Attentional Biases in Social Anxiety and Social Phobia

Submitted for the Degree of Doctor of Philosophy

by

Margarita Sylvia Pearl Ononaiye

Department of Psychology

University of Sheffield

Submitted October 2004

Abstract

Clark and Wells (1995) argued that individuals with social phobia attend solely towards internal threat, whereas Beck, Emery and Greenberg (1985) and Rapee and Heimberg (1997) proposed that social phobics attend towards internal and external threat cues, during a social encounter. With this in mind, the aim was to investigate attentional processing in social anxiety and social phobia using the dot-probe task. Findings depend in part on which aspects of social anxiety are measured and used to select groups, therefore an exploration of the psychometric properties of the Fear of Negative Evaluation (FNE: Watson & Friend, 1969) and the Social Avoidance and Distress (SAD: Watson & Friend, 1969) scales was undertaken.

Experiment one investigated conscious processing in high (n = 40) and low (n = 40) socially anxious participants. The results showed that the high socially anxious attended towards negative evaluation words (non-evaluative condition) and somatic sensation words (social-evaluative condition), compared to the low socially anxious.

Experiment two explored pre-attentive and conscious attentional processing. A pre-attentional bias towards physical threat words was evident in the high socially anxious (n = 41), compared to the low socially anxious participants (n = 41), under social-evaluative conditions. There were no more significant findings.

Experiment three investigated conscious attentional processing in generalised social phobics (n = 16) and low anxious controls (n = 16). The results revealed that individuals with generalised social phobia attended towards the physical threat words, compared to the matched controls.

Study four examined the psychometric characteristics of the FNE and SAD. The FNE comprised of a fear of negative evaluation factor and the SAD a social avoidance and distress and a fear of new situations and strangers factor.

The findings overall showed that attentional biases in social anxiety and social phobia can be specific to certain aspects of threat and modified by changes in level and cause of state anxiety.

Acknowledgements

A very special thank you goes to my supervisors Professor Graham Turpin and Dr John Reidy, for their relentless help, support and advice. They made an excellent 'double act' and I really could not have wished for better supervisors. Thanks also to Professor Glenys Parry and Dr Tom Ricketts for their supervision and guidance.

There are also many people over the years that have provided me with a great deal of support. I have to start with Tom Webb, who had the 'great honour' of sharing an office with me. I would like to express my gratitude for all his help, enthusiasm and patience, especially with my spectacularly poor computer skills. I would also like to thank him for simply being a terrific colleague and friend. Special thanks also goes to Tracey Grandfield and the Psychology Department at the University of Sheffield. I also owe a great deal of thanks to Sheffield Hallam University, for allowing me to recruit and test their students.

I would like to acknowledge my family and friends, whose faith, love and support (even without understanding what it is I was doing) was very much appreciated. A very special thanks to my sister Maria for her proof reading skills, and to my very special friends Ruth Cockram (alias Rendell), Emma Iles and Sonjie Alison.

Finally, I would like to thank my partner Peter Scott, for not only moving to Sheffield and being there for me, but also believing in me and making me laugh. He has been, and always will be, my very best friend.

I would also like to thank Community Health Sheffield and the Economic and Social Research Council for funding this programme of work.

Contents

List of Tables

List of Figures

Chapter One

The Cognitive Perspective of Emotion

Chapter Overview

This chapter presents a review of the cognitive approach to the understanding of individual differences in emotionality. The main focus of this chapter is on the complex emotion of anxiety, however a consideration of the cognitive factors involved in depression is also included. The pre-dominance of the theories and research have been on these two emotions because they are some of the most prominent and pervasive emotions that the population experiences (e.g., Klerman, 1985; Lader & Marks, 1973; Rachman, 1998; Weissman, 1985). Furthermore, both depression and anxiety can develop into clinical conditions, which challenges cognitive psychologists to ascertain the cause and the factors involved in the maintenance of these distress disorders. Thus, this chapter aims to provide a theoretical and empirical overview of the cognitive approach to the understanding of anxiety and depression, to 'set the scene' for chapter two, which focuses on attentional processing in socially anxious and socially phobic individuals. The emphasis throughout this thesis is on attentional processing, thus this chapter begins with a brief section on some of the earlier models of selective attention that have arisen from mainstream cognitive psychology (see Eysenck & Keane, 1996 for a full explanation).

Selective Attention

There are a number of theoretical perspectives that have tried to explain selective attentional processing by proposing that there is a point at which the attended information is passed on for further processing and the non-attended message is filtered out. For example, Broadbent's filter model (1958) details that due to the brain's limited capacity,

there has to be a selective mechanism operating at a early stage of processing concerned with categorising the physical properties of the information and disregarding any unattended information. Treisman's (1964) attenuation theory on the other hand, posits that the early selective attention filter does not completely block out the unwanted messages, but merely attenuates them, allowing for more detailed but limited processing of this information. The pertinence model (Deutsch & Deutsch, 1963) allows for the filtration process to occur much nearer the response stage of the information processing system, by suggesting that all incoming information is fully analysed from the start. Thus, challenging the aforementioned theories, by suggesting that the capacity of the selective processing is not limited, and that all messages are categorised and recognised with its importance weighted. Selective attentional responses occur at this late selection stage, following the determination of the incoming information's importance or relevance.

Allport (1980) argues that such single channel models as detailed above, do not account for the complexities of selective attention. Eysenck and Keane (1996) also propose the role of divided attentional processes need to be accounted for by such theoretical perspectives. Indeed, Shiffrin and Schneider (1977) argue that there is a theoretical distinction between controlled and automatic attentional processing. According to these theorists, the automatic stage is fast, capacity-free and not available to consciousness, where as the controlled stage which has a limited capacity involving strategic attentional processes allowing for flexible responses. This theoretical distinction

is explored in this thesis in relation to pre-attentional processing reflecting the automatic stage when the individual is not explicitly aware of the of the content of the information and conscious processing the more controlled state of attentional processing when there is awareness of the incoming information. Also, these theories do not consider the role of emotions and the influence they have on the processing of information and the possibility that there are different selection points for the variety of situations and types of information that a person perceives. For example, in an anxious situation, a pre-attentive bias may reflect the rapid detection of potential threat followed be a more conscious processing of the information once detected to determine potential threat value (e.g., Eysenck, 1992). It is these issues that are explored throughout this thesis using the cognition and emotion approach.

The Cognition and Emotion Perspective

Teasdale and Barnard (1993) propose that the aim of the cognitive approach is to produce comprehensive theoretical conceptualisations, with testable hypotheses, to develop an understanding of the nature of affective cognitive processing. Mathews (1996) details that the cognitive perspective assumes that all emotions arise from some sort of cognitive evaluation of the event, but that this is often an automatic pre-attentive process. In this case, the individual is unaware that any cognitive processing whatsoever has taken place. In support, Lazarus (1982) argues that "cognitive appraisal underlies and is an integral feature of all emotional states" (p. 1021). Teasdale (1996) contests however, that it is equally possible for the cognition to be powerfully influenced by the

affective state and thus be a consequence of the emotion rather than the antecedent. Teasdale goes on to suggest that there is a reciprocal relationship between cognition and emotion and that the two are strongly intertwined. In a related vein, Mathews (1996) surmises that it is now generally agreed that there is a circular relationship between affective responses and cognitive appraisal and processing.

In consideration of anxiety and depression, Dalgleish and Watts (1990) surmise that theoretical perspectives and experimental paradigms acquired from cognitive psychology provide a valuable insight into the understanding of the cognitive factors relating to these disorders. In support, Eysenck (2004) concludes that it has become increasingly obvious that much can be learned about individual differences in anxiety and depression by considering such cognitive biases. Taken together, the justification for exploring the key cognitive information processing factors that underlie affective responses in an individual becomes clear.

Cognitive psychology takes advantage of the power of experimental methodology to investigate the cognitive processes associated with emotional responses. This approach proposes that idiosyncratic differences in the processing of emotional information may be a causal factor in the development or maintenance of emotional disorders (e.g., Beck, 1976; Eysenck, 1992; Williams Watts, MacLeod & Mathews, 1988). The basic assumption is that dysfunctional information processing biases in anxious and depressed populations are thought to influence attending to, remembering and interpreting threat-relevant information. These biases cause the anxious or depressed

person to preferentially process threat information and this plays a causal role in the maintenance of the emotional disorder.

The cognitive approach yielded two influential theories, namely Beck's Schemata Theory (e.g., Beck, 1967; 1976; Beck & Clark, 1988) and Bower's Network Theory (e.g. Bower, 1981; 1987; Bower & Cohen, 1982; Gilligan & Bower, 1984). Beck's theory originated from clinical observations, whereas Bower's notion was based on cognitive experiments. Beck, Emery and Greenberg's (1985) cognitive perspective is explained in full in chapter two in relation to social anxiety and social phobia. However, since Beck's work, together with Bower's work, has been of fundamental importance in generating extensive research and further theoretical conceptualisations, a brief explanation of both theoretical perspectives is provided here.

Beck's Cognitive Perspective

Taken directly from his clinical work and used as a basis for cognitive therapy (e.g., Beck, 1995), Beck's theory proposes that emotional disorders arise from different dysfunctional schemas, such as those associated with loss or failure in depression (Beck, 1967), or potential threat or danger in anxiety (Beck, 1976). Beck and Clark (1988) define schemas as "functional structures of relatively enduring representations of prior knowledge and experience" (p. 24). The theory suggests that once these schemas are activated by a stressful life event, they influence the processing of information, shape the interpretation of experience, and affect the behavioural responses of the individual. The content of the schema is considered to be specific to the disorder. Thus, in anxiety, the

over-estimation of potential threat, and the believed inability to cope with anxious situations, reflects the activation of underlying danger schemas. In depression, the key schemas relate to negative views of the self, the world and the future. These schemas guide information processing biases and consequently maintain negative beliefs, assumptions and thought processes, and therefore the person's current emotional experience. Beck predicts that these biases are evident in both the attentional processing and the retrieval of material. The only difference between the emotions being the type of information processed is specific to the disorder.

Beck's schema theory has been of enormous heuristic value in developing effective psychological treatments, such as cognitive therapy (e.g. Beck, 1995). Teasdale and Barnard (1993) also praise this theory for generating a considerable body of research. However, it has been criticised because the theoretical construct of schema is hypothetical, ill defined and as Eysenck (1992) argues, little more than a belief. In agreement, Williams, Watts, MacLeod and Mathews (1997) posit that the theory lacks a clear definition of a schema to ensure precise predictions. Similarly, Eysenck (1992) proposes that the evidence for dysfunctional schemas lying dominant within one's cognitive system is no more than conjecture, with little supporting behavioural evidence. In an attempt to address this issue, Hedlund and Rude (1995) provide evidence for the presence of maladaptive negative schemas in individuals who have recovered from major depression. Their study found that formerly depressed individuals still displayed a negative bias using information processing tasks that was similar to currently depressed

individuals. However, Eysenck (1997) feels that the possibility of dysfunctional schemas being constantly active, or indeed present at all still requires further testing.

Bower's Network Theory

The primary concern of the network theory (e.g. Bower, 1981; 1987; Bower & Cohen, 1982; Gilligan & Bower, 1984) is the relationship between mood and memory. Fundamentally, this theory proposes that the long-term memory is a semantically associated network, consisting of units or nodes. The main stipulation is that each distinct emotion represents a specific node within the memory. There are also numerous connections to associated ideas, to the physiological system, and to muscular and expressive patterns. An affective node reaches the critical level of activation in an individual when they cognitively process threatening information from the self or the environment. This results in the activation spreading in a selective manner to other related nodes, creating a novel pathway. Subsequently, a person's mood state at encoding, biases the formation of connections in a mood-congruent fashion and ensures associative strengthening and elaborations.

Although it is basically a theory of memory, it has important implications for other aspects of cognitive functioning. Specifically, a similar pattern of mood-congruency effects can be applied to anxious and depressed mood states. Bower (1981) suggests that the activation of an emotional node (e.g. threat; sadness) leads to further triggering of anxiety or depression related nodes (e.g. danger; despair). For example, an anxious mood will cause an increase in the activation of distress and anxiety relevant

material. The network model suggests that anxious and depressed individuals process information related to their mood more quickly, due to the activation of these related nodes. Bower states that emotions enhance the salience of mood-congruent material for selective attentional and memory processing. He predicts that an individual would actively attend to material and recall information that is consistent with their current mood.

Eysenck (1992) and Williams et al. (1997) conclude that the network theory has provided an excellent basis for research on mood and cognition. Nevertheless, these authors argue that the supposition that all knowledge, cognitions and emotions are a single uniform format in a person's memory is a limitation of the theory. They propose that there are many domains of knowledge that require much larger units of organisation than suggested by Bower. In support, Power and Champion (1986) suggest that emotions, knowledge and cognitive concepts are more than just nodes in a semantic network, thus requiring a more detailed explanation of their organisation. Also, Eysenck (1992) puts forward that cognitions tend to possess an all-or-nothing quality and often rapidly change between cognitions, whereas emotions are diffuse, difficult to clarify and typically change relatively slowly over time, indicating that activation remains constant for some time. Overall, Johnson-Laird, Herrmann and Chaffin (1984) argue that the network theory is a general framework for speaking about the mood-memory phenomena, rather than a comprehensive account of cognitive processing.

Predictions from Beck's and Bower's Theories

Both Beck's and Bower's models ascertain that emotion-specific biases are active throughout the various stages of information processing within all emotional disorders. Hence, they predict that these biases should be evident in both attentional and memorial processing. Investigators examining biases in information processing have concentrated mainly on the functioning of attention and memory in depression and anxiety. However, the results from such research have revealed equivocal findings. The next section reviews such empirical evidence relating to the nature of memory and attentional processing in anxious and depressed individuals. A brief overview of the anxiety and depression literature on memory biases and attentional processing in depression is presented, but for a more detailed review see Williams et al. (1997). The emphasis of the next section is attentional research and anxiety, as this area forms the main focus of this thesis.

The Memory and Depression Literature

There is extensive support for Beck's and Bower's prediction of a depression-related memory retrieval bias of mood-congruent information (e.g., MacLeod & Mathews, 1991; Mineka & Nugent, 1995). In the autobiographical memory literature, individuals with depression are constantly associated with negative recall bias (e.g., Goddard, Dritschel & Burton, 1996; Teasdale & Barnard, 1993; Williams & Dritschel, 1988). Additionally, studies including word lists that contain emotionally valenced items followed by an unexpected memory test, show a significant negative recall effect in

depressed individuals (e.g., Blaney, 1986; Bradley & Mathews, 1983; Hedlund & Rude, 1995; Teasdale & Dent, 1987). In a meta-analysis, Matt, Vacquez and Campbell (1992) report that depressed individuals persistently show a negative recall bias, especially if it is self-referencing. Consistent with this suggestion, Denny and Hunt (1992) found that depressed participants demonstrate a retrieval advantage for negative stimuli, when the method of encoding is personally relevant.

The Memory and Anxiety Literature

In contrast to the depression research, there is less supporting evidence for the prediction of an anxiety-related memory bias in anxious individuals. For example, studies exploring explicit memory biases using free-recall tasks in patients with generalised anxiety disorder have found no evidence of a threat-related bias (e.g., Mathews, Mogg, May & Eysenck, 1989; Becker, Roth, Andrich & Margraf, 1999). Indeed, Mogg, Mathews and Weinman's (1987) results suggest that patients with generalised anxiety disorder appear to actively avoid elaborate processing of threat, as demonstrated by a memory bias for non-threat material. Conversely, evidence of an explicit memory bias for anxiety-related words in high trait anxious populations has been reported (Nugent & Mineka, 1994; Reidy & Richards, 1997a, 1997b). Although in a recent study, Reidy (2004) found that low-trait anxious participants recalled more non-worry related words than worry-related words. The high trait anxious on the other hand, did not demonstrate a preference for the recall of either category of word groups. In addition to the explicit memory studies, research focusing on anxious populations with

implicit memory tasks has also been inconsistent. For example, Richards and French (1991) tested high and low trait anxious participants using a word stem completion task and found trait anxiety effects on implicit memory processing. Conversely, studies have reported findings indicating a lack of implicit memory processing in trait anxious people (e.g. Bradley, Mogg & Williams, 1994; Dalgleish, 1994; Harrison & Turpin, 2003; Reidy, 1994). On reviewing the literature on implicit memory processing, Russo, Fox and Bowles (1999) conclude that there is no substantive evidence to support an anxiety-related bias. Taken together, evidence of implicit and/or explicit memory biases in anxious populations is inconsistent.

The Attention and Depression Literature

Research yields inconsistent support for Beck's and Bower's hypothesis of an attentional bias towards negative information in depression. MacLeod, Mathews and Tata (1986) found that depressed participants behaved in a similar way to normal controls, by directing their attention away from negative words. Indeed, MacLeod, Ebsworthy and Rutherford (1998) posited that any automatic attentional bias in people with depression is due to the influence of anxiety. In support, several visual attention studies reported that selective attention towards threatening information correlated with measures of anxiety, rather than depression (e.g., Mathews & MacLeod, 1985; Mogg, Mathews & Weinman, 1989). However, more recent depression studies (e.g., Mathews, Ridgeway & Williamson, 1996; Mogg, Bradley, Williams & Mathews, 1993) provide evidence for negative selective attentional processing, but only at the conscious level. To

conclude, contrary to the predictions, there does not appear to be a pre-attentional orientation towards negative information associated with depression. Although, a conscious attentional processing of threatening stimuli has been suggested to be characteristic of depression.

The Attention and Anxiety Literature (Part One)

There is substantial evidence consistent with the hypothesis that high trait or clinically anxious people attend to anxiety related information. As attentional processing forms the basis of this thesis, a full explanation of the two most popular experimental paradigms are presented during this review of the anxiety research.

The first paradigm extensively used in cognitive-experimental research is a modified version of the Stroop task (Mathews & MacLeod, 1985). In the original version of the Stroop task (Stroop, 1938), participants are requested to name the colour of the ink in which the words are printed and to ignore the content of the word. The time the person takes to name the colour is the key variable of interest. Essentially, long response latencies indicate interference of the word content in the processing of the colour of the words. In the modified version, the Stroop task involves the presentation of threatening words (e.g., physical or social threat), together with control neutral words. It is assumed that the attention of individuals experiencing high levels of anxiety would be more focused on the threatening words. This results in anxious participants taking longer to name the colour of the threat word, compared to those low in anxiety. It is suggested that this increased colour naming latency (interference effect) for threatening words indicates

an attentional bias towards threat. It is important to note that the threat word is generally specific to the disorder (i.e., panic related words with panic disorder and social threat words with social phobia). In computerised versions of the modified Stroop task, the role of pre-attentive biases can also be explored. The computer briefly presents the stimuli (e.g., 14 ms) and then masks the visual presentation with a non-word (e.g., xxxxx or bctfw).

Research employing the Stroop task with high trait anxious under normal (e.g., Richards & Millwood, 1989; Wikström, Lundh & Westerlund, 2003) or high state anxiety (Egloff & Hock, 2001; Mogg, Mathews, Bird & MacGregor-Morris, 1990) conditions, demonstrate a preferential attentional processing bias to threatening information, in comparison to the low trait anxious. This selective attention to threat cues has also been shown at a pre-attentive level in trait anxious individuals under normal (van Honk, Tuiten, van den Hout, Putman, de Haan & Stam, 2001) and stressful (MacLeod & Hagan, 1992; MacLeod & Rutherford, 1992) experimental conditions. Additionally, individuals experiencing generalised anxiety disorder also demonstrate a selective preference for threatening stimuli at a conscious (e.g., Mathews & MacLeod, 1985; Mogg, Kentish & Bradley, 1993) and pre-attentional (e.g., Mogg, Bradley, Millar & White, 1995; Mogg et al., 1993) level of processing. Interestingly, Bradley, Mogg, Millar and White (1995) investigated the effects of co-morbid depression on the nature of attentional processing in patients with generalised anxiety disorder. They found that compared to non-anxious controls, generalised anxiety disorder patients without depression showed longer

response latencies to threat words relative to neutral words. Generalised anxiety patients with concurrent depression however, did not differ from the non-patient control group. These findings indicate that the co-occurrence of depression may obscure the attentional bias normally associated with anxiety and provide further support for the lack of a depression-related attentional bias.

Overall, the results from studies using the Stroop task provide substantial support for the prediction of an attentional bias towards threatening stimuli in anxious populations. However, it is important to note that the Stroop has been considered an impure measure of attentional bias. In particular, MacLeod (1991b) points out that the increase in response latencies that is used as a marker of selective attention in modified Stroop studies, could arise from post-attention elaboration. In support, Mogg and Bradley (1998) propose that the interference effect with colour naming words occurs at the response selection stage (post-attentional), rather than during the pre-attentional processing stage. Furthermore, Asmundson and Stein (1994) suggest that the possibility of mood-congruent response biases also confound the proposal that the Stroop is a measure of visual attention. Overall, Williams et al. (1997) conclude from their review that the mechanisms leading to delays in colour naming have not been systematically investigated. Therefore, specific conclusions on the nature of attentional processing in research that has used this task must be considered in view of these criticisms.

MacLeod and colleagues (1986) devised the visual dot-probe task to be a bias free response (pressing a computer key) to a neutral stimulus (e.g., a probe). In a typical

version of the dot-probe task, a series of word pairs are briefly presented for 500 ms on a computer screen. On critical trials one word from the pair is threatening (i.e., social or physical), while the other word is neutral and often matched for word length and frequency. Immediately following these trials, a small dot appears in the location of one of the words. Participants are instructed to press a button (usually the space bar) as soon as they see the dot. The dot detection latency is recorded and shorter times signify greater vigilance towards the word immediately preceding the probe. Essentially, the participant is quicker to respond to the dot-probe that is presented in the attended, rather than the unattended region of visual display. Attentional research also uses a target detection categorisation task within the dot-probe paradigm. The key difference being that participants are requested to determine between one of two possible targets following the presentation of the word pair. This can include whether two dots are vertically (:) or horizontally (..) aligned, or whether an 'E' or 'F' is being presented in place of one of the words. As before, the stimuli can appear in either location of the word pair. However, unlike the traditional dot-detection task in which a number of filler trials are necessary, this method allows for all the trials to be used. Similar to the computerised version of the modified Stroop task, pre-attentive biases are investigated by presenting the word pairs for a shorter period of time followed by masking.

MacLeod et al. (1986) were the first to demonstrate that generally anxious patients orient towards the location of threat, using the visual dot-probe task. Mogg, Mathews and Eysenck (1992) replicated MacLeod et al.'s findings, and also reported that

recovered generalised anxiety disorder patients and control participants showed similar interference effects. Thus, indicating that once the current anxiety has been reduced through therapeutic intervention, preferential attentional processing of threat diminishes. Evidence of a pre-conscious attentional bias favouring threatening words, in individuals with generalised anxiety disorder has also been documented (e.g., Mogg, Bradley & Williams, 1995).

Analogue studies have reported that high trait anxious individuals, under state anxious conditions, preferentially attend to threat, in comparison to low anxious participants (e.g. Broadbent & Broadbent, 1988; MacLeod & Mathews, 1988; Mogg & Marsden, 1990; Mogg, Bradley & Hallowell, 1994). Additionally, evidence of an attentional bias toward threat in high trait anxiety participants, without evoking levels of state anxiety, has been found across a range of stimulus presentation times (100ms, 500ms & 1500ms) by Mogg, Bradley, de Bono and Painter (1997), and at a pre-conscious (e.g. 14ms) level of processing by Bradley, Mogg and Lee (1997) and Luecken, Tartaro and Appelhans (2004).

Evaluation of Beck's and Bower's Predictions

The aforementioned research has shown that different emotions may be characterised by quite different patterns of cognitive biases, rather than the more general effects as predicted by Beck and Bower. For example, there is substantial evidence for a memory bias in depression and an attentional bias in anxiety. However, support for a depression-related attentional bias has been equivocal and mainly attributed to the

influence of anxiety. Furthermore, an anxiety-related memory bias has not been clearly demonstrated in the research. Findings such as these, led Williams and colleagues (1988, 1997) to suggest that there are several limitations to the models of Beck and Bower. They propose that there is a need to recognise the dissociation between anxious and depressed populations in attentional and memory processing, and to distinguish between different levels of cognitive processing. The research has indicated that it is possible to process information both with and without awareness, the latter obviously preceding conscious attentional encoding. Thus, Williams et al. propose that it is important for theories to make a distinction between conscious and non-conscious aspects of cognition.

The Integrative Model by Williams, Watts, MacLeod and Mathews (1988)

In view of the aforementioned criticisms, Williams et al. (1988) devised an integrative model to provide a more detailed account of the different processing biases associated with anxiety and depression. The model proposes that both attentional and memorial processing incorporate both an automatic and a strategic element. Given these different elements of processing, it was possible that emotion-related biases may exist in one form of processing, and not another, and that different emotions could differentially affect various stages of processing. Hence, Williams and his colleagues successfully reformulated the cognitive perspective, discarding the view that similar processing is involved in all emotions and focusing upon different information processes for different emotions.

The model's primary theoretical categorisation is the concept of priming and

elaboration, originally proposed by Graf and Mandler (1984). In essence, priming is an automatic process, which is quick, capacity-free and occurs pre-consciously. In this case, the processing of a stimulus word generates the spontaneous activation of numerous components of the internal representation. In contrast, elaboration is described as a strategic form of processing which serves to link the representation with other associated representations, thus making the stimulus more retrievable. This process is required to put stimuli in context using previously established representations (Graf & Mandler, 1984). The Williams et al. (1988) model assumes that anxiety and depressive disorders could be attributed to such differential processing of information. Essentially, selective attention towards threatening information is an automatic process prevalent within anxiety. Whereas, biases in the mood congruent recall of past events, such as autobiographical or explicit memory tasks are elaborative processes and a characteristic of depression. The theory also predicts that measures of implicit memory bias reflect the pre-attention components and therefore underlie memorial biases demonstrated in anxiety. Figure 1.1. depicts the Williams et al. information-processing model for anxiety and depression.

In consideration of information processing in anxious people, the theory suggests that information is initially assessed for relevance or valence by the 'affective decision mechanism' (ADM). This assessment is then passed onto the 'resource allocation mechanism' (RAM), which operates in different directions depending upon this judgement. Resources can either be directed towards the stimulus or away from it.

Increased allocation of resources succeeds in prioritising the stimulus, thereby facilitating priming at a later stage, regardless of whether any deeper elaborative processing has taken place. Depression is associated with the information that is obtained during the pre-attentive priming stage being transferred to another ADM, which assesses the affective valence of the stimulus. Once again, resources are allocated depending upon the outcome of this assessment. Resources can be directed into further analysis regarding the meaning of the stimulus (elaboration), or redirected so that elaborative links with the stimulus are reduced (cognitive avoidance). Any elaborations of the stimulus are linked with it, hence the stimulus can be recalled or recognised following the activation of any one of these links. Williams et al. also propose that differential processing towards or away from affective stimuli would become more apparent as state anxiety levels increase.

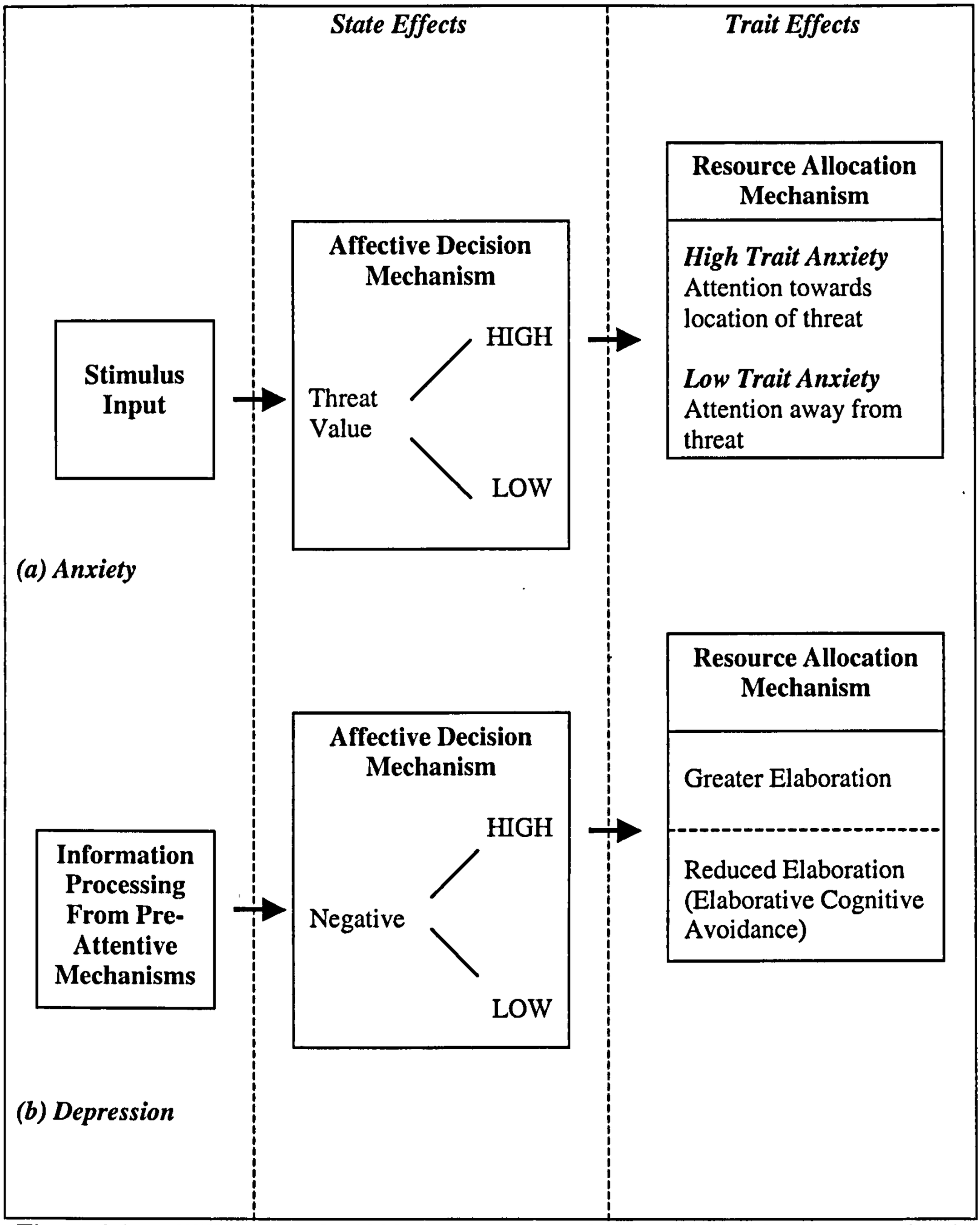


Figure 1.1. *Williams et al. (1988) Integrative Model representing how state and trait mood (e.g., (a) anxiety, (b) depression) may affect resource allocation at priming and elaboration stages (Williams et al., 1997, p.281)*

Unlike the theories of Beck and Bower, this model accounts for different patterns of processing biases in anxiety and depression. For example, the model proposes that state and trait factors have differential effects on the attentional and memory systems of an individual. State anxiety (or transient mood in depression) affects the ADM system, by increasing the likelihood of the ADM to decide that a stimulus is threatening. Essentially, it has the effect of making the system more sensitive to threat. As for trait factors, these tend to influence the workings of the RAM. In that, high trait anxiety leads to attentional resources being directed towards stimuli that the ADM classes as threatening, whereas low trait anxiety leads to resources being directed away. With depression, the trait effects tend to be located in the elaborative processing resource allocation component, and the effects are similar to the trait anxiety on attentional processing. As far as the development of anxiety and depressive disorders are concerned, Williams et al. argue that individuals high in trait anxiety or depression are more vulnerable than those wither lower trait levels of these emotions, to develop a clinical disorder. This is primarily due to such biases in cognitive processing being evident in those with higher trait levels of anxiety and depression.

On reviewing this model, Eysenck (1997) concludes that is an impressive attempt to provide a comprehensive account of the role of cognitive processes, trait and clinical anxiety, together with depression. Indeed, the distinction between priming and elaboration gives it a substantial theoretical advantage over the aforementioned notions that predict emotionally congruent biases throughout the cognitive system (e.g., Beck,

1976; Bower, 1981). However, Eysenck (1997) also argues that this theory ignores the relationship between the functioning of the cognitive, behavioural and physiological systems. Furthermore, there is evidence that anxiety influences elaborative processing too (e.g., Breck & Smith, 1983; Claeys, 1989; Mayo, 1989; Young & Martin, 1981). In support, Mathews (1993) argues that a combination of automatic and elaborative processes are involved in most emotions. For example, the initial tendency for sad individuals to make conscious negative judgements about themselves may become automated through practice, as the depression becomes more chronic (e.g. Anderson, Speilman & Bargh, 1992; Bargh & Tota, 1988). Equally, after the initial automatic perceptual identification of threatening cues, anxious individuals may then intentionally avoid further conscious processing in order to minimise the threat (e.g. Mogg et al., 1987).

Further Theoretical Perspectives

So far, this chapter has described the earlier theories of Beck and Bower that predict cognitive biases operate throughout the cognitive system in both anxiety and depression. A review of the research has shown that anxiety is mainly associated with selective attentional biases and depression with memorial biases. The Williams et al. (1988) model was then presented, as it accounted for a great deal of the inconsistencies highlighted in the research. The aim of the next section is to concentrate solely on theories that attempt to explain dysfunctional information processing in anxiety. The emphasis will be on attentional processing in anxious populations, because as Eysenck

(1992) and many others (e.g., Mathews, 1993; Öhman, 1996) propose, the major function of anxiety is attending to the rapid detection of threat. Subsequently, if the threat is to be detected as quickly as possible then the attentional system needs to be responsive to possible indicators of such threat. Thus, it is assumed that a combination of pre-attentive and attentional processes makes an anxious person more susceptible to threat-related information than low anxious individuals.

MacLeod's (1991) Theory

MacLeod (1991a) suggests a more general view of the relationship between cognitive processing and anxiety. He proposes that clinical forms of anxiety and trait anxiety are associated with different patterns of cognitive processing and not similar patterns as proposed by the Williams et al. (1988) model. He maintains that the research shows that high trait anxious individuals differ from low trait anxious individuals in the processing of threat-related information, only when pre-conscious levels of processing are being explored. In support, a study performed by MacLeod and Rutherford (1992) using the Stroop task, found that high trait anxious participants demonstrated an attentional bias towards general threat words under examination stress, but only when the stimuli were presented pre-attentively. When the stimuli were presented at a conscious level of processing, the high trait anxious participants showed a similar pattern of processing to the low trait anxious, displaying an attentional bias away from threat. In contrast, MacLeod and Mathews (1991) found that when clinically anxious participants performed the Stroop task, they showed a bias towards the threat words at both pre-

attentional and conscious processing levels, compared to low anxious controls. This provides evidence to support MacLeod (1991), as he argues that clinical anxiety influences both the pre-attentive and conscious level of processing threat. High trait anxious individuals on the other hand, are consciously able to control attentional processing of threat related information and direct attentional resources away from it. Overall, MacLeod suggests that it is the lack of ability to consciously modify the attentional focus to threat in clinically anxious patients that may account for the severity of anxiety symptoms found in such populations.

The main problem with this approach is that it offers no explanation as to why clinically anxious individuals are not able to compensate for their automatic bias towards threat using conscious processing. Also, as far as memory processing is concerned, MacLeod suggests that one would expect a memory bias for threatening information to be associated with clinical anxiety. However, the evidence suggests either the opposite, which is cognitive avoidance of threat (e.g., Foa & Kozak, 1986), or no bias at all (e.g., Mogg & Mathews, 1990; Mogg et al., 1987; Mogg, Gardiner, Starron & Golombok, 1992).

Eysenck's (1992) Hypervigilance Theory

Another conceptualisation influenced by the aforementioned theories and the empirical research on information biases described earlier, is Eysenck's (1992) cognitive theory on the multi-dimensional nature of trait anxiety. This theory argues that the primary attentional concern in people with high levels of anxiety is the detection of threat

in the environment. This theory stems from the evolutionary perspective (e.g., Oatley & Johnson-Laird, 1987), with the assumption that the most important function of anxiety is to facilitate the early detection of impeding danger, possibly being essential to survival. Similar to the integrative theory (Williams et al. 1988), he assumes that individuals high and low in trait anxiety differ in terms of their pre-attentional and attentional cognitive functioning of threat detection.

Eysenck's (1992) theory suggests that high trait anxiety is associated with a high rate of environmental scanning for threat-related information. He proposes that such increased attentional scanning of the environment could be both general and specific in nature. For example, whilst high trait anxious individuals exhibit increased environmental scanning and attend to irrelevant stimuli (known as distractibility), they also selectively process threat-related information. Once the threat is detected and processed, the high trait anxious individual narrows their attentional focus to the threatening information that is most related to their current concerns. This theory postulates that this process of hypervigilance gives rise to cognitive biases, such as selective attentional bias and negative memory biases for socially and physically threatening information.

Overall, Eysenck postulates that hypervigilance is the crucial factor that causes cognitive biases in attentional processing. He suggests that the highly anxious selectively attend toward threatening material, whereas those low in anxiety avoid such information. Hypervigilance is especially obvious in high trait anxious individuals during stressful

conditions when state anxiety is high. He argues that hypervigilance for threat, together with biases in one's cognitive appraisal and the interplay of a major life stressor, are cognitive vulnerability factors pre-disposing high trait anxious individuals to develop a clinical anxiety disorder, such as generalised anxiety disorder.

In consideration of the review of attention and anxiety literature presented earlier in this chapter, Eysenck's theoretical notion has reasonable evidence to support the major assumption that individual differences in the functioning of the cognitive system, aid in the understanding of how high and low trait anxious individuals differ (e.g., Mathews et al., 1986; Mogg et al., 1990). However, it concentrates solely on the emotional cognitive appraisal of a situation, de-emphasising the importance of one's own perception of physiological activity. For example, Clark (1986) has detailed the importance of the cognitive appraisal of one's heightened bodily arousal in the maintenance of panic disorder. Furthermore, external sources of information such as negative evaluation from others are considered to be a key factor in anxiety disorders such as social phobia (e.g. Clark & Wells, 1995). Finally, as Eysenck himself recognises in 1997, this theory also lacks the detailed consideration of the functioning of the cognitive system, which is crucial in the quest for a satisfactory theoretical account.

The Attention and Anxiety Literature (Part Two)

The next section presents recent research that highlights further issues not fully addressed by the previous theoretical conceptualisations. These studies employ the visual dot-probe task using aversive pictures or angry faces (paired with a neutral picture or

face), rather than words, as stimuli. The same basic principal applies, in that high anxious participants should show attentional priority towards threatening pictures or faces. Indeed, Mogg and Bradley (1998) argue that pictures and faces represent a more natural, ecologically valid representation of real-life danger, than words.

Bradley, Mogg, Millar, Bonham-Carter, Fergusson, Jenkins and Parr (1997) used pairings of emotional facial expressions (e.g. threatening, happy) with neutral faces and reported that individuals experiencing high levels of anxiety and depression attended towards the threat, when compared to individuals experiencing low levels of these emotions. Further studies have also shown that high trait anxious individuals orient attention towards aversive facial expressions at conscious (Bradley, Mogg, Falla & Hamilton, 1998; Bradley, Mogg & Millar, 2000) and pre-attentive (e.g., Mogg & Bradley, 1999) levels of processing. Furthermore, patients with generalised anxiety disorder, in comparison to low anxious controls, also show an attentional vigilance for threatening faces, relative to neutral faces (Bradley, Mogg, White, Groom & de Bono, 1999).

Additionally, studies have used affective pictures and found that high trait anxious participants show greater vigilance for mild or severely threatening scenes, in comparison to the neutral pictures (e.g., Mogg, Bradley, Miles & Dixon, 2004; Mogg, McNamara, Powys, Rawlinson, Seiffer & Bradley, 2000; Yiend & Mathews, 2001, study 1). The Yiend and Mathews study also found that low trait anxious individuals avoided mildly threatening scenes, but this avoidance was reduced as the threat value of the picture

increased. A similar finding has been reported by Wilson and MacLeod (2003), as they found that as the threat intensity of the angry face increased to its most severe, both high and low trait anxious participants attended towards this threat cue. These findings suggest that selective attention to severe threat is relevant for all individuals irrespective of their level of trait anxiety.

Overall, visual dot-probe studies using aversive pictorial and facial cues demonstrate the same preferential attentional focus towards threat cues in anxiety-prone participants. Furthermore, this effect is notable without evoking high levels of state anxiety. Interestingly, there is also evidence that low trait anxious individuals selectively attend to more severe threatening stimuli, such as highly threatening scenes or faces, and this finding has not been considered by the previous theoretical notions. With this in mind, the next section of the review briefly presents two more recent models of selective processing in anxiety that attempt to directly address this issue.

A Cognitive Model of Selective Processing in Anxiety by Mathews and Mackintosh (1998)

Mathews and Mackintosh (1998) developed their theory in an attempt to address certain features that have arisen from the extensive experimental evidence into preferential attentional processing. They felt that the Williams et al. (1988) model did not explain the notion of competing attentional processing and the priority placed when this occurs. Furthermore, they felt that the prediction that the low trait anxious will attend away from threatening information, does not make sense in the case of attending to a severe threat, as demonstrated in a recent dot-probe study using pictures (Yiend &

Mathews, 2001). Thus, Mathews and Mackintosh suggest that it is the current relevance of the threat cue to the individual, irrespective of their level of trait anxiety, that is the crucial factor in preferential attentional processing.

Essentially, the model (see Figure 1.2.) proposes that within the attentional system, certain characteristics of the stimuli (such as it threat value) are processed in competition with other information. The 'threat evaluation system' (TES) determines the representations concerned with potential danger, and strengthens activation of threat-related attributes if the stimulus is deemed as highly threatening. The TES is a similar evaluation system to the 'affective decision mechanism' (Williams et al. 1988). The increase in activation is strengthened by increases in the individual's current level of anxiety. The voluntary 'effortful task demand' unit is a limited source, that can counter-influence the activation to the target representation, further reducing the possibility of distraction. Mathews and Mackintosh suggest the balance between these opposing systems determines the magnitude of any attentional processing biases. More specifically, attentional differences to threatening stimuli associated with anxiety arise due to variations in the threshold level. Anxiety-prone individuals have a relatively low threshold, which causes their attention to be captured by weak threat cues (such as threatening words). Low anxious individuals, on the other hand, have a higher threshold, resulting in them being less likely to focus on weak cues. It is important to note that more severe forms of threat will capture everyone's attention, irrespective of their level of trait anxiety.

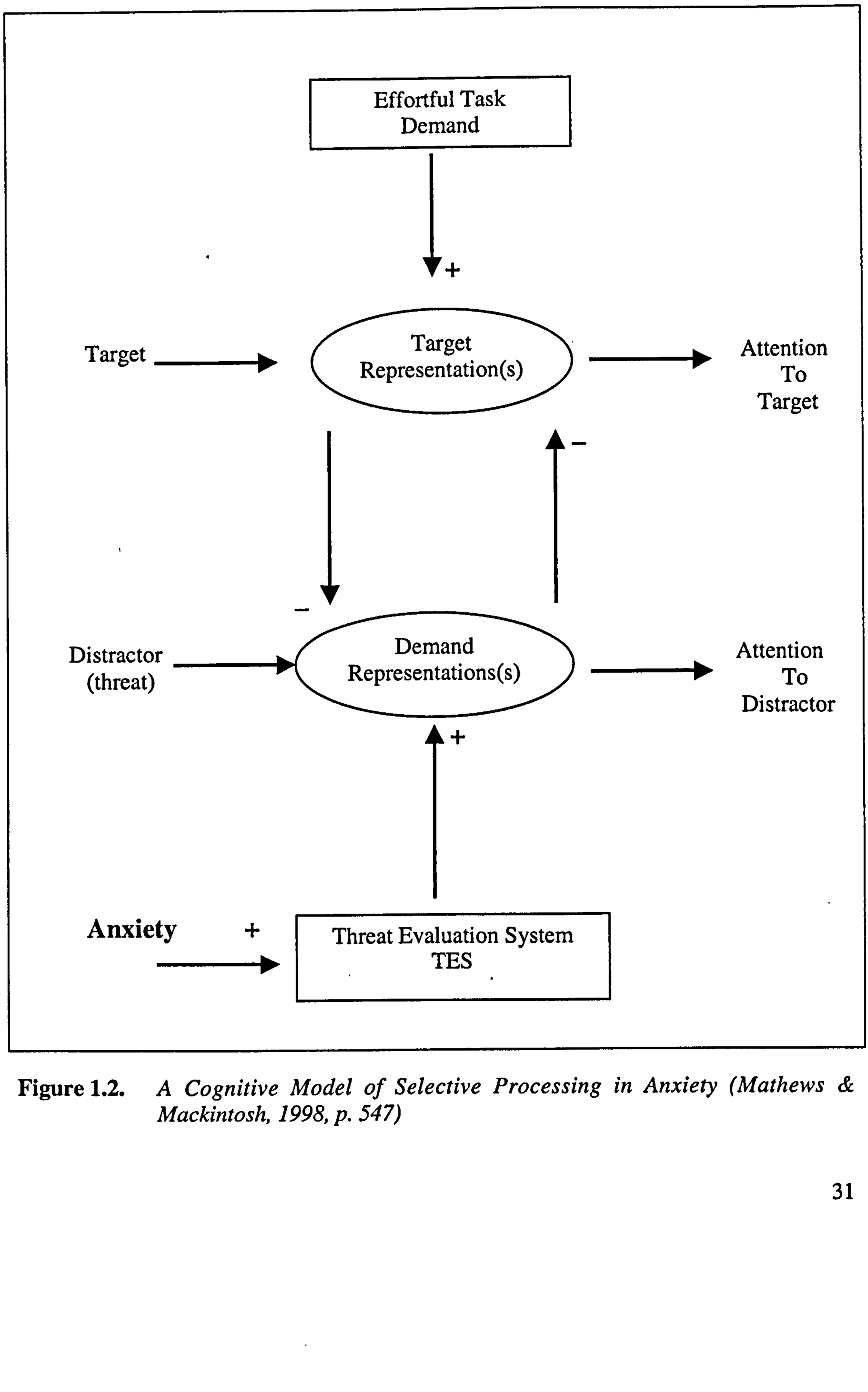


Figure 1.2. *A Cognitive Model of Selective Processing in Anxiety (Mathews & Mackintosh, 1998, p. 547)*

A Cognitive-Motivational Analysis of Anxiety by Mogg and Bradley (1998)

This cognitive-motivational view of anxiety, consistent with Mathews and Mackintosh (1998), argues that selective attention to threat is an evolutionary relevant mechanism. Basically, Mogg and Bradley (1998) propose that anxiety facilitates rapid response to potential threat, and therefore interrupts ongoing behaviour. They propose two conceptually distinct functions (see Figure 1.3.) are influential in the mediation of anxiety, namely the 'valence evaluation system' (VES) and the 'goal engagement system' (GES). This theory assumes that these two systems, the former related to emotion and the latter to motivation processes, underlie a person's behaviour.

According to this theoretical perspective, various factors influence the VES. These include the individual's level of state anxiety, the situational context, as well as the nature of the stimulus and previous learning experiences. The role of the VES is to determine potential threat value of the incoming stimulus. This assessment process can be an automatic pre-conscious analysis of the incoming information. It can also include more detailed strategic processing involving the combination of contextual and memorial information. Consequently, the VES is a complex process comprising multiple levels of processing, both within and outside of the person's awareness. This model suggests that the VES is more responsive to negative stimuli in high trait anxious individuals. This means that mildly threatening stimuli (such as aversive words used in Stroop and visual dot-probe tasks) are tagged as having a comparatively high threat value. Individuals low in trait anxiety still assess the threat value of stimuli, but if relatively mild (such as

negative words), the VES tags it with a low threat value.

The threat value of the stimuli is then passed onto the GES, which is responsible for the allocation of cognitive processing and subsequent behaviour. If the stimulus has a high threat value, this system automatically focuses on the threat and interrupts any ongoing activities. Conversely, if it is labelled with a low threat value, then the GES will ignore the stimulus and concentrate on current goals. The GES consists of many different cognitive and behavioural components, including pre-attentive and attentional focus, strategic avoidance and disengagement from current goals.

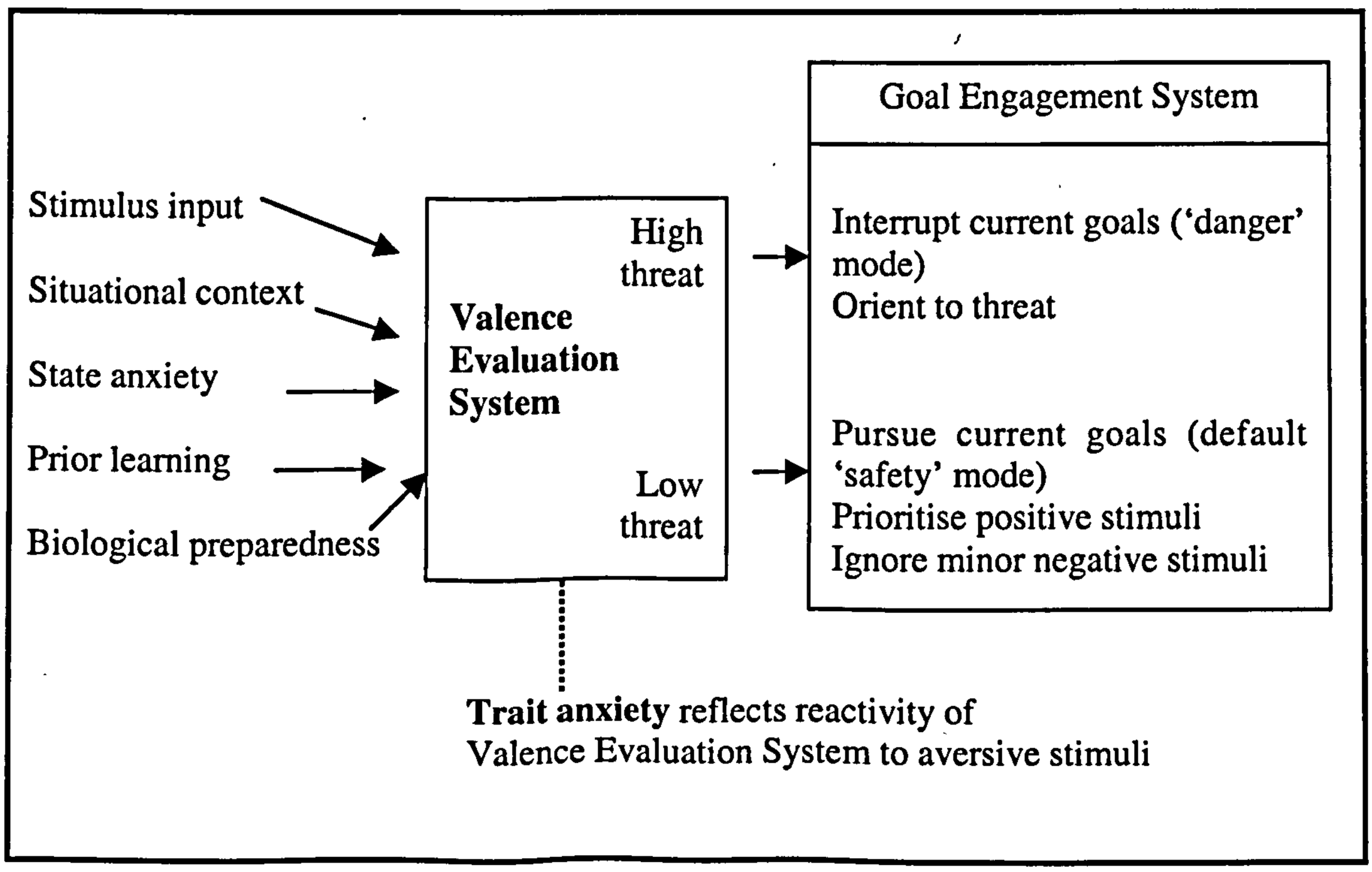


Figure 1.3. A *Cognitive-Motivational Model of the mechanisms underlying biases in initial orienting to threat in anxiety (Mogg & Bradley, 1998, p.817)*

Mogg and Bradley argue that this cognitive-motivational perspective has several strengths. For example, it integrates research developments, evolutionary and biological perspectives, and traditional theories of selective attention. It also explains pre-awareness and conscious attentional processes, and the role they play in the determination of whether a stimulus is threatening or not. Additionally, this model proposes that the subjective threat value of the stimulus is a vital factor as to whether or not it will capture the person's attention. Interestingly, Mogg and Bradley suggest that it is the bias in the operation of the VES, and not just attentional biasing per se, that is the key vulnerability factor in the development of an anxiety disorder. They surmise this as both high and low trait anxious people attend towards dangerous threat, but it is the higher threat value assigned to relatively mild threat that anxiety-prone individuals tend to do through the VES, that is the key vulnerability factor. The GES is then activated and attentional focus is thus towards the mild threat, ignoring any other current goals.

The Enhanced Dwell-Time Hypothesis by Fox, Russo, Bowles & Dutton (2001)

An alternative viewpoint to the suggestion made by previous research (e.g., Fox, 1993; MacLeod & Mathews, 1988; Mogg et al., 1994) and theories (e.g., Beck, 1976; Eysenck, 1992; Williams et al., 1998) that anxious populations are faster to detect threat is proposed by Elaine Fox and colleagues (Fox et al., 2001; Fox, Russo & Eititi, 2004; Mathews, Fox, Yiend & Calder, 2003). Essentially, they argue that once people with anxiety detect a threatening stimulus, they will process the information more deeply than

low anxious individuals, which results in them taking longer to disengage from threat-related stimuli. Fox et al. (2001) propose that this viewpoint originates from the notion that the attentional system is not a unitary concept and consists of three components. These are attentional shifting, engagement and disengagement (Posner & Petersen, 1990).

