Cognitive Processes in Socially Anxious and Repressor Individuals

AREND TIBBEN
B Soc Sci, Psych Hons, MPsyCh (Family Therapy)

This thesis is presented for the degree of
Doctor of Philosophy
School of Psychology, the University of Western Sydney, Australia
2006
ABSTRACT

This thesis investigates the implicit and explicit cognitive processes of socially anxious and defensive persons. Eysenck’s (1992, 97) model of anxiety proposed that trait-anxious people are fundamentally different to defensive individuals (repressors; REP) and this reflects how they interpret information, differing in their attentional and interpretive biases. He argued, that compared to low-anxious individuals (LA), both trait-anxious people and repressors appear to engage in different attentional styles and social behaviours to minimise their internal anxiety based on these interpretations. Furthermore, that although the behavioural styles of repressors and low-anxious individuals are similar, their implicit motivations were different in that repressors responded physiologically similar to trait anxious individual’s implicit threat, whereas low-anxious individuals did not have this response. The notion being that both trait-anxious and repressors are anxious people who utilise different and opposite social behaviours to minimise their experience of anxiety. A further consideration for this thesis was that there are other models of anxiety that do not address the concept of defensiveness (repression) and distinguish only between trait-anxious and low-anxious individuals.

In this thesis socially-anxious people (SA) were compared to repressors in their attentional and behavioural style (Mogg & Bradley, 2002). It was predicted that socially-anxious people manage their attentional and behavioural style in
opposite ways. At the pre-attentional level, socially-anxious individuals are vigilant to social threat while repressors avoid attending to this threat. However, at a conscious or attentional level they do the opposite, with socially-anxious individuals avoiding social threat while repressors, unlike low-anxious individuals, engage in social interaction to placate their anxiety. A second prediction was that, at a pre-attentional level, repressors would become more avoidant of social threat compared to low-anxious individuals but be more attentive to happy faces at an attentional level.

Three models of trait anxiety were considered as a basis for this research. Several studies were used to address the pre-attentional and attentional biases in socially anxious, repressors and low-anxious individuals. The first study was a facial recognition study where contrary to expectations, there was an attentional capture effect. Attention to emotional faces was captured by both socially anxious and repressor groups, in both the implicit and explicit (masked and unmasked) condition. Furthermore, low-anxious individuals were significantly faster to react to probes that replaced emotional and neutral faces in both the masked and unmasked condition. Unlike the socially anxious and repressors, the low-anxious individuals’ attention was not captured by emotional faces. Further, repressors were more attentive to happy faces in the unmasked condition when compared to low-anxious individuals.
The second study was a reaction time test to investigate implicit beliefs using the Implicit Association Test. Contrary to the prediction that the socially-anxious individuals and repressors would implicitly associate positive words to ‘lone’ activities and negative words to ‘social’ activities, both predispositions associated positive words to ‘social’ activities and negative words to ‘lone’ activities.

The third study was a memory task (Remember & Know Test) used to investigate whether socially-anxious individuals and repressors remember faces in the same way. This study focused on the difference between the recall of emotional faces and the familiarity of these faces. It was predicted that socially anxious individuals would ‘know’ more angry faces and ‘remember’ less, and repressors would do the opposite, namely ‘remember’ more angry faces but ‘know’ less. The results indicated that repressors were no better than other predispositions at remembering faces. Secondly, there were no significant differences between recall and familiarity of emotional faces by either socially-anxious individuals or repressors, when compared to low-anxious individuals.

The fourth study was a face-rating task to examine interpretive and attributional biases. It was predicted that socially-anxious individuals would rate emotional faces more intensely compared to repressors. This was based on the Eysenck’s (1997) view of opposite interpretive biases in these predispositions where maximising or minimising of emotional stimuli is evident. The results
showed no significant differences in face rating between these predispositions and low-anxious individuals.

A final study was an attributional task. This task examined the errors that participants made when identifying faces. The prediction was that repressors would make more positive attributions and socially-anxious individuals would attribute with less positive ones. The results showed that socially-anxious individuals attributed angry faces as sad faces and repressors attributed sad faces as angry faces. These results did not confirm the hypothesis.

