant differences for accuracy between threat versus control words at lags 3 ($t_{(34)} = -2.35, p = .03$) and 8 ($t_{(34)} = -8.06, p < .001$), with control words having a significantly higher accuracy identification rate compared to threat words. There was no significant difference between the accuracy identification of threat versus control words at lag 2, ($t_{(34)} = -.17, p = .87$). See Table 9 for descriptive statistics and Figure 10.

Discussion

The purpose of the first study was threefold: first, to examine the effects that socially threatening words have on participants with high or low levels of social anxiety in the AB paradigm; second, to confirm the presence of the AB period; and third, to examine which social threat words participants high in anxiety found to be the most anxiety provoking.

Previous research has found that in an RSVP stream, when T2 is of high relevance to the individual (e.g., their own name), they will show an attenuated AB (Shapiro et al., 1997). Furthermore, emotionally arousing stimuli, such as negative or threatening words, have also been found to cause an attenuated AB (Anderson, 2005; Keil & Ihssen, 2004). Additionally, research on social anxiety and the AB has found support for a hypervigilance towards threat stimuli (Arend & Botella, 2002). Thus, given the previous research on the AB, it was hypothesized that participants with high levels of social anxiety would show an attenuated AB for threat related words compared to control words, and compared to those low in social anxiety. Contrary to what was hypothesized, participants that were high in social anxiety did not show an attenuated AB for threat related words compared to control words, and compared to those low in social anxiety.

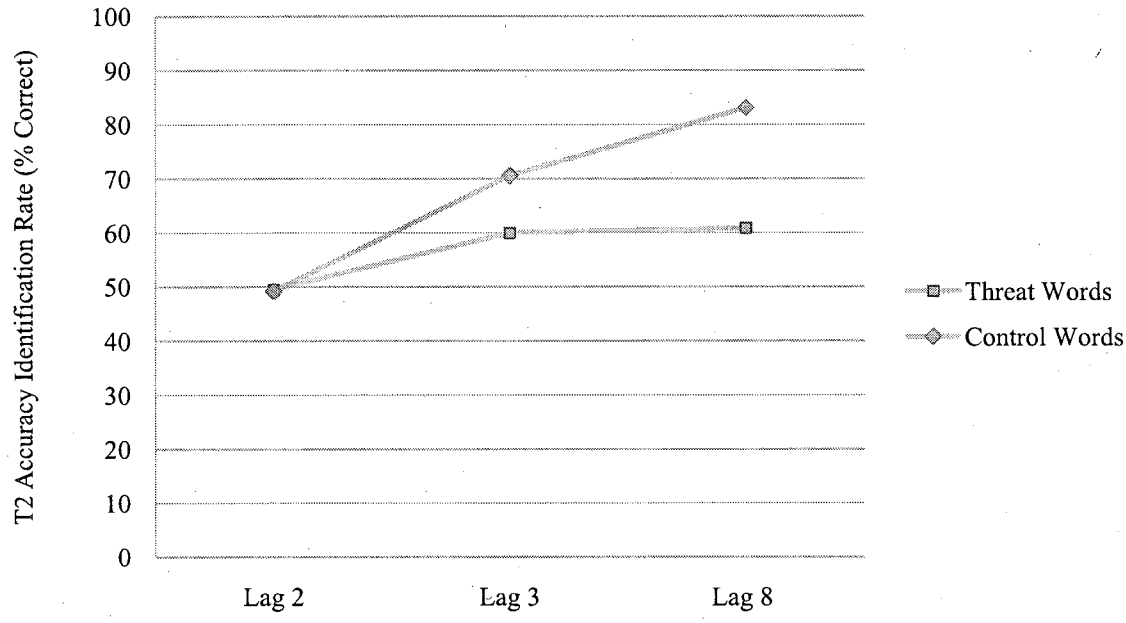
Table 9

Mean Accuracy Scores for Correct T2 Identification for Threat and Control Words Across the Different Lags for Study 1 ($N = 35$)

	Lag 2		Lag 3		Lag 8	
	M	*SD*	*M*	*SD*	*M*	*SD*
Threat Words	49.29	21.81	60.74	23.58	60.91	23.89
Control Words	49.89	24.94	71.00	20.04	83.37	21.80

Figure 10.

Lag by Word Type Interaction for the Correct Identification of T2 for the Experimental Condition of Study 1



Within the framework of attentional biases in social anxiety literature, these results do not appear to be explained by any of the theories of attentional biases, such as hypervigilance or attentional avoidance. Based on this finding, these results do not support a hypervigilance towards threat for high social anxiety participants. If a bias towards threat related words was present, then an attenuated AB for threat words would have been found, but only for socially anxious participants. This finding also goes against previous research done on social anxiety and the AB. Arend and Botella (2002) found an attenuated AB for high trait socially anxious individuals for threat words, compared to neutral words and those low in trait social anxiety. In their study, when T1 was a threat word, participants high in trait social anxiety had an increased accurate identification rate for T2 words compared to neutral words, and those low in trait social anxiety. Thus, it is possible that one reason why the hypothesized results were not found in the present study is due to having the threat words presented as T2, as opposed to being presented at T1 as in Arend and Botella's study. It is possible that target order where the threat stimuli are placed influences whether a hypervigilance bias will be found. It is possible that having a social threat word as T1 leads socially anxious individuals to pay more attention to subsequent items in an RSVP stream because of a hypervigilance towards threat. It is also possible that having a threat word as T1 requires less cognitive processing resources for the social phobic. Thus, in terms of the bottleneck model of the AB proposed by Chun and Potter (1995), the saliency of the threat word for social phobics may require less cognitive processing time, which would then eliminate the metaphorical bottleneck at which T2 is stuck at while consolidation of T1 occurs. If T1 has a faster consolidation

rate because of the saliency, then T2 does not have as long to wait in the 'bottleneck', and is subsequently less vulnerable to decay.

In terms of attentional biases in social anxiety, it is possible that once a socially anxious person perceives a threatening stimulus in their environment, they are more attentive to information in their environment regardless of whether that information is threatening or neutral. However, the length of time that a social phobic remains hypervigilant towards information in their environment remains to be determined. It is possible that this hypervigilance only lasts for a small epoch of time, particularly if another threat in the environment is not detected.

A second unexpected finding was that there were significant differences in correct responses to the word type, although not in the hypothesized direction. It was hypothesized that overall, participants would have a higher identification rate for threat words compared to control words, because threat words are emotionally arousing, and previous research has found that emotionally arousing stimuli are preferentially selected from the temporal stream (Anderson, 2005). However, control words had a significantly higher accuracy identification rate in the experimental block compared to threat related words. One potential reason for this may be due to priming. T1 was always a neutral word, and it is possible that the activation of a neutral word primed participants for subsequent neutral words, such as fruit/vegetable words. In support of this notion, Maki et al. (1997) found improved accuracy identification rates for T2 when T1 was strongly associated to T2, suggesting that priming had an effect. However, in regards to the current study, it is unclear how strongly T1 and T2 controls are related. The only semantic category that both word groups would fall under is 'neutral words', and such a

broad categorical grouping may be a bit tenuous to assume priming of T1 produced improved accuracy results for control words.

As an alternative explanation, it is possible that words that are concrete objects require less cognitive processing because they can be visually represented in the mind, and this visual representation is what aids in accuracy identification rates. For example, it is possible that in an RSVP stream, a control word like "Apple" may require less cognitive processing time (i.e., faster processing speeds), and subsequently have higher accuracy identifications rates compared to a non-object, and more abstract concept, such as a threat word like "Loser". Based on this hypothesis, it is then possible that the reason why participants overall had a higher accuracy for the control words is because they are concrete objects, compared to threat words that are abstract concepts.

The second objective of this study was to establish the AB period by having both an experimental and control condition. Because little research has been done on social anxiety and the AB, we thought it was prudent to include a control condition to compare to the experimental on the AB. Consistent with our hypothesis, and previous literature, participants had higher accuracy identification levels for T2 for the control condition compared to the experimental condition. This is consistent with previous AB research (e.g., Raymond et al., 1992) and makes theoretical sense given that in the control condition participants only had to engage in a single task identification compared to the dual-task identification in the experimental condition. Interesting to note, is that participants still had a significantly higher accuracy identification rate for control words, compared to threat words in the control block. This may provide support for the notion that concrete objects are more easily recalled compared to abstract concepts.

The third objective of this study was to ensure that the social threat words that were used as stimuli were found to be more anxiety provoking for the high socially anxious participants compared to the low socially anxious participants. Consistent with the hypothesis, it was found that participants who were high in social anxiety rated social threat words to be significantly more anxiety provoking compared to control words, and compared to participants low in social anxiety. This was important because it provided validation that the social threat stimuli were found to be threatening, particularly for participants with high levels of social anxiety.

The word ratings also had a second purpose – to determine which threat words were found to be the most threatening to socially anxious participants to use as stimuli in Study 2. Thus, threat words that were found to have an anxiety level rating of 3 or below were eliminated as threat stimuli for Study 2.

Limitations

One limitation of the current study was the social anxiety screening measure that was used. Although previous research has found the psychometric properties of the Mini-SPIN to be adequate (Weeks et al., 2007), the psychometric properties have only been assessed on clinical populations of social phobics, and not non-clinical undergraduate samples as was used in the present study. The fact that several participants switched conditions (e.g., the Mini-SPIN identified them as low in social anxiety, but their social anxiety in-lab scores revealed them to be highly socially anxious) may suggest that this measure is not as appropriate for the screening of social anxiety in a non-clinical population, compared to a clinical population. A better method to deal with screening issues would be to only include participants who met criteria on both the prescreen and in

lab measures of social anxiety. However, this approach was not feasible given the low sample size. Another limitation related to the Mini-SPIN was that only the total score on the Mini-SPIN was recorded during recruitment. Individual answers for each of the three questions were not recorded. Thus, Cronbach's alpha could not be assessed, which would have been useful in determining the reliability of the Mini-SPIN in the current sample

A second limitation was some of the words that were used at lags 6 and 8. These words had consistent low accuracy scores across anxiety conditions, and were commonly misinterpreted as other similarly spelt words (e.g., the threat word 'uptight' was commonly misinterpreted as 'upright'). Thus, these words reduced the accuracy at lag 8 for all participants, making the identification rates of T2 at these lags to be lower than what would have been expected. Thus, these commonly misinterpreted words were eliminated as target words for Study 2.

A third limitation of this study was that there were differences across the lags in terms of anxiety provoking ratings for threat words. All word stimuli were randomly distributed across the lags, therefore it was merely by chance that threat words that were found to be less anxiety provoking ended up at lag 3. However, this limitation did not appear to have any impact on the assessment of the AB, given that anxiety provoking ratings did not influence the magnitude of the AB. Unfortunately, the examination of anxiety levels across the lags was not run prior to the data collection for Study 2. However, two of the words that happened to be in Lag 3 ('boring', and 'dull') received low anxiety level ratings, and thus were replaced for Study 2.

Despite the fact that the results were not in the hypothesized direction for Study 1, for Study 2 it was still hypothesized that rumination may have some impact on the

attentional bias. Specifically, it was hypothesized that rumination would lead a socially anxious individual to have a hypervigilance towards threat related words in the environment. Thus, Study 2 sought to examine the potential relation between rumination and attentional biases in those with high, and low, levels of social anxiety.

Study #2: The Effect of Rumination on the Attentional Blink

The purpose of study 2 was to investigate the effects of rumination on attentional biases in those with high and low levels of social anxiety in an attentional blink paradigm. Specifically, the study examined whether or not rumination led to a more heightened awareness of threat related stimuli in those with high levels of social anxiety. Three main hypotheses were tested. First, it was hypothesized that participants high in social anxiety would have higher levels of distress resulting from the impromptu speech task compared to those low in social anxiety. Second, it was hypothesized that participants high in social anxiety would ruminate more than participants low in social anxiety, and that those high in social anxiety and in the rumination condition would ruminate the most. Third, it was hypothesized that participants high in social anxiety and in the rumination condition would show an attenuated AB when T2 was a social threat word, compared to participants high in social anxiety and in the distraction condition, and compared to participants low in social anxiety in either the rumination or distraction condition.