Fox et al. (2001) tentatively hypothesise that the appearance of a new object in the environment automatically draws visual attentional processes to it. At this point, the meaning and the emotional content of the stimulus have no influence on the initial orienting of attention. Next, the object is prioritised in order to determine whether any further processing is required by the attentional system. It is at this stage that relevant stimuli are selected for further attentional processing. The increase in attentional dwell time for threatening stimuli allows for the identification and evaluation of the implied threat. Importantly, Fox and colleagues suggest that it is this mechanism that may be biased in anxious individuals. They term this inability to disengage from threatening stimuli the 'enhanced dwell-time' hypothesis (Fox et al., 2001). They further argue that the inability to rapidly disengage from threat, focuses cognitive resources on the threat-stimuli, which has the consequence of maintaining and enhancing anxiety states. Thus, individuals who can rapidly disengage from threatening information may not experience increased anxiety states.

Fox and colleagues propose that this is a key theoretical distinction that has not been directly investigated by the studies using Stroop and visual dot-probe tasks. They suggest that the problem with both of these traditional cognitive experimental tasks is that

they fail to determine whether the threatening stimuli automatically attracts attentional processing resources towards it, or whether following initial detection of threat, attention is held and not able to be rapidly disengaged from it (Fox et al., 2001). Basically, Fox et al. argue that slower colour-naming times in Stroop and quicker response latencies in dot-probe tasks with threatening information could represent a quicker detection of threat or an inability to disengage from the threat.

Consequently, to investigate the exact mechanisms involved in attentional processing, a series of experiments have been conducted using visual search cueing paradigms (e.g., Posner, Inhoff, Friedrich & Cohen, 1987). This task typically includes the presentation of stimuli (threat, positive or neutral) in one of two locations (either left or right of a fixation point). Following this, a target (e.g., circle) is presented either in the location of the original stimuli (valid trial) or not (invalid trial). The participant is required to identify the target using relevant keys on the computer keyboard. The typical finding is that individuals are faster to detect the target on valid cues, whereas on invalid cues participants are slower to respond to the target. Fox et al (2001) state that this is generally termed as the 'cue validity effect'. Using this paradigm, Fox and colleagues argue that if the stimulus is neutral (face or word) then there should be no difference between high and low anxious participants in detecting the target. If the stimulus is threatening and automatically draws the attention of anxious people, the highly anxious will be faster than low anxious persons to detect the target on valid cued trials (i.e. target appears in same location as the threat stimuli). Conversely, if anxious participants dwell

on the threat stimuli then they would be slower than control participants to respond to the cue on invalid trials (i.e. target appears in the opposite location from the threat stimuli). The latter finding would provide evidence for the hypothesis of enhanced attentional dwelling on the threatening cue being a characteristic of anxiety.

In a series of studies, Fox et al. (2001) asked individuals with high and low levels of state anxiety to perform this cueing paradigm task. They found that the presence of threat related words (experiment 5), schematic angry faces (experiments 2 & 3) and real-life angry faces (experiment 4) influences the disengagement component of visual attention in high state anxious individuals relative to low state anxious participants. There was no difference between the high and low state anxious groups on the valid trials, suggesting that there is indeed increased attentional dwell time, and that this is the crucial factor in attending to threat. Yiend and Mathews (2001, study 2) also reported that high trait anxious individuals were slower than low anxious controls, to respond to targets following invalid cued trials incorporating threatening pictures. Further evidence suggesting that anxiety may primarily affect the disengagement of attention rather than the initial detection has been reported (e.g., Fox et al., 2002; Fox et al., 2004; Mathews et al., 2003).

In support of this view, Mathews (2004) surmises that it seems possible that failure to disengage attention from a threatening stimulus may be an influential factor in maintaining anxiety. Fox et al. (2001) put forward that the anxiety is being maintained by increasing awareness of potential dangers and the continued focus of cognitive

resources on the source of stress. Fox et al. (2004) further propose that the process of lack of disengagement from threatening cues may be associated with increased negative worry and rumination. Overall, effective attentional control may help to counter these adverse consequences, whereas a lack of attentional control and an increase in attentional dwell time may exacerbate them (e.g., Fox et al., 2001; Fox et al., 2004; Mathews, 2004).

Overall, the attentional dwell time hypothesis adopts an alternative insight into dysfunctional attentional processing in anxious populations. Thus offering an interesting new development in the field of the cognitive approach to the understanding of dysfunctional attentional processing in an anxious population. Currently, this view is in its early stages of development with more research required especially incorporating clinically anxious populations to ascertain if they also display this lack of ability to disengage from threat.

Chapter Summary

This chapter describes the development of the cognitive perspective and the role it plays in the understanding of anxiety (and depression). It includes a review of some of the key research in the area and highlights some theoretical shortcomings in the predictions of Beck's Schemata Theory (e.g., Beck, 1967; 1976; Beck & Clark, 1988) and Bower's Network Theory (e.g. Bower, 1981; 1987; Bower & Cohen, 1982; Gilligan & Bower, 1984). More specifically, that anxiety did not appear to be associated with a memory bias and an attentional bias in depression was not apparent. Williams et al.'s (1988) theory was then explained, as it attempted to address such issues. Also, as the

focus of this thesis is on attentional bias in anxious populations, MacLeod's (1991) and Eysenck's (1992) theories were presented, as they provide alternative explanations of dysfunctional processing. A review of further attentional research using pictorial stimuli showed that fairly consistent biases occur during attentional processing in anxious populations. It also highlighted that low trait anxious will attend towards more severe threat. In view of this, two more recent theoretical perspectives were then described that concentrate not only on the level of anxiety, but also the affective valence of the stimulus, as being important factors in attentional processing. Finally, a promising new avenue of research was presented detailing that anxious people may not actually be faster to detect threat but have a failure to disengage from it at a later stage of attentional processing.

Chapter Two

Theoretical and Empirical Review: Social Anxiety and Social Phobia

Chapter Overview

The theoretical approaches and empirical evidence presented so far have been highly influential in developing an understanding of the dysfunctional attentional processing in anxious populations. Rachman (1998) proposes that excessive anxiety is a central feature of many psychological disorders, such as panic disorder, obsessive-compulsive disorder and social phobia. Consequently, a further aim of the cognitive approach is to provide conceptualisations for guiding therapeutic intervention and for generating testable hypotheses that are specific to the anxiety disorder. The anxiety disorder of interest to this programme of work is social phobia, and its non-clinical form social anxiety. The focus of this chapter therefore, is to present and evaluate the theoretical approaches and experimental evidence pertaining directly to the nature of dysfunctional attentional processing in individuals with social anxiety and social phobia. Before this, social anxiety and social phobia are defined, together with an explanation of the relationship between them.

Definition of Social Anxiety

Lader (1998) states that "man is a social animal and inability to participate fully in social activities can be handicapping" (p. S33). Indeed, Lader also proposes that it is possible for every single person to be innately capable of feeling socially anxious in certain contexts. Furthermore, at any given time, for any individual, one's degree of social anxiety may range from being relatively low and feeling fearless, to debilitating levels and feeling extremely anxious. Stopa and Clark (2001) argue that is generally agreed that social anxiety is continuously distributed throughout the general population. Rachman (1998) suggests that the most commonly feared social encounters are fear of

public speaking, attendance at parties, and having a conversation with people in authority. Epidemiological studies (e.g., Kessler, Stein & Berglund, 1998; Stein, Walker & Forde, 1996) have established that feeling socially anxious during public speaking is the most common population concern.

Creed and Funder (1998) detail that social anxiety can manifest in a variety of ways, by affecting a person directly in the form of physiological symptoms (such as sweating, blushing or trembling) and behaviour (such as avoiding a social situation), and indirectly through its influence on self-esteem. The hallmark of social anxiety is that people fear being evaluated unfavourably by others during a social interaction (e.g., Stein & Cavira, 1998; Watson & Friend, 1969). Furthermore, individuals with high levels of social anxiety are characterised by a desire to make good impressions on others, but also experience a paralysing fear that they are unable to do so. Consequently, the high socially anxious adopt a modest no-risk approach to social interaction, in order to reduce the possibility of embarrassing social blunders. Unfortunately, the result of this tactic is that others often perceive the socially anxious person as being disinterested or bored, causing them to withdraw their efforts to be sociable. Creed and Funder (1998) put forward that this action has the effect of confirming the fears of the socially anxious individual and reaffirms their lack of self-efficacy. Often, the high socially anxious person will deliberately avoid the social situation altogether, so that they do not experience any negative reactions both from the self and others (e.g., Rachman, 1998; Watson & Friend, 1969). It is when such psychological distress or discomfort and avoidance behaviour becomes extreme and impairs normal every day functioning that the clinical syndrome of social phobia can develop.

Definition of Social Phobia

Heimberg, Stein, Hiripi and Kessler (2000) surmise that social phobia is a common disorder associated with serious social, educational and occupational impairment, considerable co-morbidity with other mental disorders and reduced life satisfaction. Social phobia was first described by Marks and Gelder (1969), but was only introduced into the psychiatric nomenclature in the third edition of the Diagnostic and Statistical Manual (DSM: American Psychiatric Association [APA], 1980) and has since remained a part of the diagnosis lexicon. Individuals with social phobia fear being observed and critically evaluated by others, with the DSM-IV defining it as a "marked and persistent fear of one or more social or performance situations in which the person is exposed to unfamiliar people or to possible scrutiny by others " (APA, 1994, p.411). Essentially, during a social interaction, persons with social phobia form negatively biased images and thoughts pertaining to their appearance (e.g., I'm blushing) and behaviour (e.g., everyone can see I am shaking). Such thoughts and images result in the individual with social phobia judging negative evaluation from others as being highly likely. Consequently, social phobics tend to engage in considerable avoidance behaviour, but inevitably certain social situations are unavoidable. In this case, the individual with social phobia experiences anticipatory anxiety by fearing the encounter, and situational anxiety during the social event (e.g., Clark & Wells, 1995). The current DSM-IV diagnosis criteria of social phobia are shown in Table 2.1.

Table 2.1. *DSM-IV Definition of Social Phobia (APA, 1994, p. 411)*

- A marked and persistent fear of one or more social or performance situations in which the person is exposed to unfamiliar people or to possible scrutiny by others. The individual fears that he or she will act in a way (or show anxiety symptoms) that will be humiliating or embarrassing. Note: In children, there must be evidence of the capacity for age-appropriate social relationships with familiar people and the anxiety must occur in peer settings, not just in interactions with adults.
- Exposure to the feared social situation almost invariably provokes anxiety, which may take the form of a situationally bound or situationally predisposed panic attack. Note: In children, that anxiety may be expressed by crying, tantrums, freezing, or shrinking from social situations with unfamiliar people.
- The person recognizes that the fear is excessive or unreasonable. Note: In children, this feature may be absent.
- The feared social or performance situations are avoided or else endured with intense anxiety or distress.
- The avoidance, anxious anticipation, or distress in the feared social or performance situation(s) interferes significantly with the person's normal routine, occupation (academic) functioning, or social activities or relationships, or there is marked distress about having the phobia.
- In individuals aged less than 18 years, the duration is at least 6 months.
- The fear or avoidance is not due to the direct physiologic effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition and is not better accounted for by another mental disorder.
- If a general medical condition or another mental disorder is present, the fear in the first criteria is unrelated to it, e.g., the fear is not of stuttering, trembling in Parkinson's disease, or exhibiting abnormal eating behavior in Anorexia Nervosa or Bulimia Nervosa.

Recent surveys calculate the lifetime prevalence of social phobia at about 7-14% in Western countries (e.g., Furmark, 2002; Kasper, 1998; Lecrubier, Wittchen, Farvelli, Bobes, Patel & Knapp, 2000). Magee, Eaton, Wittchen, McGonagle and Kessler (1996) have reported a slightly higher rate of social phobia in females than in males, with a ratio of 1.5 women to every male. Schneier and Johnson (1992) estimate that the mean age of onset is during late adolescence and early adulthood. However, as Bogels, van Oosten, Muris and Smulders, (2001) report, individuals with social phobia generally do not seek treatment until well into their adult years. Furthermore, it is also notable that in adulthood, social phobia rarely presents in its 'pure' form. Indeed, Katzelnick and Greist's (2001) research suggests that approximately 75% of patients with this disorder have at least one other psychiatric disorder, most commonly depression, but also other anxiety disorders and alcohol/substance abuse. Social phobia is not only the most common anxiety disorder, but also the 3rd most common psychiatric disorder after depression and alcohol/drug dependence (e.g., Kessler, Stang, Wittchen, Stein & Walters, 1999).

Social phobia consists of two distinct subtypes that differ in clinical characteristics and degree of associated social impairment (e.g., Stein & Chavira, 1998). The first subtype is called 'specific' or 'non-generalised' social phobia and is the most common of the two. Stein et al. (1996) suggest that this form of social phobia is generally confined to one fear, of which the most common is speaking in public. The second subtype is known as 'generalised' social phobia and is a pervasive form of the disorder. It is associated with several social anxiety fears (i.e. speaking and non-speaking fears) and accounts for the majority of social phobia patients being clinically treated.

Brown and Barlow (1992) also propose that the generalised form of social phobia is often associated with secondary anxiety or mood disorders. Table 2.2. presents the diagnostic subtypes for social phobia based on the current DSM-IV criteria.

Table 2.2. *Diagnostic Subtypes of Social Phobia*

Generalised
• Anxiety precipitated by most social interactions (except those with family or close friends)
• Most severe form of social phobia
• Likelihood of comorbid psychiatric conditions, including avoidant personality disorder
Non-Generalised or Specific
• Limited to specific social situations (e.g., public speaking, performance as an actor or musician)

n.b. Information taken from Lydiard (2001, p. 18)

The Relationship Between Social Anxiety and Social Phobia

There seems to be a close similarity between individuals experiencing high levels of social anxiety and patients with social phobia. In support, Turner, Beidel and Larkin (1986) report that during a social interaction there appears to be few differences between a clinical sample experiencing social phobia and a high socially anxious student sample in degree of distress, negative cognitions, or physiological responses. These authors conclude that undergraduate participants with high levels of social anxiety provide an appropriate analogue group for the study of social phobia.

One reliable way of distinguishing between social anxiety and social phobia is the extent to which the social anxiety symptoms interfere with day-to-day living. The DSM-IV classification (see Table 2.1.) states that the experience of anxiety "interferes significantly with the person's normal routine" (APA, 1994, p.411) and this appears to be the crucial factor in determining clinical levels of social anxiety. In support, Stein, Walker and Forde (1994) detail that 69% of people in their community survey reported experiencing anxiety in at least one social situation, but only 7% of the total sample felt that their social anxiety severely disrupted their lives.

Cognitive research has been carried out on both socially anxious analogue and socially phobia clinical samples. Indeed, Eysenck (2004) proposes that there are important similarities between manifestations of anxiety in normal individuals and patients with anxiety disorders such as social phobia. Apart from this, research focusing on socially anxious samples is required for a number of additional reasons. For example, Huppert, Franklin, Foa and Davidson (2003) note that it is well documented that due to the very nature of the disorder, individuals with social phobia can be difficult to recruit. Also, Stopa and Clark (2001) argue that there is a need for analogue studies, as they allow for the recruitment of large numbers of participants and more complex research designs. Furthermore, Rachman (1998) puts forward that high levels of social anxiety is a vulnerability factor that may predispose the individual to develop the clinical form of the disorder, and therefore provide a suitable alternative to people experiencing social phobia. Thus, there is a growing body of research investigating the cognitive attentional processes of the non-clinically socially anxious (e.g., Mansell, Clark, Ehlers & Chen,

1999; Mogg & Bradley, 2002), in an attempt to further the understanding of dysfunctional attentional processing in social phobia.

In order to determine a person's level of social anxiety, self-report measures are frequently used. The Fear of Negative Evaluation scale (FNE: Watson & Friend, 1969) and the Social Avoidance and Distress scale (SAD: Watson & Friend, 1969) are two measures that have been extensively used in social anxiety research (e.g., Harvey, Clark, Ehlers & Rapee, 2000; Mansell et al., 1999; Mullins & Duke, 2004; Winton, Clark & Edelmann, 1995). Whilst constructing these scales, Watson and Friend (1969) conducted a series of experimental and correlational studies that provided support for good test-retest reliability and concurrent validity of these scales. In support, recent reviews have proposed that both questionnaires are useful and reliable measures of social anxiety (e.g., Cox & Swinson, 1995; Heimberg, Hope, Rapee & Bruch, 1988; Herbert, Rheingold & Brandsma, 2001). Although, the appropriateness of its use with the clinical syndrome of social phobia has been debated (e.g., Heimberg et al., 1988; Turner & Beidel, 1988; Turner, McCanna & Beidel, 1987).

Theoretical Approaches to Social Phobia

The general theoretical view is that individuals with social phobia possess two central themes, namely fear of negative evaluation and heightened self-focused attention, that exacerbate their anxiety symptoms (e.g., Hartman, 1983; Beck et al., 1985; Clark & Wells, 1995 Leary & Kowalski, 1995; Rapee & Heimberg, 1997). This chapter will concentrate on three key conceptualisations that Musa and Lépine (2000) suggest have contributed significantly to the understanding and treatment of social phobia, namely Beck et al. (1985), Clark and Wells (1995) and Rapee and Heimberg (1997).

The Cognitive Model of Anxiety Disorders and Phobias by Beck, Emery and Greenberg (1985)

Beck, Emery and Greenberg (1985) provide one of the earliest and most influential cognitive models of anxiety disorders in general, and social phobia in particular. This formulation is based on clinical observations and Beck's subsequent theories of depression (Beck, 1967) and anxiety (Beck, 1976) that were briefly explained in chapter one. The model suggests that people experience social phobia, due to the existence of dysfunctional belief systems, or schemas, that socially anxious individuals hold about their ability to function effectively in social situations. The schemas applicable to social phobia are a perception of themselves as highly vulnerable to criticism and rejection by others. Beck and colleagues identify three categories of dysfunctional beliefs, namely excessively high standards for social performance, conditional beliefs concerning social evaluation, and unconditional beliefs about the self. Examples of such beliefs are 'I must not show any signs of weakness to other people', 'If I make mistakes others will reject me' and 'I will make a fool of myself if I blush or show how nervous I am', respectively. These cognitive structures bias incoming information by a process that magnifies social threat and reduces the individual's perceived ability to cope with it. The schemas play a vital role, by influencing one's perceptions, interpretations and memories, thus maintaining their social anxiety.

The theory proposes that once triggered by a social situation, these maladaptive schemas relating to negative social evaluation, contribute to the maintenance of this disorder through a series of vicious circles at both an automatic and conscious level. For example, individuals with social phobia view the world as a dangerous place in which they must be constantly vigilant for social threat cues. Consequently, an attentional bias

towards social-threat cues in the environment increases the likelihood that the socially phobic person will perceive signs of social rejections, confirming the initial negative expectations. Also, people with social phobia fear that they will not display their desired impression of themselves during a social interaction, and perceive somatic and behavioural symptoms of anxiety, such as sweating, blushing or increased heart-rate, as proof of social incompetence. They are pre-occupied with negative evaluation thoughts pertaining to their social ability. This interferes with the processing of social cues and results in deterioration in their performance. The individual with social phobia directs their attention toward potential indicators of threat or social failure in interpersonal situations and excessive detailed negative self-monitoring interferes with their ability to process social cues. Beck and colleagues highlight that unlike in other phobias, the feared consequences (poor performance) are likely to occur, because of the preoccupation with the occurrence of these outcomes.

The Cognitive Model of Social Phobia by Clark and Wells (1995)

The Cognitive Model of Social Phobia (Clark & Wells, 1995; Wells & Clark, 1997) was heavily influenced by David Clark's (1986) theory of panic, together with existing cognitive theories of social phobia (Beck et al., 1985; Fenigstein, Scheier & Buss, 1975; Hartman, 1983; Leary, 1983b; Trower & Gilbert, 1989). Wells (1997) details that it was also empirically based on accumulated clinical and experimental evidence obtained from people with social phobia.

Fundamentally, this model proposes that individuals with social phobia are preoccupied with negative evaluational thoughts, and the tendency to over-predict the probability and the seriousness of an aversive social encounter. The theory suggests that

persons with social phobia tend to construct highly negative images of their performance in social situations, which contribute substantially to anticipatory anxiety, as well as post event processing. While anticipating a social interaction, social phobics selectively retrieve and ruminate on negative information about how they will behave and be regarded by others during the social encounter. Thus, on the basis of this over emphasis on negative evaluation and self-perception, individuals with social phobia develop a series of problematic assumptions about themselves and their social world (e.g., "I must look confident" or "If I show signs of being anxious, others will think that I am a failure/stupid"). They become overly concerned with protecting themselves from negative social outcomes that they assume will occur, resulting in the appraisal of the social situation as dangerous, which in turn generates more social anxiety. Clark and Wells also propose that the socially phobic person adopts a series of safety behaviours to prevent the occurrence of the social catastrophes they fear. In support, Salkovskis (1991) suggests that patients with a variety of phobias engage in a variety of safety-seeking behaviours, that are intended to prevent or reduce the consequences of the feared catastrophe. Clark and Wells (1995) concur with this view, and propose that safety behaviours in social phobia are intended to prevent a variety of feared outcomes or hide a perceived inadequacy, thereby preventing a social catastrophe such as rejection by others or being evaluated by others in a negative fashion. Some examples of safety behaviours in social phobia are wearing clothes that would hide their blushing (e.g., scarf or high collared shirt), avoiding eye contact with anyone during a social interaction and gripping a glass tightly to hide the possibility of shaking hands. However, Clark and Wells propose that safety behaviours play a crucial role in the maintenance of the social phobia,

as they can actually make the person feel more anxious and appear distant or aloof to other people. For example, Clark and Wells present evidence that during therapy, a woman who grasped her wine glass very tightly realised that this made her hand more likely to shake. Furthermore, the avoidance of eye contact can also make other people think the socially phobic person dislikes or is not interested in them, thus provoking an unfriendly or critical response from them.

Figure 2.1. illustrates the range of processes that occur when individuals with social phobia enter a novel, demanding or important social situation. A central proposal is the importance of self-focused attention, which involves the individual with social phobia shifting their attention from the environment to a detailed monitoring and observation of themselves. This self-monitoring provides evidence of feared anxiety responses (e.g., blushing, sweating or shaking) and interferes with processing external information from others and the environment. Furthermore, the interpretation of internal sensations in this way creates or maintains a negative impression of themselves, which they then assume reflects what other people are observing. For example, if the individual with social phobia perceives that they are blushing, they will become more anxious, because they then use this internal information to infer how they appear to others and what others think of them. The model regards the process of self-focused attention as crucial in the maintenance of social phobia in individuals.

Clark and Wells propose several ways in which self-focused attention could be initiated. In certain situations it is considered to be a strategic process that is consciously mediated, such as the adoption of a safety behaviour (e.g., wearing clothes to hide blushing). In other cases, because anxiety is accompanied by a variety of physiological

changes, such fluctuations may attract attention, especially as these symptoms are considered so important in indicating how they are coming across to others. Additionally, social phobia is associated with the assumption that interoceptive information is a more reliable source of information than the people who they are interacting with. This is despite the fact that people rarely give unambiguous feedback, and even when positive feedback is given, individuals with social phobia are unlikely to process it because their primary concern is with self-monitoring.

Finally, after leaving the feared social situation, this model predicts that individuals with social phobia undertake negative 'post-event processing'. This cognitive process means that they selectively retrieve and focus on any perceived negative anxious feelings, thoughts or self-perceptions. These 'post-mortems' intensify and consolidate their negative experiences and lead the socially phobic person to review the current social encounter as being more negative than it really was. This negatively biased review process also provides the person with social phobia more negative information regarding that social encounter, which the individual with social phobia remembers during the 'anticipatory' pre-event processing stage before the next social encounter.

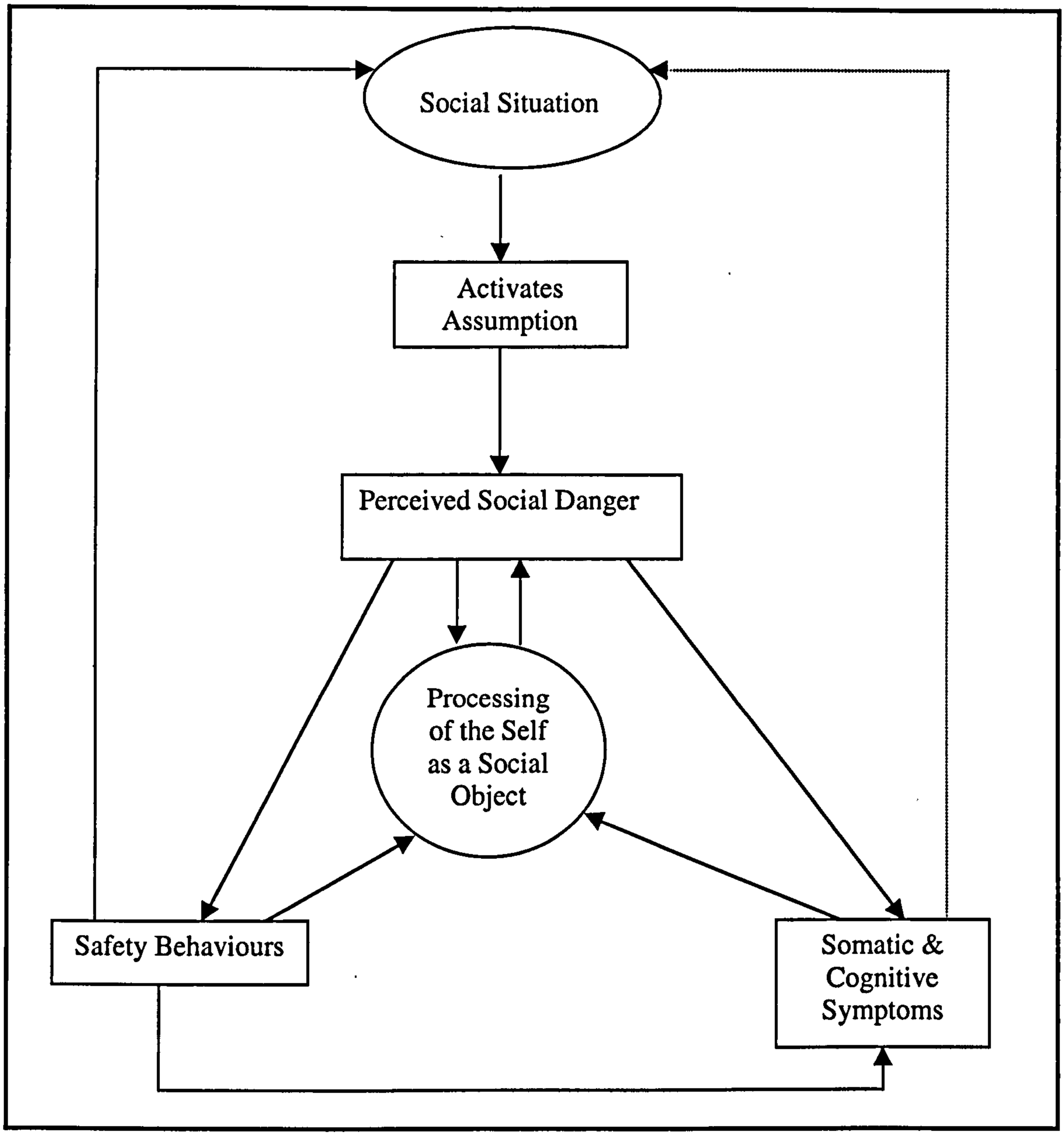


Figure 2.1. *The Cognitive Model of Social Phobia suggesting the processes that occur when an individual with social phobia enters a feared social situation (Clark and Wells, 1995; p.72)*

A Cognitive-Behavioral Model of Anxiety in Social Phobia by Rapee and Heimberg (1997)

The model described here extends earlier approaches (e.g., Carver & Scheier, 1988; Schlenker & Leary, 1982) and is very similar to the Clark and Wells model (1995). The emphasis of this model is on the anxiety that people with social phobia experience in social situations (see Figure 2.2.). It is essentially based on the premise that people with social phobia believe that other people are likely to evaluate them negatively. Thus, the theory predicts that to a person with social phobia, a social situation comprises the potential for interaction or observation by others, thus increasing the possibility of negative evaluation. A social encounter causes a person with social phobia to form a negative mental representation of his or herself. This is based on information from the long-term memory (e.g., prior experience), internal cues (e.g., physical symptoms) and external cues (e.g., audience feedback). Attentional resources are assigned to potentially negative aspects of the self-image and detailed monitoring for potential external threat.

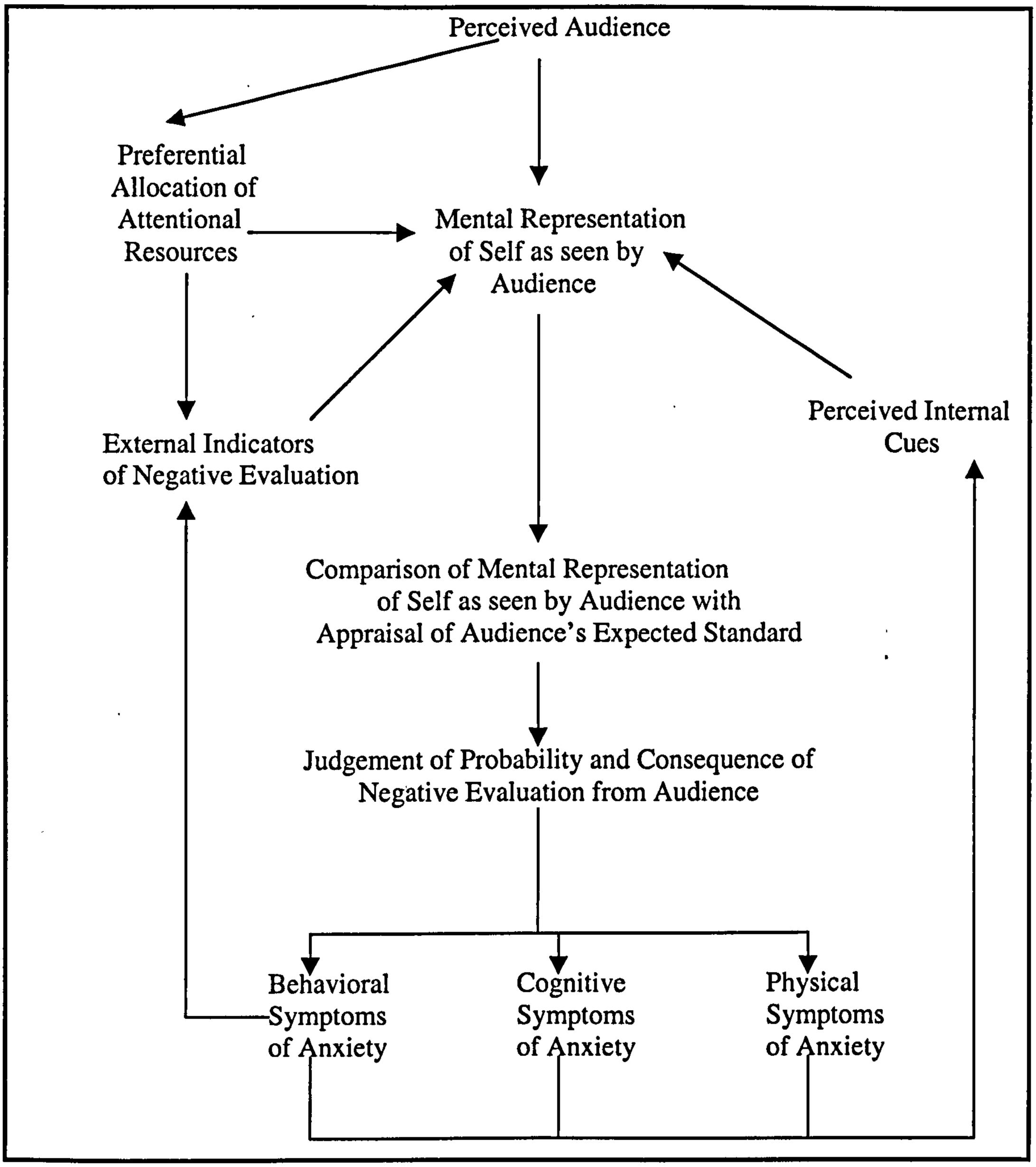


Figure 2.2. *A Cognitive-Behavioural Model of Anxiety in Social Phobia (Rapee & Heimberg, 1997; p. 743)*

Rapee and Heimberg (1997) propose that external indicators of threat include signs of negative evaluation, such as frowns, shaking of head or disinterest. Essentially, as the attentional focus of individuals with social phobia is towards negative evaluation, they frequently process external indicators with a negative bias. At the same time, the individual is also formulating a prediction of how they are being perceived by others. This involves a comparison of their own performance with what they perceive to be the audience's standard (generally more superior to them). A judgement as to whether they are performing in a manner that meets the presumed audience standard, determines the perceived likelihood of negative evaluation. The expected negative evaluation from the audience further elicits anxiety and comprises of physiological, cognitive and behavioural components. This process influences the individual's mental representation of themselves, with the consequence of renewing the cycle and maintaining the social anxiety.

This model predicts that persons with social phobia will be characterised by an extensive allocation of attentional resources to the detection of threat. Rapee and Heimberg also suggest this process of threat detection occurs at a pre-attentive and conscious level of processing. The threat however, in this case of social phobia, is the monitoring of the mental representation of how the 'self' is appearing to others and the identification of any features (both internally and externally) that may increase the risk of negative evaluation.

Summary of the Theories

It is important to understand the nature of attentional processing in socially anxious and socially phobic individuals, as Wells (1997) argues that they are considered

to be a key factor in the cause and maintenance of this anxiety disorder. Indeed, this theoretical review has highlighted that dysfunctional cognitive processing biases appear to be a core feature of social phobia. Consistent with the models presented in chapter one (e.g., Eysenck, 1992; Mathews & Mackintosh, 1998; Mogg & Bradley; 1998; Williams et al., 1988; 1997), this bias probably intervenes at a pre-conscious and conscious level of processing. This review has shown that the key cognitive perspectives of social phobia predict differences in the nature of the attentional bias. In consideration of the theoretical predictions, both Beck et al. (1985) and Rapee and Heimberg (1997) hypothesise that during a social encounter, persons with social phobia constantly scanning the 'self' and the environment for threatening social information. They propose that this process of environmental attentional scanning for threat helps to maintain the high level of social anxiety, by confirming their negative expectations. The Clark and Wells (1995) model, on the other hand, puts forward that in a social situation, individuals with social phobia focus solely on interoceptive information. In particular, they concentrate on their own somatic responses and personal negative social-evaluation thought processes and avoid attentional processing of external information.

A further difference is that Beck and colleagues predict that although schemas pertaining to social anxiety (e.g., negative evaluation) are relatively stable structures, they need to be activated by a feared social encounter. Rapee and Heimberg put forward a similar view that the anxiety experienced in a social situation is the triggering factor. In contrast, Clark and Wells suggest that the socially phobic are pre-occupied with negative evaluation thought processes, irrespective of being in a social situation. They predict that a social situation is important for activating the attentional focus towards interoceptive

information, such as anxiety physiological symptoms, as well as personal negative-evaluation thought processes.

It is important to note that there are also some similarities between the theories. For example, the theories highlight the importance of a social situation on the nature of the attentional bias in social phobia to certain socially threatening stimuli. Also, they predict that individuals with social phobia attend towards their physiological anxiety symptoms (e.g., blushing) during a social interaction, and interpret these feelings as signs of weakness and that other people will evaluate them in a negative fashion.

Attentional Bias and Social Anxiety/Phobia: The Empirical Evidence

This section presents an overview of the attentional research involving socially anxious and socially phobic individuals. The studies detailed in this review have used either the emotional Stroop task or the visual dot-probe task to assess attentional processing. Please see chapter one for a full explanation of these tasks. The emphasis in this section is on the identification of the nature of attentional processing patterns associated with individuals with social phobia or social anxiety, when compared to low-anxious controls, patients with panic disorder or generalised anxiety disorder. It also attempts to illustrate some methodological issues from the research that has influenced this current programme of work. For clarity, social anxiety is used to represent analogue studies and the term social phobia signifies clinical studies.

The Emotional Stroop Task

The first study that investigated attentional processing in social phobia using the Stroop paradigm was by Hope, Rapee, Heimberg and Dombeck (1990). They included social threat and physical threat words in this task and reported highly specific effects. In

that, the study found that individuals with social phobia were slowed by social threat words and not physical threat cues, whereas the opposite held for panic patients. In a follow-up study, Mattia, Heimberg and Hope (1993) reported that patients with social phobia were generally slower than non-anxious controls, to colour name social and physical threat words, but more so for social threat words. Furthermore, following cognitive-behavioural treatment, those who responded well to the therapy showed a significant decrease in response latency, whereas non-responders did not. This study provides initial evidence that the Stroop task is sensitive to subtle changes in clinical state. However, Williams et al. (1997) argue that as no stress test (i.e., placing the participant in a social anxiety provoking situation) was performed during the study to ascertain whether the recovered patients experienced lower levels of social anxiety as before, the possibility still remains that the emotional Stroop task may be an indicator of latent vulnerability to selectively process threat.

In contrast, a more recent study by Niekerk, Moeller and Nortje (1999) found that there was no evidence of an interference effect for disorder-specific words in social phobia using the Stroop task. However, over two thirds of the social phobia sample had participated in psycho-pharmacotherapy at the time of the study. Furthermore, there were no questionnaires or structured interviews included to ascertain the level of social phobia in the group, only measures of trait and state anxiety. Thus, it seems fair to conclude that severity of social phobia is questionable in this sample. The Nierkerk et al. study does however highlight the importance of selecting participants with social phobia who have not undergone any form of treatment, because as demonstrated by Mattia et al. (1993) the Stroop interference effect can be reduced following successful treatment for this disorder.

Levels of social evaluation have also been manipulated to explore the influence of state anxiety on attentional processing patterns in patients with social phobia. For example, Amir, McNally, Reimann, Burns, Lorenz and Mullen (1996) included a condition where participants were advised that they would have to give a speech following the Stroop task, thus raising levels of social anxiety. In line with previous studies (Hope et al., 1990; Mattia et al., 1993), the individuals with social phobia were slower to colour-name social threat words, than the control group, in the non-evaluation condition (i.e., not advised that they would have to give a speech). In the social-evaluation condition however, individuals with social phobia were quicker to colour name these words, than the non-anxious control participants. The authors surmised that social phobics might be more adept at suppressing any attentional bias, when in a socially anxious situation. However, this study also found evidence of an attentional bias towards physical threat words in the social-evaluation condition. Unfortunately, Amir and colleagues did not speculate on this finding, even though it provided evidence of social phobia being associated with a bias toward a non-specific disorder word group. Lundh and Öst (1996) included the presence of a mirror in an attempt to increase self-focus and thereby activate various dysfunctional self-related schema. The authors felt that such a manipulation would further increase the interference effect for socially threatening words. Although the social phobic group demonstrated an attentional bias towards socially threatening words, the interference effect was not strengthened by the presence of a mirror. These findings indicate the importance of using an anxiety provoking manipulation that is strong enough of activate negative self-structures, as Lundh and Öst (1996) suggest that the mirror manipulation was not effective at enhancing self-focus.

In view of Amir et al's (1996) findings, Amir, Freshman and Foa (2002) investigated the possibility that the attentional bias to threat demonstrated by the Stroop task may be attenuated, when levels of anxiety are increased. However, rather than including a social-evaluation manipulation as in the Amir et al. (1996) study, they attempted to manipulate the Stroop effect by varying the frequency of socially threatening words to non-words which comprised of a series of crosses (e.g., XXXX). They proposed that exposing the participant to a greater number of social threat words, in contrast to non-words, would increase their arousal to social threat (high frequency condition). Amir and colleagues argued that this manipulation would activate strategic processing similar to that when levels of social-evaluative anxiety are increased that would be demonstrated by a lack of attentional bias towards the social-threat cues, in the high social-threat word frequency condition. They also included a low frequency condition, exposing the individual to a lower number of social threat words in comparison to non-words. The results from the study were consistent with their hypotheses, in that patients with generalised social phobia took longer to colour-name the low ratio social threat words, when compared to high ratio social threat words. The control participants did not show such an effect. These findings not only indicate that the attentional bias to threat can be experimentally manipulated, it also suggests the strategic avoidance of threat during a heightened exposure to social-threat words. These findings provide support for the models that predict a vigilance-avoidance pattern of information processing (e.g., Mogg & Bradley, 1988; Williams et al., 1988). In that, anxious individuals may not only be characterised with an automatic attention towards threat, but also an effortful strategic avoidance of threat. Indeed, Amir and colleagues conclude that

the possible implication of demonstrating this strategic control is that it may play a factor in the development and maintenance of social phobia. This is because such strategic avoidance means that the socially phobic person does not adequately process all the information pertaining to the social situation.

The issue of specificity has been explored within social phobia groups and across anxiety disorder groups. The term specificity in these studies refers to both the valence and the content of the information presented being of unique relevance to the disorder (e.g., public speaking in social phobia or worry related words in generalised anxiety disorder). McNeil, Reis, Taylor, Boone, Carter, Turk and Lewin (1995) examined the nature of the attentional bias in people experiencing generalised and discrete social phobia. Although, both types of social phobic patients demonstrated interference effects for negative evaluational and speech related words, only the generalised social phobia group showed longer latencies in response to general social situation words.

In the assessment of specificity across different anxiety disordered groups, Maidenberg, Chen, Craske, Bohn and Bystritsky (1996) investigated the nature of the interference effect in patients with social phobia or panic disorder. The study incorporated threat words (panic, social and general), positive words (social and general) and neutral words into their Stroop task. The findings showed that social phobia and panic patients displayed an attentional bias towards threatening (and not positive) information that was specific to their disorder. Interestingly, both patient groups were equally concerned with their physical sensations as indicated by their scores on the Anxiety Sensitivity Index (Reiss, Peterson, Gursky, & McNally, 1986), indicating some similarities within the two disorders also. In a related vein, Spector, Pecknold and

Libman (2003) reported that persons with generalised social phobia, when compared to non-anxious controls, showed attentional biases to socially threatening words (e.g., criticise, failure, rejection). Interestingly, they also found that social phobia was associated with an attentional bias towards words describing anxiety symptoms that are noticeable by others (e.g., blushing, shaking, stuttering). These findings suggest that the specificity of the bias in social phobia includes words relating to visible anxiety symptoms, that the person with social phobia is often concerned about displaying to others during a social encounter. Becker, Rinck, Margraf and Roth (2001) also reported disorder-specific effects across the anxiety disorders. They found that patients with social phobia displayed a highly selective attentional bias by taking longer to colour-name public speaking-related words, whereas individuals with generalised anxiety disorder showed more general attentional biases with slower latencies to all emotional words. These studies show the importance of the issue of specificity in the determining the attentional bias in clinical populations.

Evaluation of the Stroop Findings in Relation to the Theories

Assuming that the Stroop paradigm can be interpreted as a measure of attentional bias (see chapter one for criticisms), studies including this task have shown consistent findings. They found that clinical levels of social phobia appear to be associated with longer reaction times towards socially threatening semantic stimuli, indicated by a greater interference in response latencies to colour name these words (e.g., Hope et al., 1990). These findings provide support for the aforementioned models of social phobia (Beck et al., 1985; Clark & Wells 1995; Rapee & Heimberg, 1997), as they all predict an attentional bias towards cues relating to social threat (especially as the words used in

most of the studies relate to negative evaluation). Although, the models also predict the importance of being in a social-evaluative situation, it seems fair to suggest that simply being in an experimental situation is an anxiety provoking event for individuals with clinical levels of this disorder. In further support of the theories, it appears that visible anxiety symptoms may also be of concern to individuals with social phobia (Maidenberg et al., 1996; Spector et al., 2003).

Notably, there are several findings that the models of social phobia do not address. First, that the interference effect to social threat words appears to be reduced or over-ridden when the individual with social phobia are aroused by being in a social-evaluative situation (Amir et al., 1996) or by being exposed to high frequencies of social threat words (Amir et al., 2002). As previously mentioned, all three cognitive perspectives predict an attentional bias to social threat, whether it is solely internally (Clark & Wells, 1995) or includes externally cued threat (Beck et al., 1985; Rapee & Heimberg, 1997) cued threat, under such conditions. Furthermore, that an attentional bias towards physical threat (when compared to non-anxious controls) was apparent under non-evaluation and social-evaluation conditions (e.g., Amir et al., 1996; Mattia et al., 1993). Indeed, as all three models suggest that the attentional bias in social phobia is specific to the disorder, this finding is particularly interesting.

The Visual Dot Probe Task

Asmundson and Stein (1994) were the first to investigate attentional processing in socially phobic individuals using the visual dot probe paradigm. Patients with social phobia and matched controls were asked to read aloud the top word of a pair of words presented briefly on a computer screen. Participants were then required to quickly press

the space bar for trials in which a dot appeared in the position of either the threat or the neutral word. This study reported that patients with generalised social phobia were faster, than patients with panic disorder, to detect the dot that followed social-threat words, and there was no such bias with neutral or physical threat cues. However, this effect was only apparent when the social threat word appeared at the top, rather than the bottom, part of the computer screen and this led Heinrichs and Hofmann (2001) to surmise that these findings cannot be viewed as indicating an overall attentional bias towards social threat words. Indeed, Asmundson and Stein concluded that social phobia was associated with environmental hyper-vigilance, indicated by overall faster responses to probes after processing socially threatening words. Similarly, Horenstein and Segui (1997) used comparable experimental procedures and also failed to find any evidence of selective attention to social or physically threatening words in social phobia, but did however find evidence of an attentional bias towards physical threat words in panic patients.

More recent dot-probe studies have suggested that reading the word presented on the top part of the computer screen out loud is an artificial manipulation, and have consequently dispensed with this requirement (e.g., Mansell Ehlers, Clark, & Chen, 2002). The general consensus of opinion is that people are not constantly prompted to say what they see out loud. Dispensing with this requirement, Musa, Lépine, Clark, Mansell and Ehlers (2003) investigated the nature of the attentional bias in socially phobic patients with and without concurrent depression and non-anxious controls. The study included socially threatening and physically threatening words, that were paired with a neutral word and presented for 500ms. They found that social phobia patients

without concurrent depression displayed an attentional bias towards social and physical threat words, and no such effect was found in social phobia patients with concurrent depression. Musa and colleagues suggest that the finding of an attentional bias towards physical threat is possibly due to the presence of an additional anxiety disorder, in which physical threat concerns are present. However, this is a tentative conclusion, based on *post hoc* analysis and a very small sample size ($n = 9$). Additionally, this study provided evidence, together with the generalised anxiety disorder study described in chapter one (Bradley et al., 1995), that the presence of concurrent depression abolishes the attentional bias that would normally be associated with the anxiety disorder.

So far, the evidence of an attentional bias towards threatening words in social phobia has been equivocal. Consequently, research has focused on attentional responses to facial stimuli, arguing that facial expressions are more salient to the socially anxious (e.g., Mogg & Bradley, 1998). In that, faces convey a more ecologically valid threat providing important information concerning personal acceptability and social value. The findings from dot-probe studies including facial stimuli have also yielded conflicting findings, but they have demonstrated the importance of including a social evaluation condition in studies with socially anxious analogue samples. For example, Bradley et al. (1997) presented threatening and happy faces, paired with neutral faces, using a visual dot-probe task. This study did not include a social evaluation manipulation, such as the person believing they would have to give a speech. They found no evidence of attentional bias towards or away from threatening faces in the socially anxious sample. In contrast, Yeun (1994) reported that under conditions of believing that they would have to give a speech, high social anxiety participants showed longer probe detection latencies

following a negative face, as compared to a neutral face. The low social anxiety group did not vary in response times to the two kinds of facial stimuli. These findings suggest that socially anxious individuals may be avoiding negative faces when under conditions of social evaluation. It is important to note that the Yeun study presented the stimuli for 1000 ms, which is longer than the customary period of 500 ms, and that this may have influenced the results.

Mansell et al. (1999) extended Yeun's (1994) study by displaying the stimuli for the more traditional 500 ms and included negative, happy and neutral faces paired with household objects. The household objects were used to symbolise stimuli that would be present in a room during a social interaction. The participants were a non-clinical sample with high and low levels of fear of negative evaluation as determined by the FNE scale. They replicated Yeun's findings, in that the socially anxious participants directed their attention away from all emotional faces, under conditions of social evaluation (anticipated public presentation). Furthermore, they reported no evidence of any attentional bias differences in the no threat condition, which was consistent with the results from the Bradley et al. (1997) study.

In view of these findings, Mansell et al. (2002) investigated whether the attentional bias in social anxiety is unique to faces (e.g., Mansell et al, 1999) or if it generalises to words. This study included negative and positive social words and a social evaluation manipulation (the participants believing that they would have to give a speech). They found no evidence of an attentional bias to positive or negative words associated with social anxiety. Due to the significant findings from the previous study (Mansell et al., 1999), the authors concluded that socially anxious individuals do not

demonstrate an attentional bias for socially threatening semantic stimuli, only the avoidance of facial expressions, under social-evaluative conditions. Providing further support for this view, Pishyar, Harris and Menzies (2004) investigated dysfunctional attentional processing in social anxiety using the dot probe procedure with pairs of positive-neutral and negative-neutral words and faces as stimuli. This study did not manipulate levels of social evaluation. There were no differences in the direction of the attentional bias between the high and low social anxiety groups to either the negative or positive words. These findings led Pishyar and colleagues to conclude that word stimuli may be a less sensitive index of attentional bias with the dot probe task.

In consideration of the facial dot-probe task, the results indicated that higher levels of social anxiety were associated with attentional bias toward negative facial stimuli and away from away from positive faces. The low anxious group attended towards the positive faces and avoided the negative faces. Interestingly, these results conflict with previous studies that found no evidence of an attentional bias in socially anxious samples when levels of social evaluation were low (Bradley et al. 1997; Mansell et al., 1999). Pishyar and colleagues argued that the difference between Mansell and colleagues' results and their findings was due to the fact that the former study paired faces with household objects, rather than neutral faces. Such a methodological difference may have influenced the results in some way and suggest that the nature of the competing, simultaneously presented stimuli is an important factor when considering the attentional response. This possibility does not however explain the inconsistent findings with Bradley et al. who also used faces as neutral stimuli. A second study by Pishyar et al. (2004) paired the participant's own face with a stranger's face. They argued that

evaluative threat would be greater when the participant's own face was presented. They found exactly the same results as in the first study, regardless of whether or not the participant's own face was presented.

Another possible explanation for the conflicting findings from the facial dot probe social anxiety studies (Bradley et al., 1997; Mansell et al., 1999; Pishyar et al., 2004) is that presenting the facial stimuli for 500ms may be too long to identify whether high socially anxious participants are initially vigilant for the threatening stimulus (Mogg & Bradley, 2004). An eye-movement study currently under preparation by Mogg, Bradley and Garner (2004) directly investigates this issue. The preliminary findings suggest that the high social anxiety participants were faster to direct their attention towards angry faces followed by subsequent quicker avoidance of the threat, in contrast to the low social anxiety individuals. This was indicated by the direction and speed of eye movements that were being monitored whilst the stimuli was presented for 300ms. This study provides initial evidence of a vigilance-avoidant processing style in socially anxious individuals providing support for the cognitive-motivational model of anxiety proposed by Mogg and Bradley (1998). Thus, it seems quite possible that the conflicting findings with the facial and indeed word processing studies may be due to the length of time the stimulus is being presented and that the traditional 500ms is actually too long to explore whether attention is indeed captured by threat.

Mansell, Clark and Ehlers (2003) developed a novel probe detection task to measure internally focused and externally focused attention simultaneously. The high and low socially anxious participants were requested to detect the presence of two stimuli. First, evidence of internal bias was determined by the detection of a light

vibration on the finger which the participants were (erroneously) led to believe signifies a change in their heart-rate acceleration and sweating. Second, external vigilance was ascertained by the presentation of happy, angry, neutral faces paired with household objects. They found no evidence of an internal or external attentional bias in students high and low in social anxiety as determined by the FNE. Although reanalysis using the Personal Report of Confidence as a Speaker questionnaire (PRCS: Paul, 1966) as a group predictor, found an internal attentional bias in high speech anxious students and no evidence of attentional bias to facial stimuli, in contrast to the low speech anxious participants. It thus appears that the choice of screening instrument may be critical in the identification of attentional biases in the non-clinical socially anxious population.

In the assessment of preattentive bias in social anxiety, Mogg and Bradley (2002) investigated automatic vigilance for threat by briefly presenting facial stimuli for 100ms followed by masking. They found that the high socially anxious participants selectively allocated their attention towards the spatial location of the threatening faces, rather than neutral faces, under conditions of restricted awareness. The results showed that this vigilance effect was primarily a function of social avoidance and distress as determined by the SAD measure, and not fear of negative evaluation based on the FNE scale. Once again, this study highlights the importance of choosing the most effective self-report instrument in analogue research to determine levels of social anxiety. Indeed, Mogg and Bradley concluded that the SAD scale may be a better predictor of attentional bias in socially anxious populations.

Clinical studies using facial stimuli have also shown conflicting findings. For example, Chen, Ehlers, Clark and Mansell (2002) reported greater avoidance of negative,

positive and neutral facial stimuli (presented for 500ms) irrespective of the emotional valence, as opposed to household objects, in patients with generalised social phobia compared to non-anxious controls. These results are similar to the Mansell et al. (1999) study, except that the clinical sample directed their attention away from all faces and not just the negative faces as in the analogue sample. Mogg, Philippot and Bradley (2004) also explored the attentional responses to angry, happy and neutral facial stimuli in patients with social phobia. The facial expressions were presented for 500ms to assess initial conscious orienting, and 1250 ms to investigate any further biases. In contrast to Chen et al. (2002), individuals with social phobia displayed an attentional bias toward angry faces, relative to happy and neutral faces, when presented for 500 ms. The non-anxious controls showed no evidence of an attentional bias for angry or happy faces in the 500 ms exposure condition. Mogg et al. interpreted these findings as evidence of an initial orienting towards threat being associated with social phobia. There was no evidence of an attentional bias in the social phobia group when the faces were displayed for 1250 ms. Mogg and colleagues concluded, consistent with Pishyar et al.'s view, that a possible reason why their findings are different to Chen et al.'s results lays within the choice of neutral stimuli. The Mogg et al. study paired angry facial stimuli with neutral faces, whereas Chen et al. paired a variety of negative faces (angry, sad, frightened and disgusted) with household objects. Thus, Mogg and colleagues proposed that subtle processing differences may occur when the socially phobic individual is being presented with threatening and competing innate (e.g., household objects) or biologically relevant (e.g., neutral faces) social stimuli. Although it seems fair to suggest that a neutral face is an ambiguous stimuli that could indicate disinterest, boredom or neutrality. This would

constitute as a threat, similar to an angry face, which may well cause some sort of attentional conflict in socially anxious and phobic individuals. Consequently, the household objects may indeed be a more subtle representation of a neutral cue in such studies.