The overall results indicate that socially-anxious individuals and repressors are anxious individuals who at an implicit level need the company of others (need of approval). The difference between them is that socially-anxious individuals are anxious about being with others (fearing scrutiny, humiliation and disgrace) (Clark & Wells, 1995) while the repressors are anxious about making an impression (based on their need for approval) (Paulhus, Fridhandler, & Hayes, 1997). Their coping behaviours play out in different ways raising further questions about the categorisation of socially-anxious individuals and repressors in psychological research. When low-anxious individuals are characterised by high defensiveness they cannot be labelled as ‘truly’ low-anxious, despite the similarity of their behaviours. Distinguishing between repressors and low-anxious individuals is an important consideration in research.
Declaration: I declare that this thesis is all my own work and has not been submitted previously, in whole or part, in respect of any other academic award at this University or elsewhere.

Arend Tibben.
ACKNOWLEDGEMENTS

I would like to acknowledge the many individuals who have contributed to this research

Particular thanks go to my supervisor Professor Jim McKnight (University of Western Sydney) for the opportunity, encouragement and guidance for this thesis. To Associate Professor Lynne Harris (Sydney University) for her direction and assistance, not only in statistical analysis but also her endeavours to make this area of clinical research more public. Also to Associate Professor David Russell, who provided support, direction and encouragement during this endeavour.

I also express my extreme gratitude to my family and especially my wife Ekkie without whom I would have not completed this piece of work. They were a constant source of encouragement. I am also especially grateful to my daughter Elisa who was patient enough to read my drafts. A further thank you must go to Tetske Johnston for allowing me space in a shopping complex to take photographs, also teachers from the Sutherland Shire Christian School and actors from the Sutherland Shire Drama group, who allowed me to take their photographs.
TABLE OF CONTENTS

ABSTRACT

CHAPTER 1 INTRODUCTION

1.1 The Impetus for this Study ............................................................... 1
1.2 Differences between Social Anxiety and Social Defensiveness ..... 3
1.3 Three Models of Anxiety................................................................. 7
1.4 Three Areas of Interest .................................................................. 8
1.5 A Paradoxical Relationship between Social Anxiety and Repression? ................................................................................ 9
1.6 Comparing the Behaviours of Low-anxious Individuals and Repressors ................................................................................ 12
1.7 Introduction and Background ......................................................... 13
1.8 Historical Reasons for Using Social Defensiveness....................... 15
1.9 Social Anxiety and the Problem of Comorbidity ........................... 17
1.10 The Relevance of Social Anxiety and Social Defensiveness ......... 18
1.11 Three Models of Trait Anxiety....................................................... 20
1.12 Implicit and Explicit Attentional Processes ................................... 27
1.13 Summary ........................................................................................ 28
1.14 Tests Used In This Thesis .............................................................. 34

CHAPTER 2 ATTENTIONAL PROCESSING OF EMOTIONAL FACES

2.1 Pre-attentional and Attentional Processing of Emotional Faces ... 39
2.2 Introduction to Attentional Biases.................................................. 41
2.3 Pre-Attentional and Attentional Processing ................................. 43
2.4 Literature Review of Attentional Processing ................................. 45
2.4.1 Face-in-the-Crowd Studies............................................................. 45
2.4.2 Stroop Test in Social Anxiety and Repressors ............................... 47
2.4.3 Stroop Effect in Repressors Show Conflicting Results................. 48
2.4.4 Attentional Capture or Perceptual Avoidance?.............................. 50
2.4.5 Visual Dot Probe (Social Anxiety).................................................. 52
2.4.6 Vigilance and/or Avoidance (Social Anxiety) ............................... 56
2.4.7 Visual Dot Probe (Repressors) ....................................................... 60
2.4.8 Vigilance-Avoidance Patterns in Repressors ................................. 64
2.5 Considering These Processes in the Light of Trait Models............ 68
2.6 Two Propositions............................................................................ 71
2.7 Method............................................................................................ 73
2.7.1 Participants..................................................................................... 73
2.7.2 Materials ......................................................................................... 74
2.7.2.1 Tests Used and Selection Criteria................................................... 74
2.7.2.2 Preparation of Face Stimuli........................................................... 76
Table 2.1 Correlation between Questionnaire Measures. ............................................. 83
Table 2.2 Mean Questionnaire Scores (standard deviations in brackets) for the Four Groups. ........................................................... 85
Table 2.3 Mean Response Latencies (in msec) for each Face Condition (congruent vs. incongruent) in the Masked Visual Probe Task for the Four Groups. ......................................................... 86
Table 2.4 Mean Response Latencies (in msec) for each Face Condition (congruent vs. incongruent) in the Unmasked Visual Probe Task for the Four Groups. ................................................................. 87
Table 2.5 Mean reaction times scores for masked and unmasked emotional face-neutral pairs neglecting congruence/incongruence ........................................ 90
Table 2.6 Group Differences, with Mask (2) X Emotion (3) X Congruence (2) ...................................................................................... 93
Table 3.1 Conceptual Outline of the procedure as basic components of the Implicit Association Test (IAT). .............................................. 143
Table 3.2 This experiment classifies two categories of words, namely attributional (positive and negative) words, and target (social and non-social) environments. ......................................................... 144
Table 3.3 Task sequence of the IAT valanced words (positive and negative) and social environment (social and alone) words. ........................................... 147
Table 4.1 Remember and Know Proportional (hits) ..................................................... 183
Table 5.1 Summary of Hypothesis of Interpretive and Attributional Bias ............. 198
Table 5.2 Means of Face Intensity rating .................................................................... 201
Appendices