Method

Participants

Undergraduate students at WLU were recruited for this study based on their online SIAS mass testing scores through WLU's Psychology Research Experience

Program (PREP). Out of all of the participants who completed the mass testing SIAS questionnaire, participants that scored in the top-third, and bottom-third on the SIAS were eligible to participate in the current study, provided they had not participated in Study 1. Based on a sample of 589 participants in mass testing, the cutoff score on the SIAS for the high social anxiety group was 31 and above, and the cutoff score on the SIAS for the low social anxiety group was 18 and below. Participants who met either of these prescreening requirements were invited into the lab to participate in the study. Eighty-one participants completed the in lab study, however, data from 15 people were excluded from analyses because their in lab scores on the SIAS either fell below a score of 31, or above a score of 18. Thus, to be included in the analyses participants had to meet a score for high, or low, social anxiety consistently at both testing times. The following analyses are based on a sample of 66 participants – 32 high in social anxiety, and 34 low in social anxiety.

Upon entering the lab, participants were randomly assigned to either a rumination or distraction manipulation condition by the researcher drawing a slip of paper out of an envelope. Participants' ages ranged from 17 to 39, and the majority of participants reported their ethnicity as Caucasian. See Table 10 for demographic information. As compensation for participating in the study, participants received one credit towards their course.

Baseline Measures

Demographic questionnaire. A demographic questionnaire was administered to participants, and asked them to provide information about their age, highest level of

Table 10

Demographic Information for Social Anxiety Group by Manipulation Condition for Study 2 (N = 66)

	HSA				LSA			
	Rumination (n = 15)		Distraction (n = 17)		Rumination (n = 19)		Distraction (n = 15)	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Gender								
Female	11	73.3	12	70.6	11	61.1	11	73.3
Male	4	26.7	5	29.4	7	38.9	4	26.7
Marital Status								
Single	15	100.0	16	94.1	18	100.0	12	80.0
Married	0	0.0	0	0.0	0	0.0	2	13.3
Cohabiting	0	0.0	1	5.9	0	0.0	1	6.7
Ethnicity								
White	14	93.3	12	70.6	13	72.2	8	53.3
Asian	1	6.7	2	11.8	2	11.1	3	20.0
Black/African Canadian	0	0.0	0	0.0	0	0.0	3	20.0
Hispanic	0	0.0	0	0.0	0	0.0	1	6.7
Other	0	0.0	3	17.6	3	16.7	0	0.0

Note. Demographic information missing from 1 participant in the LSA Rumination Group.

education, current living situation, marital and occupational status and ethnicity in a closed-ended format (see Appendix C).

Social anxiety. Social anxiety was assessed using the SPS and the SIAS (see Appendices D and E respectively); these measures were described in detail in Study 1.

Depression. Depression was assessed using the BDI (see Appendix F). For details on this measure, please see the description of the BDI in Study 1.

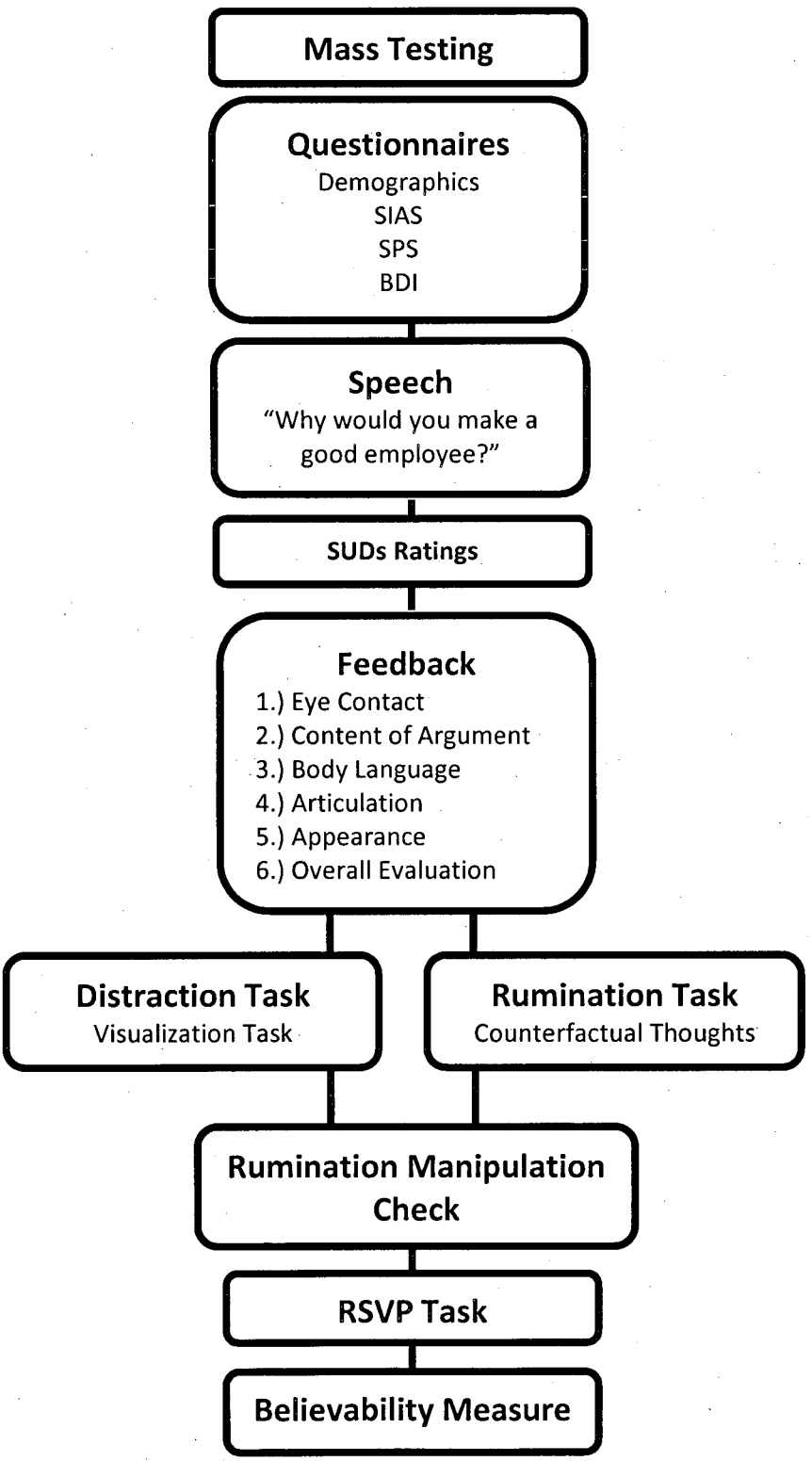
RSVP stimuli. The RSVP task was programmed using the same software and design as described in Study 1, where neutral words were presented in red font as T1, and probe words (either social threat or control words) were presented in green font as T2. A total of 12 stimuli words (5 T2 social threat words, 2 T2 control words, and 5 neutral T1 words) were replaced for Study 2 if the word was commonly misidentified, or if the word had a low anxiety rating in Study 1. As previously mentioned, threat words were replaced if they met at least one of the following criteria: (1) consistent low identification rate among all participants; (2) low anxiety word rating among high social anxiety participants. T2 control words, and T1 neutral words were replaced if they were commonly misidentified by participants (e.g., 'registrar' was commonly mistaken for 'register'), or if the length/frequency of the T2 threat word it was matched with changed.

Procedure

A procedural diagram outlining the main steps for Study 2 is presented in Figure 11. Participants who scored in the upper and bottom-thirds on mass testing were invited to participate in the current study, and were run individually with one experimenter in the laboratory with them. Upon arrival at the lab, participants first completed the informed consent (see Appendix I), which outlined the important aspects of the current study, and

Figure 11.

Procedural Diagram for Study 2.



were then given a questionnaire package, which included the demographic questionnaire, the SPS, the SIAS, and the BDI.

Speech task and feedback. After completion of the questionnaire packages participants were asked to give their subjective unit of distress (SUDs) rating, which measured anxiety/distress levels on a visual scale ranging from 0 to 100 (see Appendix P). Participants were then instructed to give a 5 minute impromptu speech in front of the research assistant on reasons why they would make a good employee. Participants were given the following instructions:

> You will now give a short speech. Please stand on the square on the floor while you speak. I would like you to talk for a full 5 minutes. If you run out of things to say, feel free to repeat things you've already said. It is important that you continue to talk for the full 5 minutes. The topic is "why would you make a good employee", and I would like you to come up with as many reasons as possible.

Participants were then immediately asked to stand and deliver their speech to the experimenter. Immediately following the speech task, participants were asked again to give their SUDs rating for the level of anxiety/distress they experienced giving the speech, during the speech, and after the speech was over. The experimenter then provided participants with standardized negative feedback (see Appendix K). The standardized feedback was modified based on the standardized feedback given by Morgan and Banerjee (2008) to socially anxious participants following an impromptu speech task. There were six categories on the speech feedback form: eye contact, content of argument, body language, articulation, appearance, and overall evaluation. Every participant

received the same feedback despite the quality of the speech they gave. Upon receiving their feedback, participants were asked to review it for 5 minutes. Next, participants were given either a distraction or rumination task to complete for the following 10 minutes (see Appendices L and M, respectively).

Distraction condition. Participants assigned to the distraction condition engaged in the same distraction manipulation done by Morrison and O'Connor (2008), which was initially developed by Nolen-Hoeksema and Morrow (1993). During this task participants were instructed to visualize and concentrate on a series of 45 items in a 10 minute period. The objects that participants visualized and concentrated on were externally focused away from the self, symptoms, and emotions. An example of an object would be: "Think about: raindrops sliding down a window pane".

Rumination condition. Participants assigned to the rumination condition were asked to list any concerns they had prior, during, or after the speech. They were also asked questions that had them focusing on counterfactual thoughts, as previous research has shown that socially anxious individuals report more counterfactual thoughts following socially distressing events compared to less anxious individuals (Kocovski et al., 2005).

Rumination manipulation check. Following the distraction or rumination condition participants were given a 5-item Rumination Questionnaire (RQ; Mellings & Alden, 2000; see Appendix N) that assessed the degree to which they had ruminated on the negative feedback given to them on the speech task. Cronbach's alpha was found to be .70 for the total score on this measure (Mellings & Alden, 2000). On this rumination

measure participants were asked to rate how accurately the statement reflected their experience on a 5-point Likert scale ranging from 1 (never true) to 5 (very often).

RSVP task. After the rumination questionnaire participants completed the RSVP task. For a list of target and probe words used in the RSVP task, see Figure 12. This RSVP task followed a similar procedure that was described in Study 1, with the exception of participants completing the control condition. Thus, participants were only run on the experimental RSVP condition, which asked them to report both the red and green words they saw. Following the RSVP task, participants were asked to fill out a believability measure (Appendix O), in order to assess how believable they found the standardized feedback that was given to them.

Believability measure. Following the RSVP task, participants were asked to fill out a believability measure (Appendix O), in order to assess how believable they found the standardized feedback that was given to them. Participants were instructed to rate on a 5-point Likert, scale ranging from 1 (strongly disagree) to 5 (strongly agree), on the extent to which they agreed with the researcher's opinion of them on the following categories: eye contact; content of argument; body language; articulation; appearance; overall performance score.

Impression of researcher measure. Participants then filled out an end of study questionnaire (Appendix Q) that assessed the overall impression participants had of the researcher. Participants were asked to indicate the extent that they agreed with the statements of 6 items (e.g., "The researcher gave me the impression that he/she did not like me") on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Figure 12.