Evaluation of the Visual Dot-Probe Findings in Relation to the Theories

The visual dot probe task, although considered to be a more direct measure of visual attention (e.g., Heinrichs & Hofmann, 2001), has also yielded inconsistent findings (please see Table 2.3. for a summary). In consideration of the theoretical perspectives (Beck et al., 1985; Clark & Wells 1995; Rapee & Heimberg, 1997), evidence of an attentional bias towards socially threatening word stimuli has not been found in socially anxious participants, under non-evaluative (Pishyar et al., 2004) or social-evaluative (Mansell et al., 2002) conditions. Also, clinical studies of social phobia have reported conflicting findings. In that, two studies (Asmundson & Stein, 1994; Horenstein & Segui, 1997) found no evidence of selective attention to social threat words, whereas Musa et al. (2003) did find that social phobia without concurrent depression was associated with an attentional bias towards social and physical threat. Overall, the findings from the dot-probe studies using semantic stimuli provide very limited support for the notion of disorder-specific attentional bias in social phobia.

Table 2.3. *Summary of the Results from the Visual Dot-Probe Studies on Social Anxiety and Social Phobia (published studies only)*

Study	Type of Sample	Stimuli *(Presentation time)*	Results
High Social Anxiety and Word Stimuli			
Mansell et al., (2002)*	31 HFNE (> 17) 32 LFNE (< 9)	32 negative, 32 positive social-evaluative words and matched neutral words *(500ms)*	No significant findings.
Pishyar et al., (2004) *(Study 1)*	18 HFNE (> 21) 15 LFNE (< 8)	20 positive, 20 negative and 40 neutral words *(500ms)*	No significant findings.
High Social Anxiety and Facial Stimuli			
Bradley et al., (1997) (Study 1)	21 HFNE (M = 20.1) 19 LFNE (M = 6.7)	32 threat, 32 happy and neutral faces (500 ms)	No significant findings.
Mansell et al. (1999)*	35 HFNE (> 17) 36 LFNE (< 8)	32 happy, 32 negative, 32 neutral faces paired with household objects (500ms)	HFNE showed an attentional bias away from positive and negative faces, but only under social-evaluative conditions.
Mogg & Bradley (2002)	13 HPOMS 16 LPOMS	32 threat, 32 happy faces matched with neutral faces (17ms+ mask)	No significant findings with POMS High SAD selectively allocated their attention towards threat faces

Table 2.3. continues

Table 2.3. continued.

Mansell et al., (2003)*	32 HBFNE(> 30) 32 LBFNE(< 19)	4 happy, 4 angry, 4 neutral faces and 4 everyday objects *(500 ms)* Plus internal (vibration on fingers) or external (detection of E on screen)	In social-evaluation condition, High speech anxious (not FNE) displayed increased internally focused attention.
Pishyar et al., (2004) *(Study 1)*	18 HFNE (> 21) 15 LFNE (< 8)	20 positive, 20 negative and 40 neutral faces *(500ms)*	HFNE displayed an attentional bias towards negative facial stimuli, LFNE showed a bias towards positive faces.
Pishyar et al., (2004) *(Study 2)*	15 HFNE(> 21) 14 LFNE (< 6)	32 positive, 32 negative and 32 neutral facial profiles *(500ms)*	HFNE displayed vigilance towards negative faces, LFNE attended towards positive faces.
Social Phobia and Word Stimuli			
Asmundson & Stein (1994)	24 GSP 20 MLAC	24 social threat, 24 physical threat and neutral words *(500ms)*	No evidence of an attentional bias in social phobia.
Horenstein & Segui (1997)	16 PD 16 SP 16 MLAC	22 social threat, 22 physical threat and neutral words *(500ms)*	No significant attentional bias effects.
Musa et al., (2003)	28 SP, 33 SP/ DEP 24 DEP & 40 MLAC	32 social threat, 32 physical threat and neutral words *(500ms)*	Social phobia patients without depression attended towards social and physical threat words.

Table 2.3. continues

Table 2.3. continued

Social Phobia and Facial Stimuli			
Chen et al., (2002)	20 GSP 20 MLAC	32 negative, 32 positive and 32 happy faces paired with household objects *(500 ms)*	Social phobia patients directed their attention away from faces and towards household objects.
Mogg et al., (2004)	15 GSP 15 MLAC	32 angry, 32 happy faces paired with a neutral face *(500 ms & 1250 ms)*	Social phobics showed an attentional bias toward angry, relative to happy and neutral faces at 500 ms. No significant attentional bias at 1250 ms

Notes: * = *study includes a social evaluation condition*

HFNE = *High Fear of Negative Evaluation;* LFNE = *Low Fear of Negative Evaluation;*

HBFNE = *High Fear of Negative Evaluation (Brief version);* LBFNE = *Low Fear of Negative Evaluation (Brief version)*

HPOMS = *High Profile of Moods States (McNair, Lorr & Droppleman, 1981);* LPOMS = *Low Profile of Moods States*

SAD = *Social Avoidance and Distress*; GSP = *Generalised Social Phobia;* SP = *Social Phobia;* DEP = *Depression*

MLAC = *Matched Low Anxious Controls*

Furthermore, although facial stimuli has been argued to be a more ecologically valid threat in social phobia (e.g., Mogg & Bradley, 1998), conflicting results have been reported in the literature. In relation to the theories, both Beck et al. (1985) and Rapee and Heimberg (1997) would predict an attentional bias towards aversive faces, as it is considered to be an external threat (i.e., signs of criticism from others) to the individual with social phobia. However, the Clark and Wells (1995) model would predict attentional avoidance of such negative facial stimuli. Mansell et al. (2003) provided evidence to support the latter model, as they found an attentional bias towards internal (vibration on finger), rather than external (facial dot-probe task) stimuli, in speech anxious participants. Furthermore, high socially anxious participants have demonstrated no evidence of an attentional bias towards negative faces (e.g., Bradley et al., 1997), as well as an attentional bias towards aversive faces (e.g., Pishyar et al., 2004) under non-evaluative conditions. Additionally, under conditions of social-evaluation, Mansell et al. (1999) have shown that individuals high in social anxiety avoid negative facial stimuli. Clinical studies incorporating facial stimuli have also shown conflicting results of an attentional bias avoidant (Chen et al., 2002) and towards (Mogg et al., 2004) negative faces at a conscious level of processing. Overall, despite the notion that faces represent a more ecological type of threat to the socially anxious (e.g., Mogg & Bradley, 1998), it appears that the findings from the facial dot-probe studies are also conflicting.

Conclusions

Overall, this literature review has shown that the evidence relating to the nature of attentional bias in social anxiety and social phobia is conflicting and in need of further detailed investigation. At the time of designing the series of experiments for this thesis,

there were no studies investigating the interplay of state anxiety and levels of social anxiety, on the nature of attentional bias in the trait socially anxious using the visual dot-probe task with semantic stimuli. Moreover, there was no reported evidence of an attentional bias to threat words in patients with social phobia using visual dot probe tasks (Asmundson & Stein, 1994; Horenstein & Segui, 1997). In contrast, Stroop studies have found consistent evidence of attentional bias towards social threat words in social phobia (e.g., Amir et al., 1996; Hope et al., 1990; Mattia et al., 1993). Furthermore, an attentional bias towards threat using the dot probe paradigm and semantic stimuli has been reported in other clinical anxiety disorders. For example, evidence of attentional bias towards disorder-specific threat cues had been reported in individuals suffering from spider phobia (Watts, McKenna, Sharrock & Tresize, 1986), generalised anxiety disorder (Mogg et al., 1992) and panic disorder (Horenstein & Segui, 1997). Also, all the theoretical perspectives presented in chapter one and chapter two, detailed that there would be attentional bias differences between a person suffering from an anxiety disorder and those low in anxiety. Taking all these factors into consideration, this programme of work was designed to explore the nature of the attentional bias in social anxiety and social phobia to semantic stimuli using the dot-probe paradigm.

The Aims of this Thesis

The overall aim of this thesis is to systematically investigate the nature of the attentional bias associated with social anxiety and social phobia to specific categories of threatening words using the visual dot-probe task. A further aim is to address the aforementioned theoretical conflict to ascertain whether the dysfunctional attentional bias is solely self-focused (Clark & Wells, 1995) or includes external stimuli as well (Beck et

al., 1985; Rapee & Heimberg, 1997). Finally, a psychometric investigation of two of the most popular self-report questionnaires (the FNE and the SAD) is undertaken to see if they reliably measure the aspects of social anxiety that they were originally designed to by Watson and Friend (1969). Several important factors highlighted in this chapter and chapter one have influenced the design of the studies included in this programme of work. The next section summarises these factors in relation to the design of the current experiments.

Nature of the Threat Cues

On reviewing the dot-probe studies using semantic stimuli, it was clear that one of the most important factors that may aid in the explanation of such inconsistent findings was the type of threatening words used in the studies. For example, Asmundson and Stein (1994) included general social-threat words (e.g., criticised, foolish, inept), and physically threatening words that included a mix of panic related (e.g., suffocating, gasping dizzy) and violence related (e.g., attack, pain, emergency) words. Horenstein and Sergui (1997) used mainly physically threatening words (e.g., fracture, mutilated, violence) together with social threat words (e.g., stupid, pathetic). These studies show the importance of the social threat word categories needing to be as specific to the current concerns of the individual, as it is quite possible that their choice of word stimuli may be an influential factor in the non-significant findings reported in both studies. Indeed, a Stroop study by McNeil et al. (1995) showed that different types of social phobia (speech anxious and generalised) was associated with different attentional biases towards different types of social threat (social situations, speech-related and negative evaluation word groups). However, the dot-probe studies have only included general social threat

words that tend to represent negative evaluation themes. It is highly possible that individuals with social anxiety and social phobia respond differently to various types of social threat, and that this needs to be explored in more detail. Also, the physical threat word group need to be as distinct as possible from the panic related concerns. This is because panic symptoms (e.g., racing heart, feeling dizzy and faint) are quite apparent in social phobia, as detailed by the DSM-IV criteria and previous Stroop studies (Maidenberg et al., 1996; Spector et al., 2003). Thus, the inclusion of such a mix of words that may be of specific interest to people with social phobia may be a factor in the inconsistent attentional bias effects reported. In support of the view, Heinrichs and Hofmann (2001) suggest that the word pool chosen in studies needs to be representative of the core of the disorder and as distinct as possible from other categories of threat.

This chapter has also shown that social anxiety and social phobia dot-probe research have used facial stimuli rather than words. It has been suggested that aversive faces may symbolise a more ecologically valid representation of threat to a socially anxious and social phobic individual (e.g., Mogg & Bradley, 1998). It is proposed that angry faces indicate signs of disapproval or negative evaluation to a person with high levels of social anxiety. Conversely, Musa and Lépine (2000) argued that photographs of faces may not be particularly threatening to individuals with social anxiety and social phobia. A face presented in a laboratory setting could be deemed as trivial to the patient with social phobia, as they do not present a realistic and current threat. Thus, such stimuli may not actually activate the typical hypervigilance response that has been shown to occur with words. Also Clark and Wells (1995) suggested that face processing studies measure attention to actual social cues, whereas word processing studies could be

representative of an attentional measure of a preoccupation with themes of social threat and danger.

It is the internal thought processes demonstrated by an attentional bias to particular categories of threat words in socially anxious and socially phobic participants that is of specific interest here. Consequently, this programme of work attempted to identify the categories of threat that are of specific concern to socially anxious and socially phobic individuals based on previous social phobia literature (Asmundson & Stein, 1994; Hope et al., 1990; Lundh & Öst, 1996; Maidenberg et al., 1996; McNeil et al., 1995). This resulted in four categorically distinct word groups being chosen and included in the series of visual dot-probe experiments in this thesis (experiments one, two and three). Negative evaluation (e.g., failure, mocked), somatic sensation (e.g., tense, nervous) and social situation (e.g., party, interview) words groups represented various categories of social threat, and a physical threat (e.g., doctor, coffin) word group was included. Please see chapter three for details on how the words were selected for each category of threat.

Influence of State Anxiety on the Nature of the Bias

Another issue that this programme of work aims to explore is the influence of state anxiety on the nature of the bias in socially anxious samples. In chapter one, the more consistent attentional bias effects were demonstrated with trait anxious participants under high state anxious conditions (e.g., Broadbent & Broadbent, 1988; Mogg & Marsden, 1990; Mogg et al., 1994). Although, the more recent dot-probe studies that did (Mansell et al., 2002) and did not (Pishyar et al., 2004) include a social-evaluation condition, have failed to find any evidence of an attentional bias with threatening words

to be associated with social anxiety. Furthermore, to date, no study has explored attentional processing in social anxiety at a pre-attentive level using semantic stimuli in a dot-probe task. The view here is, that the adoption of such distinct word groups, might make clearer the interplay of the influence of social evaluation on pre-attentional and attentional processing biases in socially anxious populations.

In view of this, experiment one investigates attentional processing to various categories of threatening words presented for the traditional 500ms. Experiment two explores pre-attentional (stimuli presentation time of 14ms) and conscious (stimuli presentation time of 500 ms) processing of threatening words. Both of these studies include individuals high and low in social anxiety and manipulate levels of social-evaluation. In the social-evaluative condition, participants were advised that they would have to give a speech, which would be recorded and assessed (please see chapter three for full details of the social-evaluation induction). Experiment three includes the same categories of threatening stimuli (presented for 500 ms) in a visual dot-probe task with individuals experiencing clinical levels of social phobia and matched low anxious controls. Partly due to ethical considerations, and the fact that individuals with social phobia will find taking part in an experiment a particularly socially anxious provoking situation, experiment three did not include a social-evaluation induction.

Participant Selection

Additionally, this chapter has highlighted that using different self-report measures of social anxiety may yield different results in the nature of the attentional bias (e.g., Mansell et al., 2003; Mogg & Bradley, 2002). As previously stated, the most widely used questionnaires in socially anxiety studies are the FNE and the SAD scales (e.g., Harvey et

al., 2000; Mansell et al, 1999; Winton et al., 1995). Furthermore, there is evidence to suggest that the SAD scale may be a more reliable measure when investigating the nature of the attentional bias in social anxiety (e.g., Mogg & Bradley, 2002). This is an important issue that needs to be explored in more detail, as crucial differences in attention processing between high and low socially anxious groups may be missed because the study has not included the most reliable measure of social anxiety.

Consequently, study four includes a detailed psychometric analysis of the FNE and SAD measures to establish whether the scales reliably measure the aspects of social anxiety they pertain too. Indeed, despite their extensive use, there appears to be a lack of studies exploring whether the questionnaires reliably measure what the original Watson and Friend (1969) paper suggested they do. Additionally, this study suggests cut-off points for high and low social anxiety groups to guide future research. It also explores the relationship between the factors identified from the scales with the attentional bias data from the three visual dot-probe experiments. The aim is to identify the factors that are the most sensitive to any attentional bias effects in socially anxious and socially phobic individuals. Finally, this study also explores the characteristics of the brief version of the FNE questionnaire by Leary (1983a) and proposes a shortened version of the SAD scale.

The issue of participant selection in clinical studies of social phobia is also a contentious one. An important consideration is that there are two subtypes of this clinical disorder, namely specific and generalised social phobia. Both of these forms of social phobia have been shown to demonstrate differences in the nature of their attentional biases (McNeil et al., 1995). Also, as detailed by Stein and Chavira (1998), the

generalised form of social phobia is believed to be the more disabling and life impairing than the specific social phobia. Additionally, Heimberg et al (2002) propose that generalised social phobia is often associated with co-morbid or secondary emotional disorders. Previous clinical dot-probe studies have not fully detailed sample characteristics such as the sub-type issue (e.g., Horenstein & Segui, 1997) and comorbid disorders (e.g., Asmundson & Stein, 1994). Although a more recent study by Musa et al. (2003) did attempt to explore the influence of comorbid depression in social phobia, as it has been suggested that depression can moderate attentional biases in anxious individuals (Bradley et al., 1995). These are all important factors to consider in the recruitment of individuals with social phobia. In view of this, experiment three uses the Anxiety Disorders Interview Schedule for the DSM-IV, Adult Version (ADIS-IV, Brown, DiNardo, & Barlow, 1994), as this questionnaire assesses the spectrum of mental health problems that an individual may experience. The aim is to try and recruit individuals with a primary diagnosis of generalised social phobia without any comorbid anxiety or depressive disorders.

Theoretical Considerations

This thesis also aims to address the apparent conflict between the theoretical perspectives of social phobia presented in this chapter (Beck et al., 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997). It is important to note that the categories of threatening word groups were also specifically chosen to explore these theoretical predictions in more detail. As a self-focusing style of information processing was expected to be evident with an attentional bias towards negative evaluation (e.g., failure, mocked) and somatic sensation (e.g., tense nervous) words and an external focus by selective attention

to social situation (e.g., party, interview) words. The physical threat (e.g., doctor, coffin) words were included to assess specificity of the attentional bias to disorder-specific words. Thus, in consideration of the theories proposed by Beck et al. (1985) and Rapee and Heimberg (1997), an attentional bias to threat cues related to the self (e.g., somatic sensation and negative evaluation word groups) and to external disorder-specific threat (e.g., social situation word group) would be predicted in socially anxious and socially phobic individuals under social-evaluative conditions. Clark and Wells (1995) on the other hand, hypothesise that a pre-occupation with negative evaluation is apparent in social phobia irrespective of being in a social-evaluative situation. Thus, this model would predict an attentional bias towards negative evaluation words under non-evaluative and social-evaluative conditions in social anxiety and social phobia. They also argue that during a social encounter the person with social phobia focuses solely on interoceptive information, thus an attentional bias towards internal information (e.g., somatic sensation word group) is also expected in the social-evaluative condition. The processing biases predicted by these theories are assumed to be an automatic process, thus a similar pattern of attentional processing should be evident in pre-attentional processing tasks. These predictions are explored in detail in experiments one, two and three of this thesis using socially anxious and socially phobic individuals.

Additionally, in chapter one, the theories by Eysenck, (1992) and Williams et al. (1988) specifically predict that selective attention to threatening stimuli is an automatic (i.e., pre-attentional) process in anxious populations operating outside conscious awareness. In particular, Eysenck proposes that those high in anxiety will display a pre-attentional bias towards disorder-specific and general threat cues in the environment. In

contrast, Williams and colleagues suggest that the pre-attentive bias in anxious population would be towards threatening stimuli that is congruent with their current concerns, such as social threat in social anxiety. These notions will be explored in experiment two, as automatic attentional processes are directly investigated using the visual dot-probe paradigm by briefly presenting the word pairs (14 ms) followed by a mask for 486 ms.

Table 2.4. presents an overview of the predictions from the relevant theories and indicates which study in this thesis addresses these theoretical notions.

Table 2.4. *Summary of Theoretical Predictions Investigated in the Thesis*

Theoretical Predictions	The Experiments
The Clark and Wells (1995) Model: • This model predicts that social phobia is associated with a general pre-occupation with negative evaluational thoughts (negative evaluation words), and during a social situation the attentional focus is towards interoceptive information (e.g., negative evaluation and somatic sensation words). This bias is apparent at both a pre-conscious and a conscious level of processing.	***Experiment 1*** *explores these predictions at a conscious level of processing using high and low socially anxious participants (including a social evaluation manipulation).* ***Experiment 2*** *investigates these proposals at a pre-conscious as well as a conscious level of processing using high and low socially anxious participants (including a social evaluation manipulation).*
Beck et al (1985) and Rapee and Heimberg (1997): • These theories both propose that social phobia is associated with an attentional bias towards self-focused (e.g., negative evaluation and somatic sensation words) and external (e.g., social situation words) social threat. The bias is only activated under conditions of social evaluation and is a pre-attentive and conscious process.	***Experiment 3*** *considers these suggestions at a conscious level of processing using a clinical population and low anxious matched controls (without the social evaluation manipulation).*
Williams et al. (1988) Integrative Theory: • This theory suggests that individuals with high levels of anxiety demonstrate an attentional bias towards disorder specific threat at a pre-attentive and conscious level of processing.	***Experiment 2*** *investigates these proposals at a pre-conscious as well as a conscious level of processing using high and low socially anxious participants (including a social evaluation manipulation).*
Eysenck (1992) Hypervigilance Theory: • He hypothesises that high levels of anxiety are associated with a pre-attentional focus towards social and physical threat. This becomes specific to the disorder at a more conscious level of processing.	

Chapter 3

The Effects of Social-Evaluative Threat on the Specificity of the Attentional Bias in Social Anxiety

Experiment One

Introduction

The experiment described in this chapter sought to investigate the nature and specificity of the attentional bias in social anxiety. Individuals high and low in social anxiety took part in a visual dot-probe task, in order to ascertain if there are any attentional processing differences between the two groups. Four categories of threatening stimuli were incorporated into the dot-probe task including negative evaluation, somatic sensation, social situation and physical threat word groups. Levels of state anxiety were manipulated by including a non-evaluation and a social evaluation induction. The latter condition involved the participant believing that they were being recorded by a video camera throughout the entire task. They were also advised that they would have to give a speech that would be recorded and assessed by an independent panel of psychologists.

The cognitive models of anxiety described in chapter one all proposed that selective attention to threatening stimuli plays an important role in the development and maintenance of anxiety disorders (e.g., Beck, 1967; Bower, 1981; Eysenck 1992; MacLeod, 1991; Mathews & Mackintosh, 1988; Mogg & Bradley, 1998; Williams et al., 1988; 1997). In support, evidence of attentional bias towards disorder-specific threat cues has been reported in individuals suffering from spider phobia (e.g., Watts et al., 1986), generalised anxiety disorder (e.g., Mogg et al., 1995), post-traumatic stress disorder (e.g., Foa, Freske, Murdock, Kozak & McCarthy, 1991) and panic disorder (e.g., McNally, Rieman & Kim, 1990).

In chapter two, direct consideration of some of the key theories relating to social anxiety and social phobia also revealed the importance of dysfunctional attentional processing in the aetiology and maintenance of this anxiety disorder (Beck et al., 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997). For example, these theoretical perspectives all proposed that fear of negative evaluation and increased self-focused attention are two central tenets in social phobia and social anxiety. More specifically, individuals with social phobia are focused on scanning the 'self' for threatening information during a social interaction. This interoceptive attentional scanning such as searching for physiological (e.g., blushing) and behavioural (e.g., stuttering) signs of anxiety, together with personal negative evaluation (critical thoughts), serves to exacerbate social anxiety. In a review of the self-focus literature, Spurr and Stopa (2002) concluded that there is substantial evidence that self-focused attention is an influential factor in social anxiety and social phobia. More specifically, they argued that it increases negative self-judgements, social anxiety and the possibility of poor performance during social interactions.

Furthermore, Beck et al. (1985) and Rapee and Heimberg (1997) proposed that during a social situation, individuals with social phobia search the environment for threatening social information, such as signs of boredom in others. This process of attentional scanning for external threat helps to maintain the high level of social anxiety by confirming the expected negative evaluations from others. Clark and Wells (1995) on the other hand, emphasised that the socially anxious are pre-occupied with negative evaluational thoughts irrespective of whether they are in a social situation. Furthermore, they suggested that during a social encounter, the primary attentional concern of the

socially phobic is towards the 'self', such as thoughts of negative evaluation and physiological sensations pertaining to anxiety and consequently avoid attentional processing of external threatening information. This attentional avoidance is considered to be a safety behaviour (Salkovskis, 1991), because the person with social phobia feels that they are reducing the risk of being humiliated. Clark and Wells noted however, that such avoidance leads to the reduction of opportunities that might disconfirm negative appraisals, thus maintaining the fear.

As shown in the literature review in chapter two, in order to test such theoretical notions, several studies have utilised the emotional Stroop task to obtain evidence for attentional biases in social phobia (e.g., Hope et al., 1990; Mattia et al., 1993). The general findings were that social phobia was associated with an attentional bias towards socially threatening words. Furthermore, the issue of specificity, described as both the valence and the content of the information presented being of unique relevance to the disorder, has been explored in studies involving the Stroop task. Social phobia patients displayed an attentional bias towards social threat, panic patients towards bodily sensation (Maidenberg et al., 1996) and generalised anxiety disorder patients to general worry (Becker et al., 2001) related words.

To date, the three studies employing a modified version of the dot probe task with word stimuli and clinical participants have yielded conflicting results. Two studies failed to find any evidence of selective attention to threatening words using this paradigm (Asmundson & Stein, 1994; Horenstein & Segui, 1997). A recent study by Musa et al. (2003) investigated the nature of the attentional bias in socially phobic patients with and without concurrent depression. They found that social phobia without depression was

associated with an attentional bias towards social and physical threat words, in comparison to low anxious controls. Interestingly, patients with social phobia and concurrent depression failed to demonstrate any evidence of an attentional bias. This finding provided further support for the notion that high levels of depression could actually abolish any attentional bias effect in anxious populations (e.g., Bradley et al. 1995).

The visual dot-probe task has also been used in analogue studies with high and low socially anxious students under social-evaluation (Mansell et al., 2002) and non-evaluation conditions (Pishyar et al., 2004). These studies failed to find any evidence of an attentional bias for socially threatening words to be associated with social anxiety. Indeed, both studies concluded that social anxiety was not associated with an attentional bias towards or away from visually presented words. If however, one considers the findings from the trait anxiety dot-probe studies presented in chapter one, this conclusion seems somewhat premature. Indeed, these studies found that the high trait anxious participants selectively attend to threatening words under high state anxiety conditions, in comparison to the low trait anxious (e.g., Broadbent & Broadbent, 1988, Mogg et al., 1994).

The choice of self-report questionnaire used to determine levels of social anxiety in analogue samples could be an influential factor in the non-significant results from the visual dot-probe studies (Mansell et al., 2002; Pishyar et al., 2004). In particular, Mogg and Bradley (2002) found no evidence of an attentional bias in students with high levels of social anxiety as determined by the FNE scale to threatening faces in a dot-probe task. However, further analysis revealed that the scores from the SAD questionnaire

demonstrated a positive relationship with the attentional bias scores from the aversive facial stimuli. In view of this, Mogg and Bradley suggested that the SAD scale may be a better predictor of attentional bias in a socially anxious sample. Furthermore, a recent study by Mansell et al. (2003) developed a novel probe detection task to measure internal and external attention simultaneously. They found no evidence of an attentional bias in students high and low in social anxiety as determined by the FNE measure. This study did however report an internal attentional bias in high speech anxious students, using the Personal Report of Confidence as a Speaker scale (Paul, 1966) as a group predictor. Taken together, it seems fair to propose that the screening instrument may be critical in the identification of attentional biases in the non-clinical socially anxious population.

A final factor to consider from the dot-probe studies is the issue of word selection. Essentially, the aforementioned studies were based on the original MacLeod et al. (1986) study that investigated attentional bias in generalised anxiety disorder. Thus, they included similar categories of socially threatening and physically threatening words to establish the specificity of the attentional bias. Although the word pools used do vary from study to study. For example, Asmundson and Stein (1994) included generally socially threatening words (e.g., criticised, foolish, inept) and physically threatening words that comprised of a mix of panic related (e.g., suffocating, gasping dizzy) and violence related (e.g., attack, pain, emergency) words. Horenstein and Sergui (1997) used mainly physically threatening words (e.g., fracture, mutilated, violence) together with social threat words (e.g., stupid, pathetic) and Musa and colleagues (2003) used the same stimuli. The problem here, as detailed by Heinrichs and Hofmann (2001), is that the social threat words need to be as specific to the current concerns of the socially

anxious individual and the corresponding physical threat as distinct from the panic related concerns as possible.

To conclude, the literature review in chapter two, together with the brief summary presented here have suggested several factors that may have affected the results from the previous social anxiety dot-probe studies incorporating threatening words. First, the lack of any attentional bias associated with socially anxious samples may be due to the choice of participant selection questionnaire. In this current study, the level of social anxiety was initially determined by screening on the FNE scale as used in most analogue studies (e.g. Bradley et al., 1997; Mansell et al, 2003). The SAD measure was also included during the experiment as a secondary measure of social anxiety. Second, participants were tested either in a social-evaluative (believing they are being filmed and that they will have to give a speech) or a non-evaluative condition (simply performing the task). This manipulation was included to explore the effects of high levels of state social anxiety on the nature of the bias. Third, categorically distinct word groups, similar to those included in the Stroop studies (e.g., Maidenberg et al., 1996; McNeil et al., 1995) were incorporated into the dot probe task. Three word groups were specific to the concerns of the socially anxious, comprising negative evaluation (e.g., failure, inept), social situation (e.g., interview, party) and somatic sensation (e.g., blushing, faint) words. In addition, a physical threatening word group (e.g., injury, coffin) representing general threat was incorporated.

Thus, the overall aim of this current study was to ascertain the nature and conditions of the attentional bias associated with social anxiety, using a dot-probe task. Furthermore, to address the aforementioned theoretical conflict, hypotheses were derived

in consideration of these theoretical frameworks. In view of both Beck et al.'s (1985) and Rapee and Heimberg's (1997) notions, no evidence of an attentional bias was expected in the high socially anxious in the non-evaluation condition. This is because both theories predicted that it is the social situation itself that activates cognitive biases in the socially anxious. Thus, in the social-evaluation condition, the high socially anxious would be predicted by these theories to display an attentional bias towards all socially threatening stimuli relating to the self and the environment. This would be demonstrated by an attentional bias towards negative evaluation, somatic sensation and social situation words. No attentional biasing effects would be expected in either experimental condition with the physical threat words, as they are not specific to the disorder.

In contrast, the Clark and Wells (1995) model suggested a more complex interaction between the nature of threat cue and levels of social-evaluative anxiety. Therefore, in the non-evaluative condition, the high socially anxious would be expected to display an attentional bias towards the negative evaluational words, as this model predicted that high levels of social anxiety is associated with a pre-occupation with negative evaluation. No further processing differences would be expected between the high and low socially anxious in the no-threat condition. In the social-evaluation condition, the model hypothesised that individuals high in social anxiety would display an attentional bias towards interoceptive information such as negative evaluation and somatic sensations. As a consequence of this self-focus, no evidence of an attentional bias in the high socially anxious towards the social situation words or the physical threatening words would be expected in this experimental condition by Clark and Wells.

Method

Participants

Students from Sheffield Hallam University (n = 397), who were predominantly female due to the sex distribution of students on health and psychology degrees, were screened using the FNE scale. Those scoring in the upper (19 and over) and lower (12 and under) tertiles on the questionnaire, constituting high and low social anxiety groups respectively, were invited to take part. Of these, 89 students participated in the main study, of which 9 participants were excluded because their FNE scores on the day of testing were not consistent with their screening assessment. The remaining participants consisted of 7 males and 73 females with an age range of 18 to 44 years and a mean age of 22.7 years (SD = 6.1). There were no social anxiety group differences in age and gender ratio across social anxiety groups and experimental conditions (χ^2<1). Gender was equally distributed across the social anxiety groups and participants were randomly allocated to either the social-evaluation or the non-evaluation condition.

Word List Generation

The visual dot probe task included negative evaluation, social situation, somatic sensation and physical threat word groups. Sixteen words were selected for each of the four groups taken from previous social phobia literature (Asmundson & Stein, 1994; Hope et al., 1990; Lundh & Öst, 1996; Maidenberg et al., 1996; McNeil et al., 1995). Each threat word was paired with a neutral word, and a further two hundred and twenty-seven neutral-neutral word pairs were created. All word pairs were matched for length and frequency of usage in the English language (Kucera & Francis, 1967). The 582

words were rated by 17 postgraduate students from the University of Sheffield. They were instructed to rate how socially threatening each particular word would be to a socially anxious individual (see Appendix 1 for the booklet used to rate each word). Please see Appendix 2 for the mean rating score (and standard deviations) for every word included in the booklet[1]. The words included in this study were selected on the basis of having a high overall mean threat rating and that the neutral words had a low overall mean rating. The 12 words for each threat category with its paired neutral word that were included in this study are presented in Table 3.1. One hundred and sixty-eight neutral-neutral words pairs were also selected to act as filler words. Four word lists contained the 48 threat-neutral (12 from each word category) and 168 neutral-neutral word pairs presented in a different random order. The participant was randomly allocated to a word list.

---

[1] It is important to note that as the postgraduate students were not necessary socially anxious, they may have over or under estimated the potential threat value of the words.

Table 3.1. *The Threat-Neutral Words Pairs by Category*

Somatic Sensation – Paired Neutral Words		Negative Evaluation – Paired Neutral Words		Social Situation – Paired Neutral Words		Physical Threat – Paired Neutral Words	
sweating	armchair	stupid	barrel	meeting	natural	injury	silver
nervous	leather	mocked	banner	interview	household	disease	version
dizzy	coral	foolish	gradual	public	enough	lethal	marrow
shaky	tweed	embarrassed	transformed	audience	returned	cancer	saddle
trembling	phenomena	failure	balance	conversation	conventional	pain	bank
suffocating	periodicals	disgraced	warehouse	assessment	originally	ambulance	flowering
breathless	downstream	pathetic	exterior	speech	travel	deadly	ladder
nausea	layman	inferior	inventor	presentation	metropolitan	illness	mustard
blushing	cupboard	worthless	cultivate	crowd	grass	emergency	furniture
gasping	geology	ridiculed	pictorial	examination	sovereignty	violence	creation
collapse	aeration	inept	purge	party	clear	doctor	cattle
tense	onion	criticised	ingredient	socialise	president	coffin	rocket

The Modified Dot Probe Task

All stimuli were presented to participants using a PC. The visual dot probe task comprised a total of 216 trials. Each trial began with a black cross in the centre of the screen for 500 milliseconds, together with a computer generated auditory tone, to serve as a fixation cue. A randomly chosen word pair was then presented, with one word appearing just above and the other word appearing just below the position of the fixation cue. All word pairs were presented in upper case for 500 ms and were 3cm apart. On 96 critical trials (12 threat-neutral pairs from each word group and 48 neutral-neutral word pairs), the word pairs were replaced with a dot probe appearing in either the upper or lower location after a 25 msec delay. The participant was instructed to press the spacebar on the keyboard as soon as they saw the dot probe and the dot remained on the screen until detected. The probability of the threat word and subsequent dot probe appearing at either the upper or lower position on the monitor was equated. On the non-probed trials, the next randomly chosen word pair followed after an inter-stimulus delay of 1 sec.

Standardised Measures

Levels of social anxiety were measured using the FNE and SAD scales. Trait and state anxiety were assessed by the use of the State-Trait Anxiety Inventory (STAI-S/T: Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983). The Beck Depression Inventory (BDI: Beck, Ward, Mendelsohn, Mick & Erbaugh, 1961) was used to determine participants' levels of depression. The Marlowe-Crowne Social Desirability Scale (SDS: Crowne & Marlowe, 1960) was included to measure whether there was any difference in the levels of repressed coping style between the two groups. This was because Mogg,

Bradley, Miller, Potts, Glenwright and Kentish (1994) argued that a low level of trait anxiety and a high score on the SDS is a potential confounding variables, as these individuals with their repressive coping style can behave in a similar way to high anxious individuals during cognitive experimental techniques. The same standardised questionnaires were used in experiments one, two and three.

Procedure

Ethical approval for this experiment was obtained from the University of Sheffield's ethics committee. The participants were tested individually in a research cubicle and were seated approximately 80 cm from the computer screen. The computer used was an Acer Veriton 7200D PC with Pentium 4 processor running under Windows 2000 and the monitor was a CTX Ultra Screen 21" CRT monitor with a refresh rate of 60hz. On arrival, they were told they would complete some questionnaires, take part in a reaction time test and possibly perform a mildly stressful task. Following consent, all participants completed the FNE, SAD, STAI-T and STAI-S scales. Upon completion, half of the participants in each of the social anxiety groups were then given the following social-evaluation induction, based on Mansell et al.'s (1999) instructions:

> The next part of this experiment is an assessment of your social skills and public speaking ability. This camera present in the corner of the room will be recording you whilst you are doing the computer task. Then I am going to ask you to make a speech on a controversial topic. I will tell you what the topic is after the computer task and you will have 3 minutes to prepare for it. I will take you through to the room next door where you will give your speech, which will also be recorded. I will watch you give the speech and rate you on several different measures of the effectiveness of your presentation. The video camera is recording you so that later some expert psychologists can make ratings of your ability as well. Right, now it is time to start the main computer task and one final point to remember is that your performance here today has been shown to predict your final degree mark. I will give you full feedback after the experiment.

The remaining participants in the non-evaluation condition were told:

The next part of this experiment is a computer-based task. Please ignore this camera in the corner of the room. It will not be recording you whilst you are doing the computer task. The camera is unplugged and it used for other experiments that take place in this room *(experimenter goes over to the camera and shows participant that the camera is unplugged and points the camera away from the individual).* Right, now it is time to start the main computer task and one final point to remember is that your performance here today has been shown to predict your final degree mark. I will give you full feedback after the experiment.

Next, they performed the dot-probe task, beginning with 10 practise trials that were repeated until the participant had completed them successfully. All participants then completed the STAI-S scale once again. Next, the participants completed the main experimental dot-probe trials. At the end of the computer task, the participants in the social-evaluative condition were advised that they would not have to give a speech and all participants completed the STAI-S, the BDI and the SDS measures. Finally, they were thanked and fully debriefed.

Results

The aim of this study was to ascertain the nature of the attentional bias in social anxiety, in relation to the specificity of the stimuli, under either a social-evaluation or a non-evaluation condition. Preliminary analyses were performed throughout to ensure no violation of assumptions, such as normality, linearity and homogeneity of variance.

The participants' scores on the FNE initially determined the high and low social anxiety groups. However, subsequent analyses of the reaction time data failed to find any significant main effects or interactions (all Fs <1). The data was also analysed using the same 80 participants with the social anxiety groups classified by a median split of the scores on the SAD scale. Scores of 4 or less classified the low social anxiety group and 5

or more represented the high social anxiety group. In terms of participant movement between social anxiety groups, 28% of the high FNE group was re-classified to the low SAD group and 23% of the low FNE group was re-assigned to the high SAD group. The relationship between the FNE and the SAD measures was investigated using Pearson product-moment correlation coefficient. There was a strong positive correlation between the two questionnaires, $r = .637$, $n = 80$, $p < .001$. The participant characteristics and the social-evaluation manipulation results are presented below in consideration of both questionnaires, with the emphasis on the SAD scale.

Participant Characteristics

The participants' scores on each of the questionnaires were subjected to a two-way, social anxiety group (high vs. low) by threat induction (social-evaluation vs. non-evaluation) ANOVA. There was no main effect of threat and no two-way interaction (all $Fs < 1$) for any of the questionnaire measures, as would be expected from the random allocation of participants to the social-evaluation and non-evaluation conditions. The main effect of social anxiety group (see Tables 3.2. & 3.3.) indicated that the high socially anxious group, determined by both the FNE and the SAD scales, scored higher than the low socially anxious on the SAD, FNE, STAI-T and BDI measures. The low socially anxious scored higher on the SDS than the high socially anxious when the groups were based on the SAD scale, but there were no group differences with the SDS questionnaire in relation to the FNE scale.

Table 3.2. *Group Characteristics Based on the FNE Scale*

	Low Social Anxiety *(n=40)*		High Social Anxiety *(n=40)*		
	M	SD	M	SD	*F*
SAD	3.7	3.4	11.0	7.0	35.6**
FNE (experiment)	5.4	3.9	25.0	3.4	578.1**
FNE (recruitment)	7.3	4.3	23.8	3.0	399.5**
STAI-T	33.1	5.0	48.0	9.5	77.4**
BDI	4.9	4.4	12.0	9.6	17.8**
SDS	17.1	4.4	15.9	5.3	1.3

n.b. * denotes $p < .05$ ** denotes $p < .001$

Table 3.3. *Group Characteristics Based on the SAD Scale*

	Low Social Anxiety (*n*=42)		High Social Anxiety (*n*=38)		
	M	SD	M	SD	*F*
SAD	2.5	1.6	12.6	5.8	116.6**
FNE (experiment)	9.3	9.3	21.7	7.7	41.4**
FNE (recruitment)	10.3	7.8	21.2	6.6	45.0**
STAI-T	35.3	7.5	46.2	10.6	28.4**
BDI	4.9	3.4	12.3	10.1	19.8**
SDS	17.6	4.1	15.3	5.3	4.6*

n.b. * denotes $p < .05$ ** denotes $p < .001$

Threat Induction

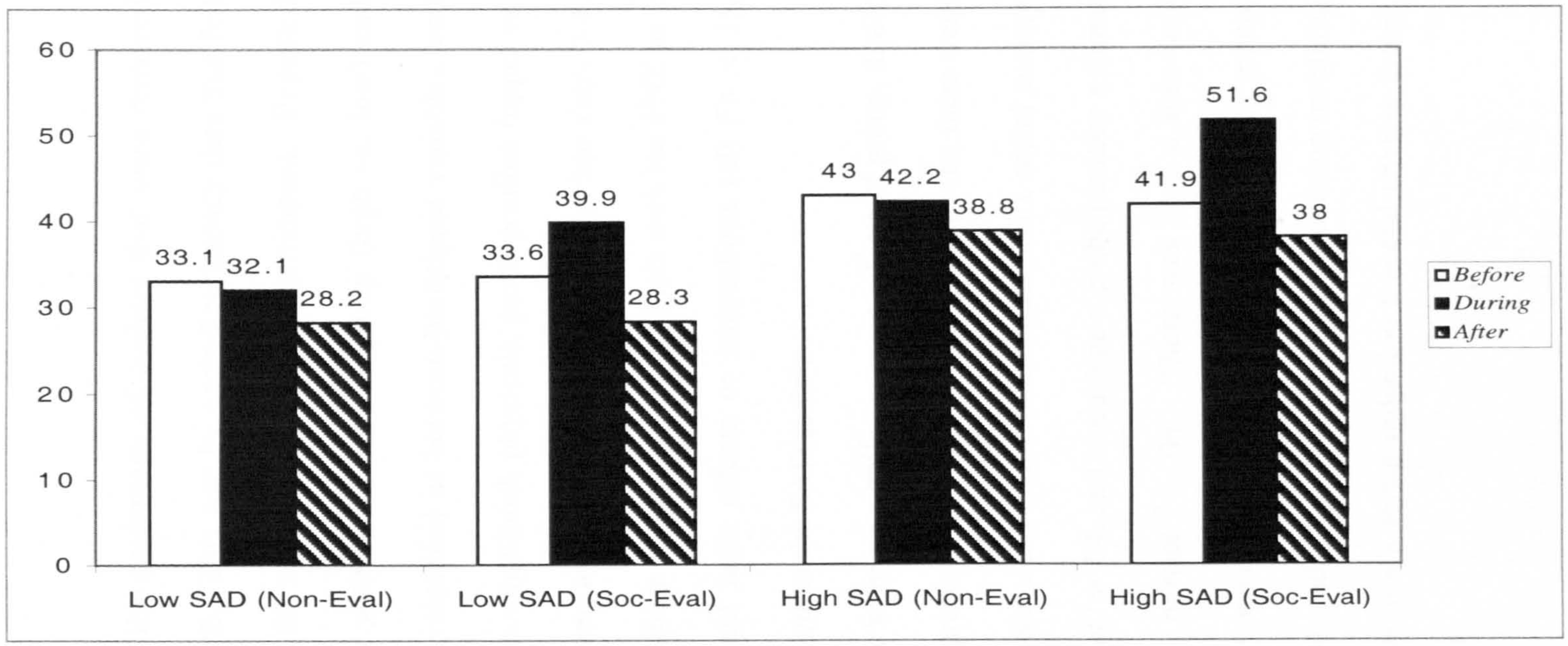
Levels of state anxiety were measured at three different time-points throughout the study. This was at the beginning of the study (*before*), after the experimental manipulation (*during*) and at the end of the study (*after*) using the STAI-S scale. Please see Figure 3.1. for full details of the mean STAI-S score for each social anxiety group for each time-point in the non-evaluation and social-evaluative condition. A three-way ANOVA was conducted with two between-participant factors of social anxiety group (high SAD vs. low SAD) and threat induction (social-evaluation vs. non-evaluation) and a within-participant factor of time-point (before, during, after). Please note that similar results were found when the groups were defined using the FNE scale.

Social Anxiety Group Differences: There was a significant main effect of SAD group, $F(1,76) = 26.2$, $p < .001$, *partial* $\eta^2 = .26$. Pairwise comparisons showed that the high SAD group ($M = 42.6$), when compared to the low SAD group ($M = 32.4$), had greater levels of state anxiety ($p < .001$).

Time-Point Differences: There was a significant main effect of time, $F(2, 152) = 29.32$, $p < .001$, *partial* $\eta^2 = .28$. Pairwise comparisons showed that the before ($M = 37.9$), during ($M = 41.2$) and after ($M = 33.3$) time-points were all significantly different from one another (all $ps < .01$). There was a two-way interaction between time and threat induction, $F(2, 152) = 11.38$, $p < .001$, *partial* $\eta^2 = .13$. This interaction was explored using repeated measures ANOVAs to ascertain if the social evaluation manipulation increased levels of state anxiety in both participant groups. There was a significant main effect of time in the non-evaluation condition, $F(1.7, 78) = 6.09$, $p = .007$, *partial* $\eta^2 = .14$, and the social-evaluation condition, $F(1.7, 78) = 31.64$, $p < .001$, *partial* $\eta^2 = .45$.

Non-Evaluation Condition: Pairwise comparisons revealed that levels of state anxiety did not differ from entering the room ($M = 38.6$) and beginning the dot-probe task ($M = 37.6$), and that it dropped significantly at the end ($M = 34.1$) of the experiment ($p = .001$). These results indicate that the participants were not experiencing any increase in the level of state anxiety during the experiment. At the end of the study, the participants' levels of state anxiety dropped which was probably due to relief of finishing the experiment.

Social-Evaluative Condition: Pairwise comparisons showed that levels of state anxiety at the start of the study ($M = 37.0$) increased after being advised of the social-evaluative induction ($M = 44.1$) and reduced significantly at the end ($M = 32.2$) of the experiment (all $ps < .001$). These results show the effectiveness of the social-evaluation manipulation, as after being given the induction the levels of state anxiety significantly increased in all the participants. After being advised that they would not have to give a speech, the participants' level of state anxiety dropped, once again probably due to relief at not having to give a speech and finishing the experiment.



n.b. *Non-Eval* = Non-Evaluation Condition *Soc-Eval* = Social Evaluation Condition

Before = Beginning of Study *During* = After Induction Advised *After* = After Induction Ended

Figure 3.1. *Mean Score of STAI-S scale by Social Anxiety Group and Experimental Manipulation at Three Different Time Points*

Reaction Time Data Analysis

On the probe detection task, the percentage of outliers that were removed throughout the entire analysis was 3.8%. This was by excluding latency data that fell outside two standard deviations from the mean score for each participant. Repeated measures ANOVAs were undertaken with social anxiety group (high vs. low) and condition (social-evaluation vs. non-evaluation) as between-participant variables, and word type (somatic, negative evaluation, situational, physical), probe position (upper vs. lower) and word position (upper vs. lower) as within-participant variables. See Table 3.4. for details of mean scores for each of these variables. The analysis with the FNE as a group predictor revealed no significant main effects or interactions (all Fs < 1), subsequently the analyses below are based on the SAD scale[2].

This analysis revealed that there were no significant main effects of group, threat induction, word type, word position or probe position (all $ps > .05$). However, there were significant three-way interactions between word type x threat induction x social anxiety group, $F(3, 228) = 3.18$, $p = .025$, *partial* $^2 = .04$, and word type x probe position x threat induction $F(3, 228) = 2.79$, $p = .041$, *partial* $^2 = .04$. There was also a four-way interaction between word type x probe position x threat induction x social anxiety group, $F(3,228) = 3.42$, $p = .018$, *partial* $^2 = .04$, and a significant five-way interaction involving word type x probe position x word position x threat induction x social anxiety group, $F(3,228) = 5.44$, $p = .001$, *partial* $^2 = .07$.

---

[2] As suggested by Howell (1997) the reaction time data was also log transformed (*LG10*) to reduce the positive skewness of response distribution. Notably however, the pattern of findings was identical to those reported above.

Table 3.4. *Reaction Times (SDs in parenthesis) from the Dot-Probe Task for the High and Low Social Anxiety Groups (based on the SAD scale)*

	Physical Threat		Somatic Sensation		Social Situation		Negative Evaluation	
Non-Evaluation Condition								
	Probe		Probe		Probe		Probe	
	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
High Social Anxiety								
Threat Word Upper	350*(33)*	365*(40)*	350*(40)*	358*(54)*	355*(49)*	347*(47)*	353*(43)*	338*(36)*
Threat Word Lower	352*(50)*	358*(52)*	360*(44)*	353*(44)*	351*(59)*	350*(50)*	358*(52)*	358*(57)*
Low Social Anxiety								
Threat Word Upper	353*(57)*	350*(46)*	361*(51)*	351*(57)*	368*(53)*	371*(49)*	367*(61)*	361*(54)*
Threat Word Lower	367*(55)*	355*(53)*	370*(53)*	353*(61)*	353*(52)*	369*(52)*	351*(52)*	348*(48)*
Social-Evaluation Condition								
	Probe		Probe		Probe		Probe	
	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
High Social Anxiety								
Threat Word Upper	339*(45)*	346*(48)*	346*(58)*	335*(33)*	361*(63)*	354*(54)*	341*(59)*	340*(40)*
Threat Word Lower	343*(43)*	352*(52)*	355*(56)*	351*(48)*	354*(60)*	350*(63)*	335*(46)*	350*(73)*
Low Social Anxiety								
Threat Word Upper	341*(30)*	348*(42)*	347*(42)*	356*(44)*	358*(50)*	345*(41)*	344*(41)*	347*(43)*
Threat Word Lower	334*(33)*	346*(47)*	341*(35)*	346*(46)*	351*(39)*	341*(31)*	353*(54)*	354*(45)*

To explore this interaction further, attentional bias scores (cf. MacLeod et al., 1986) were calculated for each word group using the following equation: 0.5 x [(UpLt-UpUt) + (LpUt-LpLt)], where U = upper position, L = lower position, p = probe, t = threat word. The bias score reflects the word position x probe position interaction with positive values reflecting selective attention towards and negative values reflecting an attentional bias away from the threatening words.

The bias scores were analysed using repeated measures ANOVAs with the social anxiety group (high SAD vs. low SAD) and threat induction (social-evaluation vs. non-evaluation) as the between-participant variables and the within-participant factor being word type (somatic, negative evaluation, situational, physical). This produced a significant word type x condition x social anxiety group interaction, $F(3,228) = 5.44$, $p = .001$, $partial^2 = .07$, which corresponded to the five-way interaction found for the latency data.

Attentional Bias Score for each Word Group

To clarify the results further analyses of bias scores was conducted separately for each category of word group. Univariate ANOVAs were conducted for each word groups bias scores (negative evaluation, somatic sensation, social situation and physical threat) with social anxiety group (high SAD vs. low SAD) and threat induction (social-evaluation vs. non-evaluation) as between-participant factors. Please see Figure 3.2. for details of each word groups bias score for each social anxiety group and threat induction.

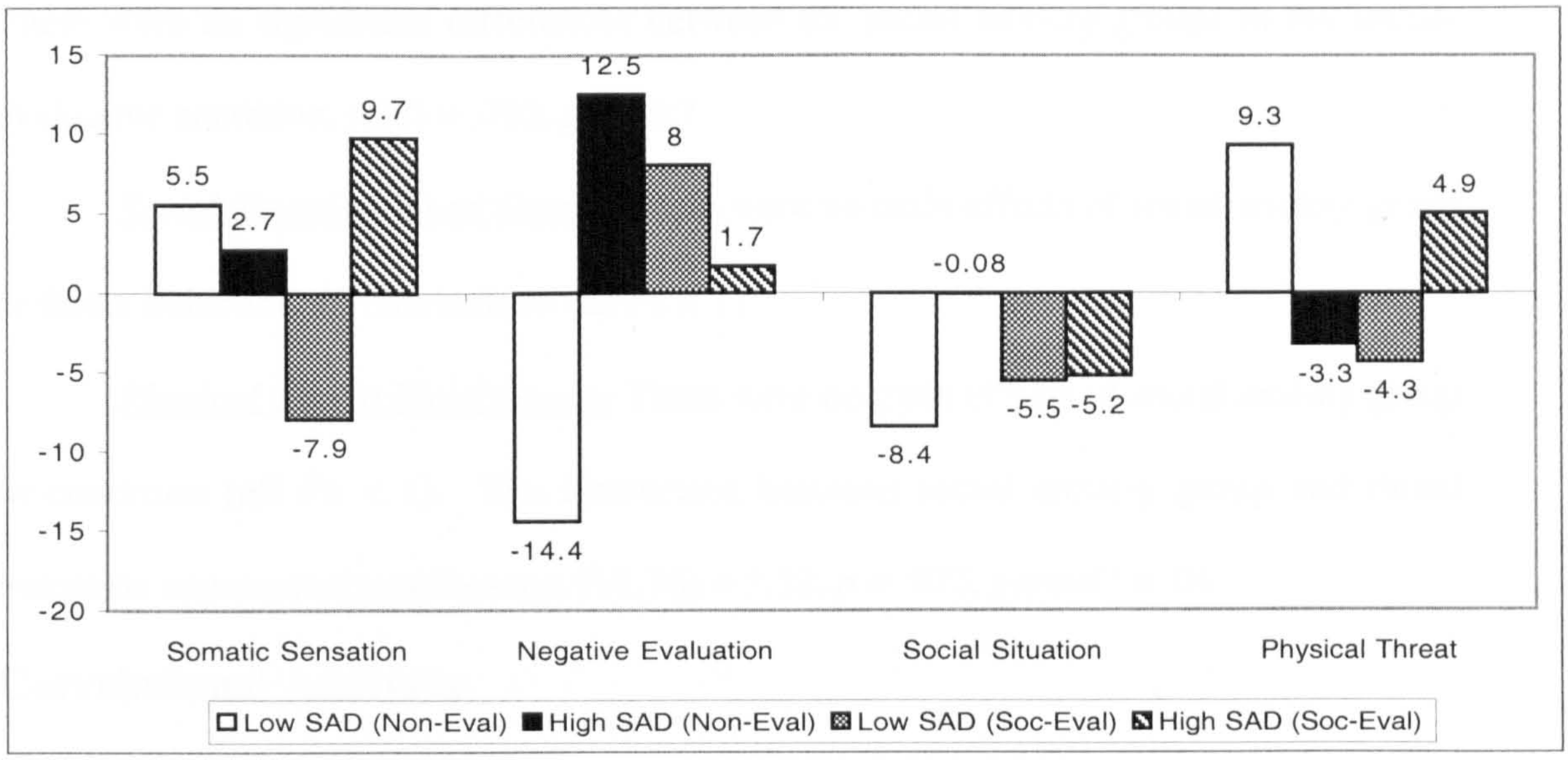


Figure 3.2. *Bar Chart Displaying the Mean Attentional Bias Score for each Word Group and Social Anxiety Group by Condition*

Somatic Sensation Word Group: There were no main effects of social anxiety group or threat induction (all Fs < 1), but there was a significant interaction, $F(1,76) = 4.13$, $p = .046$, *partial* $^2 = .05$. An independent samples t-tests revealed that there were no significant differences between the social anxiety groups in the non-evaluative condition, $t(38) = .387$, $p = .701$. In the social-evaluative condition, an independent samples t-test showed that there was a significant difference between the groups, with high social anxiety group attending towards, and the low social anxiety group attending away, from the somatic sensation words, $t(24.48) = 2.33$, $p = .028$, $d = -.79$.