Appendix A  Eysenck’s Personality Questionnaire (EPQ-R) Table…………………307
Appendix B  Informed Consent Form…………………………………………………308
Appendix C  Face Rating Form……………………………………………………….309
Appendix D  Example of Photos used in the Dot Probe Test…………………310
Appendix E  Graphical representation of Face and Probe Positions
             and reaction times…………………………………………………………324
Appendix F  Graphical Representation of Vigilance to
             Emotional Faces. ……………………………………………………330
Appendix H  Photos of 48 Faces used in the R and K Test…………………331
CHAPTER ONE
INTRODUCTION

1.1 The Impetus for this Study

The initial impetus for this present study arose from a previous masters level thesis on cognitive distraction tasks used in a clinical setting to reduce anxiety. At this point Freudian formulations of anxiety and defensive adaptation were of interest as the finer points of defensive reactions were considered in the post-thesis period. It seemed that modern literature on the subject had conflated several types of anxiety that Freud and his successors were at pains to delimit. As the literature on trait and social anxiety was read and juxtaposed it seemed that extensive conflation and mislabelling were perhaps contributing to often times confusing and contradictory results across studies by researchers addressing these issues. For example, defensiveness as an important aspect of anxiety research is frequently neglected and misattributed as low anxiousness. If this were the case there would be considerable implications for clinical investigation and treatment (Bogels & Mansell, 2004; Brewin, 1997; Mogg, Stopa & Bradley, 2001).

This informal literature review raised more questions than it answered. It seemed that there are cognitive attentional biases in our responses to anxiety and that these differ when anxiety is defined in differing ways. At a first brush
with the literature it seemed that the social anxiety literature was identifying differing pre-attentional and attentive (conscious) biases between high socially-anxious and normal individuals. Differing stimuli and in particular threat was capturing the attentional process and dictating responses. However, there are several models in the literature, these defined anxiety and its reactions differently making it difficult to compare, and contrast reported results.

One obvious disjunction was the treatment of the high socially-anxious and repressors. Following Freud these might be expected to react to high anxiety stimuli in very different ways even if the outcomes were similar behaviourally. That is, it seemed that differing processes were being confused with similar behavioural outcomes. Further reading demonstrated an awareness of this issue in theorists and researchers leading the debate but little had entered the literature to address the specific issues, which became the question for this thesis.

As the literature review progressed the focus tightened to considering possible misattributions of common defensive processes in two very dissimilar groups – repressors and social phobics. This then became the genesis of this doctoral study.
1.2 Differences between Social Anxiety and Social Defensiveness

This thesis investigates the cognitive differences between socially-anxious individuals, repressors and low-anxious individuals. There are several areas of interest in this thesis. First, it is proposed that there is an opposite relationship between the cognitive behavioural processes in socially-anxious and repressor individuals when confronted by social threat. Namely, that pre-attentional, attentional and interpretive biases are opposite to one another in each predisposition that manifests itself in opposite behavioural coping strategies. Eysenck (1997) proposed that trait-anxious individuals and repressors have opposite attentional and interpretive biases (Eysenck & Derakshan, 1997b). At a pre-attentional (perceptual) level, anxious individuals are vigilant to social threat while the repressors avoid this threat. At an attentional (conceptual) level, however, they do the opposite, namely, the anxious individual avoids social threat while the repressor engages in social situations. Second, low-anxious individuals and repressors are often seen as the one group as their surface level behaviour is similar (both display socially desirable behaviours. Defensive aspects of these groups are frequently overlooked. Finally, there are three trait-anxiety models in which only one model (Eysenck, 1997) addresses repressors (defensiveness). Both Williams, Watts, MacLeod and Mathews’ (1988, 97), and Mogg and Bradley’s (1998) models do not address repressors specifically (see Fig 1). This is a shortcoming considering that defensiveness is an important aspect of anxiety. Whereas low-
anxious individuals and repressors may present behaviourally similar, they appear to be cognitively different. It is important to examine the nature of social anxiety and social defensiveness in this context.