Word Pairings of RSVP Stimuli for Study 2

Target Words		Probe Words	
		Threat	Control
address	collect	anxious	pumpkin
journal	bargain	ashamed	parsley
created	laundry	awkward	peaches
sidewalks	**adventure**	**worthless**	**tangerine**
television	dressmaker	criticized	strawberry
registrar	fragrance	disgraced	mushrooms
nearness	**comedian**	**unworthy**	**honeydew**
test	curb	dumb	lime
maintenance	grandfather	embarrassed	cranberries
quarter	shelter	failure	lettuce
contact	garment	foolish	cabbage
population	economical	humiliated	vegetables
researching	consolidate	incompetent	cauliflower
think	towel	inept	apple
vacation	umbrella	inferior	radishes
videos	thread	judged	grapes
confirm	lottery	jittery	coconut
media	infer	loser	melon
determine	advertise	mortified	pineapple
program	leather	nervous	spinach
sun	pot	odd	pea
swimming	decorate	rejected	tomatoes
relay	eagle	**idiot**	lemon
cat	fox	shy	fig
everything	translator	**inadequate**	blackberry
intern	dealer	stupid	pepper
imagine	dresser	stutter	carrots
sweet	cloud	tense	fruit
finish	remedy	uneasy	celery
options	florist	**disgust**	raisins
news	golf	weak	corn
event	seize	weird	beans

Note. Words that are denoted with a bold typeface were the modified words added for Study 2

Debriefing. At the end of the study participants were given a debriefing form (see Appendix R), as well as given process debriefing. Ross, Lepper, and Hubbard (1975) discovered that participants that were given erroneous feedback and given a debriefing form stating the feedback was predetermined still evaluated their performance and abilities as negative. Ross and colleagues noticed that this perseverance survived the debriefing period even when participants explicitly stated that they understood the feedback was false. However, when participants underwent process debriefing, perseverance was eliminated. Ross and colleagues explain that process debriefing is where the researcher discusses the possibility with participants that negative beliefs about the self due to the erroneous feedback can still survive despite knowing that the feedback was false. Thus, due to these findings by Ross and colleagues, for this second study, participants all underwent process debriefing facilitated by the researcher.

Data Analysis

Manipulation checks were performed on rumination, believability of speech feedback, and impression of researcher. Three main hypotheses were also tested. First, it was hypothesized that participants high in social anxiety would have higher levels of distress resulting from the impromptu speech task compared to those low in social anxiety. To assess if there were any differences amongst the groups on levels of distress, a repeated measures 2 Anxiety (high vs. low socially anxious) X 3 SUDs Timing (first vs. second vs. third SUDs ratings) X 2 Manipulation (distraction vs. rumination) ANOVA was performed. Second, it was hypothesized that participants high in social anxiety would ruminate more than participants low in social anxiety, and that those high in social anxiety and in the rumination condition would ruminate the most. To assess the degree of

rumination between the anxiety groups and manipulation conditions, a 2 Anxiety (high vs. low socially anxious) x 2 Manipulation (rumination vs. distraction). A rumination score was assessed based on the average a participant scored on the RQ. Last, it was hypothesized that participants high in social anxiety and in the rumination condition would show an attenuated AB for threat related words, compared to those in the distraction task, and those low in social anxiety. To assess this, a repeated measures 2 Word (threat vs. control) X 3 Lag (2 vs. 3 vs. 8) X 2 Anxiety (high vs. low socially anxious) X 2 Manipulation (distraction vs. rumination) ANOVA was performed.

Results

Descriptive Statistics

Table 11 provides a summary of the means and standard deviations for the measures of social anxiety and depression across the high and low social anxiety conditions, as well as the rumination and distraction conditions. A 2 (social anxiety) x 2 (manipulation condition) between subjects ANOVA was conducted to examine if participants differed on social anxiety and depression measures in the rumination versus distraction conditions. Participants high in social anxiety in the rumination group did not differ on measures of social anxiety or depression from those high in social anxiety in the distraction group. Similarly, participants low in social anxiety in the rumination group did not differ on social anxiety or depression measures from those low in social anxiety and in the distraction group. However, the high social anxiety group had significantly higher scores on the SIAS ($F_{(1,62)} = 358.17, p < .001$), SPS ($F_{(1,62)} = 80.70, p < .001$), and BDI ($F_{(1,62)} = 18.11, p < .001$) compared to participants in the low social anxiety group. Taken together these findings provide support that the high social anxiety group was

Table 11

Social Anxiety and Depression Measures for Social Anxiety Group by Manipulation Condition for Study 2 (N = 66)

	HSA				LSA			
	Rumination $n = 15$		Distraction $n = 17$		Rumination $n = 19$		Distraction $n = 15$	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
SIAS	45.13	10.43	47.91	9.05	11.17	4.05	10.53	4.89
SPS	32.87	17.15	34.39	12.89	9.37	4.95	8.40	6.93
BDI	16.67	10.13	17.00	7.07	9.11	5.29	9.13	6.48

Note. HSA = High Social Anxiety; LSA = Low Social Anxiety; SIAS = Social Interaction Anxiety Scale; SPS = Social Phobia Scale; BDI = Beck Depression Inventory

significantly higher in levels of social anxiety and depression compared to the low social anxiety group. Furthermore, these findings provide support that random assignment within the social anxiety groups to either the rumination or distraction conditions was successful.

Manipulation Checks

Believability. Measures of believability were assessed out of the concern that participants high in social anxiety would be more likely to believe the negative feedback compared to participants low in social anxiety. Thus, believability of speech feedback was assessed to ensure that any differences that may be found between the social anxiety conditions would be due to the level of social anxiety, and not as a result of believability.

To assess if there were any differences in believability on speech feedback between the social anxiety groups, and manipulation conditions, an average of the believability measure for each category (eye contact, content of argument, body language, articulation, appearance, and overall performance score) was taken, and a 2 Anxiety (high vs. low) x 2 Manipulation (rumination vs. distraction) was conducted. A main effect of social anxiety was found ($F_{(1, 61)} = 13.20, p < .001$), with simple effects tests revealing that participants high in social anxiety rated the speech feedback to be more believable ($M = 3.99$, $SD = .53$) than participants low in social anxiety ($M = 3.52$, $SD = .93$), $t_{(62)} = 2.45, p < .05$. A main effect was also found for manipulation condition ($F_{(1, 61)} = 5.85, p < .05$), with simple effects tests revealing that there was a trend for participants in the rumination condition to rate the speech feedback as more believable ($M = 3.87$, $SD = .74$) than participants in the distraction condition ($M = 3.61$, $SD = .84$), $t_{(62)} = 1.32, p = .19$. A significant interaction between social anxiety group and

manipulation condition was also found ($F_{(1, 61)} = 4.39, p < .05$), see Figure 13. Simple effects reveal that participants low in social anxiety and in the rumination condition believed the feedback ($M = 3.78$, $SD = 1.11$) significantly more than participants low in social anxiety and in the distraction condition ($M = 2.73$, $SD = 1.10$), $t_{(31)} = 2.01, p < .05$. However, no significant difference was found between believability ratings for participants high in social anxiety and in the rumination condition ($M = 4.13$, $SD = .64$) compared to the distraction condition ($M = 4.06$, $SD = .75$).

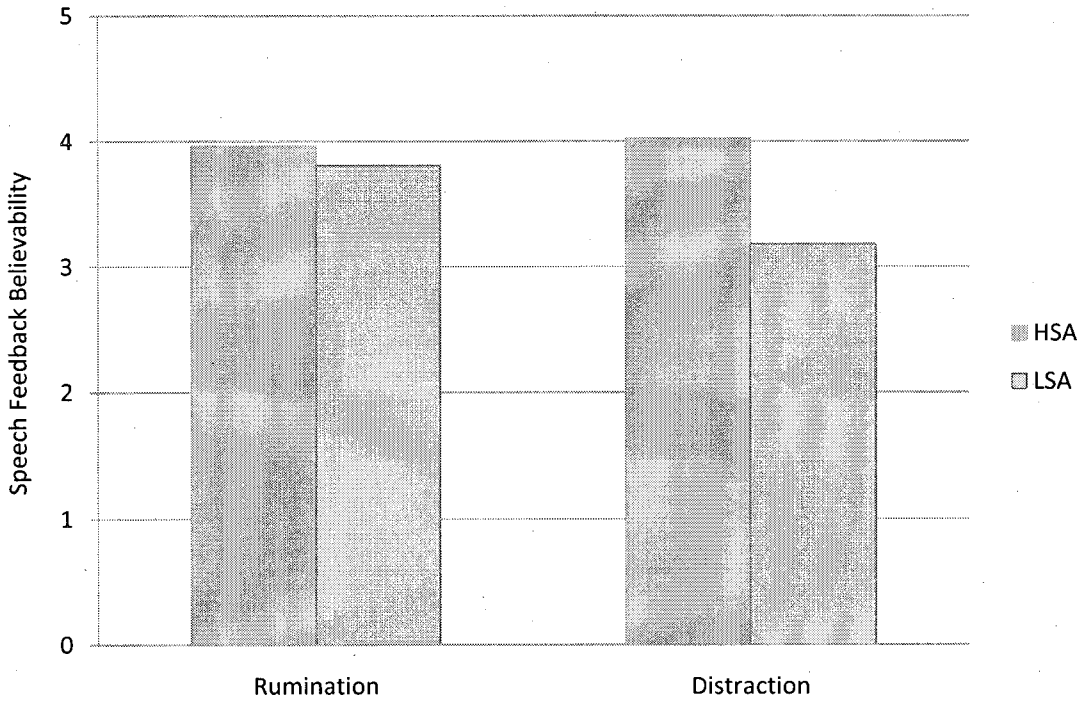
Impression of researcher. The impressions that participants had of the researcher were assessed to determine if the researcher behaved consistently towards all participants. Items C, E, and F were reverse coded, and the average of the 6 items was assessed. A 2 (social anxiety) x 2 (manipulation condition) ANOVA was conducted to determine if participants differed in their overall impressions of the researcher across social anxiety groups and manipulation conditions. A trend for social anxiety condition was found ($F_{(1,62)} = 3.31, p = .07$), with participants high in social anxiety having a slightly less favourable opinion of the researcher ($M = 4.19$, $SD = .09$) compared to participants low in social anxiety ($M = 4.42$, $SD = .09$).

Hypotheses

1. Distress levels. It was hypothesized that participants high in social anxiety would have higher levels of distress resulting from the impromptu speech task compared to those low in social anxiety. To assess if there were any differences amongst the groups on levels of distress, a repeated measures 2 Anxiety (high vs. low socially anxious) X 3 SUDs Time (first vs. second vs. third SUDs ratings) X 2 Manipulation (distraction vs. rumination) ANOVA was performed. A main effect of timing was found for distress ($F_{(2,}$

Figure 13.

Social Anxiety Level by Manipulation Condition on Speech Feedback Believability Ratings



$_{124)} = 39.52, p < .001$), with simple effect tests revealing a significant peak in distress during the speech compared to distress levels before ($t_{(65)} = 6.82, p < .001$) and after ($t_{(65)} = 8.39, p < .001$) the task. Participants did not differ significantly on their levels of distress before compared to after the speech task. See Table 12.

A main effect was also found for social anxiety ($F_{(1,62)} = 38.35, p < .001$), with participants high in social anxiety reporting significantly more distress overall ($M = 54.12$, $SD = 3.04$) compared to those low in social anxiety ($M = 27.85$, $SD = 2.96$).

A significant 3-way interaction among distress, social anxiety level, and manipulation was found (see Figure 14). Simple effect tests revealed that participants high in social anxiety, and in the rumination condition, experienced significantly greater levels of distress prior to the speech task compared to participants high in social anxiety and in the distraction condition ($t_{(30)} = 2.15, p < .05$). Simple effects also revealed that participants low in social anxiety, and in the distraction group experienced significantly higher levels of distress before the speech, compared to participants low in social anxiety in the rumination condition ($t_{(32)} = 2.97, p < .05$). Taken together, these findings suggest that random assignment into the different manipulation conditions (rumination vs. distraction) did not work in terms of levels of distress, as participants significantly differed on their measures of distress prior to receiving the rumination or distraction manipulation.