Negative Evaluation Word Group: There were no main effects of social anxiety group or threat induction (all Fs < 2.7), but there was a significant interaction, $F(1,76) = 6.85$, $p = .011$, *partial* $^2 = .08$. An independent samples t-test showed that in the non-evaluative condition, the high socially anxious attended towards the threatening words, in

comparison to low socially anxious who attended away, $t(38) = -3.01$, $p = .005$, $d = -.94$. There were no significant differences between the social anxiety groups in the social-evaluative condition, $t(38) = .702$, $p = .487$.

Social Situation Word Group: There were no main effects of social anxiety group or threat induction, or interactions (all Fs < 1).

Physical Threat Word Group: There were no main effects of social anxiety group or condition (all Fs < 1). The interaction between social anxiety group and threat induction approached significance, $F(1,76) = 3.33$, $p = .072$, *partial* $^2 = .04$.

Correlational Analyses

Correlations between the attentional bias scores for each word group and questionnaire measures showed no significant results in the low social anxiety group (all ps > .05). In the high social anxiety group, bias scores for physical threat words correlated positively with SAD scores ($r = .34$, $p = .037$) and BDI scores ($r = .42$, $p = .009$). Bias score for social situation words positively correlated with STAI-T scores ($r = .38$, $p = .018$) and BDI scores ($r = .36$, $p = .028$) in the high social anxiety participants. Thus, in the high social anxiety participants, increased social avoidance and distress and depression is associated with greater vigilance for physical threat words, whereas increased trait anxiety and depression is associated with greater vigilance for social situation words.

Discussion

The aim of the first experiment in this thesis was to ascertain the nature of the attentional bias to specific categories of threatening words in social anxiety, when conditions of social-evaluation were manipulated. A further aim was to address the

aforementioned theoretical conflict in relation to the predicted direction of this bias (Beck et al., 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997). The results have revealed differences in attentional bias with individuals who experience different levels of social avoidance and distress. Furthermore, this bias was not only dependent on the levels of social-evaluation, but also on particular category of threatening word. The results showed that in the non-evaluation condition, the high socially anxious, in comparison to the low socially anxious, displayed an attentional bias towards the negative evaluative words, which they lost in the social evaluation condition. Also, in the social-evaluative condition, in comparison to the low socially anxious, the high social anxiety group demonstrated an attentional bias towards the somatic sensation words.

These findings have important implications for the previously detailed cognitive approaches to social phobia. In consideration of both Beck et al. (1985) and Rapee and Heimberg (1997), no attentional bias effects were expected in the non-evaluation condition. However, the results from this study suggest that the high socially anxious attended towards the socially threatening negative evaluative words in this condition. Furthermore, they predicted that individuals high in social anxiety would selectively attend towards all socially threatening information in the social-evaluation condition. This study only found an attentional bias towards somatic sensation words in the social-evaluation condition to be associated with high levels of social anxiety. Thus, the evidence reported here provides limited support for these cognitive theoretical perspectives, as the attentional bias seems to be far more selective than they suggest. These theories may need to take into account not only the saliency of the stimuli, but also other cognitive and motivational factors (i.e., somatic sensations being of primary

attentional concern when expecting to give a speech) that may underlie selective attentional processes.

With respect to the cognitive model of social phobia (Clark & Wells, 1995), the findings mainly supported the proposed role of self-focused attention. Insofar as in the non-evaluative condition, the high socially anxious displayed by an attentional bias towards negative evaluation words, indicating a pre-occupation with thoughts relating to negative assessment by the self and others. Additionally when aroused, the high socially anxious attended towards the somatic sensations words, highlighting a pre-occupation with internal bodily sensations in this condition. In further support of this model, no attentional bias effect was present for the social situation words that could be considered as externally cued information. Therefore, the present results were largely supportive of Clark and Wells' theory, although the predicted attentional bias towards the negative evaluational words in the social-evaluative condition was not evident. Two Stroop studies have also found that individuals with social phobia did not display an attentional bias towards negative evaluational words under conditions of social arousal (Amir et al., 1996; Amir et al., 2002). Taken together, it seems fair to suggest that, contrary to the Clark and Wells prediction, negative evaluation may not be the primary focus of attention in high socially anxious individuals during a social-evaluation situation such as the anticipation of giving a speech.

Interestingly, studies with the clinical population have also found individuals with social phobia to attend towards their physical sensations when in a socially threatening situation. For example, Johanson and Öst (1982) reported that social phobics were particularly accurate in the estimation of their heart-rate changes during a social

encounter, suggesting an enhanced awareness of interoceptive information. Additionally, Maidenberg et al. (1996) also found that social phobia patients were as interested in their physical sensations as panic disordered patients and went on to suggest that this was restricted to social contexts. In view of this and the current findings, it seems fair to propose that somatic sensations are indeed of major attentional focus to the socially anxious when in a social-evaluative situation, such as believing they are going to be recorded and assessed whilst giving a speech.

This study was consistent with Mogg and Bradley's (2002) proposal that social avoidance and distress, as indicated by scores on the SAD scale, is an important factor in identifying dysfunctional attentional processing in social anxiety. Indeed, there were no significant findings when the FNE scale was used to determine high and low social anxiety groups. In a large-scale epidemiological study by Kessler et al. (1998), it was notable that although fear of public speaking was common, it was social phobia with more extensive fears that was the most persistent and disabling in the general population. Consequently, as Watson and Friend (1969) designed the SAD measure to assess the more multiple social fears, it seems fair to suggest that this questionnaire may be more sensitive to general and disabling effects of social anxiety. The FNE scale on the other hand, measures the more common fear of being evaluated in a negative fashion. Although it is important to note that research (e.g., Mansell et al., 1999; Pishyar et al., 2004) has reported attentional bias effects using the FNE scale too. Turner et al. (1987) explored the reliability and validity of the SAD and the FNE questionnaires within a clinical population. They argued that the questionnaires lacked discriminant validity and may be inappropriate for the use in participant selection. However, Cox and Swinson (1995) and

Heimberg et al. (1988) both reviewed this topic and concluded that both questionnaires appeared to be reliable measures of social anxiety and social phobia. Essentially, the issue of which questionnaire to use when determining high and low levels of social anxiety in analogue studies needs to be researched further. In view of this, chapter six of this thesis presents a psychometric analysis of these measures.

The implications from this research are that in contrast to previous analogue studies (Mansell et al., 2002; Pishyar et al., 2004), word stimuli can be employed within cognitive experimental paradigms to identify the subtle differences in attentional processing styles of the socially anxious. This study has demonstrated that any attentional biasing effect is dependent not only on levels of social-evaluation, but also on the specific type of the threat word used in a visual dot-probe task. Future research needs to incorporate stimuli relating to somatic sensations, as well as other key socially threatening words, when exploring cognitive biases in both analogue and clinical socially anxious samples.

The first limitation of this experiment was that it utilised a sample of undergraduate students, rather than individuals experiencing clinical levels of social phobia. Future research therefore needs to focus on a clinical sample diagnosed with social phobia to ascertain if these findings are applicable to patients with this disorder. This is investigated in chapter five of this thesis using a sample of participants with clinical levels of social phobia. The second limitation regards the data that represented the mean score for each data point in the initial reaction time analysis. The twelve words per threat word group basically allowed for three of the participant's reaction times to be included in each mean score, as there were four data points per word group. (e.g., see

Table 3.4.). Indeed, there was concern that three reaction times was not sufficient to be representative of the actual mean score. This concern was heightened further as after removing the extreme scores, in certain cases there was only one of two data point per mean. In order to address this issue, the recommendation here is to increase the number of critical trials by either including more threat words and/or presenting the trials more than once. This would allow for more reaction time data to be included into the mean data points after the extreme scores had been removed. In view of this, both experiments two and three in this thesis have increased the number of threat words per category.

In summary, the current experiment has identified that the nature of the cognitive attentional biasing effect in the trait socially anxious is dependent on a complex interaction of the saliency and interoceptive nature of the threatening word to the socially anxious individual, together with their current level of social-evaluative anxiety. The findings suggest that the high socially anxious' primary concern is with a general pre-occupation of being evaluated in a negative fashion, which changes during a social-evaluation situation to an attentional bias towards somatic sensations. Thus providing further evidence of the self-focusing internal processing style of the socially anxious as proposed by Clark and Wells (1995).

Chapter 4

Attentional Bias in Social Anxiety: Manipulation of Stimulus Duration and Social-Evaluative Anxiety

Experiment Two

Introduction

This experiment was designed to replicate the findings from experiment one and to extend the research further by examining pre-attentional processing in a socially anxious analogue sample. Thus, the visual dot-probe task incorporated the same categories of threatening semantic stimuli as in the previous experiment, but increased the number of words per threat category from twelve to sixteen. The stimuli were presented for 14 ms (+ 486 ms mask) to assess pre-attentive processing and for 500 ms (no mask) to investigate conscious attentional processing and there was the same threat induction procedure as in experiment one.

The anxiety theories presented in chapter one highlighted the importance of understanding the specific mechanisms that underlie the pattern of attentional processing in anxious populations (e.g., Eysenck, 1992; Williams et al., 1988). Indeed, they predict that individuals experiencing high levels of anxiety possess an enduring tendency to focus their attention towards threat, whereas low trait anxious people actively shift their attention away from such aversive stimuli. Furthermore, when levels of state anxiety are low, there are no obvious cognitive differences between those with high or low levels of anxiety. However, as the level of state anxiety increases, their predisposition to allocate processing resources towards or away from threat respectively, becomes more evident. Shiffrin and Schneider (1977) have suggested a theoretical distinction between two stages of attentional processing, namely the automatic and the strategic level. They proposed that the automatic stage is a fast, unconscious and involuntary process. The strategic

level on the other hand, is a more effortful, intentional and controlled stage. In consideration of this distinction, these biases are predicted to occur throughout the attentional system, both at an automatic and a strategic capture of attention.

Indeed, Mogg and Bradley (2002) have proposed that a key issue in cognitive conceptualisations of anxiety is the potential role of pre-attentive biases in the aetiology and maintenance of anxiety disorders. In support, Mathews, Ridgeway and Williamson (1996) detailed that it is important to determine whether an automatic bias exists, as it may help to explain how anxiety episodes occur outside of the person's awareness. Furthermore, the identification of the nature of automatic processing in anxiety, may lead to improved methods of clinical treatment that concentrates on the unhelpful selective attentional patterns associated with the particular anxiety disorder (e.g., Luecken et al., 2004). Thayer and Lane (2000) also argued that automatic hypervigilance towards potential threat serves to perpetuate anxiety and associated physiological arousal, even when there is no actual threat present. Thus, it is important to determine the nature of attentional processing in anxious populations at a pre-conscious level of processing.

One way in which cognitive research examines automatic attentional biases is to use a computerised visual attention task incorporating brief, masked visual stimuli. This allows for the awareness of the presentation to be restricted and not consciously processed (Holender, 1986). As described in chapter one, studies have used the emotional Stroop and the visual dot-probe task to assess pre-attentive and conscious attentional processing in anxious populations. Stroop research has shown that individuals with generalised anxiety disorder and trait anxiety are associated with prolonged colour-naming latencies for disorder-specific words, even when these are masked to prevent

conscious awareness (e.g., Bradley et al., 1995; MacLeod & Rutherford, 1992; Mogg et al., 1993a; Mogg et al., 1993b). Additionally, the interference effect of masked threat words in a Stroop task has been shown to reduce in patients following successful treatment for generalised anxiety disorder (Mogg et al., 1995a).

Visual dot-probe studies on the other hand, have reported inconsistent evidence of pre-attentional processing in anxious populations. For example, Mogg et al. (1995b) have reported evidence of subliminal attentional bias towards negative words in clinically anxious participants. Whereas, Mogg et al.'s (1994) results suggested that preconscious processing differs as a function of trait and state anxiety. In this study, an attentional bias towards threat was only found in the masked trials in the low stress condition. Overall, there appears to be a lack of cognitive experimental studies concentrating on the role of state anxiety variables and its influence on preconscious processing biases in anxious populations.

Fox (1996) has suggested that much of the work demonstrating unconscious attentional biases may simply reflect conscious priming. Fox proposed that as the masked and unmasked trials were intermixed, participants were aware that threat-related words were sometimes being presented. This procedure means that the conscious presentation of threatening stimuli will activate a search for further threat in anxious individuals. Consequently, any pre-conscious automatic attentional bias effects may be as a result of conscious strategic processes. In a series of studies addressing this issue, Fox (1996) reported evidence that an attentional bias to masked threat stimuli only occurred in a context where unmasked and masked trials were randomly intermixed or where a block of unmasked trials preceded the masked trials. In either case, the

participants were consciously aware that threat words were being presented. Conversely, a study by Wikström et al. (2003) that only included masked threat word trials, reported that high trait anxious individuals demonstrated an attentional bias for threatening stimuli at a preconscious level. With such conflicting evidence it is clear that this issue of priming needs to be explored further.

The studies mentioned so far include trait anxious participants or individuals with generalised anxiety disorder. Clark (1999) suggested that different types of anxiety are associated with different patterns of attentional processing. Indeed as presented in chapter two, Clark and Wells (1995) proposed that individuals with this social anxiety and social phobia are generally pre-occupied with negative evaluation. In a social situation, they argued that their attentional focus is on internal threat cues (e.g., negative evaluational and visible anxiety symptoms). In contrast, Beck et al. (1985) and Rapee and Heimberg (1997) have suggested that consistent with other anxiety disorders, socially phobic individuals show preferential processing of disorder-specific threatening stimuli. This style of information processing results in an attentional bias towards all socially threatening information, including external cues such as social situations and negative reactions from people. Musa and Lépine (2000) propose that it is generally assumed from these theories that the attentional bias is an automatic as well as a conscious process. In support of the latter two theories, Mogg and Bradley (2002) reported that socially anxious individuals displayed a bias towards masked threatening faces, suggesting an automatic attentional bias towards external disorder-specific threat. To date, this is the only study to examine pre-attentive processing in the socially anxious using the visual dot probe task.

The aims of this current study was to not only replicate the conscious attentional bias results from experiment one, but also to provide a clearer understanding of the pattern of pre-attentional processing in social anxiety. The experimental design and procedure were thus similar to experiment one. However, to address Fox's (1996) concern that pre-attentive biases are influenced by conscious priming of threat in the post-conscious trials, the masked trials (automatic processing) were completed first, before the unmasked trials (strategic processing). Also, the participants were selected using the SAD scale, as the previous experiment showed it to be a better predictor of attentional biases in socially anxious samples. The FNE scale was also included to provide further clarity on this issue.

As this is the first study to explore the interplay of pre-attentive biases in the socially anxious to semantic stimuli and the influence of social-evaluation upon this, the hypotheses were considered in light of several theoretical viewpoints. All predictions are based on comparing the high socially anxious individuals with the low socially anxious participants. First, in direct consideration of the theoretical perspectives of Beck et al. (1985), Rapee and Heimberg (1997) and Williams et al. (1988), the high socially anxious were predicted to display an attentional bias towards all socially threatening stimuli (e.g., negative evaluation, somatic sensation and social situation words). Furthermore, these models suggested that this attentional bias would be at an automatic and strategic level of processing, but only occurring under conditions of social-evaluation. Second, Eysenck (1992) proposed that the socially anxious would initially be hypervigilant towards all social and physical threat stimuli demonstrated by an automatic pre-attentional bias towards all the threat words. At a conscious level of processing, he suggested that the

attentional bias would be towards all socially threatening stimuli. He also suggested that the intensity of the attentional bias effect would be greater in the social-evaluation condition, than the non-evaluation condition. Third, the Clark and Wells (1985) model predicted a pre-conscious and conscious bias towards negative evaluation in the non-evaluation condition. Under social-evaluative conditions, this model would predict a pre-attentive and conscious processing bias towards interoceptive threat such as negative evaluation and somatic sensation words.

Finally, the predictions in the conscious processing stage were also based on replicating the findings from experiment one. Therefore, the high socially anxious would be expected to display an attentional bias towards negative evaluation words in the non-evaluation condition and towards somatic words in the social-evaluation condition.

Method

Participants

Students from Sheffield Hallam University (n = 561) studying for a health-related or psychology degree were screened using the SAD and the FNE scales. Those scoring in the upper (8 and over) and lower (3 and under) tertiles of the SAD questionnaire were invited to take part. A total of 103 students participated in the main study, of which 21 participants were excluded because their SAD score on the day was not consistent with their screening score. The remaining participants consisted of 67 females and 15 males. There was a predominance of females due to the sex distribution of students on health and psychology courses. The age range was 18 to 55 years, with mean age of 23.7 years (SD = 8.7). There were no social anxiety group differences in age and gender ratio across experimental conditions (^{2}<1). Gender was equally distributed across the social anxiety

groups and participants were randomly allocated to either the social-evaluation or the non-evaluation condition.

Materials

All the words included in this study came from the original word selection criteria detailed in experiment one. To address the methodological concern of the possibility that mean score for each data point was based on an insufficient number of reaction time latencies, this experiment included 16 words per threat group (negative evaluation, somatic sensation, social situation and physical threat). See Table 4.1. for details of the 64 threat-neutral word pairs. The words were randomly divided into two word sets (A and B). Each word set consisted of the 32 threat words (8 words from each group), paired with a neutral word and 64 neutral-neutral word pairs. The allocation of the word sets to the masked and unmasked conditions was balanced across participants, with half of them receiving set A pre-attentively and set B consciously, and vice versa. In total, the word sets were presented three times during the main task.

Table 4.1. *Threat-Neutral Words by Category*

Somatic Sensation – Paired Neutral Words		Negative Evaluation – Paired Neutral Words		Social Situation – Paired Neutral Words		Physical Threat – Paired Neutral Words	
sweating	armchair	stupid	barrel	meeting	natural	injury	silver
nervous	leather	mocked	banner	interview	household	disease	version
dizzy	coral	foolish	gradual	public	enough	lethal	marrow
shaky	tweed	embarrassed	transformed	audience	returned	cancer	saddle
trembling	phenomena	failure	balance	conversation	conventional	pain	bank
suffocating	periodicals	disgraced	warehouse	assessment	originally	ambulance	flowering
breathless	downstream	pathetic	exterior	speech	travel	deadly	ladder
nausea	layman	inferior	inventor	presentation	metropolitan	illness	mustard
blushing	cupboard	worthless	cultivate	crowd	grass	emergency	furniture
gasping	geology	ridiculed	pictorial	examination	sovereignty	violence	creation
collapse	aeration	inept	purge	party	clear	doctor	cattle
tense	onion	criticised	ingredient	socialise	president	coffin	rocket
lightheaded	subscribing	inadequate	locomotion	performance	contraption	stroke	string
gagging	zooming	ashamed	orchard	dating	season	fatal	perch
faint	honey	humiliated	miniatures	engagement	phonograph	hospital	nutshell
palpitations	amalgamation	incompetent	manufacture	stage	basic	coronary	snapshot

The Modified Dot Probe Task

All stimuli were presented on a computer. As in experiment one, each trial began with a black cross in the centre of the screen for 500 milliseconds, together with a sound of a bleep, to serve as a fixation cue. A randomly chosen word pair replaced this, with one word appearing just above and the other word appearing just below the location of the preceding black cross. The words were presented in upper case and were 3 cm apart. The main task consisted of a total of 576 trials, 288 per exposure condition (pre-attentional and conscious processing). The pre-attentional condition was always presented first to address the aforementioned concerns of Fox (1996).

Consistent with previous studies investing pre-attentive processing biases (e.g., Mogg et al., 1994; Mogg et al., 1995; Fox, 1996), the masked trials consisted of the word pairs being displayed for 14 ms, followed by a pair of masks (e.g. XXXX) that were presented for 486 ms. The masked pair were matched for word length and word position, so that they completely obscured the previously presented words. The stimulus onset asynchrony (SOA) was 14 ms. In the unmasked trials, word pairs were displayed for 500 ms and there was no masking of the words.

In both masked and unmasked visual dot probe trials, there were 96 threat-neutral and 48 neutral-neutral word pairs with the dot probe appearing after a 25 msec delay. There was an additional 144 non-probed neutral-neutral words trials to act as fillers. The participant was instructed to press the spacebar as soon as they saw the dot-probe and the dot remained on the screen until detected. If no dot appeared on the screen they were told to simply wait for the next trial. The probability of the threat word and subsequent dot probe appearing at either the upper or lower position on the monitor was equated. On the

non-probed trials, the next randomly chosen word pair followed after an inter-stimulus delay of 1 sec.

Awareness Checks

The participants completed two awareness checks in a well-lit room and the participants were light adapted (cf. Holender, 1986). First, they attempted the presence/absence task (Cheesman & Merikle, 1985; Merikle & Reingold, 1990). This involved randomly presented 'word present' and 'word absent' trials. The task began with a 500 ms fixation point, then a word pair (word present) or a blank screen (word absent) was displayed for 14 msec, followed by a pair of pattern masks for 486 msec. Participants were told that on 50% of the trials a word pair was being presented and on the remaining 50% a blank screen (cf. Kemp-Wheeler & Hill, 1988). They were instructed to press either "Yes" (word pair present) or "No" (word pair absent) keys. And the response accuracy was recorded. This was followed by the lexical-decision task consisting of same exposure conditions and instructions. On half of the trials, word pairs were presented and on the other trials a pair of non-words were shown and then followed by pattern masks. Each non-word in a pair was matched for length (e.g., GNUSE/SKORT). The order of the trials was fully randomised and the participant pressed the "Yes" (word pair) or the "No" (non-word pair) keys and the response accuracy was recorded. Both awareness tasks began with 10 practise trials before the 40 experimental trials. All the stimulus word pairs were a subset of those presented in the masked condition of the probe task, with an equal number of word pairs from the somatic, situational, negative evaluation, physical threat and neutral word groups.

Standardised Measures

This study included the same questionnaires as detailed in experiment one, except that a more up-to-date version of the BDI-II (Beck, Steer & Brown 1996) was used. This version of the questionnaire assesses symptoms of depression that are more consonant with the DSM-III-R and the DSM-IVIV criteria, such as increases and decreases in sleep patterns and appetite. Beck et al. (1996) have reworded lots of the items and the clinical implications were also attached to some of the items too.

Procedure

Ethical approval for this experiment was obtained from the University of Sheffield's ethics committee. The participants were tested individually in a cubicle, where they were seated approximately 80 cm from the computer screen. The computer used was an Acer Veriton 7200D PC with Pentium 4 processor running under Windows 2000 and the monitor was a CTX Ultra Screen 21" CRT monitor with a refresh rate of 60hz. On arrival, they consented to completing some questionnaires, taking part in a reaction time test and to the possibility of performing a mildly stressful task. First, the participants completed the FNE, SAD, STAI-S and STAI-T scales. Following this, half of the participants were given the social-evaluation instructions, and the remaining participants were given the non-evaluation induction that was detailed in experiment one. Next, they performed the computerised task which began with 10 practise masked and 10 practise unmasked trials. They had to successfully complete both practise trials before continuing. After this, they completed the STAI-S once again and then the first block of masked visual dot trials. Next, the participants were given a 2-minute rest period before

completing the unmasked word trials. At the end of the computer task, the participants in the social-evaluative condition were advised that they would not have to give a speech. The presence/absence task, followed by the lexical decision task, was then performed. Finally, all participants completed the STAI-S, the BDI and the SDS questionnaires. The participants were thanked and fully debriefed before leaving.

Results

The aim of this study was to ascertain the nature of pre-attentive and conscious attentional biases in social anxiety, in relation to the specificity of the stimuli, under either a social-evaluation or a non-evaluation condition. Preliminary analyses were performed throughout to ensure no violation of assumptions, such as normality, linearity and homogeneity of variance.

Awareness Decision Tasks

All participants reported that they were unable to perceive the stimuli presented under the masked exposure condition. On both awareness check tasks, the proportion of trials with the correct and incorrect responses was calculated for each participant. As the participants were aware that there was an equal probability on each trial that either a word/non-word or that a word was present/absent behind the masking, the proportion of correct responses expected by chance would be 0.5 (cf. Kemp-Wheeler & Hill, 1988). A supplementary analysis, *d* (a measure of sensitivity derived from signal detection theory) was also calculated for each participant.

Presence/Absence Discrimination Task: The mean response probabilities for the proportion of correct hits were 0.319 (*SD* 0.206) and false alarms were 0.681 (*SD* 0.206). Mean *d* score was –1.362 (*SD* 0.411), which was significantly different than zero, $t(81) = 30.00$, $p < .001$. None of these values differed between the SAD groups ($p >$ 1). One sample t-tests were conducted to assess the extent to which participants' proportion of correct hits deviated from chance (0.5). This revealed that the overall performance of the sample ($n = 82$) differed from that expected by chance, $t(81) = 7.97$, p

< .001. This suggests that the participants were aware that stimuli were being presented before the pattern masks.

Lexical Decision Discrimination Task: The mean response probabilities for the proportion of correct hits were 0.500 (*SD* 0.703) and false alarms were 0.501 (*SD* 0.702). The mean value of *d* was –1.00 (*SD* .1415), which was significantly different from zero, t (81) = 64.14, $p < .001$. There were no SAD group differences between these values ($p > 1$). One sample t-tests were undertaken to ascertain the extent that the participants' proportion of correct hits deviated from chance (0.5) and revealed that the participants did not differ from chance, t (81) = .147, $p = .883$. This suggests that participants were generally unaware of the lexical content of a word.

Overall, the awareness checks indicate that a substantial proportion of the sample were able to detect the presence versus the absence of the stimuli, but were generally unaware of the lexical content of the word, when masked. Thus, is seems safe to assume that the distracting words were below at least a subjective threshold of awareness (cf. Kemp-Wheeler & Hill, 1988). These findings are consistent with previous studies investigating pre-attentive biases in anxiety (e.g., Fox, 1996; Mogg et al., 1994).

Participant Characteristics

The participants' scores on each of the questionnaires were submitted to a two-way social anxiety group (high SAD vs. low SAD) by threat induction (social-evaluation vs. non-evaluation) ANOVAs. There was no main effect of threat and no two-way interaction (all *F*s < 1) for any of the questionnaire measures, as would be expected from the random allocation of participants to the social-evaluation and non-evaluation conditions. The main effect of social anxiety group (see Table 4.2.) indicated that the

high socially anxious group scored higher than the low socially anxious on the SAD (recruitment and experiment), FNE, STAI trait anxiety scale and the BDI-II. The low socially anxious scored higher on the SDS than the high socially anxious.

Table 4.2. *Group Characteristics Based on the SAD Scale*

	Low Social Anxiety *(n=41)*		High Social Anxiety *(n=41)*		
	M	SD	M	SD	*F*
SAD (recruitment)	2.5	2.3	12.5	4.1	183.3**
SAD (experiment)	1.7	0.7	12.1	4.3	233.1**
FNE	8.2	6.3	20.0	8.2	54.2**
STAI-T	34.7	7.9	46.9	7.8	50.2**
BDI-II	7.5	6.0	12.0	7.0	9.8**
SDS	17.3	5.9	14.2	4.7	6.9*

n.b. * denotes $p < .05$ ** denotes $p < .001$

Threat Induction

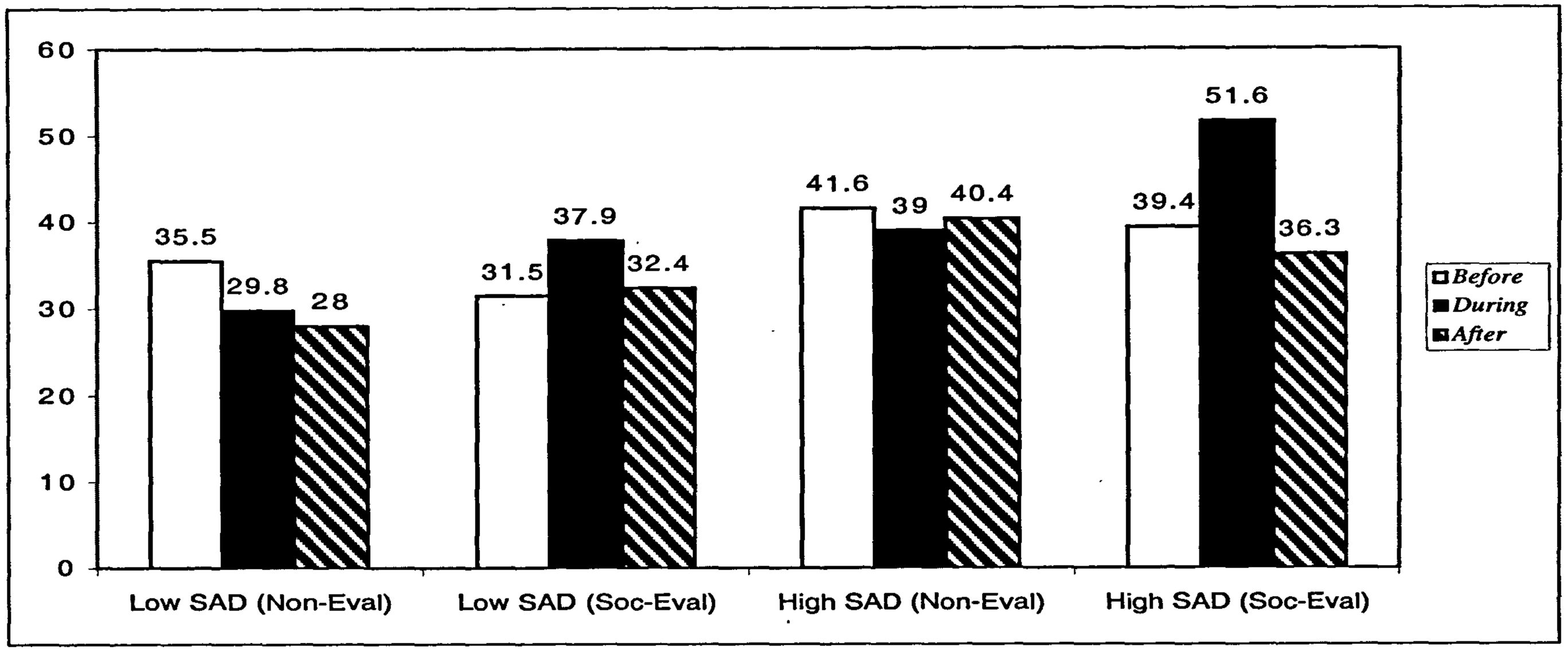
As in experiment one, levels of state anxiety were measured at three different time-points throughout the study. This was at the beginning of the study (*before*), after the experimental manipulation (*during*) and at the end of the study (*after*) using the STAI-S scale. Please see Figure 4.1. for full details of the mean STAI-S score for each social anxiety group for each time-point in the non-evaluation and social-evaluation condition A three-way ANOVA was conducted with two between-participant factors of social anxiety group (high SAD vs. low SAD) and threat induction (social-evaluation vs. non-evaluation) and a within-participant factor of time-point (before, during, after).

Social Anxiety Group Differences: There was a significant main effect of social anxiety group, $F(1,78) = 32.9$, $p < .001$, *partial* $^2 = .30$. Pairwise comparisons revealed that throughout the experiment, the high socially anxious ($M = 41.4$), when compared to the low socially anxious ($M = 32.5$), had greater levels of state anxiety ($p < .001$).

Time-Point Differences: There was a significant main effect of time, $F(2, 156) = 16.4$, $p < .001$, *partial* $^2 = .17$. Pairwise comparisons showed that the before ($M = 37.0$), during ($M = 39.6$) and after ($M = 34.3$) time-points were all significantly different from one another ($p \leq .01$). There was also a 2-way interaction between time and condition, $F(2, 156) = 29.0$, $p < .001$, *partial* $^2 = .27$. This interaction was explored using repeated measures ANOVAs to ascertain if the social evaluation manipulation increased levels of state anxiety in both participant groups. There was a significant main effect of time in the non-evaluation, $F(2, 80) = 5.62$, $p = .011$, *partial* $^2 = .12$, and social-evaluation, $F(2, 80) = 37.95$, $p < .001$, *partial* $^2 = .49$ condition.

Non-Evaluation Condition: Pairwise comparisons revealed that levels of state anxiety in the non-evaluative condition reduced from entering the room (M = 38.6) and beginning (M = 34.5) the dot-probe task (p = .013) and that it remained constant (M = 34.4) at the end of the experiment (p = .895). These results indicate that the participants were not experiencing any increase in the level of state anxiety during the experiment. At the end of the study, the participants' levels of state anxiety dropped which is probably due to relief of the experiment being over.

Social-Evaluation Condition: Pairwise comparisons showed that levels of state anxiety increased from entering the room (M = 35.3) and after being advised (M = 44.6) of the manipulation ($p < .001$) and reduced significantly at the end (M = 34.3) of the experiment ($p < .001$). As in experiment one, these results show the effectiveness of the social-evaluation manipulation, as after being given the induction participants' level of state anxiety increased significantly. After being advised that they would not have to give a speech, the participants' level of state anxiety dropped, once again probably due to relief.



n.b. Non-Eval = Non-Evaluation Condition Soc-Eval = Social Evaluation Condition

Before = Beginning of Study *During* = After Induction Advised *After* = After Induction Ended

Figure 4.1. Mean Score of STAI-S scale by Social Anxiety Group and Experimental Manipulation at Three Different Time Points

Reaction Time Data Analysis

On the probe detection task, the percentage of outliers that were removed from the entire analysis was 2.8% in the masked trials and 4.3% in the unmasked trials. This was by excluding latency data that fell outside two standard deviations from the mean score of each participant. The data from the subliminal and supraliminal trials were analysed separately. All analyses were based on the participants' level of social avoidance and distress as determined by the SAD scale[1].

Masked Condition

A repeated measures ANOVA was conducted with social anxiety group (high SAD vs. low SAD) and threat induction (social-evaluation vs. non-evaluation) as between-participant variables. The within-participant variables were word type (somatic, negative evaluation, situational and physical), probe position (upper vs. lower) and threat word position (upper vs. lower). See Table 4.4. for details of mean scores for each of these variables. This analysis revealed that there was a main effect of word type, $F(3, 234) = 4.41$, $p = .005$, *partial* $^2 = .05$. Overall, participants were quicker to respond to negative evaluation ($M = 343$) than physical threat ($M = 346$) words ($p = .037$) and than somatic sensation ($M = 347$) words ($p = .001$). There was also a main effect of threat word position, $F(1,78) = 4.60$, $p = .035$, *partial* $^2 = .06$, with participants demonstrating slower reaction times when the threat word was on the top ($M = 346$) when compared to

---

[1] The participants' scores of fear of negative evaluation based on the FNE scale did not produce any significant effects or interactions in the main analyses (all Fs <1). All analyses is based on the SAD scale. The reaction time data was log transformed (*LG10*) to reduce the positive skewness of response distribution as suggested by Howell (1997). Notably however, the pattern of findings was identical to those reported above

the lower (M = 344) part of the screen. There were no other significant main effects (all Fs < 3.3). There was a significant two-way interaction between probe position x threat induction, $F(3, 228) = 3.18$, p =.025, *partial* ^{2} = .04, and a significant five-way interaction involving word type x probe position x word position x threat induction x social anxiety group, $F(3, 234) = 2.75$, p = .044, *partial* ^{2} = .03.

Table 4.4. *Reaction Times (SDs in parenthesis) from the Dot-Probe Task for the High and Low Social Anxiety Groups for the Masked Trials*

	Physical Threat		Somatic Sensation		Social Situation		Negative Evaluation	
Non-Evaluation Condition								
	Probe		Probe		Probe		Probe	
	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
High Social Anxiety								
Threat Word Upper	352*(42)*	339*(30)*	352*(38)*	351*(32)*	343*(33)*	350*(31)*	347*(33)*	345*(34)*
Threat Word Lower	348*(38)*	346*(30)*	346*(32)*	354*(42)*	347*(38)*	346*(34)*	342*(30)*	339*(33)*
Low Social Anxiety								
Threat Word Upper	334*(33)*	330*(29)*	338*(24)*	332*(32)*	334*(30)*	331*(29)*	338*(35)*	331*(35)*
Threat Word Lower	336*(26)*	327*(25)*	332*(32)*	335*(32)*	332*(28)*	333*(37)*	327*(26)*	328*(27)*
Social-Evaluation Condition								
	Probe		Probe		Probe		Probe	
	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
High Social Anxiety								
Threat Word Upper	343*(40)*	355*(49)*	335*(38)*	349*(44)*	340*(40)*	344*(46)*	340*(37)*	345*(33)*
Threat Word Lower	342*(34)*	339*(32)*	337*(33)*	349*(40)*	334*(37)*	346*(47)*	336*(47)*	344*(36)*
Low Social Anxiety								
Threat Word Upper	360*(60)*	363*(67)*	356*(54)*	367*(71)*	356*(70)*	357*(68)*	355*(60)*	360*(68)*
Threat Word Lower	351*(66)*	367*(69)*	359*(57)*	365*(83)*	352*(56)*	361*(76)*	347*(56)*	356*(67)*

To explore this interaction further, attentional bias scores (cf. MacLeod et al., 1986) were calculated for each word group using the following equation: 0.5 x [(UpLt-UpUt) + (LpUt-LpLt)], where U = upper position, L = lower position, p = probe, t = threat word. The bias score reflects the word position x probe position interaction with positive values reflecting selective attention towards and negative values reflecting an attentional bias away from the threatening words.

The bias scores were analysed using repeated measures ANOVAs with the social anxiety group (high SAD vs. low SAD) and condition (social-evaluation vs. non-evaluation) as the between-participant variables and the within-participant factor being word type (somatic, negative evaluation, situational, physical). This produced a significant word bias x threat induction x social anxiety group interaction, $F(3, 234) = 2.75$, $p = .044$, $partial^2 = .03$, which corresponded to the five-way interaction found for the latency data.

Attentional bias for each Word Group

To clarify the results further analyses of bias scores was conducted separately for each category of word group. Each analysis consisted of a two-way ANOVA with social anxiety group (high SAD vs. low SAD) and condition (social-evaluation vs. non-evaluation) as between-participant factors and each word group's bias scores (negative evaluational, somatic, situation and physical) as dependent variables were conducted. Please see Figure 4.2. for details of each word group's bias score for each social anxiety group and experimental condition.

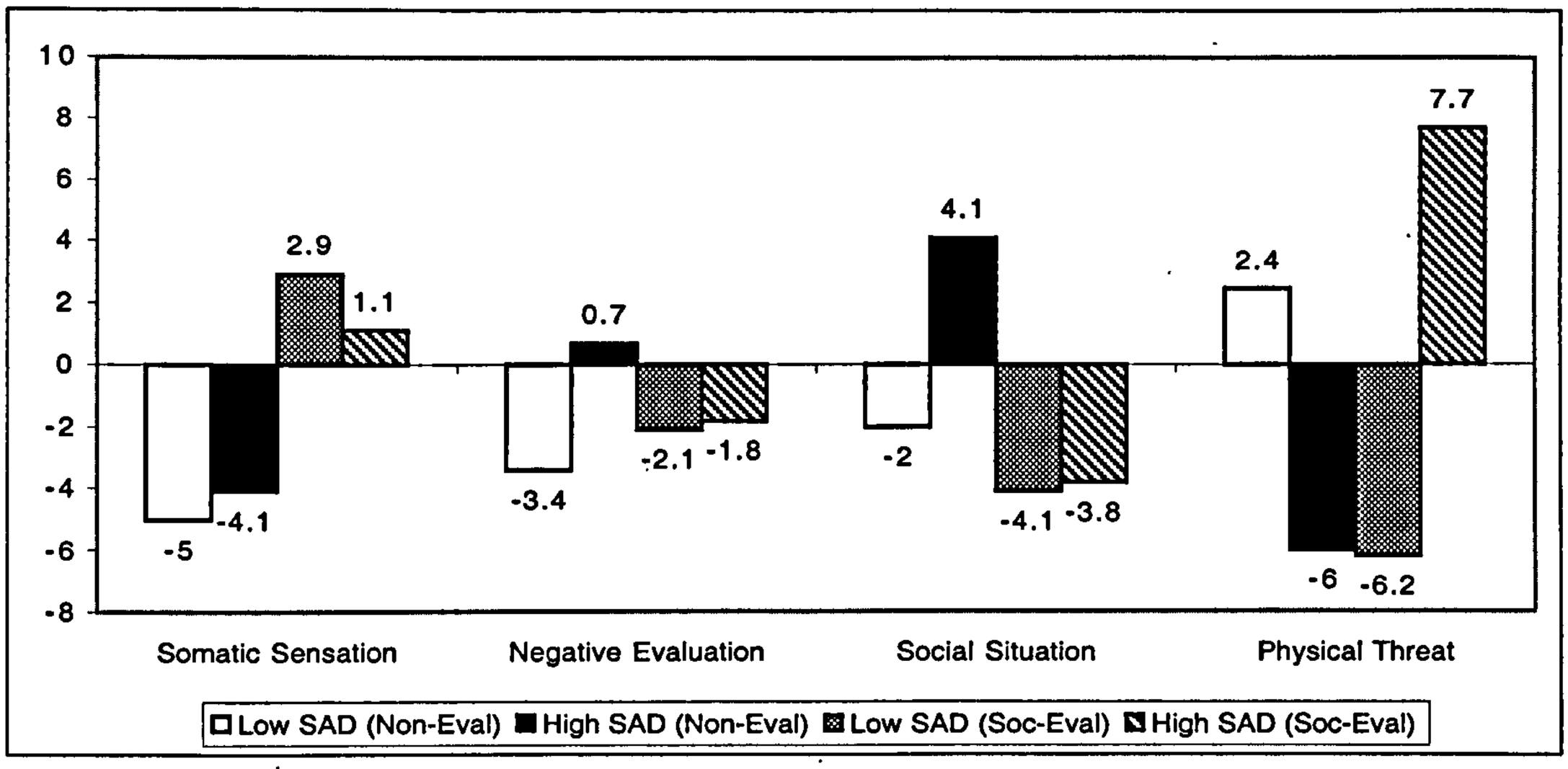


Figure 4.2. *Bar Chart Displaying each Word Group's Mean Attentional Bias Score (Masked Trials) for each Social Anxiety Group and Threat Induction*

Somatic Sensation, Negative Evaluation and Social Situation Word Groups:

There were no main effects or interactions (all *F*s < 2.5) with these word groups.

Physical Threat Word Group: There were no main effects of social anxiety group or condition (all *F*s < 1), but there was a significant interaction, $F(1, 78) = 8.42$, $p = .005$, *partial* $^2 = .10$, which was explored with independent samples *t*-tests. This showed that in the social-evaluative condition, there was a significant difference between the high social anxiety group who attended towards, and the low social anxiety group who attended away, from the physical threat words, $t(39) = 2.36$, $p = .023$, $d = .72$. Furthermore, the attentional shift from away in the non-evaluation condition to towards in the social evaluation condition was significant in the high socially anxious group, $t(39) = 2.70$, $p = .01$, $d = .82$.

Unmasked Condition

Repeated measures ANOVAs were conducted with social anxiety group (high SAD vs. low SAD) and condition (social-evaluation vs. non-evaluation) as between-participant variables. The within-participant variables were word type (somatic, negative evaluation, situational and physical), probe position (upper vs. lower) and threat word position (upper vs. lower). See Table 4.5. for details of mean scores for each of these variables. This analysis revealed that there were no significant main effects of social anxiety group, condition, word type, word position or probe position (all Fs < 1). There was a significant two-way interaction between probe position x condition, $F(1, 78) = 4.66$, $p = .034$, $partial^2 = .06$. There were no other significant interactions (all Fs < 3.7). The bias scores for each of the word types are presented in Figure 4.3.

Table 4.5. *Reaction Times (SDs in parenthesis) from the Dot-Probe Task for the High and Low Social Anxiety Groups for the Unmasked Trials*

	Physical Threat		Somatic Sensation		Social Situation		Negative Evaluation	
Non-Evaluation Condition								
	Probe		Probe		Probe		Probe	
	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
High Social Anxiety								
Threat Word Upper	345*(40)*	338*(33)*	346*(42)*	344*(37)*	341*(32)*	340*(32)*	350*(45)*	346*(41)*
Threat Word Lower	337*(37)*	340*(25)*	344*(47)*	335*(36)*	338*(30)*	352*(49)*	344*(35)*	338*(30)*
Low Social Anxiety								
Threat Word Upper	325*(30)*	325*(27)*	331*(23)*	322*(32)*	326*(29)*	328*(32)*	326*(29)*	324*(38)*
Threat Word Lower	325*(30)*	323*(33)*	329*(28)*	329*(28)*	327*(32)*	328*(26)*	330*(31)*	321*(33)*
Social-Evaluation Condition								
	Probe		Probe		Probe		Probe	
	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
High Social Anxiety								
Threat Word Upper	334*(32)*	345*(51)*	336*(39)*	361*(41)*	334*(38)*	344*(43)*	344*(41)*	341*(45)*
Threat Word Lower	345*(43)*	343*(51)*	340*(40)*	356*(41)*	343*(47)*	342*(45)*	337*(34)*	339*(37)*
Low Social Anxiety								
Threat Word Upper	358*(78)*	363*(78)*	350*(72)*	337*(70)*	356*(71)*	366*(74)*	348*(72)*	374*(87)*
Threat Word Lower	350*(61)*	349*(64)*	357*(64)*	373*(67)*	362*(93)*	355*(63)*	358*(74)*	356*(68)*

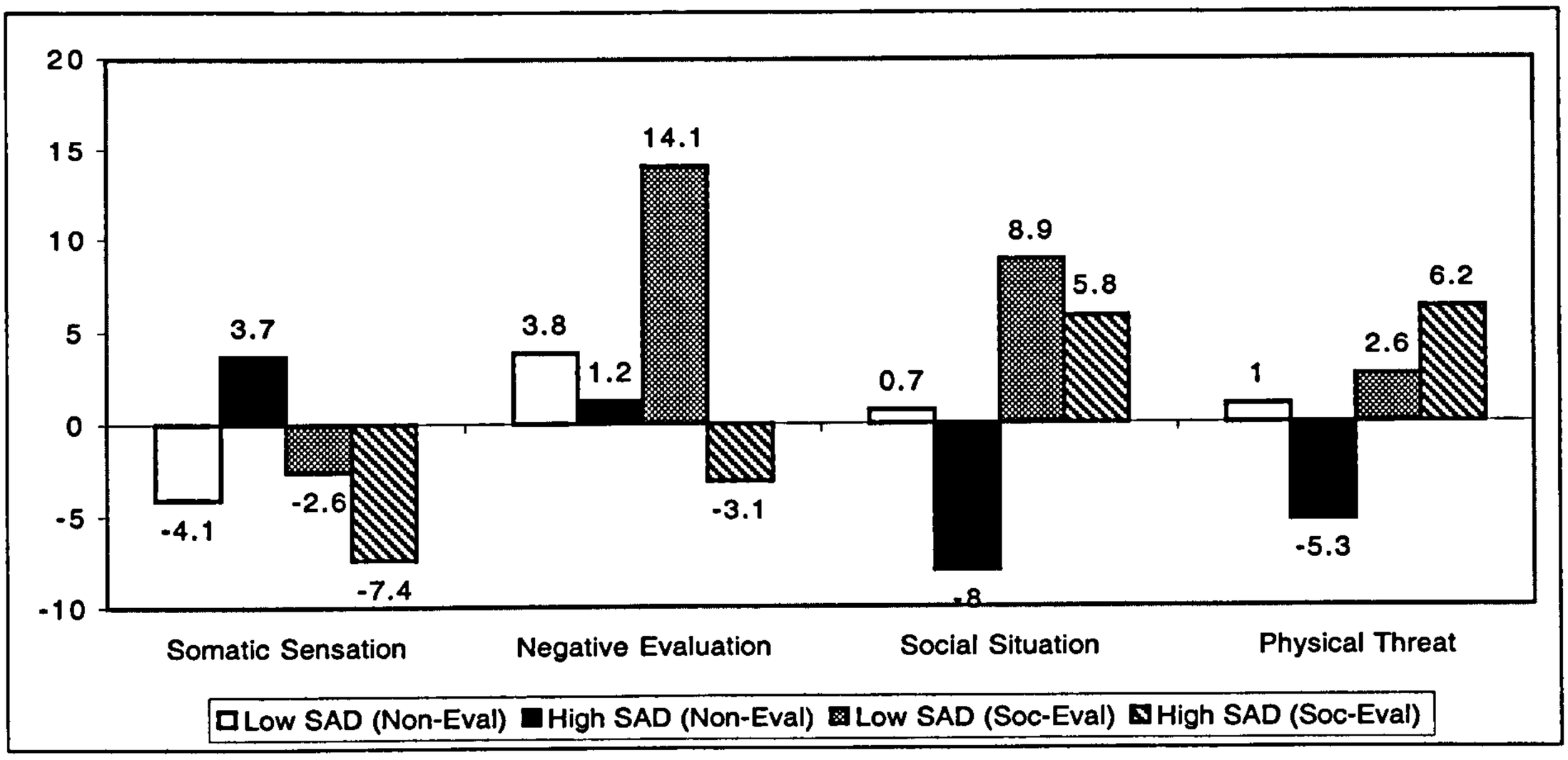


Figure 4.3. *Bar Chart Displaying Each Word Group's Mean Attentional Bias Score (Unmasked Trials) for Each Social Anxiety Group and Experimental Condition*

Correlational Analyses

Correlations between the attentional bias score for each word group and questionnaire measures showed that in the low social anxiety group, bias scores for the masked somatic words negatively correlated with SDS scores (r = -.35, p = .023). In the unmasked trials, bias scores for the somatic words positively correlated with SAD scores (r = .32, p = .039) and negatively with BDI scores (r = -.36, p = .023). In the high social anxiety group, bias scores for masked negative evaluation words correlated positively with SAD scores (r = .34, p = .028). Thus, in low social anxiety participants, increased social desirability is associated with less vigilance for masked somatic words. This group also showed that increased social avoidance and distress is associated with greater

vigilance, whereas increased depression is associated with less vigilance for unmasked somatic words. In the high social anxiety group, increased social avoidance and distress is associated with greater vigilance for masked negative evaluation words.

Discussion

The aims of this study were to ascertain the nature of the attentional bias in social anxiety, in relation to automatic and strategic attentional processing (Shiffrin & Schneider, 1977), when conditions of social-evaluation are manipulated. The results revealed that the high socially anxious participants, compared with those low in social anxiety, displayed an attentional bias towards physically threatening masked words, but only in the social-evaluation condition. There was no evidence of any further pre-attentive processing differences between the social anxiety groups to masked stimuli in either experimental condition. In the unmasked trials, there were no differences between the social anxiety groups in the nature of the attentional processing under conditions of non-evaluation or social-evaluation. All the findings were primarily a function of social avoidance and distress as measured by the SAD scale and not fear of negative evaluation as measured by the FNE scale. Thus, providing further support for Mogg and Bradley's (2002) proposal that the SAD is a better measure for determining attentional bias effects in a socially anxious analogue population.

This study has, therefore, found evidence of a selective pre-attentive bias in the high social anxiety group, in comparison to the low socially anxious, towards physical-threat words, under conditions of social evaluation. These findings do not support the theoretical conceptualisations that predict an attentional bias towards socially threatening stimuli occurring at a pre-conscious level of processing (Beck et al., 1985; Clark &

Wells, 1995; Rapee & Heimberg, 1997; Williams et al., 1988; 1997). Eysenck's (1992) theory, however, is partially supported by this finding, as he proposed a hypervigilance to physical and social threat at an automatic level of processing. Although, there was not any evidence of this bias in the non-evaluative condition and with socially threatening stimuli, which was part of Eysenck's predictions. He also suggested that there would be an attentional bias towards social threat at a conscious level of processing which, was not found in this experiment.

The pre-attentional results from this study also contrast with Mogg and Bradley's (2002) research, which found a vigilance effect for masked threat faces (external social threat) with individuals high in social avoidance and distress, under a no threat condition. Heinrichs and Hofmann (2001) have argued that the differences in findings with facial and semantic stimuli might be indicative of a separate encoding system for different types of information in social phobia. Thus it is difficult to compare the findings from visual dot-probe studies using different types of threatening stimuli, such as faces and words. Further work is needed in this area, as there is limited research investigating pre-attentive biases in the socially anxious to semantic and facial stimuli.

The results also demonstrate the importance of being in a social-evaluative condition for socially anxious individuals, as there were no significant findings with the masked word stimuli in the non-evaluation condition. These findings are in contrast to Mogg et al. (1994), who only found an attentional bias towards threatening words under conditions of low stress in the high trait anxious. Two conclusions can be drawn from these two studies. First, that the pattern of attentional processing is different for the trait anxious and the socially anxious. Second, as Mogg and colleagues intermixed their

masked and unmasked trials, the possibility of priming effects may have influenced the results in some way (Fox, 1996).