2. Rumination. Rumination was measured using the 5-item RQ measure where participants were asked to rate how accurately the statement reflected their experience on a 5-point Likert scale ranging from 1 (never true) to 5 (very often). Cronbach's alpha on the RQ for the current sample was excellent, with a score of .92. In order to assess if the

Table 12

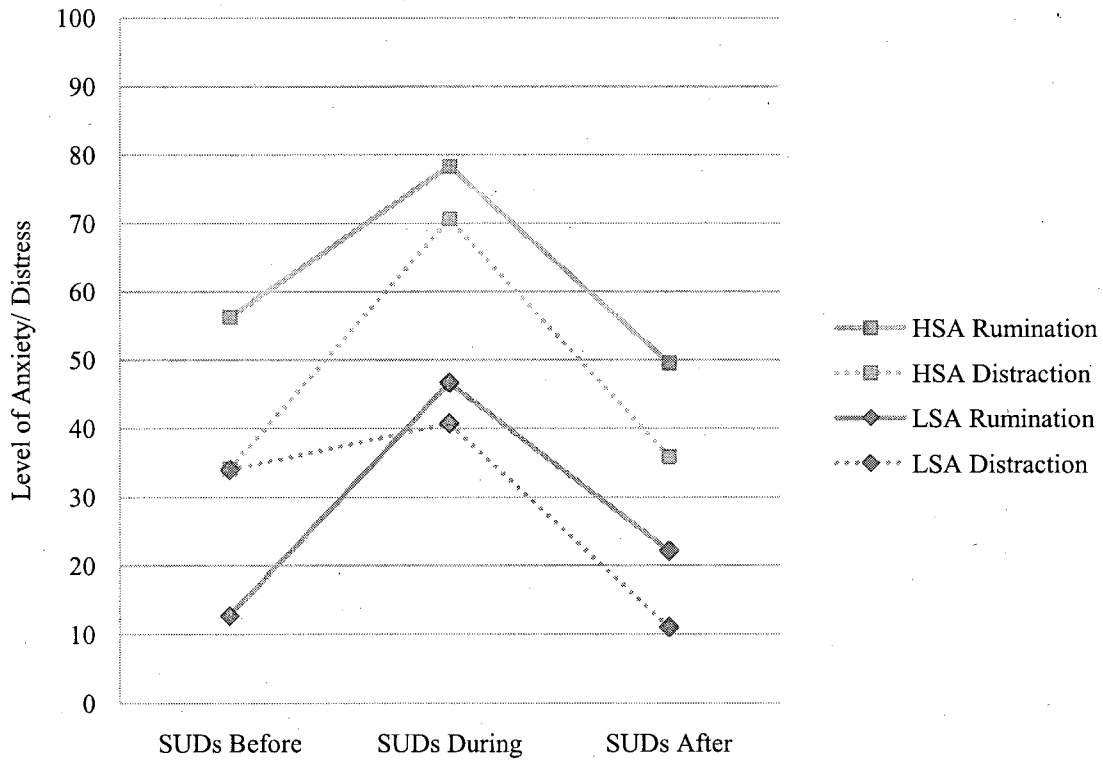
Mean SUDs Scores for Before, During, and After the Impromptu Speech Task for Study 2 (N = 66)

	Before Speech	During Speech	After Speech
M	34.27^{a}	59.05^{b}	29.64^{a}
SD	3.11	2.83	2.91

Note. Means with differing subscripts are significantly different at $p < .001$

Figure 14.

Social Anxiety Level by Manipulation Condition on SUDs as Rated Before, During, and After the Impromptu Speech



rumination manipulation was successful and if social anxiety group had any impact on rumination, a 2 Anxiety (high vs. low) x 2 Manipulation (rumination vs. distraction) ANOVA was conducted. Given that previous research has found that participants high in social anxiety ruminate more than participants low in social anxiety (Edwards et al., 2003), it was hypothesized that overall, participants who were high in social anxiety would ruminate more than participants low in social anxiety, regardless of their manipulation (rumination vs. distraction) condition. Main effects were found for anxiety group ($F_{(1, 62)} = 7.91, p < .01$), and manipulation condition ($F_{(1, 62)} = 54.85, p < .001$). Simple effects tests for the main effect of anxiety group found that there was a slight trend ($t_{(64)} = 1.61, p = .11$) for participants high in social anxiety to ruminate more ($M = 2.46$, $SD = 1.23$) than participants low in social anxiety ($M = 1.99$, $SD = 1.13$). However, when participants high in social anxiety in the rumination condition were compared to participants low in social anxiety in the rumination condition on the measure of rumination, a significant difference emerged ($t_{(32)} = 3.09, p < .05$). Participants high in social anxiety in the rumination condition had significantly higher rumination scores ($M = 3.37$, $SD = .59$) compared to participants low in social anxiety in the rumination condition ($M = 2.64$, $SD = .75$). Simple effects tests for the main effect of manipulation condition revealed that participants in the rumination condition ($M = 2.96$, $SD = 0.77$) reported significantly higher rumination levels ($t_{(64)} = 6.84, p < .001$) compared to participants in the distraction condition ($M = 1.42$, $SD = 1.05$). This finding suggests that the rumination manipulation was successful, given that participants in the rumination condition reported significantly higher levels of dwelling on negative aspects of their speech performance compared to participants in the distraction condition.

3. Attenuated AB for threat words for HSA rumination condition participants. It was hypothesized that participants high in social anxiety and in the rumination condition would show an attenuated AB for threat related words, compared to those in the distraction task, and those low in social anxiety. To assess this, a repeated measures 2 Word (threat vs. control) X 3 Lag (2 vs. 3 vs. 8) X 2 Anxiety (high vs. low socially anxious) X 2 Manipulation (distraction vs. rumination) ANOVA was performed. See Table 13. The BDI was used as a covariate and was not found to be significant, and thus, was eliminated for subsequent analyses. Further, given that previous analyses found significant differences in levels of distress prior to giving the impromptu speech, SUDs levels prior to giving the speech were also used as a covariate. However, this variable was also not found to be significant, and was eliminated for subsequent analyses.

Main effects were found for word ($F_{(1, 62)} = 47.26, p < .001$), and lag position ($F_{(2, 124)} = 160.21, p < .001$). Interactions between word and lag ($F_{(2,124)} = 23.92, p < .001$), and word by social anxiety condition ($F_{(1,124)} = 5.61, p < .05$) were also found.

The main effect of word ($t_{(65)} = 6.85, p < .001$) revealed a higher accuracy rate for control words ($M = 52.30$, $SD = 20.99$) compared to threat words ($M = 42.11$, $SD = 22.83$). Simple effects tests for the main effect for lag revealed that lag 2 had significantly lower accuracy compared to lags 3 ($t_{(65)} = -4.87, p < .001$) and 8 ($t_{(65)} = -14.76, p < .001$), and that lag 3 had significantly lower accuracy compared to lag 8 ($t_{(65)} = -15.17, p < .001$).

Simple effects tests on the word by lag interaction revealed that threat words at lag 3 ($M = 32.74$, $SD = 23.34$) had significantly lower accuracy compared to control words at lag 3 ($M = 50.01$, $SD = 26.06$), $t_{(65)} = -6.44, p < .001$. Similarly, threat words at

Table 13

Mean Accuracy Scores for 2 Word (threat vs. control) X 3 Lag (2 vs. 3 vs. 8) X 2 Anxiety (high vs. low socially anxious) X 2 Manipulation (distraction vs. rumination) ANOVA (N = 66)

		HSA				LSA			
		Rumination (n = 15)		Distraction (n = 17)		Rumination (n = 19)		Distraction (n = 15)	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Lag 2									
	Threat Words	30.20	28.02	37.18	31.02	36.32	32.39	27.40	27.94
	Control Words	17.67	17.69	29.29	26.68	38.00	32.47	30.26	23.29
Lag 3									
	Threat Words	38.13	25.67	30.35	24.18	33.95	23.42	28.53	20.93
	Control Words	45.47	27.23	52.29	26.22	56.47	22.29	43.80	29.32
Lag 8									
	Threat Words	58.67	23.01	62.82	22.90	64.05	27.25	57.73	27.85
	Control Words	76.00	22.41	76.71	21.55	86.37	17.56	75.27	29.67

Note. HSA = High Social Anxiety; LSA = Low Social Anxiety

lag 8 (M = 60.82, SD = 24.96) had significantly lower accuracy compared to control words at lag 8 (M = 79.00, SD = 22.66), $t_{(65)}$ = -6.57, $p < .001$. There was also a trend for threat words at lag 2 to have a higher accuracy compared to control words at lag 2 ($t_{(65)}$ = 1.71, p = .09). See Figure 15.

Simple effects tests on the word by social anxiety condition interaction revealed that there were no significant differences for threat word accuracy ($t_{(64)}$ = .21, p = .83) between participants high in social anxiety (M = 42.93, SD = 21.86), and participants low in social anxiety (M = 41.74, SD = 24.02). Similarly, there were no significant differences for control control words ($t_{(64)}$ = -1.14, p = .26) between participants high in social anxiety (M = 49.77, SD = 19.62) and participants low in social anxiety (M = 55.65, SD = 22.12). However, what appears to be driving this interaction is a modest impairment for the low socially anxious participants to accurately identify threat words in comparison to control words. In comparison, participants high in social anxiety do not seem to suffer as much impairment in accurately identifying threat words in relation to control words. See Figure 16.

Discussion

Overall, the purpose of this second study was to examine the effect that rumination might have on the attentional bias in those with high or low levels of social anxiety in an AB paradigm. It was hypothesized that participants high in social anxiety and in the rumination condition would show an attenuated AB when T2 was a threat related word, compared to those high in social anxiety and in the distraction condition, and participants low in social anxiety in both the distraction and rumination conditions. Contrary to the hypothesis, participants who were high in social anxiety and in the

Figure 15.

Lag by Word Interaction for the Correct Identification of T2 for Study 2

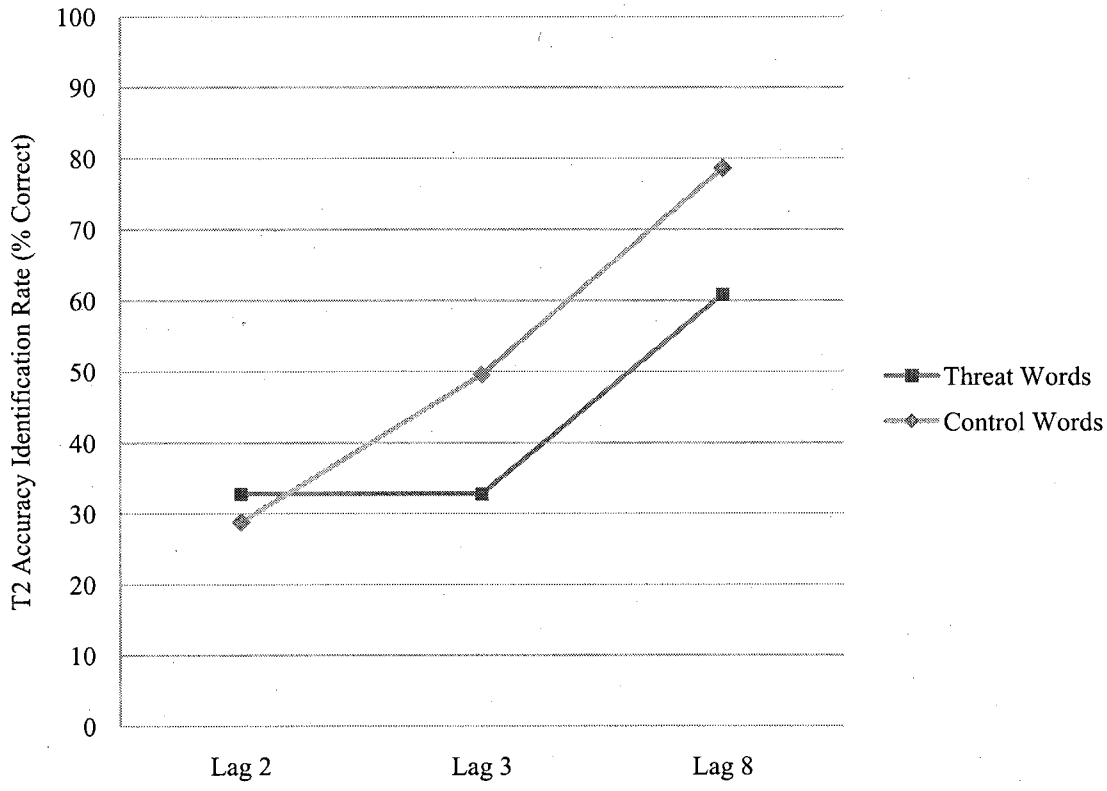
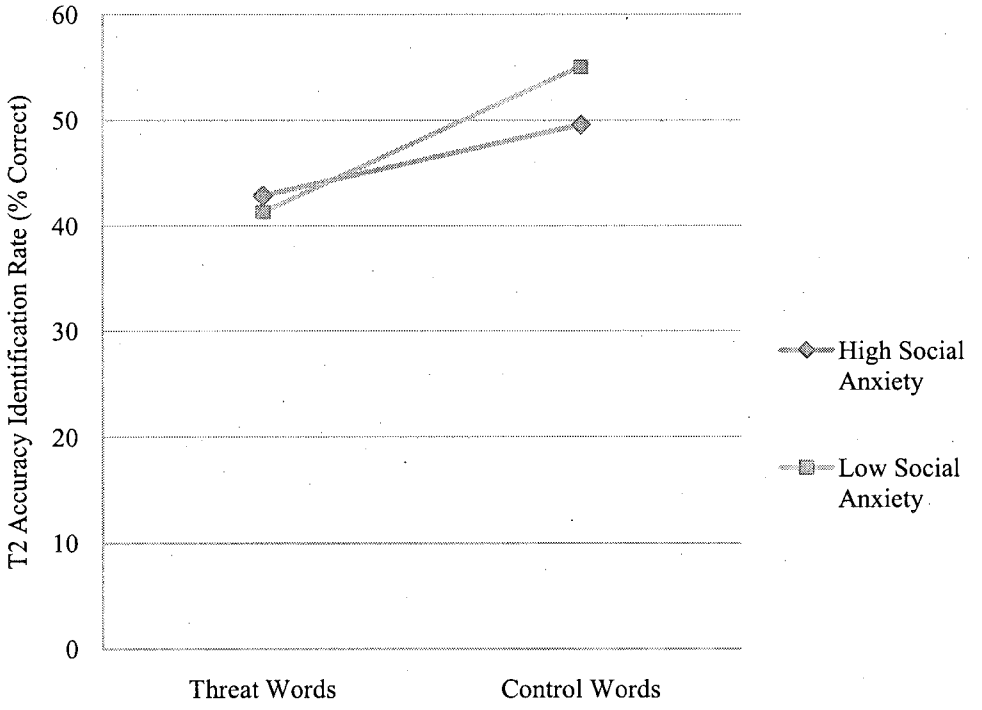


Figure 16.