Furthermore, this study challenges the argument posed by Fox (1996), that automatic processing differences are only evident in the presence of unmasked trials. It is important to note however, that the possibility still remains that the effect on masked physical-threat words was as a consequence of short-term "post-conscious" priming (Bargh, 1994). In that, although the present study guarded against Fox's (1996) argument by presenting the unmasked trials first to the participants, the possibility still remains that the questionnaires that were completed before the main dot-probe task (SAD, FNE, STAI-S & STAI-T) may have inadvertently caused priming effects. Furthermore, as these measures pertain predominantly to anxiety either trait, state or by thinking about socially anxious concerns, such as fear of negative evaluation or social avoidance and distress, it may be that they influenced the participants' attentional processing. This may explain why the only significant findings were with the physical threat words, as the indirect anxiety priming together with the social-evaluation manipulation inadvertently raised state anxiety in the participants, activating a hypervigilance to general anxiety threat in the high socially anxious. Future research should consider this possibility when designing attentional studies and consider whether the ordering of the questionnaires may have priming effects on the participants.

Another point to consider in the interpretation of results from the masked exposure condition is whether the stimuli were presented outside of the awareness of the participants. Two objective forced-choice threshold awareness checks were included in this study, a presence-absence task (Kemp-Wheeler & Hill, 1988) and a lexical decision

task (Cheesman & Merikle, 1985). The results from these objective measures yielded different results, as the participants were generally aware of the presence of stimuli behind the pattern masking, but unaware of its lexical content. The participants often stated during the awareness tests, that the combined display of a word pair and mask seemed to flicker slightly as the words changed to a mask, thus detecting a physical presence of a stimulus. Previous masking studies have also found that participants were able to detect the presence of stimuli without being able to determine their lexical content (e.g., Fox, 1996; Mogg et al., 1994)

The results from the unmasked trials did not show any evidence of attentional processing differences between the social anxiety groups in either experimental condition. It is important to emphasise that the unmasked trials were completed after the masked trials to address the issues posed by Fox (1996), although this may have caused fatigue and/or boredom effects in the participants. The masked trials took approximately twelve minutes to complete and then the individuals had a two-minute rest period before commencing the unmasked trials, that also took twelve minutes. After this, the participants regularly commented that they found the second unmasked task a strain on the eyes and that it was difficult to keep focused. Also, the participants had a greater percentage of trials removed from the analysis due to them taking too long to respond to dot during the unmasked presentation condition (4.3% in the unmasked trials vs 2.8% in the masked trials). This also suggests that the participants were getting tired and/or bored of the task and not concentrating as accurately as in the masked trials on pressing the spacebar as soon as the dot appeared on the screen. Thus, depletion in attentional focus and effort may explain the non-significant findings in the unmasked trials.

Dijksterhuis and Smith (2002) provides a further explanation of the unmasked findings, by arguing that repeated exposure to threatening stimuli could decrease the intensity of reaction in the evaluative system. In support, Luecken et al. (2004) found that presenting the same threatening stimuli pre-attentively and then consciously in a visual dot-probe task, disrupted evidence of attentional biases in a trait anxious sample in the unmasked exposure condition. These authors concluded that the lack of findings could be due to affective habituation of the threat words in the masked trials, resulting in a reduced attentional focus in the unmasked trials to the same threatening word stimuli. The current study presented the same category of words three times within each task, but the actual words were different in the masked and unmasked trials. Thus, it seems fair to speculate that being exposed subliminally and supraliminally to the same categories of words six times in total, may have inadvertently caused affective habituation (Dijksterhuis & Smith, 2002). Luecken et al. (2004) proposed that as repeated pre-conscious exposure to threat appeared to deactivate unhelpful threat processing patterns at a more strategic level of attentional focus, this might have important implications. For example, the inducement of affective habituation subliminally in therapeutic interventions may reduce strategic dysfunctional processing in the anxious population. The findings from this study provide further evidence in support of this speculative proposal and future research is needed on this issue.

Experiment one found evidence for an attentional bias for threat associated with high social anxiety. The findings from the unmasked trials in the current study are inconsistent with this. However, the possibility of fatigue effects and/or affective habituation may make direct comparisons between these two studies not possible. It is

difficult to explain the lack of supraliminal finding in relation to the social phobia (Beck et al., 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997) and anxiety (Eysenck, 1992; Williams et al., 1988; 1997) theories also. Indeed, all these theories would predict an attentional bias towards socially threatening (internal and/or external) words under presentation times of 500ms. Although, in view of the aforementioned confounding variables, it seems fair to suggest that the results from the conscious processing trials were influenced to some extent by the pre-attentive trials being presented first.

An alternative interpretation of the results from the unmasked trials could be that the socially anxious do not possess a strategic attentional bias towards threatening semantic stimuli. In support of this, recent research (Mansell, et al., 2002; Pishyar et al., 2004) has documented that there was no evidence of an attentional bias towards word stimuli in a non-clinical sample with social anxiety. Indeed, they argued that the facial dot probe task was a more ecologically valid and sensitive index of attentional bias. However, it is notable that previous dot-probe research with individuals experiencing clinical levels of social phobia has found an attentional bias favouring threatening word stimuli (Musa et al, 2003). Furthermore, the findings from the previous study in this thesis also challenges this proposal by suggesting that the nature of the conscious bias in the socially anxious is dependent on the specific word category of the threat and levels of social evaluation. Plus, the current finding of an automatic attentional bias towards masked physical-threat words, under social-evaluation conditions, provides further results to contradict this proposal. Thus, it seems quite possible that fatigue or habituation effects may have influenced the strategic findings in this current study. More research is needed on this, which focuses on exploring the nature of the attentional focus at

automatic and strategic level of processing separately, to specific word categories, and the influence of social-evaluation upon this. Furthermore, the application of this to clinical populations is also required. This is the aim of the next experiment in this thesis, by exploring the nature of conscious processing in a individuals with generalised social phobia.

In summary, these results suggest that the high socially anxious, in comparison to those low in social anxiety, display an attentional bias towards general physical threat at a pre-attentive stage of processing, under conditions of social-evaluation. This study has also shown that by completing the masked trials first, to address issues of priming (Fox, 1996), it may have inadvertently have affected the findings from the unmasked trials. More specifically, either fatigue effects or affective habituation (Dijksterhuis & Smith, 2002) to the categories of threat may have reduced the attentional focus to socially or physically threatening stimuli at a strategic level of processing. The notion of habituation is indeed of clinical importance in reducing the dysfunctional processing pattern in anxious populations and this paper supports Luecken et al.'s proposal that further research on this issue is needed.

Chapter 5

The Nature of the Attentional bias for Words in Social Phobia

Experiment Three

Introduction

This experiment was designed to investigate the nature of selective attention in social phobia, rather than social anxiety, which was explored in experiments one and two. The same visual dot-probe task and categories of threatening semantic stimuli were used as in the previous two experiments and the stimuli were presented for 500 ms. No social-evaluation condition was included, because it was felt that the experimental process would be a social-anxiety provoking situation in itself for participants experiencing clinical levels of social anxiety.

As detailed in chapter two, social phobia is the most common anxiety disorder and the third most frequently occurring psychiatric disorder after depression and alcohol/drug dependence (e.g., Kessler et al, 1998). It is defined as a "marked and persistent fear of one or more social or performance situations in which the person is exposed to unfamiliar people or to possible scrutiny by others" (APA: American Psychological Association, 1994, p. 411). A seminal review by Liebowitz, Gorman, Fyer and Klein (1985) identified the magnitude of the problem of social phobia in terms of its prevalence, co-morbidity with other disorders and attendant disability. Indeed, Heimberg et al. (2000) have detailed that this disorder has been associated with serious social, educational, and a high level of occupational impairment, considerable co-morbidity with other mental disorders and reduced life satisfaction.

The theoretical review of social phobia in this thesis has shown that idiosyncratic differences in the attentional processing of emotional information play a key factor in vulnerability to, and maintenance of, social phobia (Beck et al., 1985; Clark & Wells,

1995, Rapee & Heimberg, 1997). More specifically, these models propose that social phobia is associated with enhanced selective attention towards social threat cues, such as personal indications of poor performance (e.g., blushing, stuttering and shaking) or signs of boredom and criticism from others. As previously detailed, these cognitive perspectives proposed different theoretical predictions regarding the specific nature of selective attention in this disorder. In particular, Beck et al. (1985) and Rapee and Heimberg (1997) hypothesised that during a social encounter, individuals with social phobia are constantly scanning the 'self' and the environment for threatening social information. They proposed that environmental scanning for threat (e.g., perceiving signs of social rejection) helps to maintain the social anxiety by confirming pre-disposed negative expectations. In contrast, the Clark and Wells model (1995) predicted that in a social situation a person with social phobia focuses solely on interoceptive information, thus concentrating on their own somatic responses and personal negative social-evaluation thought processes. The model also suggested that a consequence of such a heightened self-focus is a reduced attentional bias to external social cues.

Stroop research has reported that social phobia is associated with an attentional bias towards socially threatening semantic stimuli (e.g., Hope et al., 1990; Mattia et al., 1993). This is demonstrated by a greater interference in response latencies to colour name socially threatening words. Additionally, this interference effect is attenuated when arousal to social threat is increased (Amir et al., 1996; Amir, et al., 2002). Furthermore, the issue of specificity, described as both the valence and the content of the information presented being of unique relevance to the disorder, has been explored in studies involving the Stroop task. Evidence of an attentional bias towards social threat in

social phobia, and panic patients towards physical sensations, in comparison to non-anxious controls has been reported (Maidenberg et al., 1996).

Interestingly, visual-dot probe studies that have included socially and physically threatening words have failed to find any evidence of selective attention towards threat to be associated with social phobia (Asmundson & Stein, 1994; Horenstein & Segui, 1997). This is with the exception of a recent study by Musa et al. (2003), who investigated the nature of the attentional bias in socially phobic patients with and without concurrent depression and non-anxious controls. The study included socially threatening and physically threatening words and found that social phobia without concurrent depression, in comparison to non-anxious controls, was associated with an attentional bias towards both word groups. There were no such attentional biasing effects with social phobia and concurrent depression patients. This study provides evidence that the presence of concurrent depression abolishes the attentional bias that would normally be associated with the anxiety disorder. Similar findings have been reported in generalised anxiety disorder patients with high levels of depression (Bradley et al., 1995).

As well as the clinical studies, there is also a lack of evidence for attentional bias in non-clinical high socially anxious participants using social threat words in a visual dot-probe task (e.g., Mansell et al., 2002; Pishyar et al, 2004). It is notable however, that experiment one in this thesis found that high socially anxious participants, in comparison to a low socially anxious sample, preferentially attended towards negative evaluation (under low anxious conditions) and somatic sensations (under social-evaluative conditions) words. Furthermore, the results from experiment two showed that compared with low socially anxious participants, the high socially anxious demonstrated a pre-

attentional bias towards physical threat words under social-evaluative conditions. Taken together, the first two experiments in this thesis have demonstrated selective attention to threat being evident in high socially anxious participants, under non-evaluative and social-evaluative conditions. Indeed, it is suggested in chapter two that the non-significant findings with social phobia and the dot-probe studies using word stimuli (e.g., Asmundson & Stein, 1994; Horenstein & Segui, 1997) may be attributable to the type of words used in each category of threat. The two analogue studies in this thesis have shown the importance of categorically distinct words in ascertaining the nature of the attentional focus in socially anxious samples using the visual dot-probe task. There is a need to extend this notion to a sample of individuals with social phobia to ascertain if the nature of the bias is reliant on the categories of threat being distinct from one another in the clinical form of this disorder.

The aim of this present study, therefore, is to examine the attentional processes of individuals with social phobia to negative evaluation, somatic sensation, social situation and physical threat words. This will allow for the exploration of the key constructs that are of specific concern to persons with social phobia. A further aim is to address the theoretical conflict of whether the focus of attention is solely interoceptive in nature (Clark & Wells, 1995), or whether it also includes external threat cues (Beck et al., 1985; Rapee & Hiemberg, 1997). A social-evaluation condition was not included because being in an experimental environment such as this, is considered to be a socially threatening situation for an individual with social phobia (e.g., Hope et al., 1990).

The hypotheses for this study are considered in view of the theoretical predictions and the findings from experiment one. In consideration of the Clark and Wells (1995)

model, individuals with social phobia, in comparison to the low anxious, would be expected to display an attentional bias towards word groups relating to self focus, such as negative evaluation and somatic sensation words. In contrast, Beck et al. (1985) and Rapee and Heimberg (1997) would predict that individuals with social phobia would display an attentional bias towards all socially threatening words (negative evaluation, somatic sensation and social situation), when compared to the low anxious participants. Additionally, consistent with experiment one, an attentional bias towards somatic sensations only is expected in the social phobia group, compared to the controls.

Method

Participants

The social phobia group consisted of 16 individuals (5 male, 11 female; mean age = 25.4 years, *SD* = 11.0) with a primary diagnosis of generalised social phobia as determined by the ADIS-IV. The ADIS-IV is a diagnostic interview schedule that was developed to allow for differential diagnosis among the spectrum of anxiety disorders and also to identify commonly co-occurring disorders. The assessment interviewer also rated the participants on the 0 – 8 severity rating scale included in the ADIS-IV. Participants were only included if they received a rating of 4 (moderately impaired) or greater[3]. From the social phobia group, 5 participants were recruited from local GP surgeries, 8 from student counselling services and 3 from emails sent to students from the University of Sheffield advertising for participants. The advertisements asked for individuals who felt that they experienced high levels of social anxiety and distress in social situations that

[3] Please note that there was originally 19 people who volunteered to take part, but three of them were removed from the analysis as they did not have a primary diagnosis of generalised social phobia as defined by the ADIS-IV.

significantly interfered with daily living. Individuals were excluded if there was any evidence of co-occurring drug or alcohol dependence or if generalised social phobia was not their primary diagnosis. The 16 controls (5 male, 11 female; mean age = 21.7 years, *SD* = 5.9) were individually matched as closely as possible for age, sex, and years of education. They consisted of community volunteers who were recruited by email to staff and students from the University of Sheffield that asked for people who were confident in all social situations. The control group had no known history of any psychological disorders and were not experiencing any current psychological problems as determined by the ADIS-IV.

Materials

To address the methodological concern of the possibility that mean score for each data point was based insufficient reaction time latencies (see discussion in experiment one for full details), this experiment included the same 16 words per threat group (negative evaluation, somatic sensation, social situation and physical threat) as used in experiment two were included in this study. The 224 filler neutral-neutral word pairs were also the same as in experiments one and two.

The Modified Dot Probe Task

The same modified dot probe task was used as in experiment one with the only difference being the number of experimental trials. There were 128 critical trials which reflected the increase in number of threat-neutral word pairs (16 from each word group and 64 neutral-neutral word pairs), and 160 filler trials. The stimuli were presented for 500ms to explore conscious attentional processing.

Procedure

Ethical approval from the Northern General Ethics Committee and clinical governance from Community Health Sheffield was obtained for this study. The experiment began with the assessor interviewing each participant using the ADIS-IV. Immediately after the interview, the SAD, FNE, STAI-S/T, BDI-II and SDS were completed. Next, the participant was presented with instructions on the computer screen that described the dot probe task and attempted 10 practise trials, and repeated them until they had completed successfully. After any questions had been answered, the participant proceeded with the main dot-probe task. The computer used was a Toshiba Satellite Pro Mio PC with Pentium 4 processor running under Windows XP and the monitor was a CTX Ultra Screen 16" CRT monitor with a refresh rate of 60hz. Upon completion, the participant was fully debriefed and any travel expenses paid.

Results

The aim of this study was to ascertain the nature of the attentional bias in social phobia, in relation to the specificity of the stimuli.

Participant Characteristics

The participants' scores on each of the questionnaires were submitted to independent *t*-tests. This analysis indicated that in comparison to the low anxious controls, the social phobia group had expected higher levels of SAD, FNE, STAI-T, STAI-S, and BDI-II scores. The low anxious controls had higher levels of SDS than the social phobia group. Table 5.1. shows the means, standard deviations and *t*-test results for these questionnaires.

Table 5.1. *Group Characteristics*

	Low Anxious Controls *(n=16)*		Social Phobia *(n=16)*		
	M	SD	M	SD	*t*
SAD	2.1	1.2	22.4	3.3	-22.78**
FNE	3.9	2.9	26.1	4.3	-17.13**
STAI-T	28.7	4.8	59.4	6.8	-14.65**
STAI-S	25.9	3.9	51.3	7.6	-11.92**
BDI-II	2.5	2.9	23.8	12.5	-6.63**
SDS	18.6	4.4	14.0	6.5	2.36*

n.b. * denotes $p < .05$ ** denotes $p < .001$

Reaction Time Data Analysis

On the probe detection task, the percentage of outliers that were removed throughout the entire analysis was 4%. This was by excluding latency data that fell outside two standard deviations from the mean score for each participant. A repeated measures ANOVA was undertaken with participant group (social phobia vs. low anxious control) as the between-participant variable and word type (somatic sensation, negative evaluation, social situation and physical threat), probe position (upper vs. lower) and word position (upper vs. lower) as within-participant variables. Please see Table 5.2. for full details of the reaction time means for each word group. This revealed no significant main effects of group, word type, word position or probe position (all *p*s < .05). There was a significant four-way interaction involving word type x probe position x word position x group, $F(3, 90) = 2.95$, $p = .037$, $partial^2 = .09$.

To explore this interaction further, attentional bias scores (cf. MacLeod et al., 1986) were calculated for each word group using the following equation: 0.5 x [(UpLt-UpUt) + (LpUt-LpLt)], where U = upper position, L = lower position, p = probe, t = threat word. The bias score reflects the word position x probe position interaction with positive values reflecting selective attention towards and negative values reflecting an attentional bias away from the threatening words.

The bias scores were analysed using a repeated measures ANOVA with group (social phobia vs. controls) as the between-participant variable and the within-participant factor being word type (somatic sensation, negative evaluation, social situation and physical threat). This produced a significant word type x group interaction, $F(3, 90) =$

2.95, $p = .037$, *partial* $^2 = .09$, which corresponded to the four-way interaction found for the latency data.

Table 5.2. *Reaction Times (SDs in parenthesis) in the Dot-Probe Task for the Social Phobia and Low Anxious Control Groups*

	Physical Threat		Somatic Sensation		Social Situation		Negative Evaluation	
	Probe		Probe		Probe		Probe	
	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
Generalised Social Phobia								
Threat Word Upper	368*(69)*	398*(77)*	377*(64)*	379*(80)*	393*(90)*	383*(86)*	372*(72)*	389*(81)*
Threat Word Lower	394*(69)*	379*(80)*	386*(92)*	406*(75)*	388*(93)*	409*(86)*	399*(83)*	391*(65)*
Low Social Anxiety								
Threat Word Upper	383*(79)*	383*(67)*	390*(76)*	378*(70)*	390*(71)*	380*(58)*	383*(73)*	375*(67)*
Threat Word Lower	362*(61)*	386*(77)*	396*(68)*	385*(78)*	387*(89)*	377*(73)*	391*(76)*	373*(63)*

Attentional Bias Score Analysis for each Word Group

To clarify the results further, independent t-tests were conducted on each word group (somatic sensation, negative evaluation, social situation and physical threat). Please see Figure 5.1. for details of each word groups bias score for each social anxiety group and experimental condition.

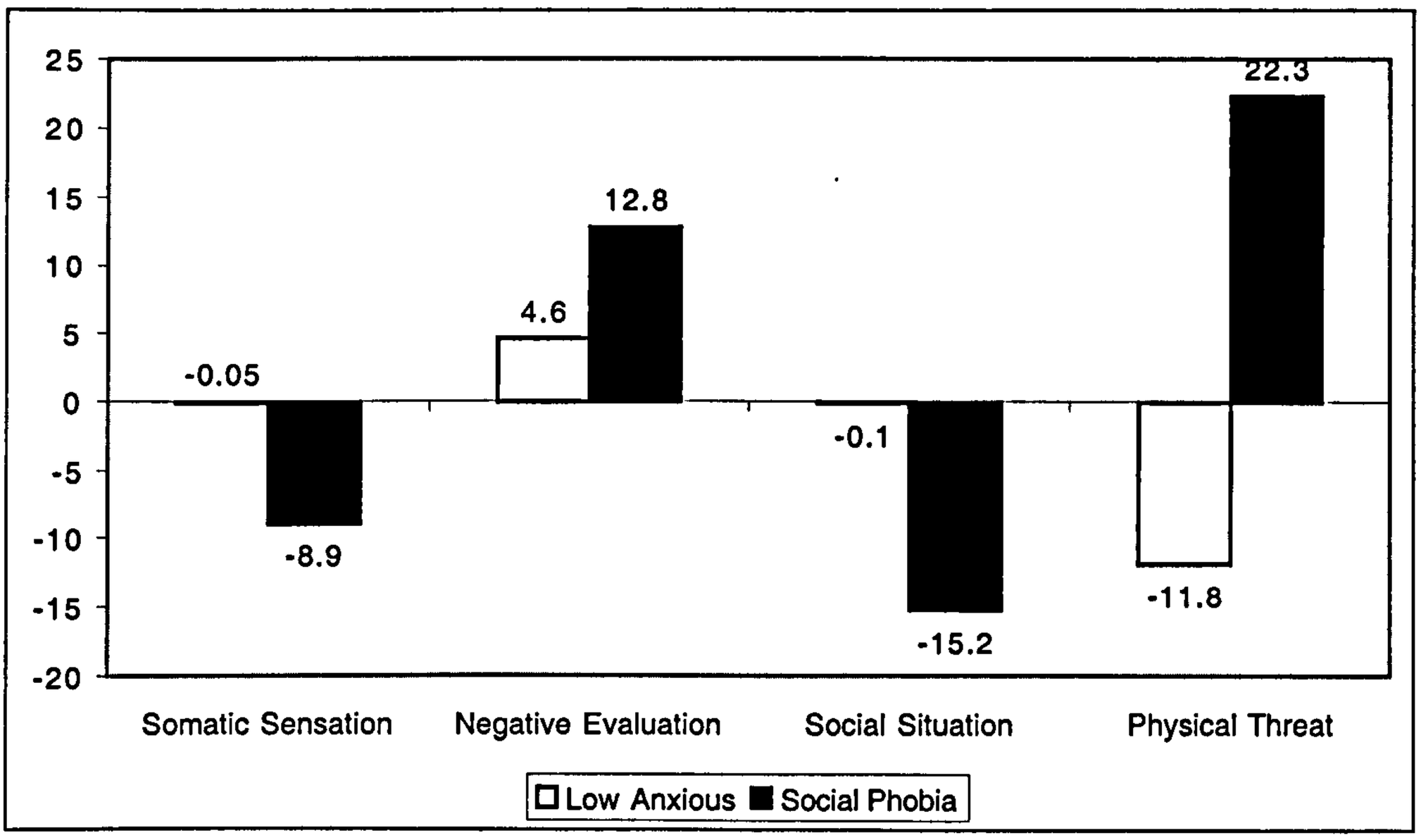


Figure 5.1. *Bar Chart Displaying Each Word Group's Mean Attentional Bias Score for the Social Phobia and Low Anxious Control Groups*

Somatic Sensation Word Group:

There was no significant difference between the social phobia group and the low anxious controls with this word group, $t(30) = .71$, $p = .483$.

Negative Evaluation Word Group:

There was no significant difference between the social phobia group and the low anxious controls with this word group, $t(30) = .65$, $p = .520$.

Social Situation Word Group:

There was no significant difference between the social phobia group and the low anxious controls with this word group, $t(30) = 1.54$, $p = .135$.

Physical Threat Word Group:

This revealed a significant difference between the social phobia group and the low anxious controls and the physical threat bias scores. The social phobia group displayed an attentional bias towards the physical threat words, in comparison to the control group who attended away from this word group, $t(30) = 2.27$, $p = .031$, $d = .78$.

Correlational Analyses

Correlations between the attentional bias scores for each word group and questionnaire measures showed that in the low social anxiety group, bias scores for negative evaluation words correlated positively with STAI-T scores ($r = .53$, $p = .037$), whereas bias scores for the physical threat words negatively correlated with BDI scores ($r = -.69$, $p = .003$). In the generalised social phobia group, bias scores for physical threat words negatively correlated with SDS scores ($r = -.53$, $p = .036$). Thus, in the low social anxiety participants increased trait anxiety is associated with greater vigilance for negative evaluation words, and increased depression is associated with less vigilance for

physical threat words. In the generalised social phobia group, increased social desirability is associated with less vigilance for physical threat words.

Discussion

This experiment investigated the nature of the attentional bias in generalised social phobia to different categories of socially and physically threatening word groups, in order to ascertain whether the focus of attention in social phobia is solely interoceptive in nature (Clark & Wells, 1995), or whether it also includes external threat cues (Beck et al., 1985; Rapee & Heimberg, 1997). A further aim was to investigate whether the attentional bias results from experiment one in a high socially anxious sample, could be replicated in a sample of individuals with social phobia. The results have revealed that individuals with social phobia, in comparison to the low anxious matched controls, displayed an attentional bias towards the physical threat words. There were no attentional bias effects differences between the two participant groups with the three categories of social threat words.

This current study has failed to provide any support for the theories discussed earlier. More specifically, the Clark and Wells model (1995) suggested that during a social encounter, individuals with social phobia would display an attentional bias towards interoceptive information, such as negative evaluation thoughts and somatic sensations relating to the experience of anxiety. In contrast, Beck et al. (1985) and Rapee and Heimberg (1997) proposed that as well as the 'self' focus, an attentional bias towards external social threat cues, such as social situations would be evident. The non-significant differences between the social phobia and non-anxious group with the negative

evaluation, somatic sensation and social situation word groups do not provide support any of these theoretical notions.

Furthermore, these results do not replicate the findings from experiment one of an attentional bias towards somatic sensations words in high socially anxious individuals, when compared to the low socially anxious, under a social-evaluation condition. This is despite similar state anxiety scores determined by the STAI-S for the social phobic group in this study (M = 51.3) and the high socially anxious group in the social-evaluation condition from experiment 1 (M = 51.6). An important consideration for the differences in results between the two studies could be attributed to the different ways in which levels of state anxiety were raised. Insofar as, experiment one increased levels of state anxiety by advising the participants that they would be recorded throughout the experiment and that they would have to give a speech. This study however, increased state anxiety in the individuals with social phobia purely by taking part in the experiment. It is also quite possible that levels of state anxiety were raised further by the ADIS-IV interview. This interview involves the person recalling and describing past anxiety provoking experiences, thus distressing the individual and raising levels of anxiety arousal, as indicated by the STAI-S. All the participants performed the visual dot-probe task immediately following the interview and questionnaire completion, when levels of state anxiety were still high in people with social phobia. Interestingly, the low anxious controls did not find the ADIS-IV or taking part in the study an anxious event, as their STAI-S scores were particularly low (M = 25.9). Thus, the suggestion here is that although both studies raised levels of state anxiety in the high socially anxious and social phobia groups, the source of this induction was different. In that experiment one raised

social-evaluative anxiety, whereas the current study raised not only social-evaluative anxiety, but also a whole range of socially anxious concerns and fears during the ADIS-IV interview.

This current experiment has shown that individuals with social phobia at a conscious level of processing preferentially attend towards physical threat words. Musa et al. (2003) have also reported that patients with social phobia (without concurrent depression) demonstrated an attentional bias towards physically threatening words, as well as negative evaluation words. Interestingly, experiment two found evidence of a pre-attentional bias towards physical threat words under social evaluation conditions in high socially anxious students, when compared to low socially anxious participants. Experiment one however, showed that high social anxiety was not associated with a conscious attentional bias towards physical threat in the social-evaluation condition. This suggests that physical threat is of attentional concern to socially anxious people during a social encounter at a pre-conscious and not a conscious level of processing. Individuals with social phobia on the other hand, displayed a conscious attentional bias towards physical threat in this current study. Taken together, these findings provide support for MacLeod (1991) theory presented in chapter one of this thesis. Specifically, this notion suggests that the key difference between clinical and trait anxious populations is that the latter group are able to consciously over-ride any pre-attentive biases for threat, which is exactly what was found in this series of experiments with the physical threat word group.

Musa et al. (2003) suggested that one possible explanation for an attentional bias to physical threat being associated with social phobia could be due to presence of an additional secondary anxiety disorder influencing the information processing bias. In

support, Sanderson, DiNardo, Rapee and Barlow (1990) proposed that at least as many as fifty percent of patients with a primary diagnosis of an anxiety disorder also meet the criteria of an additional anxiety disorder. Indeed, social phobia is highly co-morbid with other psychiatric disorders (e.g., Kessler et al., 1999), especially anxiety and mood disorders (e.g., Brown & Barlow, 1990). It is notable that generalised anxiety disorder seems to be the most common additional disorder in patients with social phobia (Barlow et al., 1990; Turner et al., 1991). Also, cognitive studies have shown that patients with generalised anxiety disorder preferentially attend towards physical threat words using both the Stroop (e.g., Becker et al., 2001) and the visual dot-probe (e.g., Mathews et al., 1986) paradigms. In the sample of people with a primary diagnosis of social phobia in this current study, three quarters of them also had a secondary anxiety disorder, mainly generalised anxiety and panic disorder. Thus, this study provides further support for the proposal that social phobia patients display an attentional bias towards physical threat due to the possibility of a secondary anxiety disorder, such as generalised anxiety disorder, influencing information processing.

The lack of attentional bias towards socially threatening words in social phobia in this study is similar to that of previous studies (Asmundson & Stein, 1994; Horenstein & Segui, 1997). In a related vein, Stroop studies have also shown that the attentional bias towards social threat words is suppressed in social phobia during social evaluative situations (Amir et al., 1996) and high social anxiety arousal conditions (Amir et al., 2002). Once again it is notable that this current study and the Amir et al. (1996) study reported similar levels of state anxiety in the socially phobic participants (mean STAI-S score was 51). Indeed, the Amir et al (1996) study also reported an attentional bias

towards physical threat and not social threat during the social-evaluation condition. The findings here provide further evidence that the expected attentional bias effect towards socially threatening words may be attenuated due to the interactive effects of high levels of state anxiety, similar to the findings from the Stroop studies. This is a tentative suggestion that needs to be explored further, by the systematic manipulation of levels of social-evaluational anxiety in social phobia patients.

In contrast to the findings from this study, Musa et al (2003) reported evidence of an attentional bias towards negative evaluation words in individuals with social phobia. As previously mentioned, this difference may be due to the selection of words incorporated in each study. In consideration of this, Musa et al. used words that were relating to themes of negative evaluation (e.g., inept, inadequate and ridiculed) and to behaviour and feelings (e.g., withdrawn, clumsy and lonely) within the same social threat word category. The current study attempted to explore the specificity of the bias to different socially threatening stimuli and consequently was more selective in the words that went into the negative evaluation, somatic sensation and social situation groups. Thus, it seems fair to suggest the possibility that generalised social phobia is associated with an attentional bias to general social threat as shown in the Musa et al. study, and not to specific categories of socially threatening information. As this is the first study to attempt to assess which type of social threat is sensitive to an attentional bias in generalised social phobia, more research is needed on this issue.

It is notable that one of the key limitations of this current study is that the issue of secondary anxiety and/or depression related disorders was not fully explored. Thus, as Heinrichs and Hofmann (2001) argued, it is difficult to ascertain whether the presence of

two or more disorders have no effect, an additive effect or an interactive effect on attentional biases in social phobia. The addition of further patient groups, such as individuals with a primary diagnosis of generalised anxiety disorder and/or depression, may have helped to highlight the differences and similarities between them.

In summary, the results from this present study suggest that individuals with generalised social phobia are characterised by an attentional bias towards physically threatening words, in comparison to low anxious controls. This paper has also highlighted that idiosyncratic differences in social phobia samples, such as the presence of a secondary anxiety disorder or increases in state anxiety may influence the nature of the attentional bias. Therefore, theoretical conceptualisations need to consider the influence of these factors when predicting information processing biases in social phobia.

Chapter 6

Re-evaluation of the Psychometric Properties of the Fear of Negative Evaluation Scale and the Social Avoidance and Distress Scale

Study Four

Introduction

This study attempted to explore in more detail an interesting issue that became evident in experiments one and two. This was in relation to the choice of screening instrument used in analogue studies investigating cognitive biases in social anxiety. More specifically, both of the previous studies found non-significant results when using the FNE scale to determine high and low social anxiety groups. However, using the SAD scale to determine social anxiety levels yielded significant findings. It is also notable that Mogg and Bradley (2002) found a positive relationship with the SAD scale and an attentional bias towards aversive faces in their study too. Taken together, the main aim of this study was to explore the psychometric properties and characteristics of the SAD and the FNE scales.

The literature review in chapter two showed that over the past few years, cognitive research has attempted to provide a deeper understanding of the underlying cognitive processes in social phobia. In particular, dysfunctional attentional processing using the emotional Stroop task (e.g., Hope et al., 1990; Spector et al., 2003) and the visual dot-probe task (e.g., Musa et al., 2003; Mogg et al., 2004) with socially phobic individuals has been reported. Such findings not only provide evidence for current theoretical conceptualisations of social phobia (e.g., Beck et al., 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997), but also yield important clinical implications. For example, Clark (1999) argued that information on the nature of the cognitive features of social anxiety provide a deeper understanding of dysfunctional processing biases, informing therapeutic intervention.

Chapter two also details that previous research into attentional processing has included both socially anxious analogue and clinical samples with social phobia. Stopa and Clark (2001) proposed that analogue studies allow for the recruitment of larger numbers of participants and more complex research designs. Also, Turner et al. (1986) reported similarities between a clinical social phobia and social anxiety analogue groups on various measures of social distress, anxiety symptoms and negative thought processes. Indeed, there is a growing body of research that has focused on the cognitive processes of the non-clinically socially anxious (e.g., Mansell et al., 1999; Mogg & Bradley, 2002; Pishyar et al., 2004). The use of participants from 'normal' populations to examine cognitive processing has also proved beneficial in a number of other areas of psychopathology, such as depression (e.g., Bradley et al., 1997) and generalised anxiety disorder (e.g., Roemer, Molina & Borkovec, 1997).

The FNE and the SAD scale are two self-report measures that have been widely used to ascertain the participant's levels of social anxiety. They are considered to be a practical assessment tool, allowing for the identification of high and low socially anxious non-clinical samples through quick and effective screening (Herbert et al., 2001). The FNE and SAD measures were developed using US students by Watson and Friend (1969). These authors determined that social anxiety comprised three components, namely social distress, social avoidance and fear of negative evaluation. The SAD scale assessed the first two factors, and the FNE measured the latter aspect. Whilst constructing these scales, Watson and Friend (1969) conducted comprehensive psychometric analysis. A series of experimental and correlational studies provided support for the test-retest reliability and concurrent validity of these scales. They

concluded that the FNE and the SAD questionnaires have high internal consistency and sufficiently discriminated from one another as reliable measures of different aspects of social anxiety.

In support, recent reviews of assessment tools and self-report questionnaires concluded that the SAD and the FNE scales were useful and reliable measures of social anxiety (e.g., Cox & Swinson, 1995; Heimberg et al., 1988; Herbert et al., 2001). However, the appropriateness of their use with the clinical syndrome of social phobia has been debated (Heimberg et al., 1988; Turner & Beidel, 1988; Turner et al., 1987). Both scales have also been criticised for being too long which consequently limits their utility, especially when several questionnaires are being used in the study (e.g., Cox and Swinson, 1995; Heimberg, 1994; Leary, 1983a). In view of this, Leary (1983a) designed the brief version of the FNE to account for most of the variance of the longer FNE scale. He also changed the scoring key from a 'true/false' response format to a five-point likert scale and this shortened form of the FNE has been used in the literature (e.g., Mansell et al., 2003; Mogg & Bradley, 2002). To date, there is no shortened version of the SAD questionnaire.

Despite their extensive use and wide acceptance (e.g., Turner et al., 1987), few studies have assessed the psychometric properties of both the SAD and FNE scales. For example, Oei, Kenna and Evans (1991) employed factor analysis using an Australian clinical sample and identified two factors, namely fear of negative evaluation, and social avoidance and distress, which loaded onto the appropriate scales. It has also been suggested that the characteristics of these measures may not be applicable across different populations (Oei et al., 1991) and cultures (Chapman, Mannuzza & Fyer, 1995). Stopa

and Clark (2001) have similarly argued that normative data based on a sample of students from the United States should not be applied to UK studies. In view of this, these authors presented British norms and cut-off points for defining high and low social anxiety groups based on the FNE questionnaire. Stopa and Clark did not provide the same information for the SAD scale, as at that point analogue research had mainly used the FNE questionnaire.

Since then, research has begun to use the SAD questionnaire to define high and low socially anxious analogue groups (e.g., Mogg & Bradley, 2002; Mullins & Duke, 2004). Interestingly, these studies, together with the two analogue experiments reported in this thesis, found that social anxiety groups based on the FNE and on the SAD displayed quite different processing biases. This highlights a further issue, in that these scales might not be equivalent and appear to be measuring different aspects of social anxiety, that lead to different processing biases.

Thus, on the basis of the considerations outlined above, this study has several aims. First, to explore the psychometric properties and characteristics of both the SAD and the FNE instruments to ascertain whether these questionnaires reliably measure different constructs of social anxiety in a UK analogue sample. Norms and cut-off points to define high and low social anxiety groups will be proposed in order to guide future research. Second, to assess whether there is a relationship between the attentional biases reported in experiments one, two and three and the factors found in this current psychometric analysis. This will determine whether the relationship between cognitive biases and the SAD and FNE scales are equivalent. Third, to ascertain whether the BFNE (Leary, 1983a) encompasses the key characteristics of the longer version of this

questionnaire. Finally, to propose a brief version of the SAD scale (BSAD), for use in future research.

Method

Participants

Students (n = 561) from Sheffield Hallam University studying on health-related or psychology degree courses were screened for experiment two in this doctoral dissertation. The screening involved the completion of the FNE and the SAD questionnaires, to allow for the recruitment of 103 high and low SAD participants. The remaining students (n = 468) that were used in the main factor analysis consisted of 64 males (14%), 384 females (84%) and 10 participants (2%) who did not record their gender and/or age on the questionnaire. The pre-dominance of females was consistent with the sex distribution of students on health and psychology degrees. The mean age of the males was 22.97 years (SD = 8.20), with an age range of 18 years to 50 years. The mean age of the females was 21.12 years (SD = 5.80), with an age range of 18 years to 50 years.

Standardised Measures

The Fear of Negative Evaluation Scale: The FNE questionnaire is a 30-item true/false (17 true and 13 false) questionnaire measuring apprehension and distress about being negatively evaluated in social situations (Watson & Friend, 1969). Examples of the items are "If someone is evaluating me I tend to expect the worst" and "I rarely worry about seeming foolish to others". Higher scores on the questionnaire indicate greater levels of fear of negative evaluation.

The Social Avoidance and Distress Scale: The SAD questionnaire is a 28-item true/false (14 true and 14 false) questionnaire assessing both actual, and desire of, avoidance of social situations and the distress caused by being in a social interaction (Watson & Friend, 1969). Examples of the statements are "It is easy for me to relax when I am with strangers" and "I tend to withdraw from people". Higher scores suggest greater levels of social avoidance and distress.

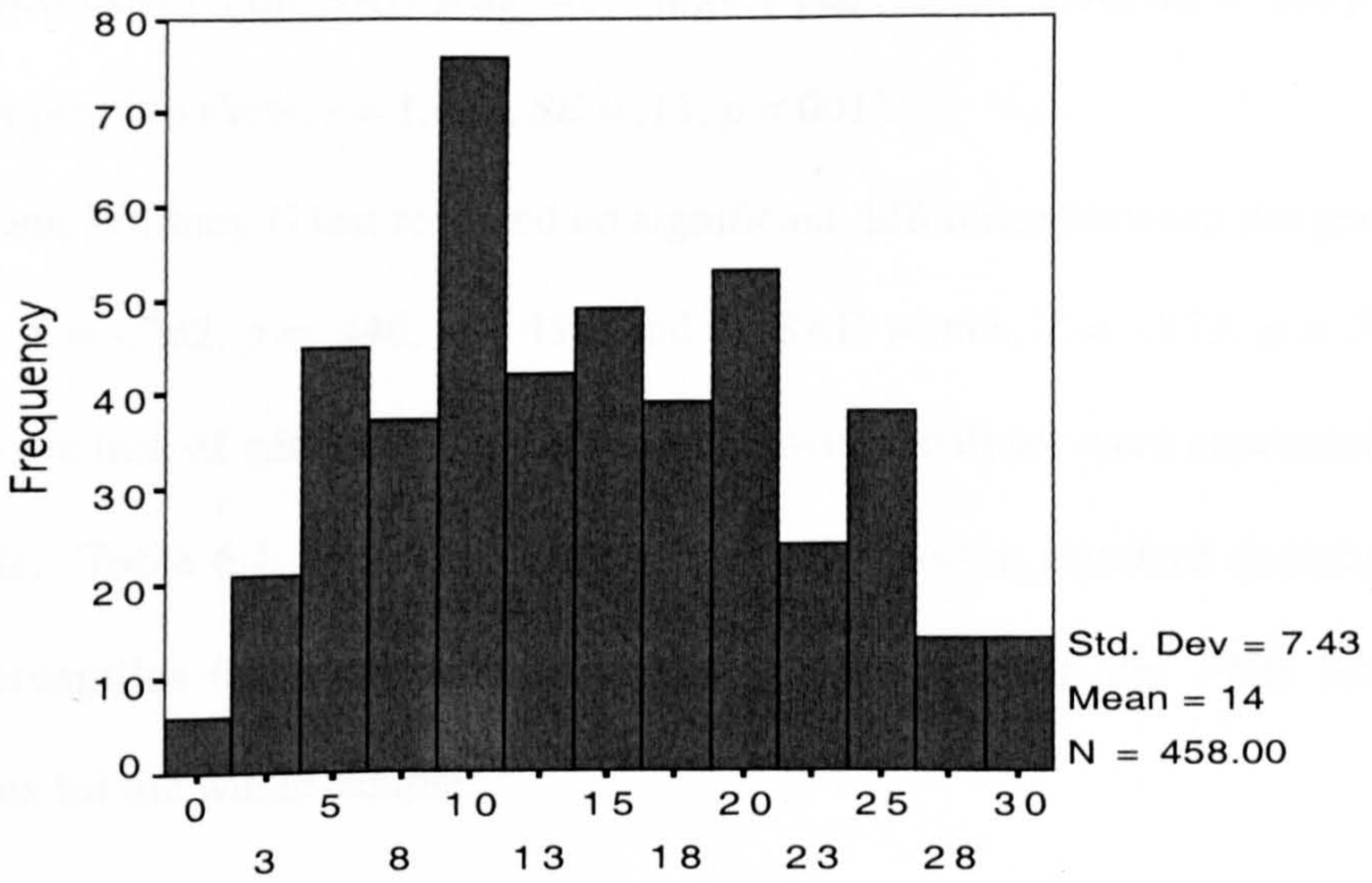
Procedure

As part of the screening process for experiment two, the students were asked to complete the FNE and then the SAD scales just before a lecture began. Following completion of the questionnaires, all participants were asked to circle either 'yes' or 'no' to indicate whether they would like to take part in a future study. None of the students were advised directly that the study was looking at social anxiety. It took approximately 15 minutes to fill in both questionnaires, which were returned to the experimenter.

Results

Normative data

The responses to the items on each questionnaire were added together to produce total FNE and SAD scores. The FNE and the SAD scales were moderately correlated, $r = .392$, $p < .001$, $n = 458$. The distribution of the data was examined. Figure 6.1. shows histograms of the FNE and SAD distribution of participants' scores and that neither of the questionnaires were normally distributed. The distribution of FNE scores was relatively flat, $k = -.89$, $SE = .23$, $p < .001$, with a slight positive skew, $s = .20$, $SE = .11$, $p < .05$.



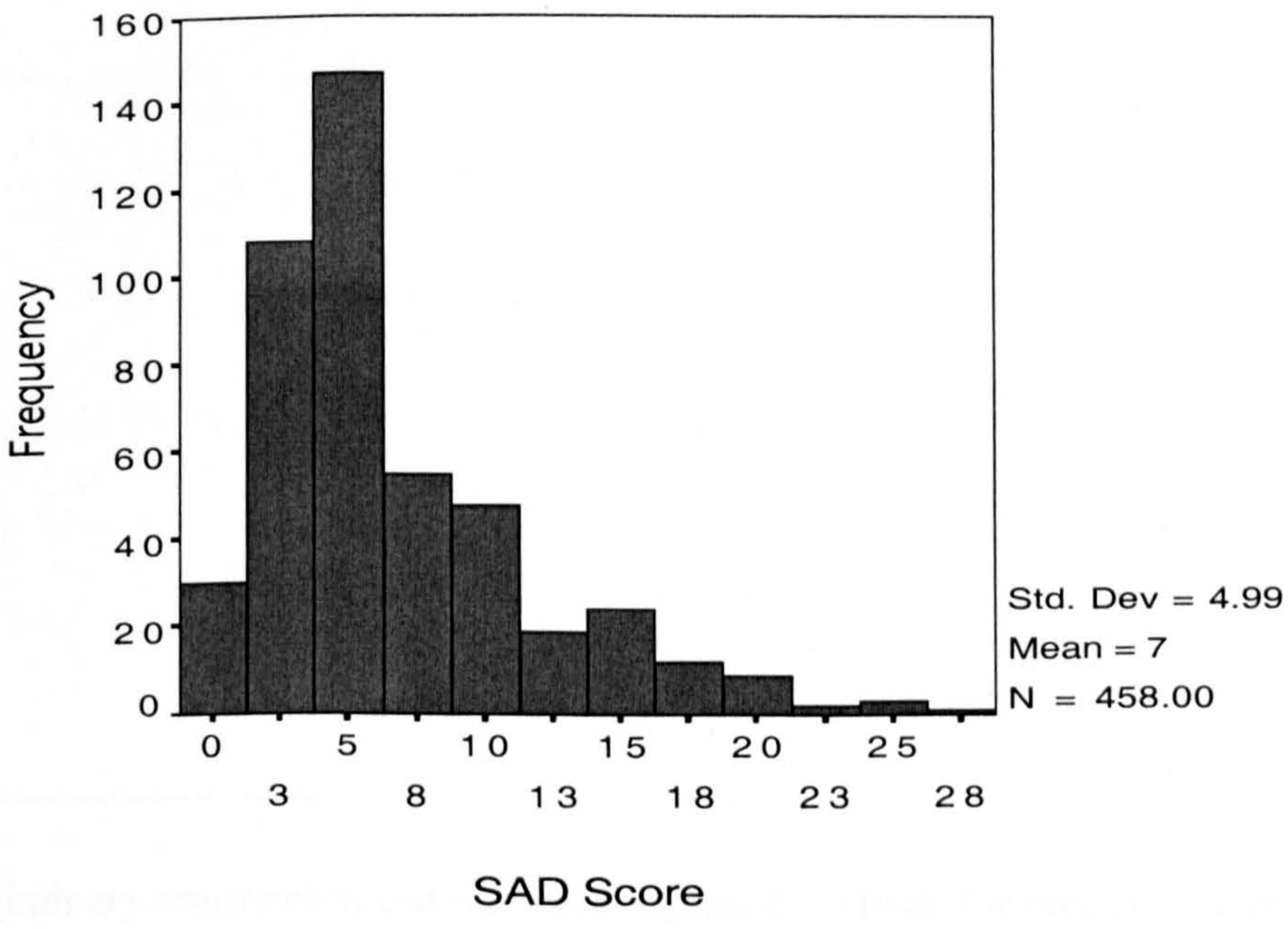


Figure 6.1. Histograms showing the distribution of FNE and SAD scores

The scores from the SAD scale were highly peaked, $k = 1.90$, $SE = .23$, $p < .001$, with a strong positive skew, $s = 1.424$, $SE = .11$, $p < 001$[4].

A Mann Whitney U test revealed no significant difference between the genders on FNE scores, Z = -.762, $p = .446$, $n = 458$, and on SAD scores, Z = -.873, $p = .383$, $n = 458$. Due to the lack of gender differences, all following analyses were conducted on the entire sample. Table 6.1. shows the means, medians, modes, standard deviations and observed percentiles (5^{th}, 10^{th}, 25^{th}, 50^{th}, 75^{th}, 90^{th}, 95^{th}) for the FNE and SAD questionnaires for the whole sample.

---

[4] Preliminary assumption testing was conducted to check for outliers and one case was identified as an outlier on the SAD scale. Removal of this participant from the analysis did not influence the findings and was subsequently left in the data set. There were no outliers with the FNE scale.

Table 6.1. *Descriptive Statistics for the FNE and the SAD scales*

Means, medians, modes and standard deviations

	n	Mean	Median	Mode	*SD*
FNE	458	14.43	14.00	10.00	7.43
SAD	458	6.64	5.00	4.00	4.99

Observed percentiles scores for the sample distribution

	n	5th	10th	25th	50th	75th	90th	95th
FNE	458	3	4	9	14	20	25	27
SAD	458	1	2	3	5	9	14	17

Cut-Off Points to Define High and Low Social Anxiety Groups

Stopa and Clark (2001) proposed two methods to determine high and low group cut-off points. They suggested either to take the mean plus or minus one standard deviation, or to select the upper (75th percentile) and lower (25th percentile) quartiles of the cut-off scores. By employing the former method in this current study, high and low FNE groups were determined by a score of 22 or above and 7 or below respectively. The SAD score was 12 or above for the high group and 2 or below for the low group. Alternatively, by considering the upper and lower quartiles, the high FNE group was 20 or above and low FNE group was 9 or below. The high SAD group was 9 or above and the low SAD group was 3 or below.

Exploratory Factor Analysis

Responses on the FNE and the SAD scales were subjected to Principal Axis Factor (PAF) analysis using SPSS, to investigate whether the scales measured different aspects of social anxiety (Floyd & Widaman, 1995). PAF was considered to be the most appropriate method of factor extraction, as in line with the Oei et al. (1991), this study was interested in a solution that was uncontaminated by unique and error variability. Prior to performing PAF, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The Kaiser-Meyer-Oklin value was .9, exceeding the recommended value of .6 (Kaiser, 1970, 1974) and the Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance ($p < .001$), supporting the factorability of the correlation matrix. Throughout the entire factor analysis, both orthogonal and oblique rotations were performed using the varimax and oblimin methods. Although both approaches produced similar findings, the results are discussed using varimax rotation (unless stated otherwise), as it transformed the data into a factor matrix that was clear and interpretable.

There were 14 components with eigenvalues exceeding 1, explaining 42.1% of the total variance. An inspection of the factor scree plot (Catell, 1966) revealed that the scree could not be clearly determined and could possibly occur after either the third, fourth or fifth factor. To determine which was the best solution, inspection of the number of items that were markers of each factor was performed using Bedford's (1997) criteria. He suggested that markers should be determined as items that load greater than or equal to .3 on a factor and which have their highest loading on that factor. Furthermore, the major loading should be .2 greater than any cross loading. Table 6.2. displays the

number of markers for one, two, three, four and five factor solutions and suggests that interpretability disappears after four factors and that either a three or four-factor model would be the best solution.

Table 6.2. *Number of Markers per Factor found in the FNE and SAD scales*

	Number of markers for the factor				
Number of factors in the solution	1	2	3	4	5
1	N/A				
2	29	25			
3	28	16	7		
4	16	13	9	7	
5	16	10	9	7	0

A technique developed by Everett (1983) was conducted to ascertain whether a three or a four-factor solution provided the best representation of the data. This procedure involved randomly splitting the sample into two groups and performing separate factor analyses. This produced two factor score coefficient matrices. Next, two sets of factor scores were calculated for the whole sample using the two separate coefficient matrices. These factor scores were then correlated together. Everett (1983) proposed that a correlation of .90 or above indicated that the factors truly converge with each other. When the four-factor model was analysed correlations of .943, .942, .905, .878 were found. However, examination of the three-factor model revealed correlations of .993, .955, and .949 respectively, suggesting better convergence.

The rotated varimax factor matrix for the three-factor solution is presented in Table 6.3. Except for FNE items 3, 6, 11, 27 and 28, all the FNE items loaded significantly on a fear of negative evaluation factor. Interestingly, the majority of the SAD items mainly loaded on two factors, with the exception of the items 8, 9, 11, 16, 17, 19, 23 and 25, which tended to load on both. Factor two incorporated general social avoidance and distress issues and consisted of 15 SAD items. The third factor was relating to fear of new situations and strangers with a loading on 5 SAD items. Thus the factor structure of the FNE and the SAD scales indicated that they were measuring different aspects of social anxiety. Also, the SAD scale was measuring a new factor consisting of the experience of fear in new situations and with strangers, which has not been reported in other studies.

Table 6.3. *Varimax Rotated Factor Matrix of the FNE and SAD measures*

	Factors				Factors		
	1	2	3		1	2	3
FNE 13	**.649**	.141	.005	SAD 5	.003	**.661**	-.005
FNE 19	**.618**	.009	.177	SAD 24	.004	**.615**	.000
FNE 14	**.607**	.139	.235	SAD 20	.009	**.589**	.131
FNE 24	**.598**	.143	.148	SAD 21	.007	**.586**	.008
FNE 7	**.593**	.128	.172	SAD 2	.003	**.583**	.240
FNE 23	**.586**	-.004	.148	SAD 26	.003	**.577**	.005
FNE 25	**.575**	.164	.158	SAD 27	.000	**.566**	.123
FNE 21	**.547**	-.002	.171	SAD 6	.176	**.562**	.340
FNE 9	**.540**	.172	.134	SAD 22	.004	**.553**	.005
FNE 12	**.513**	-.002	.009	SAD 28	.008	**.551**	.193
FNE 17	**.512**	.215	.177	SAD 10	.127	**.522**	.009
FNE 2	**.508**	.008	.185	SAD 13	.007	**.517**	-.007
FNE 30	**.500**	.006	.161	SAD 4	.009	**.510**	.107
FNE 10	**.500**	-.001	-.003	SAD 12	.008	**.478**	.175
FNE 1	**.482**	.006	.178	SAD 8	.003	.466	.273
FNE 22	**.468**	.169	.003	SAD 7	.118	**.409**	.125
FNE 15	**.466**	-.004	.005	SAD 9	-.003	.398	.363
FNE 20	**.465**	-.002	.141	SAD 16	.220	.388	.379
FNE 29	**.441**	.110	.004	SAD 19	.003	-.272	-.138
FNE 5	**.426**	.133	-.006	SAD 23	.006	.267	.007
FNE 8	**.422**	.002	-.005	SAD 15	.133	.006	**.622**
FNE 26	**.420**	-.002	-.002	SAD 3	.136	.117	**.569**
FNE 28	.404	.213	.007	SAD 1	.207	.007	**.525**
FNE 3	.394	.005	.214	SAD 11	.192	.335	.465
FNE 4	**.390**	-.109	.117	SAD 18	.124	.236	**.446**
FNE 18	**.387**	.182	.005	SAD 14	.143	.206	**.415**
FNE 16	**.331**	.001	-.009	SAD 17	.010	.222	.357
FNE 27	.330	.135	.263	SAD 25	.002	.260	.314
FNE 11	.288	.009	.196				
FNE 6	.276	-.006	-.006				

n.b. Bold print indicates the main factor loading of the item

Factor 1 = Fear of Negative Evaluation
Factor 2 = Social Avoidance and distress
Factor 3 = Fear of New Situations or Strangers

Direct oblimin rotation was performed on the three factors. The factor correlations revealed that factors 1 and 2 (r = .193), factors 1 and 3 (r = -.273) and factors 2 and 3 (r = -.354) were low to moderately correlated with one another. The reason for the negative correlations was that the main loadings on factor 1 and 2 required predominantly "true" response, whereas the items from factor 3 consisted of an equal number of "true" and "false" responses.