Word by Social Anxiety Condition Interaction for the Correct Identification of T2 for Study 2



rumination condition did not show an attenuated AB for threat related stimuli. In fact, consistent with findings from Study 1, participants did not show any type of bias towards threat related words. Thus, it appears as though rumination did not have any discernable effect on the attentional bias. One potential reason for this could be because participants were no longer ruminating about their negative speech feedback during the RSVP task. Unfortunately, the degree that participants ruminated during the RSVP task was not assessed; this is discussed further as a limitation of the current study. However, support was found that the manipulation of rumination was successful, as participants in the rumination condition reported significantly higher rumination levels compared to participants in the distraction condition. Furthermore, participants high in social anxiety in the rumination condition were found to ruminate significantly more compared to participants low in social anxiety and in the rumination condition. Thus, the manipulation was successful in that participants were ruminating; however it is unclear as to the degree that rumination persisted during the RSVP task. Alternatively, it is possible that an AB paradigm is not a useful cognitive paradigm that is conducive to assessing attentional biases, particularly when pathological related terms (e.g., social threat words) are placed in a T2 position as opposed to placement as T1.

As in Study 1, control words had a significantly higher accuracy identification rate compared to threat related words. The replication of this finding for control words suggests that the findings from Study 1 were not incidental. As previously theorized in the discussion of Study 1, there may be two potential reasons why control words had higher accuracy identification rates compared to threat words. One reason for this finding may be due to the priming of a neutral T1 – having a neutral T1 may prime participants

for a neutral T2, which would result in higher identification rates when T2 is a control word because it matches the semantic attentional set. An alternative explanation for the finding of increased identification rates for control words stems from the hypothesis that concrete objects require less attentional processing resources compared to abstract concepts. However, no research to date has examined the possibility of abstract concepts requiring additional processing resources compared to concrete objects.

Also consistent with findings from Study 1 were the effect of lag, with the highest accuracy rates being found at lag 8, and the word by lag interaction. However, in contrast with Study 1, Study 2 found a significant interaction between social anxiety and word type. There was a slight trend for participants low in social anxiety to have a higher accuracy identification rate for control words compared to participants high in social anxiety. What appears to be driving the social anxiety by word interaction is a modest reduced accuracy for threat word compared to control word identification for low socially anxious participants. This pattern was not observed in Study 1. One possible reason why the word type by condition interaction was found in Study 2 and not Study 1 could be due to the distress experienced by participants in Study 2 as a result from the speech task. Participants low in social anxiety, and in the distraction condition experienced significantly more distress prior to giving the speech, compared to participants low in social anxiety and in the rumination condition. Interestingly enough, participants that were low in social anxiety and in the distraction group also significantly reported believing the speech feedback less compared to those low in social anxiety and in the rumination condition. Given these results, it is possible that the amount of distress experienced by those low in social anxiety in the distraction condition prior to giving

their speech affected their view on whether or not to believe the speech feedback they received. It is possible that denying the believability of the speech feedback serves as a protective mechanism in terms of rationalizing the distress they felt prior to giving the speech. Instead of attributing poor speech feedback to being nervous, it is possible that the act of being nervous caused them to disregard any negative or threatening stimuli. This notion would also provide a reason for the slightly hampered accuracy identification rate for threat words in comparison to control words for low socially anxious participants that is hypothesized to be driving the word by social anxiety condition interaction. It is possible that participants who were in the distraction condition (as well as low in social anxiety) engaged in a more avoidant bias towards social threat words, and are pulling down the accuracy identification rate for the low social anxiety group as a collective.

One surprising finding was the significant differences that were found for distress levels amongst the different groups prior to giving the impromptu speech. There are two potential explanations for this occurrence: the failing of randomization, or experimenter bias. The experimenter was aware of the social anxiety condition and manipulation condition that each participant was in. There was a trend where participants high in social anxiety rated the experimenter in slightly less favourable terms compared to participants who were low in social anxiety. However, there was no difference found for manipulation condition. Thus, if experimenter bias was the reason for the difference in distress levels, then it would be expected that participants high in social anxiety and in the rumination condition would have the least favourable impressions of the experimenter, as this was the group that experienced the most distress prior to giving the

impromptu speech. However, the ratings of the experimenter did not differ based on manipulation condition.

One interesting finding was the social anxiety by manipulation condition interaction on believability of speech feedback. Participants high in social anxiety were more likely to believe the speech feedback given to them by the researcher compared to participants low in social anxiety. Interesting to note is that participants high in social anxiety did not differ in their believability ratings of the speech feedback based on manipulation condition. However, for participants low in social anxiety, differences were found in the degree they believed the speech feedback. Participants low in social anxiety and in the rumination condition reported that they believed the speech feedback to be accurate compared to participants low in social anxiety and in the distraction condition. One reason for this could be that the rumination task that targeted participants to dwell on counterfactual thoughts influenced how well they thought they actually did on the speech. By having participants think about the problems with their speech (as opposed to focusing on something else entirely) made them believe that the quality of their speech was poor and consistent with the negative feedback provided to them by the experimenter. This finding highlights the negative aspect that rumination can have on shaping cognitions. Participants low in social anxiety were more likely to believe that their speeches were below average when they ruminated and dwelled on these perceived inadequacies. However, when participants low in social anxiety were not engaged in ruminative behaviours, they were not as likely to believe the researcher's feedback. One potential reason why this difference was not found for participants high in social anxiety could be because regardless of whether they ruminated or not, participants high in social

anxiety are sensitive towards social failure, and receiving negative feedback based on their performance/interaction in a social situation.

Limitations

One of the limitations of this study was that the experimenter knew the social anxiety level of the participant, as well as the manipulation condition that the participant was placed in. Future research could avoid this limitation by having the experimenter blind to the conditions of the participant through the use of another researcher to help randomly assign participants to manipulation conditions. The only reason for knowing the social anxiety level of the participant was to ensure equal random assignment into the manipulation conditions. Although participants did not differ in their views of the experimenter's behaviour in terms of their manipulation condition, participants' judgments of the experimenter did differ in terms of their level of social anxiety. However, it is impossible to know if the differences in judgment based on social anxiety condition are a result of experimenter bias, or a result of participants high in social anxiety feeling as though they are being judged more harshly regardless of the experimenter's behaviours. Having the experimenter blind to conditions would help to tease apart these findings.

A second limitation was that levels of rumination were not assessed during or after the RSVP task. Given that it was hypothesized that rumination would have an impact on the AB, it was a limitation that the current study did not assess if rumination actually occurred during the RSVP task. Thus, it is impossible to ascertain if participants ruminated about negative speech feedback while performing the RSVP task. It would be

beneficial for future research to include a manipulation check assessing rumination levels following a RSVP task.

A third limitation of the study was that random assignment in terms of distress did not seem to work. Participants high in social anxiety in the rumination condition experienced significantly more distress prior to the speech task compared to participants high in social anxiety in the distraction condition. Participants low in social anxiety and in the distraction condition experienced significantly more distress prior to the speech task compared to participants low in social anxiety and in the rumination condition. It is possible that the experimenter unconsciously treated the groups differently due to experimenter bias. However, an alternative explanation is that random assignment did not work.

One last limitation of the present study was that anxiety provoking levels of the word stimuli was not assessed. Given that differences were found between the lags in terms of anxiety provoking stimuli for threat words in Study 1, it would have been useful to assess if the new words that replaced words that were thrown out still had this effect. However, Study 1 did not find that anxiety provoking ratings had any impact on the AB. Still, it would have been interesting to assess if the new words added influenced the AB, or if differences across the lags in terms of anxiety provoking ratings still remained.

In sum, Study 2 did not find support for the hypothesis that rumination leads to an increased hypervigilance towards threat type stimuli in an AB paradigm for participants high in social anxiety. One reason for this may be due to the manner in which the stimuli were presented. As mentioned in Study 1, future research should examine rumination and the attentional bias in an AB paradigm when a social threat or control word is placed as

T1. It is possible that any hypervigilance that may result from having a threat word as T2 is not able to be assessed due to processing demands of such abstract concepts compared to concrete objects. Thus, future research could also seek to examine how neutral abstract concepts fare as T2 compared to threat related words.

General Discussion

The main purpose for conducting the present studies was to examine the impact that rumination has on attentional biases in social anxiety, with the hypothesis that rumination would lead to an exaggerated hypervigilance towards threatening stimuli in the environment for participants high in social anxiety. This hypothesis was derived from the notion that the constant dwelling on negative information regarding the self would make the individual hypervigilant towards external environmental cues related to their perceived failure or inadequacy.

Overall, the main results and implications of the two studies can be summarized as follows. No evidence emerged that would support the notion that preferential processing occurs for socially anxious individuals in regards to threatening information, as neither study found support for a hypervigilance towards social threat stimuli for participants high in social anxiety. In fact, in contrast to previous research on emotional words, threat words for both the low and high socially anxious participants had significantly lower accuracy identification rates compared to control words.

The fact that control words had a higher accuracy identification rate in both studies suggests that a problem is occurring with the choice of control words. In one study on social anxiety and the AB using facial stimuli, de Jong and Martens (2007) found that when an angry face was placed as T2, it hampered the identification of a T1

happy face. Thus, in respect to the current studies, it is possible that T2 threat words were receiving correct identification, but that the arousing nature of the words impaired the identification rate of a T1 word. This would impact accuracy scores, because a trial in the current studies was only scored as correct if a participant was able to correctly identify both the T1 and T2 words. Although de Jong and Martens' study found support for the interference of a threat T2 on the identification of T1, the control block from Study 1 suggests that the impairment of T1 identification because of a T2 threat word may be unlikely. In the control block for Study 1 participants were told to ignore T1 and only identify T2 words; thus if threat words at T2 were receiving a higher accuracy identification at the detriment of T1 identification, then an increased identification rate for threat words should be apparent in the control block. However, consistent with the pattern found in the experimental block in Study 1, as well as the results from Study 2, control words had a significantly higher identification rate compared to threat words. Thus, it seems unlikely that threat words were impairing the identification of T1 words and subsequently causing a lower score for trials with threat words. As mentioned previously, the most viable explanation for increased accuracy rates for control words compared to threat words is surmised to result from categorical issues. As previously mentioned, it is possible that abstract concepts take more cognitive resources (e.g., time and effort) to process and identify as opposed to concrete objects. It is also possible that participants were more easily able to determine that the control words all came from a common category – fruits and vegetables-- as opposed to the threat words. Participants may have been more likely to guess a T2 control word correctly simply because they had realized that half of the time the green word was some type of fruit or vegetable.

Therefore, when selecting control words, future research should make sure that the category which the words come from is less transparent.