Test-Retest Reliability of the FNE and the SAD Measures

To assess test-retest reliability, data was gathered from the recruitment of the 103 high and low SAD participants for experiment two of this thesis. The SAD and FNE scales were administered during the screening process and approximately two weeks later during the study. Paired sample t tests revealed significant differences between FNE scores, with the participants' scoring higher at the time of screening (M = 16.4) than on the experimental day (M = 14.9), $t(102) = -3.77$, $p < .001$. Pearson correlations for the FNE scale at the time of screening and the experimental day indicate acceptable test-re-test reliability, r = .890, $p < .001$, n = 103. There were also significant differences between the SAD scores, with participants scoring higher at the time of screening (M = 7.5) than on the experimental day (M = 6.6), $t(102) = 3.2$, p = .002. Pearson correlations for the SAD scale also indicate acceptable test-retest reliability, r = .866, $p < .001$, n = 103. Therefore, although participants tended to have a lower score at the time of the experiment on both questionnaires than at screening, there was still a suitable strength of relationship between the two scores on the FNE and SAD scales at both time points.

Internal Consistency of the FNE and the SAD Scales

Reliability coefficients were computed using Cronbach's alpha and high levels of internal consistency for the FNE (= 0.91) and the SAD (= 0.87) scales was found. Internal consistency for the individual factors was as follows: the main loadings on the fear of negative evaluation factor which consisted of 25 items (= 0.90), the main loadings on the social avoidance and distress factor which had 15 items (= 0.87) and the main loadings on the fear of new situations and strangers factor that had 5 items (= 0.69), all demonstrating good internal reliability.

Volunteering to Take Part in Research Studies

A one-way between-group multivariate analysis of variance was performed to investigate if there were FNE and/or SAD score differences between those who agreed (volunteer group) to take part in a further study and those who did not (non-volunteer group). There was a significant difference between the groups on the combined dependent variables of FNE and SAD scores, F (2, 455) = 6.22, p = .002; Wilk's Lambda = .97; partial ^{2} = .03. When the results for the dependent variables were taken separately, there were no FNE scores differences between volunteers (M = 14.05) and non-volunteers (M = 14.82), $F(1, 456) = 1.22$, $p = .270$, *partial* ^{2} = .003. There was however, a significant difference between the groups for SAD scores, $F(1, 456) = 12.38$, $p < .001$; *partial* ^{2} = .03. An inspection of the mean scores indicated that non-volunteers had higher scores on the SAD (M = 7.47) than the volunteer group (M = 5.85). This suggests that those who did not volunteer were more socially anxious than those who did.

Relationship of the Factors to the Attentional Bias Data

Experiment 1

This study reported an attentional bias in high socially anxious individuals, compared to low socially anxious, to specific word groups, using a visual dot probe task. It found that in the non-evaluation condition, the high socially anxious attended towards negative evaluation words, but towards somatic sensation words in the social-evaluation condition. Importantly, these attentional biasing effects were only apparent when the SAD score, not the FNE score, determined the high and low social anxiety groups.

Pearson correlations investigated whether there was a relationship between the attentional bias scores found in the previous study and the main factor loadings (mean scores on questions that load on the specified factor) of each of the three factors. As shown in Table 6.4., there was a relationship between the main loadings on the general social avoidance and distress factor (factor 2) and the negative evaluation attentional bias score ($r = .432$, $p = .005$, $n = 40$) in the non-evaluation condition. There was also a relationship between the main loadings on the fear of new situations and strangers factor (factor 3) and the negative evaluation attentional bias score ($r = .421$, $p = 007$, $n = 40$) in this condition. In the social-evaluation condition, there was a relationship between the main loadings on the fear of new situations and strangers factor (factor 3) and the somatic attentional bias score, $r = .345$, $p = .029$, $n = 40$. There were no significant correlations with the main loadings on the fear of negative evaluation factor (factor 1) and the attentional bias scores from this experiment (all $ps > .05$).

Table 6.4. *The Relationship between the Main Loadings on the Factors and each Word Groups' Attentional Bias Score by Condition for Experiment One*

	Non-Evaluation Condition			Social-Evaluation Condition		
	Factors			Factors		
	1	2	3	1	2	3
	r	*r*	*r*	*r*	*r*	*r*
Negative Evaluation	.303	.432**	.421**	.014	-.009	-.016
Somatic Sensation	.022	-.012	-.068	.273	.144	.345*
Social Situation	.058	.135	.256	.119	.260	.092
Physical Threat	.006	.119	-.166	-.097	.131	.182

n.b. * denotes $p < .05$ ** denotes $p < .01$

Factor 1 = Fear of Negative Evaluation
Factor 2 = Social Avoidance and distress
Factor 3 = Fear of New Situations of Strangers

Experiment 2

This study reported evidence of an attentional bias in high socially anxious individuals, compared to low socially anxious, to physical threat words (pre-attentive), in the social-evaluation condition using a visual dot probe task. Once again, this finding was only apparent when the SAD score, not the FNE score, determined the high and low social anxiety groups. It is important to note that there was not any attentional bias

effects found in the conscious processing trials in either experimental condition. As detailed in chapter four, these non-significant findings were attributed to the possibility of either experimental fatigue and/or affective habituation (Dijksterhuis & Smith, 2002). Thus, due to these confounding variables, caution should be taken in the interpretation of the correlations from the 500 ms attentional bias data.

Pearson correlations investigated whether there was a relationship between the attentional bias scores found in experiment two and the main factor loadings of each of the three factors. As shown in Table 6.5., there was a relationship between the main loadings on the fear of new situations and strangers factor (factor 3) and the masked physical threat attentional bias score ($r = .342$, $p = .029$, $n = 41$) in the social evaluation condition. There were no other significant correlations with the masked trials (14 ms) in either experimental condition (all $ps > .05$). The attentional bias scores from unmasked trials (500 ms) trials did not display a relationship with any of the three factors in the non-evaluation condition. In the social-evaluation condition and the unmasked trials, there was a negative relationship between the main loadings on the fear of negative evaluation factor (factor 1) and the negative evaluation attentional bias score ($r = -.335$, $p = .032$, $n = 41$). There was also a negative relationship between the main loadings on the social avoidance and distress factor (factor 2) and the negative evaluation attentional bias score ($r = -.396$, $p = .01$, $n = 41$). The negative relationship suggests that as the factor score increases the attentional bias score for the particular word group decreases.

Table 6.5. *The Relationship between the Main Loadings on the Factors and each Word Groups' Attentional Bias Score by Condition for Experiment Two*

	Non-Evaluation Condition Factors			Social-Evaluation Condition Factors		
	1	2	3	1	2	3
14 ms Bias Scores	*r*	*r*	*r*	*r*	*r*	*r*
Negative Evaluation	-.053	.123	.176	-.065	.139	-.009
Somatic Sensation	-.060	-.159	.013	.016	.117	-.060
Social Situation	-.100	.202	.085	.004	.103	-.015
Physical Threat	.007	-.039	-.198	.112	.262	.342*
500 ms Bias Scores	*r*	*r*	*r*	*r*	*r*	*r*
Negative Evaluation	.058	.039	-.010	-.335*	-.396*	-.236
Somatic Sensation	.108	.179	.075	-.013	-.064	.031
Social Situation	-.158	-.034	-.124	-.018	-.084	-.005
Physical Threat	-.199	-.118	-.287	-.002	.038	.033

n.b. * denotes $p < .05$ ** denotes $p < .01$

Factor 1 = Fear of Negative Evaluation
Factor 2 = Social Avoidance and distress
Factor 3 = Fear of New Situations of Strangers

Experiment 3

This study found an attentional bias towards physical threat words in individuals with social phobia, compared to low anxious matched controls, using the visual dot-probe task.

Pearsons correlations investigated whether there was a relationship between the attentional bias scores found in experiment three and the main factor loadings of each of the three factors. Table 6.6. shows that there was a relationship between the main loadings on the fear of negative evaluation factor (factor 1) and the physical threat attentional bias score, $r = .469, p = .007, n = 32$. There was also a relationship between the main loadings on the fear of new situations and strangers factor (factor 3) and the physical threat attentional bias score, $r = .405, p = .021, n = 32$.

Table 6.6. *The Relationship between the Main Loadings on the Factors and each Word Groups' Attentional Bias Score for Experiment Three*

	Factors		
	1	2	3
	r	*r*	*r*
Negative Evaluation	.149	.071	.117
Somatic Sensation	-.126	-.144	-.112
Social Situation	-.285	-.304	-.289
Physical Threat	.469**	.238	.405*

n.b. * denotes $p < .05$ ** denotes $p < .01$

Factor 1 = Fear of Negative Evaluation
Factor 2 = Social Avoidance and distress
Factor 3 = Fear of New Situations of Strangers

The BFNE Measure

The 12 items included in the BFNE (Leary, 1983a) all have a high factor loading (.390 or above) in this current study. Consistent with the FNE scale, paired sample *t* tests revealed significant differences between BFNE scores, with the participants' scoring higher at the time of screening ($M = 7.2$) than on the experimental day ($M = 6.4$), $t(102) = 3.58$, $p = .001$ taken from experiment two of this thesis. Reliability coefficients were computed using Cronbach's alpha and high levels of internal consistency for the BFNE was found during the initial large-scale screening (= 0.86, $n = 458$). The brief version of the FNE correlates highly with the full FNE questionnaire, both on screening ($r = .957$, n

= 103, $p < .001$) and on the experimental day ($r = .956$, $n = 103$, $p < .001$). The test-retest reliability of the BFNE ($r = .844$, $n = 103$, $p < .001$), suggests good reliability. Thus, the BFNE does appear to encompass the key items of the original scale, without sacrificing its psychometric properties.

The BSAD Questionnaire

Twenty items were selected from the SAD using Bedford's (1997) criteria. This included 15 items from factor 2 (general social avoidance and distress) and 5 items from factor 3 (fear of new situations and strangers). Please see table 6.7. for full details of the proposed brief version of the SAD and the scoring key. Reliability coefficients were computed using Cronbach's alpha on the BSAD scores during the initial screening and acceptable levels of internal consistency were found ($r = 0.85$, $n = 458$). Consistent with the full version of this questionnaire, paired sample t tests revealed significant differences between the BSAD scores, with participants scoring higher at the time of screening (M = 5.0) than on the experimental day ($M = 4.2$), $t(102) = 3.39$, $p = .001$. The brief version of the SAD correlates highly with the full SAD questionnaire, both on screening ($r = .977$, n = 103, $p < .001$) and on the experimental day ($r = .981$, $n = 103$, $p < .001$) taken from experiment two of this thesis. The test-re-test reliability for the BSAD ($r = .841$, $n = 103$, $p < .001$) was also good. The results suggest that the proposed brief version of the SAD measure accounts for most of the variance of the longer scale.

Table 6.7. Varimax Rotated Factor Loadings for the Items of the BSAD Questionnaire

Item	Factor Loading
1. I feel relaxed even in unfamiliar social situations. *F* (SAD 1)	.525
2. I try to avoid situations which force me to be very sociable. *T* (SAD 2)	.583
3. It is easy for me to relax when I am with strangers. *F* (SAD 3)	.569
4. I have no particular desire to avoid people. *F* (SAD 4)	.510
5. I often find social occasions upsetting. *T* (SAD 5)	.661
6. I usually feel calm and comfortable at social occasions. *F* (SAD 6)	.562
7. I am usually at ease when talking to someone from the opposite sex. *F* (SAD 7)	.409
8. I often feel nervous or tense in casual get-togethers in which both sexes are present. *T* (SAD 10)	.522
9. I usually feel relaxed when I am with a group of people. *F* (SAD 12)	.478
10. I often want to get away from people. *T* (SAD 13)	.517
11. I usually feel uncomfortable when I am with a group of people I don't know. *T* (SAD 14)	.415
12. I usually feel relaxed when I meet someone for the first time. *F* (SAD 15)	.622
13. I would avoid walking up and joining a large group of people *T* (SAD 18)	.446
14. I often feel on edge when I am with a group of people. *T* (SAD 20)	.589
15. I tend to withdraw from people. *T* (SAD 21)	.586
16. I don't mind talking to people at parties or social gatherings. *F* (SAD 22)	.553
17. I often think up excuses in order to avoid social engagements. *T* (SAD 24)	.615
18. I try to avoid formal social occasions. *T* (SAD 26)	.577
19. I usually go to whatever social engagements I have. *F* (SAD 27)	.566
20. I find it easy to relax with other people. *F* (SAD 28)	.551

N.B. The scoring key of True (*T*) or False (*F*) is given after each item.

Discussion

The FNE was designed to measure fear of negative evaluation and the SAD was developed as a measure of social avoidance and distress (Watson & Friend, 1969). In this current study both questionnaires displayed good internal consistency and reliability together with excellent test-retest reliability. An exploratory common factor analysis of the items from both questionnaires revealed a three-factor solution. The majority of FNE items loaded on the fear of negative evaluation factor as proposed by Watson and Friend (1969). The SAD items, on the other hand, showed an underlying factor structure that was different to the original two-factor proposal of social avoidance factor and distress. The first factor was a combination of general social avoidance and distress and a novel second factor of fear of new situations and strangers was also identified. These two factors consisted of a combination of avoidance and distress statements as defined by Watson and Friend (1969). Overall, the three factors showed good reliability and internal consistency. Based on these findings, it can be surmised that the FNE and the SAD scales measure different aspects of social anxiety and have strong psychometric properties. Additionally, the brief versions of the FNE scale (Leary, 1983a) and the proposed brief SAD scale demonstrated strong correlations with the longer version of both measures at two different time points. They also displayed good internal reliability and consistency. Moreover, the BFNE appeared to be a suitable alternative for the FNE, encompassing all the key aspects of the original measure but in a shorter and more manageable version. Finally, the proposed BSAD is a useful and reliable alternative measure of the more general aspects social anxiety, for use in cognitive research.

In consideration of examining the factors with the attentional bias data from the three experimental chapters in this thesis, the results have provided support for the validity of using the SAD scale in analogue research. In that, the social avoidance and distress factor correlated both with the negative evaluation attentional bias scores (non-evaluation condition) from experiment one and with the same word group also presented for 500ms (social evaluation condition) from experiment two. Furthermore, the fear of new situations and strangers factor from the SAD scale demonstrated a relationship with the negative evaluation attentional bias scores (non-evaluation condition) and with the somatic sensation attentional bias scores (social-evaluation condition) taken from experiment one. It also correlated with the physical threat attentional bias scores for the pre-attentive stimuli (social-evaluation condition) in experiment two. These findings illustrate the importance of this novel factor relating to fear in determining the nature of the attentional bias both at a conscious and pre-conscious level in socially anxious individuals.

Conversely, the results provide limited evidence for the validity of using the FNE scale in analogue research. Critically, the fear of negative evaluation factor only correlated with the negative evaluation bias scores (500ms) in the social evaluation condition from experiment two. It is important to note that caution needs to be taken with the attentional bias scores from the conscious processing trials in experiment two, as there is a possibility of attentional fatigue or pre-attentional priming influencing the conscious processing trials. Please see the discussion in chapter four for full details of these methodological considerations. Interestingly, both the fear of negative evaluation and the fear of new situations and strangers factors demonstrated a relationship with the

physical threat attentional bias scores from experiment three. Thus validating the use of both of these measures in identifying attentional biases in clinical studies incorporating individuals with social phobia matched with low anxious controls,

Epidemiological studies (e.g., Kessler et al., 1998; Stein et al., 1996) may help to explain why the SAD scale is more susceptible to attentional biases to socially threatening stimuli in the socially anxious. These studies claimed that fear of being evaluated negatively (especially public speaking) is a common phenomenon throughout the population. For example, this research indicated that although it is an important factor in social anxiety, as specified in the DSM-IV, fear of negative evaluation is also a key concern within the population as a whole. In contrast, social phobia with more extensive fears, involving at least one non-public speaking fear, is the most persistent and disabling in the general population. Watson and Friend (1969) designed the SAD questionnaire to assess such multiple social fears and suggested that high levels of social avoidance and distress were indicative of a more pathological form of social anxiety. Taken together, it seems fair to conclude that those who score highly on the SAD scale, are experiencing greater levels of social anxiety with more than one social fear. Furthermore, in support of the suggestion by Mogg and Bradley (2002), it is this more disabling form of social anxiety that is a more sensitive predictor of cognitive biases in the socially anxious.

Comparisons of the normative findings from the FNE and SAD scales with previous research yielded similar results. In particular, the Stopa and Clark (2001) study reported almost identical means for the FNE (14.26 versus 14.43 in the current study) and the SAD (6.27 versus 6.64 in the current study). Watson and Friend (1969) on the other

hand, stated slightly higher means for the FNE (15.47) and the SAD (9.11) scales. These differences might indicate that either US students experience slightly higher levels of FNE and SAD, or that the norms have shifted over time. Also, the Oei et al. (1991) paper reported higher levels of FNE (17.6) and SAD (14.6), this is to be expected however, as the scores were taken from clinical sample.

The current paper suggests that when using the FNE as a group classifier, future analogue research should adopt one of two selection criteria. First, by considering the mean score method (cf., Stopa & Clark, 2001), the cut off points are 22 or above for high FNE and 7 or below for low FNE grouping. Alternatively, by employing the percentiles notion (cf., Stopa & Clark, 2001), the grouping for high FNE are 20 or above and low FNE are 9 or below. This is the first study to propose social anxiety grouping classification based on the SAD measure in analogue population. The suggestion is that when determining groups based on this scale, the cut off points are 12 or above for high SAD and 2 or below for low SAD. The alternative proposition of high SAD groups scoring 9 or above and the low SAD group 3 or below based on percentile cut-offs, may make it easier to recruit participants. Interestingly, the mean score from the SAD scale in experiment three that included individuals with social phobia was 22.4, with a scores that ranged from 16 to 27. This indicates that generalised social phobics as determined by the ADIS-IV display higher than the recommended cut off score suggested by this current study. However, this study has also shown that high SAD scorers are not only less well distributed in a populational sample, but are also more unlikely to take part in research. Consequently, having a more lenient high SAD scoring criteria will increase the availability of participants for recruitment.

The present factor analysis of the FNE items showed that it is a uni-dimensional measure and that fear of negative evaluation is spread fairly evenly over the sample of students. There were seven FNE items (23%) that loaded either onto two or more factors or had a low factor loading. Leary (1983a) also found these items to have a low correlation with the scale total taken from a sample of US students and subsequently removed them from the BFNE scale. Oei et al. (1991) reported that the FNE consisted of the same single factor, with one item displaying weak support for the fear of negative evaluation factor. Thus, it seems fair to conclude that this questionnaire measures the same construct in analogue and clinical social anxiety samples, as proposed by Watson and Friend (1969), namely fear of negative evaluation.

Interestingly, the SAD items loaded onto the two separate factors of general social avoidance and distress and fear of new situation and strangers. This was with the exception of eight items (29%) that either jointly loaded onto both of these or had low factor loadings. The proposed BSAD does not include these items and still demonstrates good internal consistency and reliability. Oei and colleagues (1991) reported that the SAD scale comprised of only a social avoidance and distress factor, and that only item 19 did not load on it. The original Watson and Friend (1969) paper proposed that the SAD was a bi-dimensional measure of social anxiety, but that the factors were social avoidance and distress. Thus, this current factor analysis has provided initial evidence of a novel factor, termed fear of new situations and strangers, together with a general social avoidance and distress factor represents the underlying factor structure of the SAD and the BSAD scales. There is of course the possibility that the fear of new situations and

strangers factor may be particularly salient to the student population in this sample, thus this issue needs to be explored further in future research.

Given the above considerations, the question as to which self-report measure to use in future analogue studies becomes highly pertinent. Specifically, the FNE and the SAD instruments have been shown to measure different features of social anxiety. Additionally, the measures should not be viewed as interchangeable, for it is quite possible for participants who have a low score on the FNE, to score highly on the SAD and vice versa. The recommendation is to use the scales together, as it may be that separate analysis of the scales will yield a more detailed evaluation of processing biases in social anxiety, as indeed has been reported already (Mogg & Bradley, 2002; Mullins & Duke, 2004). It is important to note that there are several analogue studies that have used the FNE and found interesting and significant results in facial dot-probe studies (e.g., Mansell et al, 1999; Pishyar et al., 2004). Furthermore, if the research design does not allow for the use of such lengthy questionnaires, then the suggestion is to use the BFNE (Leary, 1983a) and the proposed BSAD. As the results from this study have shown that the scales can be reduced and still measure the key aspects of social anxiety, in an analogue population.

A limitation of this study was that it was conducted on a student sample. Future research should extend this research not only to an UK clinical sample, but to other cultures too (Chapman et al., 1995). Also, the participants were predominantly a female sample thus limiting its applicability to men. Moreover, it should be recognised that other measures of social anxiety also exist and might need to be appraised together with the SAD and the FNE questionnaires, including the Social Phobia Scale and the Social

Interaction and Anxiety Scale (Mattick & Clarke, 1998), the Social Phobia and Anxiety Inventory (Turner, Beidel, Dancu & Stanley, 1989), the Speech Anxiety Thoughts Inventory (Cho, Smits & Telch, 2004). All of which would be suitable for analogue research, although not as widely used as the current measures.

To conclude, the SAD and FNE scales are comprehensive and valuable measures, with excellent psychometric properties, making them a useful adjunct in the assessment of social anxiety. The FNE scale considers the more prevalent populational and social anxiety fear of being evaluated in a negative fashion. The SAD instrument measures not only general social avoidance and distress, but also specific fears of new situations and strangers, encompassing the more general and disabling aspects of social anxiety. United Kingdom student norms and possible cut-off point for defining social anxiety groups for both questionnaires have been presented. This study has highlighted that care should be taken in the consideration of which of these scales to use in future research. Given that that these scales are not equivalent, it may be appropriate to employ both, if at all possible, to allow for the measurement of all the dimensions of social anxiety. Finally, the shortened form of the FNE (Leary, 1983a) has been endorsed and a shortened version of the SAD proposed.

Chapter 7

Overview and Evaluation

Chapter Overview

This thesis has sought to systematically investigate the nature of the attentional bias in social anxiety and social phobia to different categories of threatening words using the visual dot-probe paradigm. This final chapter will assess how well this aim has been addressed. Initially, the results from the visual-dot probe experiments and the psychometric study in this thesis will be described. Following this, an examination of the issues raised in chapter two, where it was proposed that further research might be useful in the understanding of dysfunctional attentional processing in social anxiety and social phobia, will be presented. Next, there will be some discussion on the implications of the findings from this thesis for the general anxiety theories presented in chapter one and the cognitive theories of social phobia detailed in chapter two. Finally, methodological issues, directions for future research and clinical implications will be considered.

Summary of Results

Experiment one attempted to establish evidence of an attentional bias in an analogue sample of individuals experiencing either high or low levels of social anxiety using the visual dot-probe task. At the time of designing this experiment, no previous studies had explored this phenomenon in high and low socially anxious participants using this experimental paradigm with semantic stimuli, although there has been two published studies since (Mansell et al., 2002; Pishyar et al., 2004). Based on the previous findings from the trait anxiety studies described in chapter one, detailing that high trait anxious individuals demonstrated an attentional bias towards threat under conditions of high state anxiety, such as during a period of examination stress (e.g., Mogg et al., 1994), this study included a social-evaluation condition. The choice of threatening words included in the

study was also considered an important factor. Thus, four categories of threatening words were selected, three of which related to social anxiety concerns (somatic sensations, negative evaluation and social situations). A physical threat word group was also included in line with previous dot-probe studies (e.g., MacLeod et al., 1988; Asmundson & Stein, 1994), to assess the specificity of the bias.

As shown in Table 7.1., the results from experiment one showed that, in the non-evaluation condition, the high socially anxious participants, in comparison to the low socially anxious individuals, displayed an attentional bias towards negative evaluation words. In the social-evaluation condition, individuals high in social anxiety demonstrated an attentional bias towards somatic sensation words, compared to those participants low in social anxiety. Importantly, these attentional bias effects were only apparent when the SAD scale, not the FNE questionnaire, was used to determine high and low social anxiety grouping. These findings contrasted with two recently published analogue dot-probe studies that did (Mansell et al., 2002) and did not (Pishyar et al., 2004) manipulate levels of social-evaluation. Both of these studies failed to find any evidence of selective attention effects towards threatening word stimuli to be associated with social anxiety. Thus, experiment one has shown not only that the high socially anxious do display attentional biases towards certain categories of threatening word stimuli, but that this is also dependent on current levels of state anxiety (i.e., non-evaluation and social-evaluation experimental conditions).

The second experiment in this thesis attempted to replicate the findings from experiment one and to extend the research further by exploring the nature of pre-attentional processing in social anxiety to semantic stimuli. Pre-attentional processing

biases have already been demonstrated in high trait anxious individuals using the Stroop (e.g., MacLeod & Hagan, 1992) and visual dot-probe task (e.g., Bradley et al., 1997). Therefore, by using the same procedure as in experiment one, with the addition of varying the stimulus duration times, pre-attentive processing was also explored. To assess pre-conscious attentional processing, the first part of the dot-probe task presented word pairs for 14 ms followed by a pattern mask for 486 ms. After a short rest period, the second part of the task showed word pairs for 500 ms, in order to assess conscious processing as in experiment one.

The results from this second experiment are presented in Table 7.1. The findings showed that there were no pre-attentional processing differences between the high and low social anxiety groups to the socially threatening word groups. The high socially anxious participants did however selectively attend towards masked physical threat words, in comparison to low socially anxious individuals, in the social evaluation condition. Thus providing evidence of a pre-attentional bias in socially anxious participants to cues that are physically threatening in nature. Mogg and Bradley (2002) have also recently reported evidence of a pre-attentive bias in socially anxious participants towards threatening faces, under non-evaluation conditions. Taken together, it seems fair to suggest that individuals high in social anxiety do display an automatic pre-attentional bias towards generally threatening cues represented by a threatening face or physically threatening words in a dot-probe task. Disappointingly, there were not any significant findings from the conscious processing trials in this study. However, it appears that experimental fatigue or affective habituation (Dijksterhuis & Smith, 2002)

may have influenced the findings. Once again, the only significant findings were when the SAD scale, and not the FNE measure, defined the social anxiety groups.

The third experiment in this thesis extended the research further by investigating dysfunctional attentional biases in participants with generalised social phobia, in comparison to matched low anxious controls. As detailed in chapter two, when this study was originally designed there was no evidence of an attentional bias associated with social phobia using the visual dot-probe task (Asmundson & Stein, 1994; Horenstein & Segui, 1997). This was particularly surprising when one considers the consistent evidence of an attentional bias associated with negative evaluation words in individuals with social phobia in the Stroop studies (e.g., Hope et al., 1990; Maidenberg et al., 1996). Additionally, selective attentional biases towards threatening words have been established in patients with generalised anxiety disorder (e.g., MacLeod et al., 1986; Mogg et al., 1992). With this in mind, experiment three used the same experimental paradigm and categories of words as in experiment one. This study did not include a social-evaluative condition, as the very fact that an individual with generalised social phobia was taking part in the study was considered to be a socially anxiety provoking environment for them.

As detailed in Table 7.1., experiment three's results showed that individuals with social phobia attended towards physical threat words, in comparison to the low anxious controls. There were no attentional bias effects towards the social threat words associated with social phobia. These findings are partially consistent with a recently published study by Musa et al. (2003). They found that individuals experiencing social phobia without concurrent depression displayed an attentional bias towards physical

threat words, though they also reported that this patient group showed a selective attentional preference for social threat words too. It is also notable that an attentional bias towards physical threat words has also been shown in Amir et al.'s (1996) Stroop study. Thus, it appears that physical threat is of attentional concern to individuals with social phobia.

Table 7.1. *Summary of Theoretical Predictions and the Results from the Experimental Studies*

Theoretical Predictions	The Experiments	The Results
The Clark and Wells (1995) Model: Individuals with social phobia generally display an attentional bias towards negative evaluation words. Also, during a social situation they attend towards interoceptive information (e.g., negative evaluation and somatic sensation words). This bias is apparent at both a pre-conscious and a conscious level of processing. ***Beck et al (1985) and Rapee and Heimberg (1997):*** Individuals with social phobia display an attentional bias towards self-focused (e.g., negative evaluation and somatic sensation words) and external (e.g., social situation words) social threat. The bias is only activated under conditions of social evaluation and is a pre-attentive and conscious process. ***Williams et al. (1988) Integrative Theory:*** High anxious individuals demonstrate an attentional bias towards disorder-specific threat at a pre-attentive and conscious level of processing. ***Eysenck (1992) Hypervigilance Theory:*** Individuals with high levels of anxiety are associated with a pre-attentional focus towards social and physical threat. This becomes specific to the disorder at a more conscious level of processing.	***Experiment 1:*** Explored these predictions at a conscious level of processing using high and low socially anxious participants (including a social evaluation manipulation). ***Experiment 2:*** Investigated these proposals at a pre-conscious as well as a conscious level of processing using high and low socially anxious participants (including a social evaluation manipulation). ***Experiment 3:*** Considered these suggestions at a conscious level of processing using a clinical population and low anxious matched controls (without the social evaluation manipulation)	***Experiment 1:*** The high socially anxious participants attended towards the negative evaluation words (non-evaluation condition) and the somatic sensation words (social-evaluation condition), when compared to the low socially anxious participants. ***Experiment 2:*** The high social anxiety participants, in contrast to the low social anxiety individuals, attended towards the physical threat words (social-evaluation condition) when they were presented at a pre-attentive level of processing. There were no further differences between the social anxiety groups at either level of processing. ***Experiment 3:*** Individuals with social phobia, compared to the low anxious matched controls, attended towards the physical threat words.

Study four investigated an interesting finding from the first two experiments. This was that levels of social avoidance and distress as indicated by the SAD scale, and not fear of negative evaluation based on the FNE measure, identified attentional processing differences between the high and low social anxiety groups. Mogg and Bradley (2002) have also reported similar findings of the SAD measure being a better predictor of attentional bias effects in socially anxious samples using a facial dot probe task. With this in mind, together with the lack of psychometric studies on these two popular self-report questions (Oei et al., 1991), the main aim of this experiment was to explore the psychometric characteristics of the FNE and SAD scales using an analogue sample. Essentially, this study wanted to determine whether these scales reliably measured the aspects of social anxiety that Watson and Friend (1969) had originally designed them to do. Further aims were to provide group cut-off points to guide future social anxiety research, and to endorse the BFNE scale and propose a shortened form of the SAD scale. The data were taken from a large-scale screening that took place to obtain participants for the second experiment in this thesis.

The psychometric analysis in this study identified that the FNE scale comprised mainly a fear of negative evaluation factor. The SAD scale had a two-factor structure that was different to the one proposed by Watson and Friend (1969). Partially consistent with the original paper, there was a social avoidance and distress factor, but there was also a new factor relating to fears of new situations and strangers. It also showed the BFNE and the BSAD scales reliably measure the key characteristics of the longer FNE and SAD scales.

Importantly, the three factors demonstrated different relationships with the attentional bias data from the three dot-probe experiments. Please see Table 7.2. for a summary of the findings. This table shows that in experiment one, the social avoidance and distress factor and the fear of new situations and strangers factor correlated with the negative evaluation attentional bias scores (non-evaluation condition). Also, the fear of new situations and strangers factor showed a significant relationship with the somatic sensation attentional bias scores (social-evaluation condition) taken from the data from experiment one. In experiment two, the physical threat attentional bias data for the pre-attentive stimuli (social-evaluation condition) demonstrated a relationship with the fear of new situations and strangers factor, and the negative evaluation attentional bias data correlated with the fear of negative evaluation factor and the social avoidance and distress factor when displayed from 500 ms under conditions of social evaluation. Both the fear of negative evaluation and the fear of new situations and strangers factors demonstrated a relationship with the physical threat attentional bias data from experiment three.

The demonstration of such a relationship between these measures and the attentional bias data from the experimental chapters validates the use of both of these measures in identifying attentional biases in socially phobic clinical and socially anxious analogue studies. These findings highlight not only the importance of the SAD scale in identifying the nature of the attentional bias in socially anxious and socially phobic populations, but that it is a fear of new situations and strangers that is one of the key factors in the attentional bias. In contrast, these findings provide limited evidence for the validity of using the FNE scale in analogue research, as a significant relationship was

only found with the negative evaluation word groups in the second experiment. The FNE scale does however appear to be equally as effective as the SAD scale in the detection of attentional biases in clinical studies incorporating individuals with social phobia matched with low anxious controls. Interestingly, there were no significant relationships with any of the factors and the social situation attentional bias data from any of the experiments. The lack of a significant relationship suggests that seeing words that are relating to social situations confirms the findings from the experimental studies, that these stimuli do not elicit any selective attentional biases in socially anxious or socially phobic individuals.

Table 7.2. *Summary of the Relationship Between the Factors from Study Four with Each Word Group's Attentional Bias Score from each Experiment*

	Negative Evaluation Attentional Bias Data	Somatic Sensation Attentional Bias Data	Social Situation Attentional Bias Data	Physical Threat Attentional Bias Data
Fear of Negative Evaluation *(factor 1)*	**Experiment 2** (SE = 500ms)	*No Significant Relationship*	*No Significant Relationship*	**Experiment 3** (500ms)
Social Avoidance And Distress *(factor 2)*	**Experiment 1** (NE = 500ms) **Experiment 2** (SE = 500ms)	*No Significant Relationship*	*No Significant Relationship*	*No Significant Relationship*
Fear of New Situations and Strangers *(factor 3)*	**Experiment 1** (NE = 500ms)	**Experiment 1** (SE = 500ms)	*No Significant Relationship*	**Experiment 2** (SE = 14ms) **Experiment 3** (500ms)

n.b. NE = *Non-Evaluation Condition* SE = *Social-Evaluation Condition*
14 ms and 500 ms = *Stimuli Presentation Times*

Examination of the Issues

This section of the overview and evaluation considers the four issues that were raised in chapter two, which this programme of work sought to systematically investigate. Following this, the implications of the findings will be discussed in relation to the aforementioned cognitive theories of anxiety and social phobia.

Nature of Threat Cues

After reviewing the literature on attentional processing in social phobia studies, the choice of word stimuli included in the visual dot-probe task was considered to be an important factor. Indeed, chapter two identified that there were inconsistencies in the choice of word selection that had been previously included in dot-probe studies. For example, the Stroop studies highlighted that different categories of social threat (e.g., anxiety symptoms, negative evaluation and social situation) were important factors in identifying attentional processing differences in patients with social phobia (e.g., Maidenberg et al., 1996; McNeil et al., 1995). Furthermore, as the physical threat words included themes of panic symptoms (Asmundson & Stein, 1994) or themes of violence (Horenstein & Segui, 1997), it was felt that more categorically distinct word groups were needed.

The results from experiment one demonstrated the importance of including different categories of social threat words. The findings showed that the high socially anxious selectively attended toward negative evaluation words in the non-evaluation condition and they attended to the somatic sensation words in the social evaluative condition, in contrast to the low socially anxious. The suggestion here is, that subtle processing differences between the high and low social anxiety groups may have not

have been identified without the inclusion of such categorically distinct words. In support of this view, both Mansell et al. (2002) and Pishyar et al. (2004) only included 'general' negative social-evaluative words and failed to find any significant attentional bias differences between high and low social anxiety groups. Indeed, these studies included a mix of both negative evaluation (e.g., foolish, ridiculed, inadequate) and somatic sensation (e.g., blushing, embarrassed, sweating) words, and it may be that including such categories under one negative word group could have inadvertently confounded any selective attention effects. Thus, it seems fair to propose that the inclusion of different categories of social threat words may be an influential factor, together with other factors that are discussed throughout this section, in detecting dysfunctional attentional processing in social anxiety.

Additionally, an attentional bias towards physical threat words at a pre-attentional level in social anxiety (experiment two) and at a conscious level in social phobia (experiment three), when levels of state anxiety were high has been reported in this thesis. These findings are consistent with research that showed a pre-attentive bias only being apparent in trait anxious participants under state anxious conditions (MacLeod & Rutherford, 1992) and in clinically anxious patients at a conscious level of processing (MacLeod & Mathews, 1991). Furthermore, a selective attentional preference for physical threat words has also been documented in social phobia research using dot-probe (Musa et al., 2003) and Stroop (Amir et al., 1996) tasks. Thus, it appears that physical threat words are of attentional concern to individuals with social anxiety and social phobia. However, it is interesting that the biasing effects did not include any of the social

threat words at a pre-attentive level in social anxiety and a conscious level of processing in social phobia. Possible explanations for this are provided throughout this section.

As previously mentioned, the reason for including a negative evaluation, a somatic sensation and a social situation word group was to try and tease out the subtle selective attentional effects associated with social anxiety and social phobia using these categorically distinct social-threat words. Experiment one was the only study in this thesis that found the nature of attentional bias in individuals with high levels of social anxiety was towards different categories of social-threat (negative evaluation under non-evaluative conditions and somatic sensations under social evaluative conditions) word groups. The findings from experiment two suggested that at a pre-conscious level, the attentional bias was towards physical and not disorder-specific threat. The non-significant results from the conscious processing trials were possibly due to experimental fatigue and/or priming effects that caused affective habituation of the threat words. The latter possibility has important therapeutic implications that are discussed later. The lack of processing differences in experiment three between the social phobia group and the low anxious controls, to the social-threat words was initially disappointing. In contrast, a more recent study by Musa et al. (2003) reported that social phobics (without concurrent depression) attended towards social-threat and physical threat words, in comparison to non-anxious controls. Thus, in comparing these findings to the results from experiment three, it appeared that social phobia was associated with an attentional bias towards general social-threat words (e.g., embarrassed, stupid, grotesque), as well as physical threat words, and not specific categories of social threat, such as negative evaluation, somatic sensation and social situation words. The next section of this evaluation

however, will present an alternative explanation regarding the lack of attentional focus to somatic sensation, negative evaluation and social situation word groups in experiment three.

Influence of State Anxiety on the Nature of the Bias

The inclusion of a social-evaluative condition in experiments one and two was effective in highlighting differences in the nature of attentional processing in socially anxious individuals, compared to low social anxious participants, both at a pre-attentive and conscious level of attentional processing. Therefore, in line with the trait anxiety studies described in chapter one (e.g., MacLeod & Mathews, 1988; Bradley et al., 1997), these findings provide further support for cognitive analogue research to include state anxiety manipulations to identify processing differences between high and low anxious individuals, irrespective of the type of anxiety. Furthermore, dot-probe studies including facial stimuli have also found differences in attentional processing, when levels of social-evaluative anxiety have been manipulated (e.g., Mansell et al., 1999; Mansell et al., 2003). For example, Mansell and colleagues (2003) found no significant attentional bias effect between individuals who were high and low in social anxiety when levels of state anxiety were low. In the social-evaluation condition however, the high socially anxious group attended away from both positive and negative faces in comparison to the low social anxiety group.

Experiment three did not specifically include a social-evaluation condition. It is notable however that the state anxiety scores for the social phobia sample ($M = 51.3$), compared to the low anxious controls ($M = 25.9$), indicated that the experimental situation together with the ADIS-IV interview increased levels of state anxiety in the

social phobia sample and not the low anxious controls. The suggestion here is that increases in state anxiety may have different effects on individuals with clinical levels of generalised social phobia than the analogue sample with high levels of social anxiety. More specifically, experiment three found that a high level of state anxiety resulted in no evidence of an attentional bias towards disorder-specific threat in individuals with social phobia, whereas experiment one found that individuals with high levels of social anxiety attended towards somatic sensation words when levels of state anxiety were high.

Interestingly, similar findings to experiment three, have been reported in Stroop studies that have induced social-evaluative conditions with social phobia patients (Amir et al., 1996). In fact, the level of state anxiety in the social phobia sample reported in the Amir et al. (1996) study was the same ($M = 51.6$) as the generalised social phobia sample in experiment three. Indeed, t tests revealed no significant differences between the state anxiety score in experiment three and the Amir et al. (1996) study, $t(29) = .15$, $p = .40$, $d = .05$. Furthermore, in line with experiment three, Amir and colleagues also found no evidence of selective attention towards social-threat words, only an attentional bias towards physical threat words when levels of state anxiety were high. Thus, providing further evidence that the attentional bias towards social-threat words associated with social phobia may be suppressed when levels of state anxiety are high, although an attentional bias towards physical threat words are still evident.

In further support, the individuals with social phobia in the Asmundson and Stein (1994) study also had high levels of state anxiety ($M = 53.3$), which was similar to experiment three ($M = 51.6$), and also found no attentional bias effects to social threat words, when compared to low anxious controls. Additionally, the social phobia sample

without concurrent depression that demonstrated an attentional bias towards negative evaluation words in the Musa et al. (2003) study, had relatively low levels of state anxiety (M = 43.1). The level of state anxiety in this study was significantly lower than in the social phobia study in this thesis (experiment 3), t (43) = 2.76, p = .004, d = .75. In contrast, levels of state anxiety were as low (M = 43.1) in the Horenstein and Segui (1997) sample of social phobics, as in the Musa et al. study, but there was no evidence of an attentional bias in this study to social threat words. Also, the individuals with social phobia with concurrent depression in the study by Musa and colleagues, who did not demonstrate any evidence of an attentional bias had similarly high levels (M = 50.8) of state anxiety as in experiment three, t(48) = .16, p = .40, d = .04. Taken together, with the exception of the Horenstein and Segui study, experiment three concurs with the findings from the previous Stroop (Amir et al., 1996) and dot-probe (Asmundson & Stein, 1994; Musa et al., 2003) studies. Essentially, when levels of state anxiety are high in individuals with social phobia, it appears to have the effect of attenuating the strength of the bias towards social-threat words.

The results from experiment one however, do not concur with this assumption, as the attentional bias towards somatic sensation words was not suppressed in a sample of high socially anxious participants under high levels of state anxiety (M = 51.6). An alternative proposal to the possibility that socially anxious and socially phobic samples may react differently under high levels of state anxiety is that the method of inducing state anxiety was different in experiment one and three. The former experiment included a social-evaluation condition by focusing on one of the key concerns of the socially anxious, believing that they would have to give a speech. The latter study did not

deliberately manipulate state anxiety by such an induction technique instead it was increased by a variety of fears. These included being in a strange social situation (the experiment) and having to describe previous life events that occurred from a variety of socially and generally anxious situations (the ADIS-IV interview). The arousal of more general social concerns and fears in social phobia, compared to just one specific speech related anxiety in social anxiety, may have been a possible explanation for the results. In that, social anxiety relating to giving a presentation could result in an attentional focus towards somatic sensations relating to displaying physical signs of anxiety seen as a weakness to high socially anxious individuals (e.g., Spurr & Stopa, 2002). It is notable that the Amir et al. (1996) Stroop social phobia and the Mansell et al. (1999) dot-probe social anxiety studies, both manipulated social evaluation in a similar way to experiment one. They did not however include words relating to anxiety symptoms, so it is not possible to generalise this view any further at this point.

Overall, the suggestion here is that different types of social anxiety provoking situations may lead to differences in the nature of the selective attention towards threat. More specifically, a social-evaluative condition (e.g., believing that they would have to give a speech and be recorded and assessed) would motivate the socially anxious person to attend to specific speech related threat, such as anxiety-related somatic sensations (nervous, blushing). Whereas, when levels of state anxiety are increased due to experiencing a situation that causes the person to recall a variety of social anxiety and indeed general anxiety provoking situations (such as the ADIS-IV), the attentional focus of people with social phobia may be towards more general threat, possibly at the cost of processing social-threat related words. It does however seem fair to suggest that somatic

sensations could be a response to both social-evaluative and more general social threat situations, but as the social phobia sample in experiment three were not expecting to be evaluated after the dot-probe task, as the social anxiety sample were in experiment one, this may have reduced the attentional focus to such visible signs of anxiety. Future research needs to incorporate themes of threatening stimuli that are specific to the induction used to raise levels of state anxiety in cognitive experimental research to explore this proposal further.

Participant Selection

The issue of participant selection in the two analogue studies proved to be an important one, in relation to the choice of self-report social anxiety questionnaire that can reliably identify any attentional bias effects. Experiment one initially used the FNE scale to determine levels of fear of negative evaluation in the students that were screened to take part in the study. This questionnaire was originally chosen because it was the most popular choice in previous social anxiety analogue research (e.g., Bradley et al., 1997; Mansell et al., 1999). However, when the reaction time data was analysed using the FNE scale to determine high and low groups, there were no significant main effects or interactions. The data were reanalysed using the SAD scale (based on a median split of participant scores), which participants also completed on the day of the experiment. This revealed differences in attentional bias between the high and low social anxiety groups. Due to this finding, experiment two used the SAD scale to define high and low social anxiety groups, but also included the FNE scale at screening and on the experimental day. Once again the SAD scale was the best predictor of attentional bias in the social anxiety

groups and social anxiety groups based on the FNE questionnaire yielded no significant results.

In view of these two findings, study four involved a detailed psychometric analysis of these questionnaires. Exploratory factor analysis revealed that the FNE scale consisted of one factor, namely fear of negative evaluation. The SAD scale comprised a social avoidance and distress factor and a fear of new situations and strangers factor. Interestingly, it was the two factors from the SAD scale that demonstrated more evidence of a relationship with the attentional bias data from experiments one and two that included an analogue non-clinical sample. Interestingly, both the fear of negative evaluation factor (FNE scale) and the fear of new situations factor (SAD scale) demonstrated a relationship with the physical threat attentional bias data from experiment three, that included a generalised social phobia sample and low anxious matched controls. This suggests that the validity of both questionnaires is apparent in studies including generalised social phobia participants and low anxious controls. Overall, study four confirms not only that the two questionnaires reliably measure different aspects of social anxiety, but also that the findings from the correlational analysis also suggest that the SAD scale is a more sensitive measure of attentional bias in socially anxious samples.

A further aim of study four was to explore shortened versions of both questionnaires, as it has been argued that the FNE and SAD scales took too long to complete (e.g., Cox & Swinson, 1995; Heimberg, 1994; Leary, 1983a). There was already a brief version of the FNE designed by Leary (1983a), but there was no published version of a shortened form of the SAD scale. Consequently, this study devised a BSAD scale based on the main factor loadings from the psychometric analysis of the SAD scale.

Psychometric analysis showed that both the BFNE and BSAD questionnaires encompassed the key characteristics of the longer versions. Thus, if future studies wish to include both measures, but feel that the FNE and SAD scales are too long, the BFNE and BSAD measures provide suitable alternatives.

In experiment three, the recruitment of individuals with generalised social phobia was based on the ADIS-IV. The participants also completed the SAD and FNE scales on the experimental day to ensure that they had high levels of social anxiety. The recruitment criteria used in this experiment did successfully identify individuals with generalised social phobia, but it may not have allowed for the full exploration of the degree to which any secondary diagnoses, such as generalised anxiety disorder, could have influenced the participants' mental health and indeed attentional processing. It does however, seem fair to safely surmise that at the very least, the generalised social phobia participants in experiment three where also experiencing high levels of generalised anxiety disorder. The difficulty lies within the determination of the possible interaction between these two anxiety disorders and their influence on the nature of attentional bias in this experiment. Indeed, the generalised anxiety disorder literature shows that both Stroop (e.g., Mathews & MacLeod, 1985) and dot-probe (e.g., MacLeod et al., 1986) studies reported an attentional bias towards physical threat to be associated with this disorder. Thus, in consideration of the psychological processes associated with this sample of generalised social phobia, it is possible that the saliency and the potency of the threat stimulus, together with the influence of generalised anxiety, and being in a generally state anxious frame of mind, may have been influential factors in the attentional bias towards physical threat, which was found in this experiment.

Theoretical Implications – Cognitive Theories of Anxiety

The current programme of work has shown that the notion of disorder-specific threat in social phobia needs to be considered in more detail by Eysenck (1992) and Williams and colleagues (1988). It is quite possible, as highlighted in experiment three, that an individual with generalised social phobia may have a secondary or dual diagnosis of generalised anxiety disorder. Thus, the disorder-specific threat could be related not only to themes of social-threat, but also to stimuli relating to worry and physical-threat. On the other hand, it is also quite possible that the psychological processes of individuals with social phobia include the preferential processing of physical threat, as well as social threat. This raises the question of exactly what is disorder-specific threat in social phobia. The suggestion here is that these theories do not fully address the issue of secondary or dual diagnosis anxiety disorders when predicting the nature of the attentional bias in anxiety disorders. Both theoretical perspectives need to consider what type(s) of threatening information capture attentional processing not only within each anxiety disorder, but also in relation to the issue of secondary or dual diagnosis anxiety disorders too. Essentially, these theories do not make it clear how secondary or dual diagnosis anxiety disorders influence the nature of selective attention to threatening information.

Overall, if one decides that disorder-specific information in social anxiety relates to themes of social-threat only, then the results from the pre-attentional processing trials in experiment two do not provide support for the Williams et al. (1988). This model predicted that pre-attentive biases towards socially threatening words were associated with individuals high in social anxiety, in a state anxious condition. The results however,

only found evidence of a pre-attentional attentional bias towards physical threat in high socially anxious participants, when compared to the low socially anxious. In contrast, Eysenck (1992) predicted that those high in anxiety would display a pre-attentional bias towards disorder-specific and generally threatening stimuli too. Experiment two's results provided partial support for Eysenck's theory, in that the attentional focus in socially anxious individuals at the pre-attentive stage of processing is only towards physical threat which represent a more general threat, and not social threat, during social-evaluative manipulations.

MacLeod (1991) proposed that the key difference between high trait anxious and clinically anxious individuals is that the former were able to consciously override certain dysfunctional attentional processing. Interestingly, the three information-processing studies in this thesis supplied some evidence to support this notion. More specifically, even though experiment two found pre-attentive biases towards physical threat words under social evaluative conditions to be associated with social anxiety, experiment one did not reveal any significant conscious selective attention effects towards this word group in the high or low socially anxious groups. This indicates, in line with MacLeod (1991), that some sort of attentional control could be evident in the conscious processing of physical threat in high socially anxious participants, which was not apparent in experiment two at a pre-attentive level. In further support, experiment three found that individuals with social phobia attended towards physical threat at a conscious level of processing, whereas the control group attended away. Taken together, the findings from experiment one, two and three of this thesis provide support for MacLeod (1991), who

stated that differences between trait and clinically anxious individuals are that the latter are unable to consciously avoid attending to physical threat cues.

However, MacLeod's (1991) prediction was not supported with the findings from the socially threatening word groups. In fact, the reverse effect appeared to occur in the analogue studies. There was no evidence of a pre-attentive bias to the negative evaluation, social situation and somatic sensation word groups in high socially anxious individuals in experiment two. Although in experiment one, the high socially anxious attended towards the negative evaluation (non-evaluation condition) and somatic sensation (social-evaluative condition) words at a conscious level of processing. Furthermore, experiment three showed that people with social phobia displayed no attentional bias effects towards the socially threatening word groups at a conscious level of processing. Overall, although the series of dot-probe studies suggested some evidence to support MacLeod's view with the physical threat words, they equally provided evidence to contradict this theory with the socially threatening word groups. This suggests that this viewpoint is perhaps too simplistic and that other factors such as the type and saliency of the threat, together with current levels of state anxiety, also influence the nature of the processing in socially anxious and socially phobic individuals.

A final point to consider is the attentional behaviour of the low socially anxious groups in experiment one, two and three, in relation to the more recent anxiety theories of Mathews and Mackintosh (1998) and Mogg and Bradley (1998). They both argued that individuals with low levels of anxiety would not attend to relatively low indicators of threat (such as threatening words), but would attend to more severe forms of threat (such as threatening pictures). In support, where there were significant differences between the

high and low socially anxious groups, the low anxious participants tended to attend away from the threat words, irrespective of whether they were in a social-evaluative situation or not. Thus, individuals low in social anxiety do not appear to direct their attention to threatening words, in comparison to individuals with high levels of social anxiety. However, as pictorial stimuli were not included in this thesis, no conclusions can be drawn on more severe forms of threat.

Theoretical Implications – Cognitive Theories of Social Phobia

This thesis also aimed to address the aforementioned theoretical conflict between the three different cognitive perspectives of social phobia (Beck et al., 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997), in relation to their predictions regarding the focus of the attentional bias to threatening information. Beck et al. (1985) and Rapee and Heimberg (1997) proposed that in a social situation, an individual with social phobia would attend towards threat cues related to the self (e.g., physical signs of anxiety, thoughts of negative evaluation from others) and to external disorder-specific threat (e.g., the social situation or negative reactions from others). In contrast, Clark and Wells (1995) hypothesised that a pre-occupation with negative evaluation is apparent in social phobia irrespective of being in a social-evaluative situation. Furthermore, during a social encounter, the person with social phobia would focus solely on interoceptive information, such as negative beliefs in their performance and the fear of showing physiological signs of anxiety.