In attempts to further understand the nature of the attentional bias in social anxiety, the second study examined the potential impact that rumination on negative feedback had on the attentional bias. Contrary to the hypothesis that rumination would exacerbate the hypervigilance towards threat stimuli for high socially anxious participants, no effect was found. However, it is possible that participants in the rumination condition were no longer ruminating during the RSVP task. Previous research has found that when participants engage in an RSVP task and have their thoughts directed elsewhere, the AB period is attenuated (Olivers &Nieuwenhuis, 2005). Although, it is important to note that these findings were unable to be replicated in subsequent studies (e.g., Olivers &Nieuwenhuis, 2006), other research has found that when cognitive load increases, the AB becomes attenuated (e.g., Taatgen, Juvina, Schipper, Borst, & Martens, 2009). An attenuation of target identification when cognitive load increases may seem counter-intuitive, however, it is thought that the diffusion of attention leaves an excess of resources that would normally be allocated to T1 available for the processing and consolidation of T2. Therefore, it could be argued that if participants in Study 2 in the rumination condition were still dwelling on their negative feedback and feelings of inadequacy during the RSVP condition, then an overall attenuation at lags 2 and 3 for identification of T2 should have been found. If rumination were to be examined again using an AB paradigm, then a measure of rumination should be used to assess the degree that participants ruminated during the RSVP task.

Along with the examination of rumination in future studies, anticipatory processing should also be examined. It is possible that the attentional bias differs for when an individual engages in anticipatory versus post-event processing. Given that rumination and anticipatory processing are hypothesized to play integral roles in the maintenance and exacerbation of social anxiety, future research needs to further explore how these variables are involved in the attentional bias.

Another limitation of the second study was that participants were only provided with standardized negative feedback; future research could manipulate the feedback by giving negative, positive, or neutral feedback. It would be interesting to examine if a socially anxious person's attentional bias changes when provided with positive feedback, given the fact that individuals high in social anxiety are extremely concerned with meeting the expectations of others. Given that previous research has found that socially anxious individuals also have a fear of positive evaluation (e.g., Weeks, Heimberg, & Rodebaugh, 2008), future research should examine the impact that positive feedback, compared to negative, and neutral feedback has on attentional biases.

Despite not finding support for any form of attentional bias for social anxiety in either of the two studies, the current research does have some findings that are consistent with previous research on rumination, as well as the AB. With respect to rumination, Study 2 found that participants who were high in social anxiety and in the rumination condition did ruminate more on their negative speech feedback in comparison to participants high in social anxiety in the distraction condition, and participants low in social anxiety in either condition. This finding is consistent with previous literature that has found that in general, participants high in social anxiety ruminate more than

participants low in social anxiety (e.g., Edwards et al., 2003). The fact that the high social anxiety participants, in comparison to the low, in the rumination condition ruminated more suggests that rumination is a behaviour/ thought pattern that the high anxiety participants are used to engaging in when receiving negative feedback (either imagined or actual). This is consistent with the cognitive models of social anxiety presented by Clark and Wells (1995) and Rapee and Heimberg (1997) that stipulate the important role that rumination plays in the maintenance of social anxiety. Overall, participants high in social anxiety did not ruminate more than participants low in social anxiety, which was to be expected given that half of the participants were in a distraction condition. Given that a manipulation task was used to induce rumination or distraction among participants, one may question the generalizability, or authenticity, of the rumination or distraction experienced by participants high in social anxiety. Previous research conducted by Kocovski et al. (2005) suggests that when ruminative and distractive coping were assessed via self-report, participants high in social anxiety were more likely to report engaging in ruminative thoughts and less likely to distract when faced with a social stressor. Thus, although distraction may not be an activity that individuals high in social anxiety are used to engaging in, and a manipulation design where distraction is induced may have limited generalizability for those with high levels of social anxiety, it was still important to assess if the attentional bias was affected in any way by this cognitive process.

The AB is a robust phenomenon with hundreds of studies from the past two decades finding support for decrease in accuracy identification for T2 at lags 2, 3 and 4 (Broadbent & Broadbent, 1987; Raymond et al., 1992; Weichselgartner & Sperling,

1987). In terms of the AB, both of the present studies found support for the AB period, with significant impairments in identification of T2 at lags 2 and 3 compared to lag 8. However, the lack of attenuation for threat type words, regardless of social anxiety condition, is inconsistent with previous AB literature (e.g., Anderson, 2005). It is postulated that this disparity between the current studies and previous literature is a result of the word stimuli that were used in both Study 1 and 2.

In general, future research needs to determine if the AB is a useful paradigm for examining attentional biases for social anxiety. To date, only three studies have examined social anxiety using the AB, with only one study finding differences between high and low socially anxious participants. Arend and Botella (2002) found an attenuated AB when T1 was a threat word for a high trait anxious group, compared to when T1 was a neutral stimulus, and compared to participants low in trait anxiety. However, this study is limited in that presenting threat stimuli as T1 does not allow for the examination of how socially anxious individuals respond to word stimuli that precedes a threat. It is possible that threatening stimuli presented at T2 interferes with the processing capability of T1, as de Jong and Martens (2007) observed. Although this notion is unlikely to be true for the current studies, the problems with the control word stimuli may be preventing the appearance of this effect.

The other two studies looking at the AB and social anxiety were done by de Jong and colleagues (2007; 2009) where facial stimuli were used for the targets. Similar to the current studies, in both of their studies, de Jong and colleagues did not find any difference between high and low socially anxious participants on response to threat stimuli. The fact that neither study conducted by de Jong and colleagues found support

for an attentional bias for high socially anxious participants raises the question if the AB is a useful paradigm for examining biases in social anxiety. It is possible that this paradigm does not accurately tap into the mechanisms that are driving the attentional bias. It is also possible that the nature of the attentional bias for threat in socially anxious individuals cannot be adequately measured by any cognitive paradigm due to the nature, complexity, and the multitude of factors that may contribute to the bias.

Overall, the research on attentional biases in social anxiety has been mixed, with some research finding support for a hypervigilance towards threat (e.g., Mogg & Bradley, 2002), and other research finding support for avoidance (e.g., Mansell et al., 1999), and other research suggesting a vigilance-avoidance of threat stimuli (e.g., Mogg et al., 2004). Given the discrepancy in the literature that different cognitive paradigms cannot seem to resolve, it is possible that factors such as self-focused attention mask the nature of the attentional bias. Future research on attentional biases in relation to social anxiety should further explore mechanisms that may contribute to the bias, and the circumstances under which a bias may be found. It is possible that certain situations provoke a different type of attentional bias. For example, the attentional bias that a socially anxious person displays in a presentation situation may differ from the attentional bias held in a social interaction. Consistent with this line of thought, previous research investigating attentional biases in social anxiety has found support for this notion. For example, Ononaive et al. (2002) found that when under a social threat condition (giving a speech), high socially anxious participants showed a hypervigilance towards somatic (i.e., anxiety symptom) words, compared to high socially anxious participants in the no-threat condition who showed a hypervigilance for social evaluative words. These findings

suggest that the type of situation dictates the type of stimuli that the socially anxious individual will show an attentional bias towards.

Not only can the type of situation potentially dictate the nature of the attentional bias, but also the specific anxiety an individual faces in terms of a social situation/interaction. For example, Spector, Pecknold, and Libman (2003) found that patients with generalized social phobia had a hypervigilance for social threat words describing negative evaluation (e.g., criticize) and words denoting observable characteristics of anxiety (e.g., blushing), compared to anxiety words not visible to others (e.g., palpitations), and compared to non-anxious controls. This is also consistent with previous research that has found that somatic symptom concerns differ between those with social anxiety and those with other anxiety disorders. Those with social anxiety are more concerned with symptoms that are visible and indicative of their anxiety to others, such as blushing, twitching, sweating, and stammering (Amies, Gelder, & Shaw, 1983; Solyom, Ledwidge, & Solyom, 1986).Thus, the current studies may benefit from a re-analysis of the data by dividing the social threat words into the following categories: negative evaluation, observable characteristics of anxiety, and non-observable characteristics of anxiety.

The type of emotional response that a situation evokes may also influence the nature of the attentional bias. Mogg and Bradley (2004) suggest that fear and anxiety may be characterized by two distinct motivational systems, and thus display different patterns of cognitive bias. To support this theory, Mogg and Bradley found that trait anxiety was associated with vigilance towards threat stimuli, but anxiety for specific fears (e.g., blood injury fear) produced a vigilance-avoidance pattern.

Overall, there are many directions that future research could examine with regards to attentional biases in social anxiety, such as situational factors, mood, and the degree of internal self-focus that may dictate the nature of the bias. The current research did not find support for an attentional bias towards threat stimuli for socially anxious participants using an AB paradigm. Rumination was also not found to have an impact on the attentional bias in participants with high levels of social anxiety. Given that previous research using cognitive paradigms to measure the attentional bias in social anxiety has found mixed results, future research may want to explore the circumstances under which hypervigilance versus avoidance asserts itself. Variables in the cognitive model of social anxiety that are theorized to contribute to its maintenance should also be examined in relation to the impact they may have on the attentional bias.

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Appendix A

WILFRID LAURIER UNIVERSITY
INFORMED CONSENT STATEMENT
Attention and Social Anxiety
Katie Walters and Dr. Nancy Kocovski, Department of Psychology

You are invited to participate in a research study. The purpose of this study is to further investigate the cognitive mechanisms of social anxiety. Social anxiety is the type of anxiety experienced in situations where one may be evaluated by others (e.g., presentations, parties). The principal researcher is Katie Walters, a graduate student in the Department of Psychology, and her research supervisor, Dr. Nancy Kocovski, Assistant Professor in the Department of Psychology.

INFORMATION
Based on your scores from a brief questionnaire given to you over the phone you are eligible to complete the following study. Your participation in this study will involve the completion of questionnaires, followed by the completion of a computerized task. The questionnaires will be used to assess social anxiety, and depression. You will then be asked to complete a computerized program viewing word stimuli. Afterwards you will be required to rate the effects of different words. This study will take approximately 45 minutes to complete. It is expected that 40 students will be participating in this research. The study cannot be fully explained at this time, but the full details of the study will be explained following the conclusion of your participation in this research.

RISKS
There are no physical risks associated with the computerized task. You may feel slight fatigue or sore eyes from staring at a monitor, and thus are encouraged to take a break whenever you feel it is necessary. Foreseeable psychological risks may include feelings of anxiety that may arise from the surveys or the computerized task. You will be asked questions regarding depression and suicidality, and are free at any time to omit your answer and/or withdraw from this study. If you are experiencing any concerns about social anxiety, please contact Dr. Nancy Kocovski (nkocovski@wlu.ca) and/or Counseling Services (519) 884-0710 extension 2338, 2nd floor, Student Services Building, (http://www.mylaurier.ca/counselling; 22couns@wlu.ca) and/or counseling services at Canadian Mental Health Association. Please note that Counseling Services on campus are free and confidential.

BENEFITS
You will have the opportunity to take part in psychological research on social anxiety. In addition, the information obtained from your participation may lead to a better understanding of social anxiety.

CONFIDENTIALITY
All information that is obtained from you during the course of this research is completely confidential and will not be shared with anyone other than the researcher (Katie Walters) and the research supervisor (Dr. Nancy Kocovski). The consent form will be kept separately from the data. All raw data (e.g. paper and pencil questionnaires) will be anonymous and only identified by a research identification number in a locked file that can only be accessed by the researchers. All

electronic information (e.g., answers to questions) will be anonymous and only identified by the same research identification number in a password-protected computer file. Your name will not appear in this file. There will be no identifying information on the data. If you complete the study, raw data (paper and pencil questionnaires) will be retained for seven years and destroyed after that time by Dr. Kocovski. The electronic data file will be retained indefinitely. If you choose to withdraw from the study at any time your data will be destroyed. Although the results of this study may be published, they will be reported in a way that makes it impossible to identify individual participants. Only aggregate data will be presented. As such, your specific scores will not be made available to you, though a general report of the study's findings will be made available to you.

COMPENSATION

For participating in part one of this study you will receive $11 dollars.

CONTACT

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study) you may contact the researcher, Katie Walters (walt3090@wlu.ca), at (519) 884-0710 ex. 2587, N2059 or the research supervisor, Dr. Nancy Kocovski (nkocovski@wlu.ca) at (519) 884-0710 ex. 3519, office N2025. This project has been reviewed and approved by the University Research Ethics Board at Wilfrid Laurier University. If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr. Bill Marr, Chair, University Research Ethics Board, Wilfrid Laurier University, at (519) 884-0710, extension 2468, or by email at bmarr@wlu.ca.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be deleted. You may withdraw from the study at any time without penalty. You have the right to omit any question(s)/procedure(s) you choose.