The three studies exploring this theoretical conflict used different categories of words designed to adequately evaluate these predictions. The negative evaluation and somatic sensation word groups were included as, according to these theoretical

perspectives, they represent the interoceptive concerns of an individual with social phobia. A social situation word group was included to assess external threat processing and a physical threat word group to determine whether the attentional bias is specific to the disorder.

Experiment one provided partial support for the Clark and Wells (1995) model, as there was an attentional bias towards negative evaluation words in the high socially anxious individuals, compared to the low socially anxious, in the non-evaluation condition. These findings suggested a pre-occupation with themes of negative evaluation being apparent in socially anxious individuals, without them actually being in a socially threatening situation. Conversely, the findings did not support the predictions by Beck and colleagues (1985) and Rapee and Heimberg (1997), who both argued that the individual with social phobia needed to be in a social situation for such selective effects to become apparent. In the social-evaluation condition, the findings partially support all three theoretical perspectives. The high socially anxious demonstrated an attentional bias towards somatic sensation words, in contrast to the low socially anxious who looked away. Although, this supports the three cognitive theories of social phobia, the predicted bias towards negative evaluation words during this experimental induction was not found. Overall, this finding provided evidence that the primary attentional concern in individuals with social anxiety is towards anxiety symptoms and not negative evaluation, when in a social-evaluative situation.

The results from experiment two and three of a pre-attentive bias towards physical threat words in high socially anxious individuals, in the social-evaluative condition, and a conscious attentional bias towards physical threat in social phobia respectively, did not

provide support for any of the cognitive perspectives of social phobia. In particular, all three theories predicted that the attentional bias in social phobia is towards social threat only (e.g., Beck et al., 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997). However, if one considers that secondary anxiety disorders in social phobia are extremely common (e.g., Brown & Barlow, 1992) and that generalised anxiety disorder is the most common secondary anxiety disorder in social phobia (e.g., Barlow et al., 1986, Turner et al., 1991), then the selective processing of physical threat could be a disorder-specific stimuli. Further evidence to support this notion can be obtained from the generalised anxiety disorder attentional studies. For example, the literature exploring the nature of the attentional bias in generalised anxiety disorder patients has shown that they demonstrate an attentional bias towards physical threat, both in Stroop (e.g., Mathews & MacLeod, 1985; Mogg et al., 1995) and visual dot-probe (Mathews et al., 1986; Mogg et al., 1992) tasks. Additionally, an attentional bias towards physical threat in social phobics has been reported in Stroop (e.g., Amir et al., 1996) and dot-probe (Musa et al., 2003) research. Taken together, it seems fair to propose that in individuals with generalised social phobia, the influence of secondary anxiety disorders or possible dual diagnoses, may have an interactive effect on the nature of the bias to physical threat and as such is a disorder-specific word category in information processing studies. An alternative view however, is that in the disorder of social phobia, both biases may actually be evident. Indeed, this may possibly be due to environmental and/or developmental factors, the individual could actually have started with an attentional bias towards physical threat that generalised to social threat, as the social phobia developed.

Thus, making it part of the psychological process in individuals with social phobia that biases exist both to social-threat and to physical threat.

Overall, the dot-probe experiments in this thesis did not fully determine whether the attentional bias in socially anxious and socially phobic individuals was towards internally related threat cues and/or external threat information. Although, as all three studies did not find evidence of an attentional bias towards the social situation words whatsoever, it seems fair to propose that there does not seem to be an attentional bias to this type of external related threat in social anxiety and social phobic individuals. This is in direct contrast to Beck et al. (1985) and Rapee and Heimberg (1997), who both predicted an attentional bias towards external threat. It is notable however, that facial dot-probe studies have reported that high socially anxious individuals (e.g., Mogg & Bradley, 2002; Pishyar et al. 2004) and people with social phobia (Mogg et al. 2004) attend towards negative facial expressions. Importantly, as this type of threat is considered to be an external cue, these studies provide support for the aforementioned theoretical perspectives. Conversely, the lack of attentional bias towards social situation words provided support for the Clark and Wells (1995) model, who suggested that the primary attentional concern in individuals with social phobia is towards interoceptive threat cues. Also, there is evidence from the facial dot-probe studies of an attentional bias away from aversive facial stimuli, classified as an external threat, in participants with high levels of social anxiety (e.g., Mansell et al., 1999) and with socially phobia (e.g., Chen et al., 2002). Thus, the issue of whether the attentional focus is externally and/or internally cued in social anxiety and social phobia still requires further research.

The findings from the information processing experiments in this thesis have suggested that the key cognitive perspectives of social phobia need to take into account several other factors. More specifically, how the influence of state anxiety impacts on the nature of pre-attentional and attentional processing associated with social anxiety and social phobia. Also, how the presence of secondary disorders or a dual diagnosis in persons with social phobia affects the nature of attentional processing.

Methodological Considerations and Future Research

One important methodological consideration that arose in experiment one was a design issue with the number of critical trials presented to the participants. In that, there were 12 words per threat category presented once to the participants throughout the dot-probe task. Essentially, this allowed for three data points to contribute to the mean reaction time score of which there were four possible connotations. These were the four different threat word groups, the probe position and the threat word position (that could be presented in the upper or lower part of the screen). There was concern that the number of data points that represented a mean reaction time score for a participant may not be sufficient. This concern was even more apparent once the data had been 'cleaned' to remove the extreme scores, as in certain cases one or two reaction times scores determined the data point mean. Thus, in experiment two and three the number of critical trials was increased. The former experiment used 16 threatening words per word category and due to the exploration of pre-attentive and conscious processing trials requiring two dot-probe tasks, each word was presented a total of three times throughout a task. This resulted in the increase of the number of critical data points for each mean reaction time score to a maximum total of four. Experiment three also included 16 words

per word group, and only presented them once to the participants throughout the dot-probe trial, once again allowing for four data points to contribute to the mean reaction time score. To overcome this potential problem in future research, the suggestion here is to include as many critical trials as possible into the research design.

A further issue in experiment two, was in relation to the participants completing the pre-attentive trials before the conscious processing trials. This may have given rise to a methodological problem, because by ordering the trials in this way, the possibility of fatigue or affective habituation (Dijksterhuis & Smith, 2002) effects influencing the results from the conscious processing trials cannot be ruled out. The reason for presenting the pre-attentive trials first was to address the concerns of Fox (1996), who argued that intermixing conscious and pre-conscious trials caused pre-attentional priming effects. Fox proposed that presenting the conscious trials either before, or intermixed with, the pre-conscious trials would heighten the participants' awareness that threat was being presented, and thus pre-attentively activate a search for further threat. Fox suggested that this was a confounding factor when trying to determine pre-attentive biases to threat.

Consequently, experiment two was designed in direct consideration of this proposal and presented the pre-conscious dot-probe trials before the conscious trials. However, by doing this, it could have inadvertently caused the participants to get tired or bored with the second part of the dot-probe task that presented the trials for 500ms. Luecken et al. (2004) proposed an alternative explanation for the non-significant findings in experiment two. Their study also found that by presenting the pre-attentive trials before the conscious processing trials disrupted evidence of attentional bias in the conscious task. The authors suggested that consistent with a previous proposal by

Dijksterhuis and Smith (2002), repeated exposure to threatening stimuli at a pre-attentive level of attentional processing, causes affective habituation in the conscious processing trials. Essentially, Dijksterhuis and Smith suggested that being constantly exposed to threat pre-consciously could decrease the intensity of the threat at a conscious level. An important point to note however is that experiment two found evidence of a pre-attentive bias to physical threat being evident without conscious priming, which challenges Fox's argument that automatic processing differences are only apparent in the presence of unmasked trials. However, the designing of experiment two in this way may have inadvertently resulted in the participants getting used to the threat at a pre-conscious level, thus reducing the intensity of the word categories at a conscious level of attentional processing. Further research is needed on this issue, which could include the participants completing the pre-attentive dot-probe task first, followed by a longer break period (e.g., a day or a week) before they attempted the conscious processing task. The inclusion of such a long time-scale between the two tasks should reduce any effects of affective habituation in the conscious processing trials. Also, this experiment needs to be replicated to provide further support for this notion of affective habituation.

The majority of the participants that took part in the studies in this thesis were taken from a student sample experiencing various levels of social anxiety. It was argued in chapter two that the results from the exploration of attentional biases in high socially anxious individuals can be generalised to persons with social phobia (e.g., Turner et al., 1986). Experiment one and experiment three however, indicate that this may not be the case, as during high levels of state anxiety, the high socially anxious displayed an attentional bias towards somatic sensation words, whereas the social phobics attended

towards physical threat. It was argued earlier in this section that this dissimilarity could be attributable to differences in the factors that heightened the state anxiety. Insofar as, the high socially anxious group were given a social evaluative induction, whereas the experimental setting and the ADIS-IV interview may have led to an increase of anxiety in the social phobia sample. However, an alternative explanation mentioned earlier in this section, may be that individuals high in social anxiety and individuals with social phobia possess different processing biases. To explore this further, future research needs to directly compare high socially anxious and social phobia samples, together with low anxious controls. Within the experimental design, all participants need to be exposed to the same social-evaluative induction. This will allow for a determination of where the differences and similarities are between the different groups. To date, there are no published studies that have explored this issue comparing the attentional processing in socially anxious and socially phobic individuals with one another.

A limitation of this programme of work was in the nature of the control groups used in the three experimental chapters. It should be pointed out that although they all reported lower levels of social avoidance and distress equivalent to an average person, they still may not be a homogeneous group. Some of the low anxious participants were likely to be low in levels of anxiety and depression, therefore making them suitable control participants. Other individuals may have been less appropriate because they had other personality traits such as high levels of repression, as assessed by the SDS scale. In all three information-processing studies included in this thesis the low socially anxious groups scored slightly but significantly higher on the SDS scale, than the high social anxiety or generalised social phobia group. High scores on this scale are associated with

a repressed coping style, which has in turn been associated with health problems. For example, there is evidence to show that a repressed coping style is a potential confounding variable in studies looking at cognitive biases in anxiety (e.g., Derakashan & Eysenck, 1997; Mogg et al., 1994). The proposal is that individuals who report low levels of anxiety, but have a high score on the SDS, behave like high anxious individuals in physiological tests. It was not within the scope of this thesis to investigate the heterogeneity of each group of low socially anxious individuals, but it would certainly provide a further avenue of research.

A further issue is that the effects of gender differences were not covered in this thesis. As noted in chapter two, most studies have found a slightly higher rate of social phobia in females than in males (e.g., Magee et al., 1996; Schneier & Johnson, 1992). Nevertheless, there were no hypotheses concerning differences between the genders from the cognitive theories of social phobia (Beck et al., 1985; Clark & Well, 1995; Rapee & Heimberg, 1997). Furthermore, the small cell sizes and the predominance of females in the studies made it difficult to conduct a *post hoc* analysis of the effects of gender. However, as men and women are socialised to possess somewhat different kinds of social competencies, to view themselves in different ways, and motivated to convey somewhat different images of themselves to other people (e.g., Deaux & Major, 1987), gender differences would make an interesting topic for further research.

Another consideration relating to the issue of participant selection was with regards to the generalised social phobia group. Whilst conducting the ADIS-IV interviews it became very clear that although it was easy to ascertain the presence of social phobia, the possibility of secondary or indeed a dual diagnosis of generalised

anxiety disorder were also important factors in at least 75% of the sample. It is unclear how this influenced the findings in experiment three, due to a relatively small sample size (n = 16) not permitting further *post hoc* analysis. Future research is needed looking not only at individuals with social phobia, but also the influences of comorbid or secondary disorders on the nature of dysfunctional attentional processing. Studies could include larger samples of participants and examine several categories of social phobia. They could include not only people experiencing relatively 'pure' generalised social phobia, but also generalised social phobia with generalised anxiety disorder and 'pure' generalised anxiety disorder. Such an approach would provide further insight into the effects of other anxiety disorders on the nature of dysfunctional attentional processing at a conscious and pre-attentive level of processing.

A final point to consider is the choice of stimuli used in the series of dot-probe studies included in this thesis. As detailed in chapter two, at the time of designing these studies there was no published research that had found evidence of an attentional bias towards threatening words in individuals with social anxiety and social phobia (Asmundson & Stein, 1994; Horenstein & Segui, 1997). This was felt to be unusual considering the fact that Stroop studies (e.g., Hope et al., 1990; Mattia et al., 1993) had found quite consistent evidence of an attentional bias towards social threat words. Also, evidence of an attentional bias towards disorder specific threat has been found in individuals suffering from spider phobia (Watts et al., 1986), generalised anxiety disorder (Mogg et al., 1992) and panic disorder (Horenstein & Segui, 1997). Consequently it was felt that a systematic investigation into selective attentional processing to threat words was needed.

Since then, facial stimuli have been used to explore attentional bias towards aversive faces in social anxiety (e.g., Mansell, 1999, Mogg & Bradley, 2002) and social phobia (Chen et al., 2002; Mogg et al., 2004) has been reported. It has been argued that facial stimuli represent a more ecologically valid social threat to social anxiety and social phobia, as angry faces denotes signs of disapproval from others (e.g., Mogg & Bradley, 1998). The viewpoint here is that the pairing of an angry face with a neutral face may actually be presenting a similar type of social threat to a person with high levels of social anxiety. Indeed, a neutral face could be interpreted as a sign of disinterest or boredom, which individuals with social anxiety or social phobia may find equally as threatening as an angry face. A further consideration would be to include pictorial stimuli, as the trait anxiety literature using such stimuli has reliably demonstrated preferential attentional focus towards affective pictures (Mogg et al., 2000; Yiend & Mathews, 2001). Obviously, it would be difficult to design pictures relating to negative evaluation, but it would be interesting for future research to include pictorial stimuli relating to social situational threat (such as an interview setting, person giving a speech or a social gathering), including the display of anxiety symptoms (e.g., the person sweating or blushing), to ascertain how this influences the nature of the attentional bias in social phobia and social anxiety.

Clinical Implications

This section of the thesis looks at the clinical implications from the research presented throughout this programme of work, of which two main areas of interest have arisen. First, a consideration of how the findings from the dot probe studies may help to inform the attentional re-training studies, which is an exciting new avenue of cognitive

research. Second, and in a related vein, the role of affective habituation on reducing the intensity of an attentional bias to threatening information will be presented and discussed.

The exploration of attentional processing biases in anxious populations is motivated by the hope that it will lead to new or better methods for treating and preventing emotional disorders. Mathews (1996) suggested that the notion of attentional processing biases maintaining anxiety (e.g., Beck et al., 1985; Clark & Wells, 1995; Eysenck, 1992; Williams et al., 1988) is validated and upheld by the successful use of cognitive therapy to treat anxiety disorders such as social phobia. A promising new area of cognitive research is that of attention re-training procedures to modify biases in information processing. Interestingly, Mathews and MacLeod (2002) recently demonstrated that the inducement of attentional biases in anxious populations followed by repeated training sessions, might be able to reduce levels of anxiety in these anxious participants. Additionally, work on attention by MacLeod, Rutherford, Campbell, Ebsworthy and Holker (2002) showed that the processing styles typical of individuals with high levels of anxiety could be induced experimentally. This series of experiments involved an extensive training phase, where one group of participants were always exposed to the targets being found in the threat location (threat-trained) and another group always had the target replacing the non-threat location (neutral trained). The training phase was followed by a non-contingent test task. This showed that those who were threat-trained attended to new threat words, and were slowed if the target appeared elsewhere, similar to the dysfunctional attentional processing displayed by highly anxious individuals. Critically, this threat-training procedure did not increase the participants' level of state anxiety, but it did make them experience heightened level of stress in a later

unsolvable anagram task. In a related vein, Amir, Beard, Klump, Elias, Brady and Hewitt (2004) have recently presented evidence suggesting that the attentional bias in social phobia can be modified. They trained treatment seeking socially phobic individuals using a modified version of the probe detection paradigm with aversive and positive faces as stimuli. The modification programme directed their attention to positive stimuli, which was achieved by the dot-probe replacing the happy face on 80% of the trials. The dot-probe task was effective in changing biased attention away from threat, and also reduced social anxiety symptoms in the patients.

So how do the results from this series of dot-probe studies aid in the advancement of this new and exciting area of research? First, experiment one showed that in the social-evaluation condition, those high in social anxiety attended towards somatic sensations (e.g., blushing, nervous, tense). Indeed, all three theoretical perspectives (Beck et al., 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997) and research (e.g., Mansell et al., 2003) have proposed that a heightened awareness of physiological sensations relating to anxiety symptoms is a characteristic of social anxiety. Thus, the proposal here is to apply the aforementioned training technique that incorporates words relating to somatic sensations and to also include a similar social-evaluation instruction as in experiment one, in order to heighten attentional awareness to the displaying of anxiety symptoms. Once the participants have completed the training phase, they would then actually give a speech and rate their levels of anxiety, together with an independent rater's assessment, to see if they felt and appeared less anxious having completed the training phase. Also, as attentional bias to physical threat appears to be a theme that has emerged in experiments two and three and published research (e.g., Amir et al., 1996;

Musa et al., 2003), this word group could also be included into a similar training programme. Furthermore, although an attentional bias to negative evaluation words was only evident in experiment one, the fairly strong research evidence (e.g., Hope et al., 1990; Musa et al., 2003), together with the theoretical proposals that fear of negative evaluation is a central construct in social phobia (Beck et al., 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997), provide support for the inclusion of this word group in such an attentional training procedure.

The possibility that the experimental design in experiment two may have led to affective habituation of the threat stimuli in the participants may have possible clinical implications similar to the attentional training notion presented above. Recently, Dijkersterhuis and Smith (2002) argued that repeated exposure to threat could decrease the intensity of reaction in the individual, thus reducing attentional biasing effects. They termed this phenomenon 'affective habituation'. In support, a study by Luecken et al. (2004) found this to be the case when they presented the same stimuli pre-consciously and then consciously to individuals using the dot-probe task. Their results indicated that the evidence of attentional biases in trait anxious individuals was disrupted in the conscious processing trials. The authors argued that the lack of differences between the high and low trait anxious groups in the conscious processing trials was because of affective habituation to the threat words in the masked trials. In view of this, it seems fair to speculate that the findings from the unmasked trials in experiment two were influenced in a similar way. This was mainly due to the possibility that even though different threat words were presented in each level of processing, they were still the same categories of threat. Furthermore, the same stimuli were presented three times within each trial, thus

exposing the participant to the same categories of threat six times in total. Taken together, it seems fair to suggest that the participants became less reactive to the intensity of the threat due to affective habituation effects, which of course would be extremely useful in reducing selective attention to threat in clinical populations.

Leucken et al. (2004) proposed that if the repeated pre-attentive exposure to threat does disrupt dysfunctional attentional processing patterns at a more conscious level of processing, then the clinical implications were that the inducement of affective habituation in clinically anxious individuals may help to reduce dysfunctional threat processing. Furthermore, as selective attention to threat is considered to be influential in the development and maintenance of a clinical anxiety disorder (e.g., Eysenck, 2004; Mathews, 1994), such techniques to reduce the threat related attentional focus would be of great therapeutic benefit. Further research is needed to systematically investigate the influence of affective habituation on trait anxious or socially anxious analogue individuals and clinical populations with anxiety disorders. The aim would be to ascertain whether exposing the individual repeatedly to threatening stimuli pre-consciously, does indeed mediate dysfunctional attentional biases at a conscious level of processing. This could be achieved by using a visual dot-probe task designed so that in the pre-attentive trials the dot always replaces the threat word. The proposal here is that this would pre-attentively heighten the attentional focus to threat. Thus, if affective habituation is effective, the following set of conscious processing trials can ascertain whether there is an attentional bias away from the threat, or whether there are no attentional bias effects whatsoever, or whether this technique still results in the highly anxious participants selectively attending to the threat stimulus. The use of psycho-

physiological measures would also be a complimentary adjunct, as the reduction of physiological reactions (e.g., heart-rate and skin conductance responses) would be a further indicator that the person is less aroused by the conscious presentation of threat cues following the continual pre-attentive exposure to threat.

Final Conclusions

This thesis has attempted to explore the interaction between social anxiety or social phobia, state anxiety, and the kinds of threatening word stimuli that elicit dysfunctional attentional biases. It has highlighted the importance of the presence of a social-evaluative situation on the nature of the attentional bias in social anxiety at a pre-attentive and conscious level of attentional focus. More specifically, experiments one and two have identified not only differences between high and low socially anxious individuals in the nature of their attentional focus to different categories of threat words, but that this is also as a function of current levels of state anxiety. Experiments two and three have also indicated that both the socially anxious at a pre-attentive level and the socially phobic at a conscious level of attentional processing, attend to physical threat cues. This programme of work has also shown the importance of selecting the most effective self-report questionnaire to identify actual attentional bias effects in socially anxious individuals. The findings from study four suggested that although the FNE scale is the most popularly used questionnaire in social anxiety research, the SAD scale may actually be a more sensitive measure in the determination of selective attentional processing.

Finally, the implications for the theoretical perspectives of social phobia (Beck et al., 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997) that can be drawn from the

dot-probe studies presented in this thesis were partially supportive of an internal processing style in social anxiety. Indeed, the results from the first experiment provided evidence of an attentional bias towards negative evaluation (non-evaluative condition) and somatic sensation (social-evaluative condition) being associated with social anxiety. Additionally, all three dot-probe studies did not find any selective attentional effects with the social situation words, which are considered to be an external threat cue to socially anxious and socially phobic individual. However, there was a notable lack of any attentional bias effects towards the internally cued social-threat groups (somatic sensations and negative evaluation words) in experiments two and three, which was in direct contrast to not only the social phobia theories mentioned above, but also the cognitive perspectives of anxiety (e.g., Eysenck, 1992; Williams et al., 1988). Essentially, all these theoretical notions predicted an attentional bias towards disorder-specific threat cues in anxious individuals, and this was not consistently found in the dot-probe studies. Also, the attentional bias towards physical threat cues found at a pre-attentive level in social anxiety and a conscious level in social phobia was not predicted by any of these theories. Notably, this is with the exception of Eysenck (1992) who predicted an attentional bias towards general and socially threatening stimuli. Overall, this thesis has shown that theoretical perspectives, together with future research, need to consider several issues. These include the influence of additional anxiety disorders, levels of state anxiety, and the actual cause of the elevated state anxiety, in the development and maintenance of dysfunctional cognitive processing in the complex and multifaceted disorder of social anxiety social phobia.

References

Allport, D.A (1980). Attention and performance. In G.Claxtom (ed.), *Cognitive Psychology: New directions.* London: Routledge & Kegan Paul.

American Psychiatric Association. (1980). *Diagnostic and Statistical Manual of Mental Disorders* (Vol. 3). Washington, D. C.: American Psychiatric Association.

American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders* (Vol. 4). Washington, DC.

Amir, N., Beard, C., Klumpp, H., Elias, J., Brady, R., & Hewett, J. (2004). Modification of attentional bias in social phobia: change in attention, generalizability across paradigms, and change in symptoms. Paper presented at the *European Association for Behavioural and Cognitive Therapies*, University of Manchester.

Amir, N., Freshman, M., & Foa, E. (2002). Enhanced Stroop interference for threat in social phobia. *Journal of Anxiety Disorders, 16*, 1-9.

Amir, N., McNally, R. J., Riemann, B. C., Burns, J., Lorenz, M., & Mullen, J. (1996). Suppression of the emotional Stroop effect by increased anxiety in patients with social phobia. *Behaviour Research and Therapy, 34*(11/12), 945-948.

Anderson, S. M., Speilman, L. A., & Bargh, J. A. (1992). Future-event schemas and certainty about the future: automatically in depressives' future-event predictions. *Journal of Personality and Social Psychology, 54*, 925-939.

Asmundson, G. J. G., & Stein, M. B. (1994). Selective processing of social threat in patients with generalized social phobia: evaluation using a dot-probe paradigm. *Journal of Anxiety Disorders, 8*(2), 107-117.

Bargh, J. A., & Tota, M. E. (1988). Context-dependent automatic processing in depression: accessibility of negative constructs with regard to self but not others. *Journal of Personality and Social Psychology, 54*, 925-939.

Bartlett, M. S. (1954). A note on the multiplying factors for various chi square approximations. *Journal of the Royal Statistical Society, 16*(Series B), 296-298.

Beck, A. T. (1967). *Depression: clinical, experimental and theoretical aspects.* New York: Hoeber.

Beck, A. T. (1976). *Cognitive therapy and the emotional disorders.* Madison: International Universities Press.

Beck, A. T. (1995). Cognitive therapy: past, present and future. In M. J. Mahoney (Ed.), *Cognitive and constructive psychotherapies: theory, research and practice.* New York: Springer.

Beck, A. T., & Clark, D. M. (1988). Anxiety and depression: an information processing perspective. *Anxiety Research, 1*, 23-36.

Beck, A. T., Emery, G., & Greenberg, R. L. (1985). *Anxiety Disorders and phobias: a cognitive perspective.* New York: Basic Books.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck Depression Inventory - Second Edition Manual* (2nd ed.). San Antonio: The Psychological Corporation.

Beck, A. T., Ward, C. H., Mendelsohn, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561-571.

Becker, E. S., Rinck, M., Margraf, J., & Roth, W. T. (2001). The emotional Stroop effect in anxiety disorders: general emotionality or disorder specificity? *Journal of Anxiety Disorders, 15*, 147-159.

Becker, E. S., Roth, W. T., Andrich, M., & Margraf, J. (1999). Explicit memory in anxiety disorders. *Journal of Abnormal Psychology, 108*(1), 153-163.

Bedford, A. (1997). On Clark-Watson's tripartite model of anxiety and depression. *Psychological Reports, 80*, 125-126.

Blaney, P. H. (1986). Affect and memory: a review. *Psychological Bulletin, 99*, 229-246.

Bogels, S. M., van Oosten, A., Muris, P., & Smulders, D. (2001). Familial correlates of social anxiety in children and adolescents. *Behaviour Research and Therapy, 39*, 273-287.

Bower, G. H. (1981). Mood and memory. *American Psychologist, 36*, 129-148.

Bower, G. H. (1987). Commentary on mood and memory. *Behaviour Research and Therapy, 25*, 443-455.

Bower, G. H., & Cohen, P. R. (1982). Emotional influences in memory and thinking: data and theory. In S. T. Fiske & M. Clark (Eds.), *Affect and cognition.* Hillsdale, N.J.: Lawrence Erlbaum.

Bradley, B., & Mathews, A. (1983). Negative self-schema in clinical depression. *Journal of Clinical Psychology, 22*, 173-182.

Bradley, B. P., Mogg, K., Falla, S. J., & Hamilton, L. R. (1998). Attentional bias for threatening facial expressions in anxiety: manipulation of stimulus duration. *Cognition and Emotion, 12*(6), 737+753.

Bradley, B. P., Mogg, K., & Lee, S. C. (1997). Attentional biases for negative information in induced and naturally occurring dysphoria. *Behaviour Research and Therapy, 35*(10), 911-927.

Bradley, B. P., Mogg, K., & Millar, N. (2000). Covert and overt orienting of attention to emotional faces in anxiety. *Cognition and Emotion, 14*(6), 789-909.

Bradley, B. P., Mogg, K., Millar, N., Bonham-Carter, C., Fergusson, E., Jenkins, J., & Parr, M. (1997). Attentional biases for emotional faces. *Cognition and Emotion, 11*(1), 25-42.

Bradley, B. P., Mogg, K., Millar, N., & White, J. (1995). Selective processing of negative information: effects of clinical anxiety, concurrent depression, and awareness. *Journal of Abnormal Psychology, 104*(3), 532-536.

Bradley, B. P., Mogg, K., White, J., Groom, C., & de Bono, J. (1999). Attentional bias for emotional faces in generalised anxiety disorder. *British Journal of Clinical Psychology, 38*(3), 267-278.

Bradley, B. P., Mogg, K., & Williams, R. (1994). Implicit and explicit memory for emotional information in non-clinical subjects. *Behaviour Research and Therapy, 32*, 65-78.

Breck, B. E., & Smith, S. H. (1983). Selective recall of self-descriptive traits by socially anxious and nonanxious females. *Social Behaviour and Personality, 11*, 71-76.

Broadbent, D.E. (1958). *Perception and communication.* Oxford:Pergamon.

Broadbent, D., & Broadbent, M. (1988). Anxiety and attentional bias: state and trait. *Cognition and Emotion, 2*(3), 165-183.

Brown, T. A., & Barlow, D. H. (1992). Comorbidity among anxiety disorders: implications for treatment and DSM-IV. *Journal of Consulting and Clinical Psychology, 60*, 835-844.

Brown, T. A., DiNardo, P. A., & Barlow, D. H. (1994). *Anxiety Disorders Interview Schedule for DSM-IV.* Albany, NY: Graywind Publications Incorporated.

Butler, G. (1985). Exposure as a treatment for social phobia: some instructive difficulties. *Behaviour Research and Therapy, 23*, 651-657.

Carver, C. S., & Scheier, M. F. (1988). A control-process perspective on anxiety. *Anxiety Research, 1*, 17-22.

Catell, R. B. (1966). The scree test for number of factors. *Multivariate Behavioral Research, 1*, 245-276.

Chapman, T. F., Mannuzza, S., & Fyer, A. J. (1995). Epidemiology and family studies of social phobia. In R. G. Heimberg & M. Liebowitz & D. Hope & F. Schneier (Eds.), *Social phobia: diagnosis, assessment and treatment* (pp. 21-39). New York: Guildford.

Cheesman, J., & Merikle, P. M. (1986). Distinguishing conscious from unconscious perceptual processes. *Canadian Journal of Psychology, 40*, 343-367.

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

Cho, Y., Smits, J. A. J., & Telch, M. J. (2004). The Speech Anxiety Thoughts Inventory: scale development and preliminary psychometric data. *Behaviour Research and Therapy, 42*, 13-25.

Claeys, W. (1989). Social anxiety, evaluative threat and incidental recall of trait words. *Anxiety Research, 2*, 27-43.

Clark, D. M. (1986). A cognitive approach to panic. *Behaviour Research and Therapy, 24*(4), 461-470.

Clark, D. M. (1999). Anxiety disorders: why they persist and how to treat them. *Behaviour Research and Therapy, 37*, S5-S27.

Clark, D. M., & Wells, A. (1995). A cognitive model of social phobia. In R. G. Heimberg & M. Liebowitz & D. Hope & F. Schneier (Eds.), *Social phobia: diagnosis, assessment and treatment* (pp. 69-93). New York: Guildford.

Cox, B. J., & Swinson, R. P. (1995). Assessment and measurement. In M. B. Stein (Ed.), *Social phobia: clinical and research perspectives* (pp. 261-291). Washington DC: American Psychiatric Press Inc.

Creed, A. T., & Funder, D. C. (1998). Social anxiety: from the inside and outside. *Personality and Individual Differences, 25*, 19-33.

Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24*, 349-354.

Dalgleish, T. (1994). The relationship between anxiety and memory biases for material that has been selectively processed in a prior task. *Behaviour Research and Therapy, 32*, 227-231.

Dalgleish, T., & Watts, F. N. (1990). Biases of attention and memory in disorders of anxiety and depression. *Clinical Psychology Review, 10*, 589-604.

Deaux, K., & Major, B. (1987). Putting gender into context: an interactive model of gender related behaviour. *Psychological Review, 94, 369-389.*

Denny, E. B., & Hunt, R. R. (1992). Affective valence and memory in depression: dissociation of recall and fragment completion. *Journal of Abnormal Psychology, 101,* 575-580.

Derakshan, N., & Eysenck, M. W. (1997). Interpretive biases for one's own behavior and physiology in high-trait-anxious individuals and repressors. *73, 4*(816-825).

Deutsch, J.A., & Deutsch, D. (1963). Attention: Some theoretical considerations. *Psychological Review, 70,* 80-90.

Dijksterhuis, A. P., & Smith, P. K. (2002). Affective habituation: subliminal exposure to extreme stimuli decreases their extremity. *Emotion, 2*(3), 203-214.

Egloff, B., & Hock, M. (2001). Interactive effects of state anxiety and trait anxiety on emotional Stroop interference. *Personality and Individual Differences, 31*(6), 875-882.

Everett, J. E. (1983). Factor comparability as a means of determining the number of factors and their rotation. *Multivariate Behavioral Research, 18,* 197-218.

Eysenck, M. (1992). *Anxiety the cognitive perspective.* London: Lawrence Erlbaum Associates Ltd.

Eysenck, M. (1997). *Anxiety and cognition: a unified theory.* Hove: Psychology Press Ltd.

Eysenck, M. W. (2004). *Anxiety, stress, and coping: the past 25 years.* Paper presented at the *25th Stress and anxiety research society conference*, Amsterdam, The Netherlands. Book of abstracts.

Ysenck, M.W., & Keane, M.T. (1996). *Cognitive psychology a student's handbook.*. Hove, UK: Psychology Press.

Fenigstein, A., Scheier, M. F., & Buss, A. H. (1975). Public and private self-consciousness: assessment and theory. *Journal of Consulting and Clinical Psychology, 43*(4), 522-527.

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment, 7*(3), 286-299.

Foa, E., B., Freske, U., Murdock, T. B., Kozak, M. J., & McCarthy, P. R. (1991). Processing of threat related information in rape victims. *Journal of Abnormal Psychology, 100*, 156-162.

Foa, E. G., & Kozak, M. J. (1986). Emotional processing and fear: exposure to corrective information. *Psychological Bulletin, 99*, 20-35.

Fox, E. (1993). Attentional bias in anxiety: selective or not? *Behaviour Research and Therapy, 31*(5), 487-493.

Fox, E. (1996). Selective processing of threatening words in anxiety: the role of awareness. *Cognition and Emotion, 10*(5), 449-480.

Fox, E., Russo, R., Bowles, R., & Dutton, K. (2001). Do threatening stimuli draw or hold attention in subclinical anxiety? *Journal of Experimental Psychology: General, 130*(4), 681-700.

Fox, E., Russo, R., & Eltiti, S. (2004). *The role of anxiety in determining the detection and disengagement of attention from angry facial expressions.* Paper presented at the *European Association for Behavioural and Cognitive Therapies*, University of Manchester.

Furmark, T. (2002). Social Phobia: overview of community surveys. *Acta Psychiatry, 105*, 84-93.

Gilligan, S. G., & Bower, G. H. (1984). Cognitive consequences of emotional arousal. In C. Izard & J. Kagan & R. Zajonc (Eds.), *Emotions, cognitions and behaviour.* New York: Cambridge University Press.

Goddard, L., Dritschel, B., & Burton, A. (1996). The role of autobiographical memory on social problem-solving and depression. *Journal of Abnormal Psychology, 105*, 606-616.

Graf, P., & Mandler, G. (1984). Activation makes words more accessible, but not necessarily more retrievable. *Journal of Verbal Learning and Verbal Behaviour, 23*, 553-568.

Harrison, L. K., & Turpin, G. (2003). Implicit memory bias and trait anxiety: a psychophysiological analysis. *Biological Psychiatry, 62*, 97-114.

Hartman, L. M. (1983). A metacognitive model of social anxiety: implications for treatment. *Clinical Psychological Review, 3*, 435-456.

Harvey, A. G., Clark, D. M., Ehlers, A., & Rapee, R. M. (2000). Social anxiety and self-impression: cognitive preparation enhances the beneficial effects of video feedback following a stressful social task. *Behaviour Research and Therapy, 38*, 1183-1192.

Hedlund, S., & Rude, S. S. (1995). Evidence of latent depressive schemas in formerly depressed individuals. *Journal of Abnormal Psychology, 104*(3), 517-525.

Heimberg, R. G. (1994). Cognitive assessment strategies and the measurement of outcome of treatment for social phobia. *Behaviour Research and Therapy, 32*(2), 269-280.

Heimberg, R. G., Hope, D. A., Rapee, R. M., & Bruch, M. A. (1988). The validity of the social avoidance and distress scale and the fear of negative evaluation scale with social phobic patients. *Behaviour Research and Therapy, 26*(5), 407-410.

Heimberg, R. G., Stein, M. B., Hiripi, E., & Kessler, R. C. (2000). Trends in the prevalence of social phobia in the United States: a synthetic cohort analysis of changes over four decades. *European Psychiatry, 15*, 29-37.

Heinrichs, N., & Hofmann, S. G. (2001). Information processing in social phobia: a critical review. *Clinical Psychology Review, 21*(5), 751-770.

Herbert, J. D., Rheingold, A. A., & Brandsma, L. L. (2001). Assessment of social anxiety and social phobia. In S. G. Hofmann & P. M. Dibartolo (Eds.), *From social anxiety to social phobia: multiple perspectives* (pp. 20-45). Needham Heights, USA: Allyn & Bacon.

Holender, D. (1986). Semantic activation without conscious identification in dichotic listening, parafoveal vision, and visual masking: a survey and appraisal. *The Behavioral and Brain Sciences, 9*, 1-66.

Hope, D. A., Rapee, R. M., Heimberg, R. G., & Dombeck, M. J. (1990). Representations of the self in social phobia: vulnerability to social threat. *Cognitive Therapy and Research, 14*(2), 177-189.

Horenstein, M., & Segui, J. (1997). Chronometrics of attentional processes in anxiety disorders. *Psychopathology, 30*, 25-35.

Howell, D. C. (1997). *Fundamental statistics for the behavioral sciences* (2nd ed.). Boston: PWS-Kent.

Huppert, J. D., Franklin, M. E., Foa, E. B., & Davidson, J. R. T. (2003). Study refusal and exclusion from a randomized treatment study of generalized social phobia. *Journal of Anxiety Disorders, 17*, 683-693.

Johanson, J., & Öst, L. G. (1982). Perception of autonomic reactions and actual heart rate in phobic patients. *Journal of Behavioral Assessment, 4*, 133-143.

Johnson-Laird, P. N., Herrmann, D. J., & Chaffin, R. (1984). Only connections: a critique of semantic networks. *Psychological Bulletin, 96*, 292-315.

Kaiser, H. (1970). A second generation Little Jiffy. *Psychometrika, 35*, 401-415.

Kaiser, H. (1974). An index of factorial simplicity. *Psychometrika, 39*, 31-36.

Kasper, S. (1998). Social phobia: the nature of the disorder. *Journal of Affective Disorders, 50*, S3-S9.

Katzelnick, D. J., & Greist, J. H. (2001). Social anxiety disorder: an unrecognized problem in primary care. *Journal of Clinical Psychiatry, 62*(1), 11-16.

Kemp-Wheeler, S. M., & Hill, A. B. (1988). Semantic priming without awareness: some methodological considerations and replications. *The Quarterly Journal of Experimental Psychology, 40(A)*(5), 671-692.

Kessler, R. C., Stang, P., Wittchen, H. U., Stein, M. B., & Walters, E. E. (1999). Lifetime co-morbidities between social phobia and mood disorders in the US National Comorbidity Survey. *Psychological Medicine, 29*(3), 555-567.

Kessler, R. C., Stein, M. B., & Berglund, P. (1998). Social phobia subtypes in the national comorbidity survey. *The American Journal of Psychiatry, 155*(5), 613-619.

Klerman, G. L. (1985). Diagnosis of psychiatric disorders in epidemiological field studies. *Archives of General Psychiatry, 42*, 723-724.

Kucera, H., & Francis, W. N. (1967). *Computational analysis of present-day American English*. Providence: Brown University Press.

Lader, M. (1998). The clinical relevance of treating social phobia. *Journal of Affective Disorders, 50*, S29-S34.

Lader, M., H., & Marks, I. M. (1973). *Clinical anxiety*. New York: Grune and Stratton.

Lazarus, R. S. (1982). Thoughts on the relations between emotion and cognition. *American Psychologist, 37*, 1009-1010.

Leary, M. R. (1983a). A brief version of the fear of negative evaluation scale. *Personality and Social Psychology Bulletin, 9*(3), 371-375.

Leary, M. R. (1983b). *Understanding social anxiety*. Beverly Hills, CA: Sage.

Leary, M. R., & Kowalski, R. M. (1995). The self-presentation model of social phobia. In R. G. Heimberg & M. R. Liebowitz & D. A. Hope & F. R. Schneier (Eds.), *Social phobia: diagnosis, assessment, and treatment* (pp. 94-112). New York: Guildford Press.

Lecrubier, Y., Wittchen, H. U., Faravelli, C., Bobes, J., Patel, A., & Knapp, M. (2000). A European perspective on social anxiety disorder. *European Psychiatry, 15*, 5-16.

Liebowitz, M. R., Gorman, J. M., Fyer, A. J., & Klein, D. F. (1985). Social phobia: review of a neglected anxiety disorder. *Archives of General Psychiatry, 42*, 729-736.

Luecken, L. J., Tartaro, J., & Appelhans, B. (2004). Strategic coping responses and attentional biases. *Cognitive Therapy and Research, 28*(1), 23-37.

Lundh, L.-G., & Öst, L.-G. (1996). Stroop interference, self-focus and perfectionism in social phobics. *Personality and Individual Differences, 20*(6), 725-731..

Lydiard, R. B. (2001). Social anxiety disorder: co-morbidity and its implications. *Journal of Clinical Psychiatry, 62*(1), 17-24.

MacLeod, C. (1991a). Clinical anxiety and the selective encoding of threatening information. *International Review of Psychiatry, 3*, 279-292.

MacLeod, C. M. (1991b). Half a century of research on the Stroop effect: an integrative review. *Psychological Bulletin, 109*(2), 163-203.

MacLeod, C., Ebsworthy, G., & Rutherford, E. M. (1998). *Selective attention and emotional vulnerability: accessing the causal basis of their association through the experimental induction of attentional bias.* Unpublished manuscript.

MacLeod, C., & Hagan, R. (1992). Individual differences in the selective processing of threatening information, and emotional responses to a stressful life event. *Behaviour Research and Therapy, 30*(2), 151-161.

MacLeod, C., & Mathews, A. (1988). Anxiety and the allocation of attention to threat. *Quarterly Journal of Experimental Psychology, 40*, 653-670.

MacLeod, C., & Mathews, A. (1991). Cognitive-experimental approaches to the emotional disorders. In P. R. Martin (Ed.), *Handbook of behaviour therapy and psychological science: an integrative approach.* Oxford: Pergamon.

MacLeod, C., Mathews, A., & Tata, P. (1986). Attentional bias in emotional disorders. *Journal of Abnormal Psychology, 95*(1), 15-20.

MacLeod, C., & Rutherford, E. M. (1992). Anxiety and the selective processing of emotional information: mediating roles of awareness, trait and state variables, and

personal relevance of stimulus materials. *Behaviour Research and Therapy, 30*(5), 479-491.

MacLeod, C., Rutherford, E. M., Campbell, L., Ebsworthy, G., & Holker, L. (2002). Selective attention and emotional vulnerability: assessing the causal basis of their association through the experimental induction of attentional bias. *Journal of Abnormal Psychology, 111*(1), 107-123.

Magee, W. J., Eaton, W. W., Wittchen, H.-U., McGonagle, K. A., & Kessler, R. C. (1996). Agoraphobia, simple phobia and social phobia in the National Comorbidity Survey. *Archives of General Psychiatry, 53*(2), 159-168.

Maidenberg, E., Chen, E., Craske, M., Bohn, P., & Bystritsky, A. (1996). Specificity of attentional bias in panic disorder and social phobia. *Journal of Anxiety Disorders, 10*(6), 529-541.

Mansell, W., & Clark, D. M. (1999). How do I appear to others? Social anxiety and processing of the observable self. *Behaviour Research and Therapy, 37*, 419-434.

Mansell, W., Clark, D. M., & Ehlers, A. (2003). Internal versus external attention in social anxiety: an investigation using a novel paradigm. *Behaviour Research and Therapy*(41), 555-572.

Mansell, W., Clark, D. M., Ehlers, A., & Chen, Y.-P. (1999). Social anxiety and attention away from emotional faces. *Cognition and Emotion, 13*(6), 673-690.

Mansell, W., Ehlers, A., Clark, D. M., & Chen, Y.-P. (2002). Attention to positive and negative social-evaluative words: investigating the effects of social anxiety, trait anxiety and social threat. *Anxiety, Stress and Coping, 15*(1), 19-29.

Marks, I. M., & Gelder, M. G. (1969). Different ages of onset in varieties of phobia. *American Journal Of Psychiatry, 123*, 218-221.

Mathews, A. (1993). Biases in processing emotional information. *The Psychologist, 6*, 493-499.

Mathews, A. (1996). Information-processing biases in emotional disorders. In D. M. Clark & C. G. Fairburn (Eds.), *Science and practice of cognitive behaviour therapy.* New York: Oxford University Press.

Mathews, A. (2004). On the malleability of emotional encoding. *Behaviour Research and Therapy, 42*, 1019-1036.

Mathews, A., Fox, E., Yiend, J., & Calder, A. (2003). The face of fear: effects of eye gaze and emotion on visual attention. *Visual Cognition, 10*(7), 823-835.

Mathews, A., & Mackintosh, B. (1998). A cognitive model of selective processing in anxiety. *Cognitive Therapy and Research, 22*(6), 539-560.

Mathews, A., & MacLeod, C. (1985). Selective processing of threat cues in anxiety states. *Behaviour Research and Therapy, 23*(5), 563-569.

Mathews, A., & MacLeod, C. (2002). Induced processing biases have causal effects on anxiety. *Cognition and Emotion, 16*(3), 331-354.

Mathews, A., Ridgeway, V., & Williamson, D. A. (1996). Evidence for attention to threatening stimuli in depression. *Behaviour Research and Therapy, 34*(9), 695-705.

Mathews, A. M., Mogg, K., May, J., & Eysenck, M. W. (1989). Memory bias in anxiety. *Journal of Abnormal Psychology, 98*, 236-240.

Matt, G. E., Vacquez, C., & Campbell, W. K. (1992). Mood-congruent recall of affectively toned stimuli: a meta-analytic review. *Clinical Psychological Review, 12*, 227-255.

Mattia, J. I., Heimberg, R. G., & Hope, D. A. (1993). The revised Stroop color-naming task in social phobics. *Behaviour Research and Therapy, 31*(3), 305-313.

Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy, 36*, 455-470.

Mayo, P. R. (1989). A further study of the personality-congruent recall effect. *Personality and Individual Differences, 10*, 247-252.

McNair, D. M., Lorr, M., & Droppleman, L. F. (1981). *Manual for the profile of mood states*. San Diego, CA: Educational and Industrial Testing Service.

McNally, R. J., Reiman, B. C., & Kim, E. (1990). Selective processing of threat cues in panic disorder. *Behaviour Research and Therapy, 28*, 407-412.

McNeil, D. W., Reis, B. J., Taylor, L. J., Boone, M. L., Carter, L. E., Turk, C. L., & Lewin, M. R. (1995). Comparison of social phobia subtypes using Stroop tests. *Journal of Anxiety Disorders, 9*(1), 47-57.

Merikle, P. M., & Reingold, E. M. (1990). Recognition and lexical decision without detection: unconscious perception? *Journal of Experimental Psychology: Human Perception and Performance, 16*, 574-583.

Mineka, S., & Nugent, K. (1995). Mood-congruent memory biases in anxiety and depression. In D. Schacter (Ed.), *Memory Distortion: how minds, brains and society reconstruct the past*. Cambridge, M. A.: Harvard University Press.

Mogg, K., & Bradley, B. P. (1998). A cognitive-motivational analysis of anxiety. *Behaviour Research and Therapy, 36*, 809-848.

Mogg, K., & Bradley, B. P. (1999). Orienting of attention to threatening facial expressions presented under conditions of restricted awareness. *Cognition and Emotion, 13*(6), 713-740.

Mogg, K., & Bradley, B. P. (2002). Selective orienting of attention to masked threat faces in social anxiety. *Behaviour Research and Therapy, 40*(12), 1403-1414.

Mogg, K., & Bradley, B. P. (2004). A cognitive-motivational perspective on the processing of threat information in anxiety. In J. Yiend (Ed.), *Cognition, Emotionn and Psychopathology*. Cambridge: Cambridge University Press.

Mogg, K., Bradley, B. P., de Bono, J., & Painter, M. (1997). Time course of attentional bias for threat information in non-clinical anxiety. *Behaviour Research and Therapy, 35*(4), 297-303.

Mogg, K., Bradley, B., & Garner, M. (2004). *Cognitive biases in anxiety: some unresolved questions*. Paper presented at the *European Association for Behavioural and Cognitive Therapies*, University of Manchester.

Mogg, K., Bradley, B. P., & Hallowell, N. (1994). Attentional bias to threat: roles of trait anxiety, stressful events, and awareness. *The Quarterly Journal of Experimental Psychology, 47a*(4), 841-864.

Mogg, K., Bradley, B. P., Miles, F., & Dixon, R. (2004). Time course of attentional bias for threat scenes: testing the vigilance -avoidance hypothesis. *Cognition and Emotion, 18*(5), 689-700.

Mogg, K., Bradley, B. P., Millar, N., & White, J. (1995). A follow-up study of cognitive bias in generalized anxiety disorder. *Behaviour Research and Therapy, 33*(8), 927-935.

Mogg, K., Bradley, B. P., Miller, T., Potts, H., Glenwright, J., & Kentish, J. (1994). Interpretation of homophones related to threat - anxiety or response bias effects. *Cognitive Therapy and Research, 18*(5), 461-477.

Mogg, K., Bradley, B. P., & Williams, R. (1995). Attentional bias in anxiety and depression: the role of awareness. *British Journal of Clinical Psychology, 34*, 17-36.

Mogg, K., Bradley, B. P., Williams, R., & Mathews, A. (1993). Subliminal processing of emotional information in anxiety and depression. *Journal of Abnormal Psychology, 102*(2), 304-311.

Mogg, K., Gardiner, J. M., Starron, A., & Golombok, S. (1992). Recollective experience and recognition memory for threat in clinical anxiety states. *Bulletin Psychological Society, 30*, 109-112.

Mogg, K., Kentish, J., & Bradley, B. P. (1993). Effects of anxiety and awareness on colour-identification latencies for emotional words. *Behaviour Research and Therapy, 31*(6), 559-567.

Mogg, K., & Marsden, B. (1990). Processing of emotional information in anxious subjects. *British Journal of Clinical Psychology, 29*, 227-229.

Mogg, K., & Mathews, A. (1990). Is there a self-referent mood congruent recall bias in anxiety? *Behaviour Research and Therapy, 28*, 91-92.

Mogg, K., Mathews, A., Bird, C., & MacGregor-Morris, R. (1990). Effects of stress and anxiety on the processing of threat stimuli. *Journal of Personality and Social Psychology, 59*, 1230-1237.

Mogg, K., Mathews, A. M., & Eysenck, M. W. (1992). Attentional bias to threat in clinical anxiety states. *Cognition and Emotion, 6*, 149-159.

Mogg, K., Mathews, A., & Weinman, J. (1987). Memory bias in clinical anxiety. *Journal of Abnormal Psychology, 96*, 94-98.

Mogg, K., Mathews, A., & Weinman, J. (1989). Selective processing of threat cues in anxiety states: a replication. *Behaviour Research and Therapy, 27*(4), 317-323.

Mogg, K., McNamara, J., Powys, M., Rawlinson, H., Seiffer, A., & Bradley, B. P. (2000). Selective attention to threat: a test of two cognitive models of anxiety. *Cognition and Emotion, 14*(3), 375-399.

Mogg, K., Philippot, P., & Bradley, B. P. (2004). Selective attention to angry faces in clinical social phobia. *Journal of Abnormal Psychology, 113*(1), 160-165.

Mullins, D. T., & Duke, M. P. (2004). Effects of social anxiety on nonverbal accuracy and response time 1: facial expressions. *Journal of Nonverbal Behavior, 28*(1), 3-33.

Musa, C. Z., & Lépine, J. P. (2000). Cognitive aspects of social phobia: a review of theories and experimental research. *European Psychiatry, 15*, 59-66.

Musa, C. Z., Lépine, J. P., Clark, D. M., Mansell, W., & Ehlers, A. (2003). Selective attention in social phobia and the moderating effect of a concurrent depressive disorder. *Behaviour Research and Therapy, 41*(9), 1043-1054.

Niekerk, J. K., Moeller, A. T., & Nortje, C. (1999). Self-schema in social phobia and panic disorder. *Psychological Reports, 84*, 843-854.

Nugent, K., & Mineka, S. (1994). The effect of high and low trait anxiety on implicit and explicit memory tasks. *Cognition and Emotion, 8*, 147-163.

Oatley, K., & Johnson-Laird, P. (1987). Towards a cognitive theory of emotions. *Cognition and Emotion, 1*, 29-50.

Oei, T., P.S., Kenna, D., & Evans, L. (1991). The reliability, validity and utility of the SAD and FNE scales for anxiety disorder patients. *Personality and Individual Differences, 12*(2), 111-116.

Öhman, A. (1996). Preferential preattentive processing of threat in anxiety: Preparedness and attentional biases. In R. R.M. (Ed.), *Current controversies in the anxiety disorders* (pp. 253-289). New York: The Guildford Press.

Paul, G. L. (1966). *Insight vs. desensitisation in psychotherapy. An experiment in anxiety reduction*. Stanford, CA: Stanford University Press.

Pishyar, R., Harris, L. M., & Menzies, R. G. (2004). Attentional bias for words and faces in social anxiety. *Anxiety, Stress and Coping, 17*(1), 23-36.

Posner, M. I., Inhoff, A. W., Friedrich, F. J., & Cohen, A. (1987). Isolating attentional systems: cognitive-anatomical analysis. *Psychobiology, 15*, 107-121.

Posner, M. I., & Petersen, S. E. (1990). The attention system of the human brain. *Annual Review of Neuroscience, 13*, 25-42.

Power, M. J., & Champion, L. A. (1986). Cognitive approaches to depression: a theoretical critique. *British Journal of Clinical Psychology, 25*, 201-212.

Rachman, S. (1998). *Anxiety*. Hove: Psychological Press.

Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behaviour Research and Therapy, 35*(8), 741-756.

Reidy, J. (1994). *Anxiety and explicit memory for emotionally toned words.* Birkbeck College, University of London, Unpublished Ph.D thesis.

Reidy, J. (2004). Trait anxiety, trait depression, worry and memory. *Behaviour Research and Therapy, 42*, 937-948.

Reidy, J., & Richards, A. (1997a). Anxiety and memory: a recall bias for threatening words in high anxiety. *Behaviour Research and Therapy, 35*, 531-542.

Reidy, J., & Richards, A. (1997b). A memory bias for threat in high-trait anxiety. *Personality and Individual Differences, 23*, 653-663.

Reiss, S., Peterson, R. A., Gursky, D. M., & McNally, R. J. (1986). Anxiety sensitivity, anxiety frequency, and the prediction of fearfulness. *Behaviour Research and Therapy, 24*, 1-8.

Richards, A., & French, C. C. (1991). Effects of encoding and anxiety on implicit and explicit memory performance. *Personality and Individual Differences, 12*, 131-139.

Richards, A., & Millwood, B. (1989). Colour-identification of differentially valenced words in anxiety. *Cognition and Emotion, 3*, 171-176.

Roemer, L., Molina, S., & Borkovec, T. D. (1997). An investigation of worry content among generally anxious individuals. *Journal of Nervous and Mental Disease, 185*, 314-319.

Russo, R., Fox, E., & Bowles, R. J. (1999). On the status of implicit memory bias in anxiety. *Cognition and Emotion, 13*(435-456).

Salkovskis, P. M. (1991). The importance of behaviour in the maintenance of anxiety and panic: a cognitive account. *Behavioural Psychotherapy, 19*, 6-19.

Schlenker, F. R., & Leary, M. R. (1982). Social anxiety and self-presentation: a conceptualization and model. *Psychological Bulletin, 92*, 641-669.

Schneier, F. R., & Johnson, J. (1992). Social phobia: comorbidity and morbidity in an epidemiological sample. *Archives of General Psychiatry, 49*, 282-288.

Shiffrin, R. M., & Schneider, W. (1977). Controlled and automatic human information processing: II. Perceptual learning, automatic attending, and a general theory. *Psychological Review, 84*(2), 127-190.

Spector, I. P., Pecknold, J. C., & Libman, E. (2003). Selective attentional bias related to the noticeability aspect of anxiety symptoms in generalised social phobia. *Journal of Anxiety Disorders, 437*, 1-15.

Spielberger, C. D., Gorsuch, R. L., Lushene, R. E., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory.* Palo Alto, Ca: Consulting Psychologists Press.

Spurr, J. M., & Stopa, L. (2002). Self-focused attention in social phobia and social anxiety. *Clinical Psychological Review, 22*, 1-29.

Stein, M. B., & Chavira, D. A. (1998). Subtypes of social phobia and comorbidity with depression and other anxiety disorders. *Journal of Affective Disorders, 50.*

Stein, M. B., Walker, J. R., & Forde, D. R. (1994). Setting diagnostic thresholds for social phobia: considerations from a community survey of social anxiety. *American Journal Of Psychiatry, 151*(3), 408-412.

Stein, M. B., Walker, J. R., & Forde, D. R. (1996). Public-speaking fears in a community sample: prevalence, impact on functioning, and diagnostic classification. *Archives of General Psychiatry, 53*(2), 169-174.

Stopa, L. (1995). *Cognitive processes in social anxiety.* University of Oxford, Department of Psychiatry.

Stopa, L., & Clark, D. M. (2001). Social phobia: comments on the viability and validity of an analogue research strategy and British norms for the Fear of Negative Evaluation questionnaire. *Behavioural and Cognitive Psychotherapy, 29*, 423-430.

Stroop, J. R. (1938). Factors affecting speed in serial verbal reactions. *Psychological Monographs, 50*, 38-48.

Teasdale, J. D. (1996). The relationship between cognition and emotion: the mind-in-place in mood disorders. In D. M. Clark & C. G. Fairburn (Eds.), *Science and practice of cognitive behaviour therapy.* New York: Oxford University Press.

Teasdale, J. D., & Barnard, P. J. (1993). *Affect, cognition and change*. Hove, Uk: Erlbaum.

Teasdale, J. D., & Dent, J. (1987). Cognitive vulnerability to depression: an investigation of two hypotheses. *British Journal of Clinical Psychology, 26*, 113-126.

Thayer, J. F., & Lane, R. D. (1996). A model of neurovisceral integration in emotion regulation and dysregulation. *Journal of Affective Disorders, 61*, 201-206.

Treisman, A.M. (1964). Verbal cues, language, and meaning in selective attention. *American Journal of Psychology, 77,* 206-219.

Trower, P., & Gilbert, P. (1989). New theoretical conceptions of social anxiety and social phobia. *Clinical Psychological Review, 9*, 19-35.

Turner, S. M., & Beidel, D. C. (1988). Some further comments on the measurement of social phobia. *Behaviour Research and Therapy, 26*(5), 411-413.

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

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

Turner, S. M., McCanna, M., & Beidel, D. C. (1987). Validity of the social avoidance and distress and fear of negative evaluation scales. *Behaviour Research and Therapy, 25*(2), 113-115.

van Honk, J., Tuiten, A., van den Hout, M., Putman, P., de Haan, E., & Stam, H. (2001). Selective attention to unmasked and masked threatening words: relationships to trait anger and anxiety. *Personality and Individual Differences, 30*, 711-720.

Watson, D., & Friend, R. (1969). Measurement of social-evaluative anxiety. *Journal of Consulting and Clinical Psychology, 33*(4), 448-457.

Watts, F., McKenna, F. P., Sharrock, R., & L., T. (1986). Colour-naming of phobia-related words. *British Journal of Psychology, 77*, 97-108.

Weissman, M. W. (1985). The epidemiology of anxiety disorders: rates, risks, and familial patterns. In A. H. Tuma & J. D. Maser (Eds.), *Anxiety and the anxiety disorders.* Hillsdale, N. J.: Lawrence Erlbaum Associates.

Wells, A. (1997). *Cognitive therapy of anxiety disorders: a practice manual and conceptual guide*. Sussex: Wiley.

Wells, A., & Clark, D. M. (1997). Social phobia: a cognitive approach. In D. C. L. Davey (Ed.), *Phobias: a handbook of theory, research and treatment* (pp. 3-26). Chichester: Wiley.

Wikström, J., Lundh, L.-G., & Westerland, J. (2003). Stroop effects for masked threat words: pre-attentive bias or selective awareness. *Cognition and Emotion, 17*(6), 827-842.

Williams, J. M. G., & Dritchel, B. H. (1988). Categorical and extended autobiographical memories. In M. A. Conway & D. C. Rubin & H. Spinnler & W. A. Wagenaar (Eds.), *Theoretical perspectives on autobiographical memory*. Dordecht, Boston & London: Kluwer Academic Publishers.

Williams, J. M. G., Watts, F. N., MacLeod, C., & Mathews, A. (1988). *Cognitive Psychology and Emotional Disorders*. Chichester: John Wiley.

Williams, J. M. G., Watts, F. N., MacLeod, C., & Mathews, A. (1997). *Cognitive psychology and emotional disorders*. London: Wiley.

Wilson, E., & MacLeod, C. (2003). Contrasting two accounts of anxiety-linked attentional bias: selective attention to varying levels of stimulus threat intensity. *Journal of Abnormal Psychology, 112*(2), 212-218.

Winton, E. C., Clark, D. M., & Edelmann, R. J. (1995). Social anxiety, fear of negative evaluation and the detection of negative emotion in others. *Behaviour Research and Therapy, 33*(2), 193-196.

Yeun, P. K. (1994). *Social anxiety and the allocation of attention: evaluation using facial stimuli in a dot-probe paradigm.* Unpublished research project, Department of Psychology, University of Oxford, Oxford.

Yiend, J., & Mathews, A. (2001). Anxiety and attention to threatening pictures. *The Quarterly Journal of Experimental Psychology, 54a*(3), 665-681.

Young, G. C. D., & Martin, M. (1981). Processing of information about self by neurotics. *British Journal of Clinical Psychology, 20*, 205-212.

Appendix 1

The Booklet Used for Rating the Threat Value of a Word to a Socially Anxious Individual

For each of the following words, please rate by encircling the appropriate number on the scale, how far you think a person suffering from *SOCIAL ANXIETY* would consider the word to be *threatening*. Essentially, social anxiety is characterised by the fear of social situations and interactions with other people. A major problem is the fear of being judged and evaluated negatively by other people, and this can lead to feelings such as inadequacy, humiliation and anxiety. In the unlikely event that you are unable to recognise a word then please circle it as *unfamiliar*.

	Neutral						**Very Threatening**	
Aboard	1	2	3	4	5	6	7	Unfamiliar
Bleach	1	2	3	4	5	6	7	Unfamiliar
Gravel	1	2	3	4	5	6	7	Unfamiliar
Mohawk	1	2	3	4	5	6	7	Unfamiliar
Baboon	1	2	3	4	5	6	7	Unfamiliar
Dizzy	1	2	3	4	5	6	7	Unfamiliar
Coral	1	2	3	4	5	6	7	Unfamiliar
Violin	1	2	3	4	5	6	7	Unfamiliar
Jelly	1	2	3	4	5	6	7	Unfamiliar
Barge	1	2	3	4	5	6	7	Unfamiliar
Average	1	2	3	4	5	6	7	Unfamiliar
Chateau	1	2	3	4	5	6	7	Unfamiliar
Nausea	1	2	3	4	5	6	7	Unfamiliar
Schools	1	2	3	4	5	6	7	Unfamiliar
Index	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral					Very Threatening		
Mitt	1	2	3	4	5	6	7	Unfamiliar
Able	1	2	3	4	5	6	7	Unfamiliar
Standard	1	2	3	4	5	6	7	Unfamiliar
Hospital	1	2	3	4	5	6	7	Unfamiliar
Chin	1	2	3	4	5	6	7	Unfamiliar
Mild	1	2	3	4	5	6	7	Unfamiliar
Fresh	1	2	3	4	5	6	7	Unfamiliar
Flexible	1	2	3	4	5	6	7	Unfamiliar
Modulate	1	2	3	4	5	6	7	Unfamiliar
Audience	1	2	3	4	5	6	7	Unfamiliar
Returned	1	2	3	4	5	6	7	Unfamiliar
General	1	2	3	4	5	6	7	Unfamiliar
Gymnast	1	2	3	4	5	6	7	Unfamiliar
Back	1	2	3	4	5	6	7	Unfamiliar
Wash	1	2	3	4	5	6	7	Unfamiliar
Above	1	2	3	4	5	6	7	Unfamiliar
Yeast	1	2	3	4	5	6	7	Unfamiliar
Normal	1	2	3	4	5	6	7	Unfamiliar
Tables	1	2	3	4	5	6	7	Unfamiliar
Vector	1	2	3	4	5	6	7	Unfamiliar
Gallon	1	2	3	4	5	6	7	Unfamiliar
Mocked	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral					Very Threatening		
Tinted	1	2	3	4	5	6	7	Unfamiliar
Waterfall	1	2	3	4	5	6	7	Unfamiliar
Cultivate	1	2	3	4	5	6	7	Unfamiliar
Performance	1	2	3	4	5	6	7	Unfamiliar
Opportunity	1	2	3	4	5	6	7	Unfamiliar
Quadrant	1	2	3	4	5	6	7	Unfamiliar
Mattress	1	2	3	4	5	6	7	Unfamiliar
Flavour	1	2	3	4	5	6	7	Unfamiliar
Coarse	1	2	3	4	5	6	7	Unfamiliar
Embarrassed	1	2	3	4	5	6	7	Unfamiliar
Transformed	1	2	3	4	5	6	7	Unfamiliar
Desk	1	2	3	4	5	6	7	Unfamiliar
Bird	1	2	3	4	5	6	7	Unfamiliar
Pipe	1	2	3	4	5	6	7	Unfamiliar
Rise	1	2	3	4	5	6	7	Unfamiliar
Breeze	1	2	3	4	5	6	7	Unfamiliar
Pollen	1	2	3	4	5	6	7	Unfamiliar
Yardstick	1	2	3	4	5	6	7	Unfamiliar
Evolution	1	2	3	4	5	6	7	Unfamiliar
Radish	1	2	3	4	5	6	7	Unfamiliar
Volume	1	2	3	4	5	6	7	Unfamiliar
Disease	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral					Very Threatening		
Version	1	2	3	4	5	6	7	Unfamiliar
Liquid	1	2	3	4	5	6	7	Unfamiliar
Squeak	1	2	3	4	5	6	7	Unfamiliar
Network	1	2	3	4	5	6	7	Unfamiliar
Station	1	2	3	4	5	6	7	Unfamiliar
Nature	1	2	3	4	5	6	7	Unfamiliar
Rookie	1	2	3	4	5	6	7	Unfamiliar
Periodicals	1.	2	3	4	5	6	7	Unfamiliar
Suffocating	1	2	3	4	5	6	7	Unfamiliar
Fabric	1	2	3	4	5	6	7	Unfamiliar
Barrel	1	2	3	4	5	6	7	Unfamiliar
Import	1	2	3	4	5	6	7	Unfamiliar
Bakery	1	2	3	4	5	6	7	Unfamiliar
Icicle	1	2	3	4	5	6	7	Unfamiliar
Budget	1	2	3	4	5	6	7	Unfamiliar
Terrace	1	2	3	4	5	6	7	Unfamiliar
Shuttle	1	2	3	4	5	6	7	Unfamiliar
Fence	1	2	3	4	5	6	7	Unfamiliar
Wharf	1	2	3	4	5	6	7	Unfamiliar
Voucher	1	2	3	4	5	6	7	Unfamiliar
Factory	1	2	3	4	5	6	7	Unfamiliar
Pathetic	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Exterior	1	2	3	4	5	6	7	Unfamiliar
Nutshell	1	2	3	4	5	6	7	Unfamiliar
Ignition	1	2	3	4	5	6	7	Unfamiliar
Periscope	1	2	3	4	5	6	7	Unfamiliar
Barrister	1	2	3	4	5	6	7	Unfamiliar
Paper	1	2	3	4	5	6	7	Unfamiliar
Graze	1	2	3	4	5	6	7	Unfamiliar
Journal	1	2	3	4	5	6	7	Unfamiliar
Starlit	1	2	3	4	5	6	7	Unfamiliar
Near	1	2	3	4	5	6	7	Unfamiliar
Plug	1	2	3	4	5	6	7	Unfamiliar
Lodge	1	2	3	4	5	6	7	Unfamiliar
Penny	1	2	3	4	5	6	7	Unfamiliar
Fur	1	2	3	4	5	6	7	Unfamiliar
Pen	1	2	3	4	5	6	7	Unfamiliar
Dating	1	2	3	4	5	6	7	Unfamiliar
Season	1	2	3	4	5	6	7	Unfamiliar
Oblong	1	2	3	4	5	6	7	Unfamiliar
Device	1	2	3	4	5	6	7	Unfamiliar
Package	1	2	3	4	5	6	7	Unfamiliar
Cushion	1	2	3	4	5	6	7	Unfamiliar
Gadget	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Paddle	1	2	3	4	5	6	7	Unfamiliar
Calculate	1	2	3	4	5	6	7	Unfamiliar
Dandelion	1	2	3	4	5	6	7	Unfamiliar
Entry	1	2	3	4	5	6	7	Unfamiliar
Cable	1	2	3	4	5	6	7	Unfamiliar
Stroke	1	2	3	4	5	6	7	Unfamiliar
String	1	2	3	4	5	6	7	Unfamiliar
Pattern	1	2	3	4	5	6	7	Unfamiliar
Deflect	1	2	3	4	5	6	7	Unfamiliar
Texture	1	2	3	4	5	6	7	Unfamiliar
Formula	1	2	3	4	5	6	7	Unfamiliar
Saddle	1	2	3	4	5	6	7	Unfamiliar
Driver	1	2	3	4	5	6	7	Unfamiliar
Ride	1	2	3	4	5	6	7	Unfamiliar
Herd	1	2	3	4	5	6	7	Unfamiliar
Patio	1	2	3	4	5	6	7	Unfamiliar
Flock	1	2	3	4	5	6	7	Unfamiliar
Bracelet	1	2	3	4	5	6	7	Unfamiliar
Business	1	2	3	4	5	6	7	Unfamiliar
Trembling	1	2	3	4	5	6	7	Unfamiliar
Phenomena	1	2	3	4	5	6	7	Unfamiliar
Necklace	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Tomorrow	1	2	3	4	5	6	7	Unfamiliar
Biscuit	1	2	3	4	5	6	7	Unfamiliar
Lacquer	1	2	3	4	5	6	7	Unfamiliar
Heather	1	2	3	4	5	6	7	Unfamiliar
Pumpkin	1	2	3	4	5	6	7	Unfamiliar
Drum	1	2	3	4	5	6	7	Unfamiliar
Buoy	1	2	3	4	5	6	7	Unfamiliar
Teapot	1	2	3	4	5	6	7	Unfamiliar
Gallop	1	2	3	4	5	6	7	Unfamiliar
Saw	1	2	3	4	5	6	7	Unfamiliar
Pet	1	2	3	4	5	6	7	Unfamiliar
Disgraced	1	2	3	4	5	6	7	Unfamiliar
Warehouse	1	2	3	4	5	6	7	Unfamiliar
Tempo	1	2	3	4	5	6	7	Unfamiliar
Rhyme	1	2	3	4	5	6	7	Unfamiliar
Creek	1	2	3	4	5	6	7	Unfamiliar
Salad	1	2	3	4	5	6	7	Unfamiliar
Dollar	1	2	3	4	5	6	7	Unfamiliar
Castle	1	2	3	4	5	6	7	Unfamiliar
Eclipse	1	2	3	4	5	6	7	Unfamiliar
Deflect	1	2	3	4	5	6	7	Unfamiliar
Dawn	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Base	1	2	3	4	5	6	7	Unfamiliar
Interview	1	2	3	4	5	6	7	Unfamiliar
Household	1	2	3	4	5	6	7	Unfamiliar
Scarf	1	2	3	4	5	6	7	Unfamiliar
Ruler	1	2	3	4	5	6	7	Unfamiliar
Breezy	1	2	3	4	5	6	7	Unfamiliar
Shovel	1	2	3	4	5	6	7	Unfamiliar
Shampoo	1	2	3	4	5	6	7	Unfamiliar
Gallery	1	2	3	4	5	6	7	Unfamiliar
Bicycle	1	2	3	4	5	6	7	Unfamiliar
Cologne	1	2	3	4	5	6	7	Unfamiliar
Sheep	1	2	3	4	5	6	7	Unfamiliar
Meeting	1	2	3	4	5	6	7	Unfamiliar
Natural	1	2	3	4	5	6	7	Unfamiliar
Slope	1	2	3	4	5	6	7	Unfamiliar
Berry	1	2	3	4	5	6	7	Unfamiliar
Round	1	2	3	4	5	6	7	Unfamiliar
Nozzle	1	2	3	4	5	6	7	Unfamiliar
Zipper	1	2	3	4	5	6	7	Unfamiliar
Coffin	1	2	3	4	5	6	7	Unfamiliar
Rocket	1	2	3	4	5	6	7	Unfamiliar
Chalk	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Flash	1	2	3	4	5	6	7	Unfamiliar
Point	1	2	3	4	5	6	7	Unfamiliar
Young	1	2	3	4	5	6	7	Unfamiliar
Manufacture	1	2	3	4	5	6	7	Unfamiliar
Contraption	1	2	3	4	5	6	7	Unfamiliar
Ancient	1	2	3	4	5	6	7	Unfamiliar
Battery	1	2	3	4	5	6	7	Unfamiliar
Breathless	1	2	3	4	5	6	7	Unfamiliar
Downstream	1	2	3	4	5	6	7	Unfamiliar
Balance	1	2	3	4	5	6	7	Unfamiliar
Quarter	1	2	3	4	5	6	7	Unfamiliar
Arc	1	2	3	4	5	6	7	Unfamiliar
Dam	1	2	3	4	5	6	7	Unfamiliar
Lever	1	2	3	4	5	6	7	Unfamiliar
Apple	1	2	3	4	5	6	7	Unfamiliar
Tiptoe	1	2	3	4	5	6	7	Unfamiliar
Native	1	2	3	4	5	6	7	Unfamiliar
Bucket	1	2	3	4	5	6	7	Unfamiliar
Stable	1	2	3	4	5	6	7	Unfamiliar
Incompetent	1	2	3	4	5	6	7	Unfamiliar
Freeflowing	1	2	3	4	5	6	7	Unfamiliar
Hobby	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Stake	1	2	3	4	5	6	7	Unfamiliar
Dissolve	1	2	3	4	5	6	7	Unfamiliar
Bungalow	1	2	3	4	5	6	7	Unfamiliar
Phonograph	1	2	3	4	5	6	7	Unfamiliar
Locomotive	1	2	3	4	5	6	7	Unfamiliar
Quail	1	2	3	4	5	6	7	Unfamiliar
Route	1	2	3	4	5	6	7	Unfamiliar
Hue	1	2	3	4	5	6	7	Unfamiliar
Pot	1	2	3	4	5	6	7	Unfamiliar
Oven	1	2	3	4	5	6	7	Unfamiliar
Deep	1	2	3	4	5	6	7	Unfamiliar
Engagement	1	2	3	4	5	6	7	Unfamiliar
Ambassador	1	2	3	4	5	6	7	Unfamiliar
Taking	1	2	3	4	5	6	7	Unfamiliar
Modern	1	2	3	4	5	6	7	Unfamiliar
Quilt	1	2	3	4	5	6	7	Unfamiliar
River	1	2	3	4	5	6	7	Unfamiliar
Piano	1	2	3	4	5	6	7	Unfamiliar
Crest	1	2	3	4	5	6	7	Unfamiliar
Deadly	1	2	3	4	5	6	7	Unfamiliar
Ladder`	1	2	3	4	5	6	7	Unfamiliar
Garbage	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Neutron	1	2	3	4	5	6	7	Unfamiliar
Tip	1	2	3	4	5	6	7	Unfamiliar
New	1	2	3	4	5	6	7	Unfamiliar
Zigzag	1	2	3	4	5	6	7	Unfamiliar
Nickel	1	2	3	4	5	6	7	Unfamiliar
Pillow	1	2	3	4	5	6	7	Unfamiliar
Ascend	1	2	3	4	5	6	7	Unfamiliar
Palace	1	2	3	4	5	6	7	Unfamiliar
Buffer	1	2	3	4	5	6	7	Unfamiliar
Orbit	1	2	3	4	5	6	7	Unfamiliar
Album	1	2	3	4	5	6	7	Unfamiliar
Gasping	1	2	3	4	5	6	7	Unfamiliar
Geology	1	2	3	4	5	6	7	Unfamiliar
Pancake	1	2	3	4	5	6	7	Unfamiliar
Circuit	1	2	3	4	5	6	7	Unfamiliar
Pocket	1	2	3	4	5	6	7	Unfamiliar
Sporty	1	2	3	4	5	6	7	Unfamiliar
Ginger	1	2	3	4	5	6	7	Unfamiliar
Rubber	1	2	3	4	5	6	7	Unfamiliar
Zebra	1	2	3	4	5	6	7	Unfamiliar
Grape	1	2	3	4	5	6	7	Unfamiliar
Sunshine	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Mobility	1	2	3	4	5	6	7	Unfamiliar
Ancestor	1	2	3	4	5	6	7	Unfamiliar
Sprinkle	1	2	3	4	5	6	7	Unfamiliar
Failure	1	2	3	4	5	6	7	Unfamiliar
Circular	1	2	3	4	5	6	7	Unfamiliar
Channel	1	2	3	4	5	6	7	Unfamiliar
Angular	1	2	3	4	5	6	7	Unfamiliar
Fling	1	2	3	4	5	6	7	Unfamiliar
Piped	1	2	3	4	5	6	7	Unfamiliar
Functionary	1	2	3	4	5	6	7	Unfamiliar
Teaspoon	1	2	3	4	5	6	7	Unfamiliar
Speech	1	2	3	4	5	6	7	Unfamiliar
Travel	1	2	3	4	5	6	7	Unfamiliar
Collect	1	2	3	4	5	6	7	Unfamiliar
Transit	1	2	3	4	5	6	7	Unfamiliar
Gardening	1	2	3	4	5	6	7	Unfamiliar
Versatile	1	2	3	4	5	6	7	Unfamiliar
Detergent	1	2	3	4	5	6	7	Unfamiliar
Conductor	1	2	3	4	5	6	7	Unfamiliar
Ambulance	1	2	3	4	5	6	7	Unfamiliar
Flowering	1	2	3	4	5	6	7	Unfamiliar
Pictorial	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Vibration	1	2	3	4	5	6	7	Unfamiliar
Inventor	1	2	3	4	5	6	7	Unfamiliar
Powdered	1	2	3	4	5	6	7	Unfamiliar
Banner	1	2	3	4	5	6	7	Unfamiliar
Outlet	1	2	3	4	5	6	7	Unfamiliar
Bouquet	1	2	3	4	5	6	7	Unfamiliar
Lullaby	1	2	3	4	5	6	7	Unfamiliar
Sweating	1	2	3	4	5	6	7	Unfamiliar
Armchair	1	2	3	4	5	6	7	Unfamiliar
Feathered	1	2	3	4	5	6	7	Unfamiliar
Transient	1	2	3	4	5	6	7	Unfamiliar
Lengthwise	1	2	3	4	5	6	7	Unfamiliar
Voluminous	1	2	3	4	5	6	7	Unfamiliar
Chimney	1	2	3	4	5	6	7	Unfamiliar
Trumpet	1	2	3	4	5	6	7	Unfamiliar
Coconut	1	2	3	4	5	6	7	Unfamiliar
Winking	1	2	3	4	5	6	7	Unfamiliar
Ample	1	2	3	4	5	6	7	Unfamiliar
Spray	1	2	3	4	5	6	7	Unfamiliar
Ashamed	1	2	3	4	5	6	7	Unfamiliar
Orchard	1	2	3	4	5	6	7	Unfamiliar
Abridge	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Soulful	1	2	3	4	5	6	7	Unfamiliar
Satin	1	2	3	4	5	6	7	Unfamiliar
Swamp	1	2	3	4	5	6	7	Unfamiliar
Bagpipe	1	2	3	4	5	6	7	Unfamiliar
Dialling	1	2	3	4	5	6	7	Unfamiliar
Dusty	1	2	3	4	5	6	7	Unfamiliar
Orbit	1	2	3	4	5	6	7	Unfamiliar
Anchovy	1	2	3	4	5	6	7	Unfamiliar
Cabaret	1	2	3	4	5	6	7	Unfamiliar
Curly	1	2	3	4	5	6	7	Unfamiliar
Olive	1	2	3	4	5	6	7	Unfamiliar
Hairpin	1	2	3	4	5	6	7	Unfamiliar
Madeira	1	2	3	4	5	6	7	Unfamiliar
Ketchup	1	2	3	4	5	6	7	Unfamiliar
Skylark	1	2	3	4	5	6	7	Unfamiliar
Shaky	1	2	3	4	5	6	7	Unfamiliar
Tweed	1	2	3	4	5	6	7	Unfamiliar
Wrap	1	2	3	4	5	6	7	Unfamiliar
Limb	1	2	3	4	5	6	7	Unfamiliar
Leaflet	1	2	3	4	5	6	7	Unfamiliar
Oatmeal	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Bean	1	2	3	4	5	6	7	Unfamiliar
Reed	1	2	3	4	5	6	7	Unfamiliar
Periodically	1	2	3	4	5	6	7	Unfamiliar
Characterise	1	2	3	4	5	6	7	Unfamiliar
Inept	1	2	3	4	5	6	7	Unfamiliar
Purge	1	2	3	4	5	6	7	Unfamiliar
Snowball	1	2	3	4	5	6	7	Unfamiliar
Youngish	1	2	3	4	5	6	7	Unfamiliar
Mushroom	1	2	3	4	5	6	7	Unfamiliar
Postmark	1	2	3	4	5	6	7	Unfamiliar
Socialise	1	2	3	4	5	6	7	Unfamiliar
President	1	2	3	4	5	6	7	Unfamiliar
Beaker	1	2	3	4	5	6	7	Unfamiliar
Cruise	1	2	3	4	5	6	7	Unfamiliar
Pebble	1	2	3	4	5	6	7	Unfamiliar
Veneer	1	2	3	4	5	6	7	Unfamiliar
Turbine	1	2	3	4	5	6	7	Unfamiliar
Biology	1	2	3	4	5	6	7	Unfamiliar
Freight	1	2	3	4	5	6	7	Unfamiliar
Blanket	1	2	3	4	5	6	7	Unfamiliar
Fatal	1	2	3	4	5	6	7	Unfamiliar
Perch	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Octopus	1	2	3	4	5	6	7	Unfamiliar
Potting	1	2	3	4	5	6	7	Unfamiliar
Clam	1	2	3	4	5	6	7	Unfamiliar
Isle	1	2	3	4	5	6	7	Unfamiliar
Wooden	1	2	3	4	5	6	7	Unfamiliar
Engine	1	2	3	4	5	6	7	Unfamiliar
Presentation	1	2	3	4	5	6	7	Unfamiliar
Metropolitan	1	2	3	4	5	6	7	Unfamiliar
Parsley	1	2	3	4	5	6	7	Unfamiliar
Zoology	1	2	3	4	5	6	7	Unfamiliar
Tissue	1	2	3	4	5	6	7	Unfamiliar
Symbol	1	2	3	4	5	6	7	Unfamiliar
Paddle	1	2	3	4	5	6	7	Unfamiliar
Raisin	1	2	3	4	5	6	7	Unfamiliar
Doctor	1	2	3	4	5	6	7	Unfamiliar
Cattle	1	2	3	4	5	6	7	Unfamiliar
Highway	1	2	3	4	5	6	7	Unfamiliar
Fifteen	1	2	3	4	5	6	7	Unfamiliar
Agent	1	2	3	4	5	6	7	Unfamiliar
Broad	1	2	3	4	5	6	7	Unfamiliar
Spectrum	1	2	3	4	5	6	7	Unfamiliar
Driveway	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Collapse	1	2	3	4	5	6	7	Unfamiliar
Aeration	1	2	3	4	5	6	7	Unfamiliar
Cloudy	1	2	3	4	5	6	7	Unfamiliar
Groove	1	2	3	4	5	6	7	Unfamiliar
Foolish	1	2	3	4	5	6	7	Unfamiliar
Gradual	1	2	3	4	5	6	7	Unfamiliar
Saffron	1	2	3	4	5	6	7	Unfamiliar
Thimble	1	2	3	4	5	6	7	Unfamiliar
Matrix	1	2	3	4	5	6	7	Unfamiliar
Oblong	1	2	3	4	5	6	7	Unfamiliar
Ravine	1	2	3	4	5	6	7	Unfamiliar
Auburn	1	2	3	4	5	6	7	Unfamiliar
Lightheaded	1	2	3	4	5	6	7	Unfamiliar
Subscribing	1	2	3	4	5	6	7	Unfamiliar
Brick	1	2	3	4	5	6	7	Unfamiliar
Motel	1	2	3	4	5	6	7	Unfamiliar
Roofing	1	2	3	4	5	6	7	Unfamiliar
Apricot	1	2	3	4	5	6	7	Unfamiliar
Sausage	1	2	3	4	5	6	7	Unfamiliar
Paddock	1	2	3	4	5	6	7	Unfamiliar
Humiliated	1	2	3	4	5	6	7	Unfamiliar
Miniatures	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						**Very Threatening**	
Carrot	1	2	3	4	5	6	7	Unfamiliar
Donkey	1	2	3	4	5	6	7	Unfamiliar
Chalky	1	2	3	4	5	6	7	Unfamiliar
Funnel	1	2	3	4	5	6	7	Unfamiliar
Embryo	1	2	3	4	5	6	7	Unfamiliar
Jumper	1	2	3	4	5	6	7	Unfamiliar
Inadequate	1	2	3	4	5	6	7	Unfamiliar
Quotations	1	2	3	4	5	6	7	Unfamiliar
Sander	1	2	3	4	5	6	7	Unfamiliar
Almond	1	2	3	4	5	6	7	Unfamiliar
Batch	1	2	3	4	5	6	7	Unfamiliar
Eagle	1	2	3	4	5	6	7	Unfamiliar
Frothy	1	2	3	4	5	6	7	Unfamiliar
Oracle	1	2	3	4	5	6	7	Unfamiliar
Cancer	1	2	3	4	5	6	7	Unfamiliar
Saddle	1	2	3	4	5	6	7	Unfamiliar
Pentagon	1	2	3	4	5	6	7	Unfamiliar
Charcoal	1	2	3	4	5	6	7	Unfamiliar
Pillar	1	2	3	4	5	6	7	Unfamiliar
Safari	1	2	3	4	5	6	7	Unfamiliar
Quince	1	2	3	4	5	6	7	Unfamiliar
Spongy	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Assessment	1	2	3	4	5	6	7	Unfamiliar
Originally	1	2	3	4	5	6	7	Unfamiliar
Gagging	1	2	3	4	5	6	7	Unfamiliar
Zooming	1	2	3	4	5	6	7	Unfamiliar
Tailor	1	2	3	4	5	6	7	Unfamiliar
Palate	1	2	3	4	5	6	7	Unfamiliar
Alfresco	1	2	3	4	5	6	7	Unfamiliar
Harmonic	1	2	3	4	5	6	7	Unfamiliar
Pain	1	2	3	4	5	6	7	Unfamiliar
Bank	1	2	3	4	5	6	7	Unfamiliar
Airframe	1	2	3	4	5	6	7	Unfamiliar
Crescent	1	2	3	4	5	6	7	Unfamiliar
Bookcase	1	2	3	4	5	6	7	Unfamiliar
Mackerel	1	2	3	4	5	6	7	Unfamiliar
Party	1	2	3	4	5	6	7	Unfamiliar
Clear	1	2	3	4	5	6	7	Unfamiliar
Flooring	1	2	3	4	5	6	7	Unfamiliar
Postcard	1	2	3	4	5	6	7	Unfamiliar
Junction	1	2	3	4	5	6	7	Unfamiliar
Trousers	1	2	3	4	5	6	7	Unfamiliar
Nervous	1	2	3	4	5	6	7	Unfamiliar
Leather	1	2	3	4	5	6	7	Unfamiliar

Cabinet	1	2	3	4	5	6	7 Unfamiliar
Tracing	1	2	3	4	5	6	7 Unfamiliar
Compiler	1	2	3	4	5	6	7 Unfamiliar
Elephant	1	2	3	4	5	6	7 Unfamiliar
Diameter	1	2	3	4	5	6	7 Unfamiliar
Advanced	1	2	3	4	5	6	7 Unfamiliar
Mile	1	2	3	4	5	6	7 Unfamiliar
Land	1	2	3	4	5	6	7 Unfamiliar
Antenna	1	2	3	4	5	6	7 Unfamiliar
Whiskey	1	2	3	4	5	6	7 Unfamiliar
Violence	1	2	3	4	5	6	7 Unfamiliar
Creation	1	2	3	4	5	6	7 Unfamiliar
Straw	1	2	3	4	5	6	7 Unfamiliar
Lemon	1	2	3	4	5	6	7 Unfamiliar
Twist	1	2	3	4	5	6	7 Unfamiliar
Angel	1	2	3	4	5	6	7 Unfamiliar
Hour	1	2	3	4	5	6	7 Unfamiliar
Mind	1	2	3	4	5	6	7 Unfamiliar
Lotion	1	2	3	4	5	6	7 Unfamiliar
Pillow	1	2	3	4	5	6	7 Unfamiliar
Coal	1	2	3	4	5	6	7 Unfamiliar
Pope	1	2	3	4	5	6	7 Unfamiliar
Wrinkled	1	2	3	4	5	6	7 Unfamiliar

Palpitations	1	2	3	4	5	6	7 Unfamiliar
Amalgamation	1	2	3	4	5	6	7 Unfamiliar
Guitar	1	2	3	4	5	6	7 Unfamiliar
Miller	1	2	3	4	5	6	7 Unfamiliar
Adjacent	1	2	3	4	5	6	7 Unfamiliar
Fin	1	2	3	4	5	6	7 Unfamiliar
Ink	1	2	3	4	5	6	7 Unfamiliar
Examination	1	2	3	4	5	6	7 Unfamiliar
Sovereignty	1	2	3	4	5	6	7 Unfamiliar
Sphere	1	2	3	4	5	6	7 Unfamiliar
Freely	1	2	3	4	5	6	7 Unfamiliar
Nucleus	1	2	3	4	5	6	7 Unfamiliar
Tractor	1	2	3	4	5	6	7 Unfamiliar
Facet	1	2	3	4	5	6	7 Unfamiliar
Glaze	1	2	3	4	5	6	7 Unfamiliar
Juice	1	2	3	4	5	6	7 Unfamiliar
Venus	1	2	3	4	5	6	7 Unfamiliar
Public	1	2	3	4	5	6	7 Unfamiliar
Enough	1	2	3	4	5	6	7 Unfamiliar
Inch	1	2	3	4	5	6	7 Unfamiliar
Tool	1	2	3	4	5	6	7 Unfamiliar
Waist	1	2	3	4	5	6	7 Unfamiliar
Array	1	2	3	4	5	6	7 Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						**Very Threatening**	
Viola	1	2	3	4	5	6	7	Unfamiliar
Haven	1	2	3	4	5	6	7	Unfamiliar
Layman	1	2	3	4	5	6	7	Unfamiliar
Cement	1	2	3	4	5	6	7	Unfamiliar
Criticised	1	2	3	4	5	6	7	Unfamiliar
Ingredient	1	2	3	4	5	6	7	Unfamiliar
Golf	1	2	3	4	5	6	7	Unfamiliar
Wash	1	2	3	4	5	6	7	Unfamiliar
Bounce	1	2	3	4	5	6	7	Unfamiliar
Greasy	1	2	3	4	5	6	7	Unfamiliar
Faint	1	2	3	4	5	6	7	Unfamiliar
Honey	1	2	3	4	5	6	7	Unfamiliar
Hereby	1	2	3	4	5	6	7	Unfamiliar
Seaside	1	2	3	4	5	6	7	Unfamiliar
Tumbler	1	2	3	4	5	6	7	Unfamiliar
Academy	1	2	3	4	5	6	7	Unfamiliar
Suburb	1	2	3	4	5	6	7	Unfamiliar
Aerial	1	2	3	4	5	6	7	Unfamiliar
Ballad	1	2	3	4	5	6	7	Unfamiliar
Saline	1	2	3	4	5	6	7	Unfamiliar
Crowd	1	2	3	4	5	6	7	Unfamiliar
Grass	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Commerce	1	2	3	4	5	6	7	Unfamiliar
Railroad	1	2	3	4	5	6	7	Unfamiliar
Foam	1	2	3	4	5	6	7	Unfamiliar
Gate	1	2	3	4	5	6	7	Unfamiliar
Canyon	1	2	3	4	5	6	7	Unfamiliar
Heater	1	2	3	4	5	6	7	Unfamiliar
Illness	1	2	3	4	5	6	7	Unfamiliar
Mustard	1	2	3	4	5	6	7	Unfamiliar
Sunset	1	2	3	4	5	6	7	Unfamiliar
Breeze	1	2	3	4	5	6	7	Unfamiliar
Lens	1	2	3	4	5	6	7	Unfamiliar
Chip	1	2	3	4	5	6	7	Unfamiliar
Furnish	1	2	3	4	5	6	7	Unfamiliar
Utility	1	2	3	4	5	6	7	Unfamiliar
Pitcher	1	2	3	4	5	6	7	Unfamiliar
Builder	1	2	3	4	5	6	7	Unfamiliar
Mars	1	2	3	4	5	6	7	Unfamiliar
Port	1	2	3	4	5	6	7	Unfamiliar
Tense	1	2	3	4	5	6	7	Unfamiliar
Onion	1	2	3	4	5	6	7	Unfamiliar
Seal	1	2	3	4	5	6	7	Unfamiliar
Dome	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Towel	1	2	3	4	5	6	7	Unfamiliar
Brand	1	2	3	4	5	6	7	Unfamiliar
Worthless	1	2	3	4	5	6	7	Unfamiliar
Adjoining	1	2	3	4	5	6	7	Unfamiliar
Ivory	1	2	3	4	5	6	7	Unfamiliar
Fleet	1	2	3	4	5	6	7	Unfamiliar
Bunch	1	2	3	4	5	6	7	Unfamiliar
Tract	1	2	3	4	5	6	7	Unfamiliar
Tray	1	2	3	4	5	6	7	Unfamiliar
Loop	1	2	3	4	5	6	7	Unfamiliar
Coronary	1	2	3	4	5	6	7	Unfamiliar
Snapshot	1	2	3	4	5	6	7	Unfamiliar
Geographical	1	2	3	4	5	6	7	Unfamiliar
Transmission	1	2	3	4	5	6	7	Unfamiliar
Cloth	1	2	3	4	5	6	7	Unfamiliar
Porch	1	2	3	4	5	6	7	Unfamiliar
Route	1	2	3	4	5	6	7	Unfamiliar
Grown	1	2	3	4	5	6	7	Unfamiliar
Broader	1	2	3	4	5	6	7	Unfamiliar
Emperor	1	2	3	4	5	6	7	Unfamiliar
Ridiculed	1	2	3	4	5	6	7	Unfamiliar
Footprint	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Blowing	1	2	3	4	5	6	7	Unfamiliar
Rolling	1	2	3	4	5	6	7	Unfamiliar
Pond	1	2	3	4	5	6	7	Unfamiliar
Coal	1	2	3	4	5	6	7	Unfamiliar
Cotton	1	2	3	4	5	6	7	Unfamiliar
Shadow	1	2	3	4	5	6	7	Unfamiliar
Pottery	1	2	3	4	5	6	7	Unfamiliar
Channel	1	2	3	4	5	6	7	Unfamiliar
Injury	1	2	3	4	5	6	7	Unfamiliar
Silver	1	2	3	4	5	6	7	Unfamiliar
Portion	1	2	3	4	5	6	7	Unfamiliar
Brother	1	2	3	4	5	6	7	Unfamiliar
Attic	1	2	3	4	5	6	7	Unfamiliar
Candy	1	2	3	4	5	6	7	Unfamiliar
Mixture	1	2	3	4	5	6	7	Unfamiliar
Logical	1	2	3	4	5	6	7	Unfamiliar
Entry	1	2	3	4	5	6	7	Unfamiliar
Sheet	1	2	3	4	5	6	7	Unfamiliar
Curve	1	2	3	4	5	6	7	Unfamiliar
Blushing	1	2	3	4	5	6	7	Unfamiliar
Cupboard	1	2	3	4	5	6	7	Unfamiliar
Nowadays	1	2	3	4	5	6	7	Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening
Currency	1	2	3	4	5	6	7 Unfamiliar
Lethal	1	2	3	4	5	6	7 Unfamiliar
Marrow	1	2	3	4	5	6	7 Unfamiliar
Floating	1	2	3	4	5	6	7 Unfamiliar
Stockade	1	2	3	4	5	6	7 Unfamiliar
Ghetto	1	2	3	4	5	6	7 Unfamiliar
Arched	1	2	3	4	5	6	7 Unfamiliar
Cubism	1	2	3	4	5	6	7 Unfamiliar
Magnum	1	2	3	4	5	6	7 Unfamiliar
Emergency	1	2	3	4	5	6	7 Unfamiliar
Furniture	1	2	3	4	5	6	7 Unfamiliar
Parish	1	2	3	4	5	6	7 Unfamiliar
Vacant	1	2	3	4	5	6	7 Unfamiliar
Easter	1	2	3	4	5	6	7 Unfamiliar
Herald	1	2	3	4	5	6	7 Unfamiliar
Inferior	1	2	3	4	5	6	7 Unfamiliar
Barnyard	1	2	3	4	5	6	7 Unfamiliar
Nine	1	2	3	4	5	6	7 Unfamiliar
File	1	2	3	4	5	6	7 Unfamiliar
Elevator	1	2	3	4	5	6	7 Unfamiliar
Landlord	1	2	3	4	5	6	7 Unfamiliar
Nut	1	2	3	4	5	6	7 Unfamiliar

Please Remember to Rate the Words from the Socially Anxious Perspective!

	Neutral						Very Threatening	
Pat	1	2	3	4	5	6	7	Unfamiliar
Conversation	1	2	3	4	5	6	7	Unfamiliar
Conventional	1	2	3	4	5	6	7	Unfamiliar
Fibre	1	2	3	4	5	6	7	Unfamiliar
Chain	1	2	3	4	5	6	7	Unfamiliar
Circulation	1	2	3	4	5	6	7	Unfamiliar
Philosopher	1	2	3	4	5	6	7	Unfamiliar
Saloon	1	2	3	4	5	6	7	Unfamiliar
Jungle	1	2	3	4	5	6	7	Unfamiliar
Stupid	1	2	3	4	5	6	7	Unfamiliar
Dipped	1	2	3	4	5	6	7	Unfamiliar
Nominal	1	2	3	4	5	6	7	Unfamiliar
Avocado	1	2	3	4	5	6	7	Unfamiliar
Trailer	1	2	3	4	5	6	7	Unfamiliar
Poultry	1	2	3	4	5	6	7	Unfamiliar
Stage	1	2	3	4	5	6	7	Unfamiliar
Basic	1	2	3	4	5	6	7	Unfamiliar

Appendix 2

The Mean Rating and Standard Deviation for each Word

Word	Mean	Std Dev	Word	Mean	Std Dev	Word	Mean	Std Dev
aboard	2.3	1.4	performance	4.8	1.8	cultivate	1.3	0.8
bleach	1.8	1.0	opportunity	3.1	1.4	voucher	2.1	1.2
gravel	1.5	0.9	quadrant	1.2	0.6	factory	5.2	1.6
mohawk	2.1	1.7	mattress	1.3	0.6	pathetic	1.9	1.2
baboon	2.1	1.7	flavour	1.1	0.3	exterior	1.5	0.9
dizzy	3.8	1.5	coarse	2.1	0.9	nutshell	1.4	0.5
coral	1.3	0.6	embarrassed	5.5	1.1	ignition	1.4	0.7
violin	1.6	0.9	transformed	1.8	0.8	periscope	3.1	1.8
jelly	2.2	1.4	desk	1.4	0.7	barrister	1.8	1.2
barge	2.1	1.1	bird	1.3	0.6	paper	1.7	0.9
average	2.4	1.3	pipe	1.2	0.4	graze	1.6	1.0
chateau	1.6	0.9	rise	1.9	0.9	journal	1.3	0.8
nausea	4.4	1.5	breeze	1.2	0.4	starlit	1.9	1.2
schools	3.5	1.7	pollen	1.3	0.6	near	1.2	0.4
index	1.4	0.7	yardstick	2.2	1.5	plug	1.2	0.4
mitt	1.3	0.8	evolution	1.6	1.1	lodge	1.1	0.2
able	2.8	1.4	radish	1.4	1.1	penny	1.2	0.4
standard	2.8	1.5	volume	1.6	1.1	fur	1.2	0.4
hospital	3.5	1.7	disease	2.8	1.5	pen	3.9	2.1
chin	1.7	1.1	version	1.5	0.7	dating	1.4	0.9
fresh	1.4	0.7	liquid	1.2	0.4	season	1.1	0.3
flexible	1.5	0.8	squeak	2.4	1.7	oblong	1.5	0.6
modulate	1.5	0.9	network	2.7	1.5	device	1.5	0.6
audience	5.5	1.4	station	2.1	1.7	package	1.1	0.2
returned	1.9	1.2	nature	1.5	1.1	cushion	1.5	0.9
general	1.3	0.8	rookie	2.3	1.6	gadget	1.3	0.6
gymnast	1.4	0.8	periodicals	1.7	1.2	paddle	1.8	1.0
back	1.6	1.2	suffocating	5.2	1.0	calculate	1.2	0.3
wash	1.5	1.0	fabric	1.2	0.4	dandelion	2.3	1.2
above	2.0	1.0	barrel	1.1	0.2	entry	1.2	0.4
yeast	1.1	0.3	import	1.2	0.4	cable	2.4	1.3
normal	2.4	1.0	bakery	1.4	1.0	stroke	1.1	0.3
tables	1.5	0.9	icicle	1.3	0.5	string	1.2	0.4
vector	1.4	0.7	budget	1.4	0.6	pattern	1.8	0.9
gallon	1.1	0.2	terrace	1.5	0.9	deflect	1.2	0.4
mocked	5.8	1.1	shuttle	1.8	1.2	texture	1.6	0.9

Word	Mean	Std Dev	Word	Mean	Std Dev	Word	Mean	St De
driver	2.0	0.9	breezy	1.2	0.4	freeflowing	2.2	1.
ride	1.6	0.6	shovel	1.1	0.3	hobby	1.6	0.
herd	1.6	1.1	shampoo	1.1	0.3	stake	2.1	1.
patio	1.2	0.6	gallery	1.6	0.9	dissolve	1.5	0.
flock	1.5	1.2	bicycle	1.4	0.6	bungalow	1.1	0.
bracelet	1.0	0.0	cologne	1.4	0.8	phonograph	1.2	0.
business	2.5	1.0	sheep	1.5	0.9	locomotive	1.2	0.
trembling	4.9	1.8	meeting	4.4	1.8	quail	1.5	1.
phenomena	1.9	1.1	natural	1.5	1.1	route	1.4	0.
necklace	1.1	0.2	slope	1.3	0.7	hue	1.5	0.
tomorrow	2.6	1.8	berry	1.2	0.4	pot	1.2	0.
biscuit	1.1	0.2	round	1.1	0.3	oven	1.2	0.
lacquer	1.1	0.2	nozzle	1.2	0.6	deep	1.8	1.
heather	1.1	0.3	zipper	1.6	1.1	engagement	3.7	1.
pumpkin	1.3	0.8	coffin	2.6	1.6	ambassador	2.9	2.
drum	1.4	0.6	rocket	1.6	1.0	taking	1.9	1.
buoy	1.2	0.4	chalk	1.6	1.2	modern	1.6	1.
teapot	1.1	0.3	flash	1.5	0.8	quilt	1.1	0.
gallop	1.6	0.7	point	2.6	2.0	river	1.2	0.
saw	1.3	0.6	young	1.2	0.4	piano	1.3	0.
pet	1.2	0.5	manufacture	1.1	0.3	crest	1.3	0.
disgraced	5.2	1.1	contraption	1.6	0.8	deadly	3.4	1.
warehouse	1.3	0.6	ancient	1.3	0.8	ladder	1.8	1.
tempo	1.8	1.3	battery	1.1	0.2	garbage	1.9	1.
rhyme	1.3	0.6	breathless	4.1	1.4	neutron	1.3	1.
creek	1.4	0.5	downstream	1.5	0.9	tip	1.4	0.
salad	1.1	0.3	balance	1.5	0.9	new	1.7	1.
dollar	1.2	0.4	quarter	1.1	0.3	zigzag	1.3	0.
castle	1.4	0.7	arc	1.1	0.3	nickel	1.1	0.
eclipse	1.8	1.0	dam	1.3	0.5	pillow	1.1	0.
deflect	1.4	0.5	lever	1.1	0.3	ascend	1.8	1.
dawn	1.1	0.3	apple	1.1	0.2	palace	1.8	1.
base	1.3	0.8	tiptoe	1.4	0.6	buffer	1.1	0.
interview	4.8	1.9	native	1.3	0.6	orbit	1.3	0.
household	1.4	0.8	bucket	1.2	0.6	album	1.2	0.
scarf	1.1	0.2	stable	2.0	1.3	gasping	3.9	1.
ruler	1.4	0.6	incompetent	5.2	1.6	geology	1.2	0.

Word	Mean	Std Dev	Word	Mean	Std Dev	Word	Mean	St De
pancake	1.1	0.2	lullaby	1.2	0.5	bean	1.2	0.
circuit	1.2	0.6	sweating	4.4	1.7	reed	1.1	0.
pocket	1.1	0.3	armchair	1.2	0.4	periodically	1.6	0.
sporty	1.8	0.8	feathered	1.2	0.2	characterise	2.0	1.
ginger	1.3	0.8	transient	1.6	0.8	inept	5.1	1.
rubber	1.3	0.8	lengthwise	1.2	0.6	purge	1.9	1.
zebra	1.2	0.3	voluminous	1.9	1.3	snowball	1.3	0.
grape	1.2	0.3	chimney	1.4	0.6	youngish	1.5	0.
sunshine	1.2	0.3	trumpet	1.4	0.6	mushroom	1.2	0.
mobility	1.8	0.8	coconut	1.1	0.3	postmark	1.1	0.
ancestor	1.5	1.0	winking	2.1	1.1	socialise	4.9	1.
sprinkle	1.2	0.4	ample	1.5	0.8	president	2.2	1.
failure	5.5	1.6	spray	1.2	0.6	beaker	1.2	0.
circular	1.1	0.3	ashamed	4.8	1.5	cruise	2.3	1.
channel	1.4	0.9	orchard	1.1	0.3	pebble	1.2	0.
angular	1.2	0.4	abridge	1.2	0.4	veneer	1.6	1.
fling	1.8	0.9	soulful	1.8	1.1	turbine	1.3	0.
piped	1.1	0.3	satin	1.2	0.6	biology	1.5	0.
functionary	1.5	1.0	swamp	1.8	1.0	freight	1.2	0.
teaspoon	1.1	0.2	bagpipe	1.2	0.3	blanket	1.1	0.
speech	5.5	1.7	dialling	1.5	0.9	fatal	3.9	1.
travel	2.7	2.2	dusty	1.1	0.3	perch	1.5	1.
collect	1.4	0.8	orbit	1.2	0.4	octopus	1.6	1.
transit	1.8	1.0	anchovy	1.2	0.8	potting	1.1	0.
gardening	1.2	0.4	cabaret	1.7	0.8	clam	1.8	1.
versatile	2.2	1.3	curly	1.2	0.6	isle	1.4	1.
detergent	1.2	0.6	olive	1.1	0.2	wooden	1.8	1.
conductor	1.8	1.2	hairpin	1.1	0.3	engine	1.2	0.
ambulance	2.9	1.5	madiera	1.3	0.6	presentation	5.2	2.
flowering	1.3	0.6	ketchup	1.1	0.3	metropolitan	2.2	1.
pictorial	1.5	0.8	skylark	1.1	0.3	parsley	1.2	0.
vibration	1.7	0.8	shaky	3.8	1.8	zoology	1.1	0.
inventor	1.6	1.0	tweed	1.4	0.9	tissue	1.4	0.
powdered	1.2	0.6	wrap	1.2	0.4	symbol	1.5	0.
banner	1.4	0.7	limb	1.3	0.6	paddle	1.1	0.
outlet	1.5	0.8	leaflet	1.3	0.5	raisin	1.1	0.
bouquet	1.1	0.3	oatmeal	1.2	0.4	doctor	3.1	1.