FEEDBACK AND PUBLICATION

The results of this research may be presented at conferences or submitted for publication. The results may also be written up for partial fulfillment of Katie Walter's Master of Arts degree.

CONSENT

I have read and understand the above information. I have received a copy of this form. I agree to participate in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

Appendix B

Mini- SPIN

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

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

1. Fear of embarrassment causes me to avoid doing things or speaking to people.

2. I avoid activities in which I am the center of attention.

3. Being embarrassing or looking stupid are among my worst fears.

Appendix C

Demographic Questionnaire

What is your gender? _____
What is your age? _____

What is the *highest* level of education that you have completed? (check only one)

Completed part of high school □
Graduated from high school □
Completed some college or university □

Graduated from university:
Undergraduate degree □
Masters degree □
Doctoral degree □
Other professional degree (e.g., medical, law) □
Graduated from college □

What is your marital status?

Single □ Married □ Cohabiting □

Separated □ Divorced □ Widow(er) □

What is your occupational status?

Unemployed □ Employed-full time □ Employed-part time □

Student- full time □ Student-part time □ Other _____ (please specify)

What is your ethnicity?

White/Caucasian □ Asian □ Black/African-Canadian □

Native Canadian □ Hispanic □ Other_____(please specify)

Appendix D

Social Phobia Scale

For each of the questions, please check 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	1	2	3	4
	Not at all	Slightly	Moderately	Very	Extremely
1. I become anxious if I have to write in front of people.	0	1	2	3	4
2. I become self-conscious when using public toilets.	0	1	2	3	4
3. I can suddenly become aware of my own voice and of others listening to me.	0	1	2	3	4
4. I get nervous that people are staring at me as I walk down the street.	0	1	2	3	4
5. I fear I may blush when I am with others.	0	1	2	3	4
6. I feel self-conscious if I have to enter a room where others are already seated.	0	1	2	3	4
7. I worry about shaking or trembling when I'm watched by other people.	0	1	2	3	4
8. I would get tense if I had to sit facing other people on a bus or train.	0	1	2	3	4
9. I get panicky that others might see me faint or be sick or ill.	0	1	2	3	4
10. I would find it difficult to drink something in a group of people.	0	1	2	3	4
11. It would make me feel self-conscious to eat in front of a stranger in a restaurant.	0	1	2	3	4
12. It am worried people will think my behaviour odd.	0	1	2	3	4
13. I would get tense if I had to carry a tray across a crowded cafeteria.	0	1	2	3	4
14. I worry I'll lose control of myself in front of other people.	0	1	2	3	4
15. I worry I might do something to attract the attention of other people.	0	1	2	3	4
16. When in an elevator, I am tense if people look at me.	0	1	2	3	4
17. I can feel conspicuous standing in a line.	0	1	2	3	4
18. I can get tense when I speak in front of other people	0	1	2	3	4
19. I worry my head will shake or nod in front of others.	0	1	2	3	4
20. I feel awkward and tense if I know people are watching me.	0	1	2	3	4

Appendix E

Social Interaction and Anxiety Scale

For each question, please check 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	1	2	3	4
	Not at all	**Slightly**	**Moderately**	**Very**	**Extremely**
1. I get nervous if I have to speak with someone in authority (teacher, boss).	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 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 attractive people 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 F

Beck Depression Inventory-II

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feeling during the **past week, including today.** Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix G

Word Ratings

Please rate the following words on how anxiety provoking you find them to be. For each item, please answer using the following scale:

1----------2----------3----------4----------5----------6----------7

Not at All Provoking			Moderately Anxiety Provoking			Extremely Anxiety Provoking	
Advertise	_____	Failure	_____	Pea	_____	Repulsive	_____
Anxious	_____	Fig	_____	Peaches	_____	Insecure	_____
Apple	_____	Florist	_____	Pear	_____	Disliked	_____
Ashamed	_____	Foolish	_____	Pepper	_____	Unworthy	_____
Awkward	_____	Fox	_____	Pineapple	_____	Worthless	_____
Bargain	_____	Fragrance	_____	Pot	_____	Outcast	_____
Beans	_____	Fruit	_____	Pumpkin	_____	Despise	_____
Blackberry	_____	Garment	_____	Radishes	_____	Lonely	_____
Boring	_____	Golf	_____	Raisins	_____	Hurtful	_____
Cabbage	_____	Grandfather	_____	Rejected	_____	Shunned	_____
Carrots	_____	Grapes	_____	Remedy	_____	Ugly	_____
Cauliflower	_____	Humiliated	_____	Seize	_____	Idiot	_____
Celery	_____	Incompetent	_____	Shaky	_____	Unloved	_____
Chin	_____	Inept	_____	Shelter	_____	Disgust	_____
Cloud	_____	Infer	_____	Shovel	_____	Ridicule	_____
Coconut	_____	Inferior	_____	Shy	_____	Clumsy	_____
Collect	_____	Jittery	_____	Spinach	_____	Inadequate	_____
Consolidate	_____	Judged	_____	Stammering	_____	Unsuccessful	_____
Corn	_____	Laundry	_____	Strawberry	_____		
Cranberries	_____	Leather	_____	Stupid	_____		
Criticized	_____	Lemon	_____	Stutter	_____		
Curb	_____	Lettuce	_____	Tense	_____		
Dealer	_____	Lime	_____	Thread	_____		
Decorate	_____	Loser	_____	Tomatoes	_____		
Disgraced	_____	Lottery	_____	Towel	_____		
Dresser	_____	Melon	_____	Translator	_____		
Dressmaker	_____	Mortified	_____	Umbrella	_____		
Dull	_____	Mushrooms	_____	Uneasy	_____		
Dumb	_____	Nervous	_____	Uptight	_____		
Eagle	_____	Odd	_____	Vegetables	_____		
Economical	_____	Orange	_____	Weak	_____		
Embarrassed	_____	Parsley	_____	Weird	_____		

Appendix H

WILFRID LAURIER UNIVERSITY
DEBRIEFING FORM
Attention and Social Anxiety
Katie Walters and Dr. Nancy Kocovski, Department of Psychology

It is very important that you read this information. Please take some time to go over it carefully.

The overall goal of this research is to examine the attentional biases in those with high and low levels of social anxiety. You were selected to participate in this study based on your results to a brief questionnaire given over the phone. Participants that scored in the bottom and top third on a social anxiety measure were invited to partake in this study. Social anxiety is the type of anxiety that is experienced in situations where one may be evaluated or judged by others (see p. 582 of your psychology text book for more information on anxiety).

Cognitive models of anxiety disorders suggest the existence of an attentional processing bias to information related to anxiety. It is hypothesized that such preferential processing serves to exacerbate and maintain the disorder. However, there appears to be a discrepancy in the literature as to the nature of the bias. For example, some research has shown that anxious individuals show a hypervigilance bias to threatening material in their environment while other research has found that anxious individuals avoid threatening material.

The attentional blink (AB) paradigm is designed to target attentional processes across time through the use of stimuli presented in rapid succession at the same fixation point. This type of presentation of stimuli is called a rapid series visual presentation (RSVP) stream. When stimuli are presented in a RSVP stream it is hard to process a second target within 500 ms of the presentation of the first target. This phenomenon is known as the AB. Previous research has extensively documented that when the second target is of relevance to the individual, their AB will be attenuated.

The computerized experiment that you took part in was an RSVP stream looking for an AB. We have hypothesized that the participants high in social anxiety will have an attenuated AB to social threat words compared to neutral words, or other participants low in social anxiety. For instance, it is hypothesized that if you have a high social anxiety score you would have a higher accuracy identifying threat related words (such as loser) compared to those with a low social anxiety score. Furthermore, it is also hypothesized that those with a high social anxiety score will identify more threat related words compared to neutral fruit related words, such as melon. It is hoped that the findings of this research will help to clarify the discrepancy in the literature surrounding the nature of attentional biases in social anxiety.

Thank you for your participation in this study.

If you have any questions about your participation in this study or about the study itself, please contact:

Katie Walters
Department of Psychology
Wilfrid Laurier University

Office: N2059
Phone: 519-884-0710 ext. 2587
Email: walt3090@wlu.ca

or

Dr. Nancy Kocovski
Department of Psychology
Wilfrid Laurier University

Office: N2025
Phone: 519-884-0710 ext. 3519
Email: nkocovski@wlu.ca

If you feel your rights as a participant in research have been violated during the course of this project, you may contact Dr. Bill Marr, Chair, University Research Ethics Board, Wilfrid Laurier University, at (519) 884-0710, ext. 2468, bmarr@wlu.ca.

Counselling services at WLU are confidential and free of charge. If you are experiencing social anxiety, depression, or suicidal ideation, please refer to the following list of resources:

Counseling Services
Wilfrid Laurier University
75 University Avenue West
Waterloo, Ontario, N2L 3C5
(519) 884 0710 x2338

http://www.mylaurier.ca/counselling/home.htm

Canadian Mental Health Association
Kitchener Branch
67 King Street East
Kitchener, ON N2G 2K4
Ph: (519) 744-7645

http://www.cmha.ca
http://www.cmhawrb.on.ca

Appendix I

WILFRID LAURIER UNIVERSITY
INFORMED CONSENT STATEMENT
Attention and Rumination
Katie Walters and Dr. Nancy Kocovski, Department of Psychology, Wilfrid Laurier University

You are invited to participate in a research study. The purpose of this study is to further investigate the cognitive mechanisms of social anxiety. Social anxiety is the type of anxiety experienced in situations where one may be evaluated by others (e.g., presentations, parties). The principal researcher is Katie Walters, a graduate student in the Department of Psychology, and her research supervisor, Dr. Nancy Kocovski, Assistant Professor in the Department of Psychology.

INFORMATION
Based on your scores from a previous measure in mass testing you are eligible to complete the following study. Your participation in this study will involve the completion of questionnaires, followed by giving a 5 minute speech, and then completing of a computerized task. The questionnaires will be used to assess social anxiety and depression. You will then be asked to complete a computerized program viewing word stimuli. This study will take approximately 45 minutes to complete. It is expected that 80 students will be participating in this research. The study cannot be fully explained at this time, but the full details of the study will be explained following the conclusion of your participation in this research.

RISKS
There are no physical risks associated with the computerized task. You may feel slight fatigue or sore eyes from staring at a monitor, and thus are encouraged to take a break whenever you feel it is necessary. Foreseeable psychological risks may include feelings of anxiety that may arise from the surveys, giving the speech, or the computerized task. You are free at any time to omit your answer and/or withdraw from this study. If you are experiencing any concerns about social anxiety, please contact Dr. Nancy Kocovski (nkocovski@wlu.ca) and/or Counseling Services (519) 884-0710 extension 2338, 2nd floor, Student Services Building, (http://www.mylaurier.ca/counselling; 22couns@wlu.ca) and/or counseling services at Canadian Mental Health Association. Please note that Counseling Services on campus are free and confidential.

BENEFITS
You will have the opportunity to take part in psychological research on social anxiety. In addition, the information obtained from your participation may lead to a better understanding of social anxiety.

CONFIDENTIALITY
All information that is obtained from you during the course of this research is completely confidential and will not be shared with anyone other than the researcher (Katie Walters) and the research supervisor (Dr. Nancy Kocovski), and the Psychology Research Experience Pool Teaching Assistant (Glen Gorman). Student IDs will be used to match the mass testing data to today's data, and then student IDs will be deleted. Identifying information (e.g., student numbers) will not be linked to the data after compensation has been given. The consent form will be kept separately from the data. All raw data (e.g. paper and pencil questionnaires) will be anonymous. Consent forms and all of the raw data will be stored in a locked filing cabinet in Dr. Kocovski's lab. All electronic information (e.g., answers to questions) will be anonymous and only identified by the same research identification number in a password-protected computer file. Your name

will not appear in this file. There will be no identifying information on the data. If you complete the study, raw data (paper and pencil questionnaires) will be retained for seven years and destroyed after that time by Dr. Kocovski on April 30, 2017. Dr. Kocovski will also destroy consent forms on April 30, 2017. The electronic data file will be retained indefinitely. If you choose to withdraw from the study at any time your data will be destroyed. Although the results of this study may be published, they will be reported in a way that makes it impossible to identify individual participants. Only aggregate data will be presented. As such, your specific scores will not be made available to you, though a general report of the study's findings will be made available to you.

COMPENSATION

For participating in this study you will receive 1 credit. Other ways to earn the same amount of credit are to complete a journal article review or other research studies (guidelines are available in the general psychology office, N2006).

CONTACT

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study) you may contact the researcher, Katie Walters (walt3090@wlu.ca), at (519) 884-0710 ex. 2587, N2059 or the research supervisor, Dr. Nancy Kocovski (nkocovski@wlu.ca) at (519) 884-0710 ex. 3519, office N2025. This project has been reviewed and approved by the University Research Ethics Board at Wilfrid Laurier University. If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr. Robert Basso, Wilfrid Laurier University Research Ethics Chair, at (519) 884-0710, ext. 5225, or by email at rbasso@wlu.ca.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be deleted. However, please note that it would be impossible to remove your data from the study after it is collected, as the data is not linked to participants. You may withdraw from the study at any time without penalty. You have the right to omit any question(s)/procedure(s) you choose.

FEEDBACK AND PUBLICATION

The results of this research may be presented at conferences or submitted for publication. The results may also be written up for partial fulfillment of Katie Walters' Master of Arts degree.

You will be sent information about the final results via email by April 1, 2010 and the results will be posted outside the psychology department main office.

CONSENT

I have read and understand the above information. I have received a copy of this form. I agree to participate in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

Appendix J

PREP Sign Up Sheet

Title: Attention and Rumination

Researcher: Katie Walters

Supervisor: Dr. Nancy Kocovski

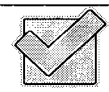
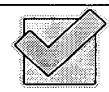
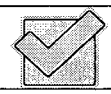
Credit: 1 credit

Description of Study: The purpose of this study is to investigate attentional biases and rumination in social anxiety. Visibility of this study is based on mass testing results. This study will take approximately 45 minutes and takes place in the lab. You will be asked to complete questionnaires (e.g., on demographics, anxiety), give a speech, and then perform a task viewing stimuli on a computer. Approximately 80 participants will take part in this study.

Appendix K

Speech Feedback

Your performance on the speech task has been rated based on how your performance compares to other's speeches. You have been rated using the criteria below. Please take some time to thoroughly go over your feedback.

	Below Average	Average	Above Average
Eye Contact ▪ Maintains appropriate level of eye contact			
Content of Argument ▪ Ideas clearly presented ▪ Interesting			
Body Language ▪ Slouching ▪ Stiff posture ▪ Movement			
Articulation ▪ Use of filler words (um, like) ▪ Stuttering ▪ Long pauses ▪ Appropriate volume ▪ Appropriate speed			
Appearance ▪ Blushing ▪ Sweating ▪ Uncomfortable			
Overall Evaluation			

Appendix L

Distraction Condition Visualizations

Instructions:

For the next 10 minutes, try your best to focus your attention on each of the ideas on the following pages. Read each item slowly and silently to yourself. As you read the items, use your imagination and concentration to focus your mind on each of the ideas. Spend a few moments visualizing and concentrating on each item.

Please continue until the experimenter tells you the time is finished.

Think about: and imagine a boat slowly crossing the Atlantic

Think about: the layout of a typical classroom

Think about: the shape of a large black umbrella

Think about: the movement of an electric fan on a warm day

Think about: raindrops sliding down a windowpane

Think about: a double-decker bus driving down a street

Think about: and picture a full moon on a clear night

Think about: clouds forming in the sky

Think about: the layout of the local shopping center

Think about: and imagine a plane flying overhead

Think about: fire darting around a log in a fire-place

Think about: and concentrate on the expression on the face of the Mona Lisa

Think about: a parking lot at a drive-in

Think about: two birds sitting on a tree branch

Think about: the shadow of a stop sign

Think about: the layout of the local post office

Think about: the structure of a high-rise office building

Think about: and picture the Eiffel Tower

Think about: and imagine a truckload of watermelons

Think about: the pattern on an Oriental rug

Think about: the "man in the moon"

Think about: the shape of the continent of Africa

Think about: a band playing outside

Think about: a group of polar bears fishing in a stream

Think about: the shape of the torch on the Statue of Liberty

Think about: the shape of the state of California

Think about: the way the Grand Canyon looks at sunset

Think about: the structure of the Golden Gate Bridge

Think about: a train stopped at a station

Think about: a lone cactus in the desert

Think about: the shape of the country of Italy

Think about: a row of shampoo bottles on display

Think about: a gas station on the side of a highway

Think about: the fuzz on the shell of a coconut

Think about: the Presidents' faces on Mount Rushmore

Think about: a band playing "The Star Spangled Banner"

Think about: the shape of a cello

Think about: the birthmark on Gorbachev's head

Think about: the shape of the United States

Think about: the baggage claim area at the airport

Think about: the size of the Statue of Liberty

Think about: the shape of a baseball glove

Think about: a freshly painted door

Think about: the shiny surface of a trumpet

Appendix M

Rumination Condition Questionnaire

For the 10 minutes, try your best to focus your attention on each of the ideas on the following pages. Read each item slowly and silently to yourself. As you read the items, use your imagination and concentration to focus your mind on each of the ideas. Spend a few moments visualizing and concentrating on each item, and then write down your thoughts in the space provided below.

Think about: the concerns you had prior to giving your speech. Write about these thoughts.

Think about: the concerns you had during your speech. Write about these thoughts.

Think about: the concerns you had after giving your speech. Write about these thoughts.

Think about: your speech feedback. Write about these thoughts.

Think about: how you appeared while giving the speech. Write about these thoughts.

Think about: the physical sensations you experienced while giving your speech. Write about these thoughts.

Think about: all the mistakes you made during your speech. Write about these thoughts.

Think about: how you did on your speech compared to others. Write about these thoughts.

Think about: how you could have improved your articulation while giving the speech. Write about these thoughts.

Think about: how you could have improved the content of your argument during your speech. Write about these thoughts.

Appendix N

Rumination Questionnaire (RQ)

Please consider how much you have thought about the speech task you participated in during this study and answer the following questions. Please circle the number that most accurately reflects your experience.

	0	1	2	3	4
	Never True	**Rarely**	**Sometimes**	**Often**	**Very Often**
1. To what extent did you think about the speech task since you gave it?	0	1	2	3	4
2. How negative were your thoughts about the speech task?	0	1	2	3	4
3. How positive were your thoughts about the speech task?	0	1	2	3	4
4. To what extent did you criticize yourself about not handling the speech task well?	0	1	2	3	4
5. How much did you think about other past instances of speaking in public?	0	1	2	3	4
6. To what extent did you think about the anxiety you experienced during the speech task?	0	1	2	3	4

Appendix O

Believability Measure

For the following questions, please rate the degree to which you disagreed or agreed with the research assistant's assessment of your speech for each of the separate categories that you were rated on.

Strongly Disagree	Disagree	Neither Disagree or Agree	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

1.) _____ Eye Contact

2.) _____ Content of Argument

3.) _____ Body Language

4.) _____ Articulation

5.) _____ Appearance

6.) _____ Overall Performance Score

Appendix P

SUDS Ratings

0	25	50	75	100
No distress	Mild Distress	Moderate distress	Significant distress	Highest Possible Distress
	Slight discomfort	Some interference		

	DISTRESS (0-100)
a) How distressed/anxious were you **before** the speaking task?	
b) How distressed/anxious were you **during** the speaking task?	
b) How distressed/anxious were you **after** the speaking task?	

Appendix Q

End of Study Questionnaire

1. Please rate the following questions on this scale:

Strongly Disagree	Disagree	Don't Know	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

a) _____ The researcher in the study was friendly towards me.

b) _____ I did not feel judged by the researcher.

c) _____ The researcher made me feel uncomfortable.

d) _____ The researcher smiled a lot during my speech.

e) _____ The researcher gave me the impression he/she did not like me.

f) _____ I thought the researcher was cold and unfriendly.

2. Do you have any other comments about this study?

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Appendix R

WILFRID LAURIER UNIVERSITY
DEBRIEFING FORM
Attention and Social Anxiety
Katie Walters and Dr. Nancy Kocovski, Department of Psychology

It is **very important** that you read this information. Please take some time to go over it carefully.

The overall goal of this research is to examine the effect that rumination has on attentional biases in those with high and low levels of social anxiety. You were selected to participate in this study based on your mass testing results. Participants that scored in the bottom and top third on a social anxiety measure were invited to partake in this study. Social anxiety is the type of anxiety that is experienced in situations where one may be evaluated or judged by others (see p. 582 of your introductory psychology text book for more information on anxiety).

Cognitive models of anxiety disorders suggest the existence of an attentional processing bias to information related to anxiety. However, there appears to be a discrepancy in the literature as to the nature of the bias. For example, some research has shown that anxious individuals show a hypervigilance bias to threatening material in their environment, while other research has found that anxious individuals avoid threatening material. Cognitive models of social anxiety also highlight the importance of rumination in maintaining and exacerbating anxiety.

The feedback from the speech that you gave was **false**, and was designed to elicit high levels of rumination of those with high levels of social anxiety. After receiving and reviewing your speech feedback, you were randomly assigned to either a distraction or rumination condition. Participants in the distraction condition were asked to visualize a list of items that are externally focused away from the self and any anxiety symptoms. An example of an object would be: "Think about: raindrops sliding down a window pane". If you were in the rumination condition, you were asked to think about your speech feedback and write about how you could have improved your speech to do better on each of the sections you were "evaluated" on. Deception was necessary for this study in order to provide something for the rumination group to dwell on. Concealment of your mass testing results was also necessary in order for you, the participant, to remain blind to which category you fell in to (e.g., either high social anxiety, or low social anxiety). This was important because knowing what group you fell in to may have influenced your response to questionnaire items, the speech, or the computerized task.

The attentional blink (AB) paradigm is designed to target attentional processes across time through the use of stimuli presented in rapid succession at the same fixation point. This type of presentation of stimuli is called a rapid series visual presentation (RSVP) stream. When stimuli are presented in a RSVP stream it is hard to process a second target within 500 ms of the presentation of the first target. This phenomenon is known as the AB. Previous research has extensively documented that when the second target is of relevance to the individual, their AB will be attenuated.

The computerized experiment that you took part in was an RSVP stream looking for an AB. We have hypothesized that the participants high in social anxiety and in the rumination condition will have an attenuated AB to social threat words compared to neutral words, participants high in social anxiety in the distraction condition, and participants who are low in

social anxiety in both the distraction and rumination conditions. For instance, it is hypothesized that if you have a high social anxiety score, and are in the rumination condition, you would have a higher accuracy identifying threat related words (such as loser) compared to those with high social anxiety in the distraction condition, and those with low social anxiety scores. We are hypothesizing that this will occur because the social threat words will be highly salient to those with social anxiety, particularly if participants just spent the past 10 minutes thinking about how their speech performance could have been improved. It is hoped that the findings of this research will help to clarify the discrepancy in the literature surrounding the nature of attentional biases in social anxiety.

Researchers have discovered that when participants are given erroneous feedback and given a debriefing form stating the feedback was predetermined, they still evaluated their performance and abilities as negative. Thus, **it is important that you realize there is the possibility that negative beliefs about the self due to the erroneous feedback can still exist despite knowing that the feedback was false.** If you have any negative self perceptions, please contact counseling services, whose information is provided on the back of this form.

Thank you for your participation in this study. Results will be e-mailed to you by April 1, 2010 and posted outside the psychology main office.

If you have any questions about your participation in this study or about the study itself, please contact:

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If you feel your rights as a participant in research have been violated during the course of this project, you may contact Dr. Robert Basso, Wilfrid Laurier University Research Ethics Chair, at (519) 884-0710, ext. 5225, or by email at rbasso@wlu.ca.

Counselling services at WLU are confidential and free of charge. If you are experiencing social anxiety, depression, or suicidal ideation, please refer to the following list of resources:

Counseling Services
Wilfrid Laurier University
75 University Avenue West
Waterloo, Ontario, N2L 3C5
(519) 884 0710 x2338

http://www.mylaurier.ca/counselling/home.htm

Canadian Mental Health Association
Kitchener Branch
67 King Street East
Kitchener, ON N2G 2K4
Ph: (519) 744-7645

http://www.cmha.ca
http://www.cmhawrb.on.ca