Both socially-anxious individuals and repressors can be seen as anxiety conditions (i.e., defensiveness is as much an anxiety state as is social anxiety). Research has shown that both socially anxious individuals and repressors elicit a physiological response when confronted with implicit social threat (Eysenck, 1997; Gudjonsson, 1981). This is not so for low-anxious individuals who do not to have this reaction unless the threat is real. Interestingly the behavioural coping responses of socially anxious individuals and repressors appear to be opposite to one another at different levels. For example, at a pre-attentional level socially-anxious individuals are vigilant to potential social threat stimuli whereas at an attentional level they avoid social activities. Repressors, on the other hand, do the opposite. They avoid attending to social threat (pre-attentionally), however, at an attentional level they engage in socially desirable behaviours. At the implicit and explicit levels, both these groups are quite opposite in nature which leads to speculation as to the nature of these social coping strategies and what motivates them. Low-anxious individuals appear to utilise both vigilant and defensive strategies appropriate to the social situation whereas excesses of these attentional behaviours in socially-anxious individuals and repressors, leads to psychopathology.
Socially-anxious individuals are preoccupied with issues of social shame, humiliation and disgrace in the social environment and they prefer not to be under the scrutiny of others (especially in a performance situation). The repressors, on the other hand, do the opposite with a need to be engaged with people to overcome their inherent anxiety, and act very much like low-anxious individuals (Paulhus, Fridhandler, & Hayes, 1997). Frequently, repressors are labelled as optimists, extroverts and outgoing. Several commentators have suggested that repressors are self-deceivers unaware of their over-engaging behaviours (Derakshan & Eysenck, 1999; Paulhus, Fridhandler, & Hayes, 1997). Paulhus et al., (1997) further suggest that work colleagues become aware of a lack of genuineness in defensive individuals, despite their positive level of social involvement. Paulhus argues that repressors have a high need for approval and could be classed more as self-deceivers than other-deceivers. That is, they themselves are not aware of their anxiety or their socially desirable behavioural repertoire initiated to reduce anxiety. This raises the question as to the motivation that underpins these two contrary behaviours in reaction to implicit social threat. The idea that implicit social threat initiates a physiological response which motivates the repressor’s need for approval (and social involvement) and the socially-anxious individual’s fear (scrutinising by others) and the avoidance of social situations, is an intriguing question. It is proposed that the coping behaviours of these two groups may be generated by different motivations despite the fact that they are related to the social environment.
Coping with anxiety is important for positive social relationships. The ability to control behaviour appropriately is an essential life skill, not withstanding that, to some degree, both anxious and defensive behaviours are used to construct appropriate social boundaries and sustain communications in social situations.

An important aspect of cognitive functioning that is often neglected in anxiety studies is the concept of defensiveness. Eysenck (1997) in his four-factor theory of trait anxiety labels low-anxious, highly defensive individuals as repressors. They present similarly to low-anxious individuals, however, unlike them, repressors react physiologically similar to anxious individuals when confronted by threat and, they use different cognitive and behavioural strategies to manage their social environment. Eysenck (1997) suggests that repressors avoid anxiety because they have an opposite attentional and interpretive bias to anxious individuals. These biases assist repressors in avoiding threat related information and/or accessing negative long-term memories.

This research focuses on the attentional, interpretive and memory processes of socially-anxious individuals, repressors and low-anxious individuals. Little research has been done in the area of defensiveness as it is often labelled as low anxiousness. Eysenck’s (1997) model includes repressors, whereas other models of trait anxiety neglect defensiveness as a category. This thesis tests Eysenck’s notion of defensiveness as being distinct from social and
low anxiety. It is important to distinguish social anxiety from defensiveness since they both manifest an anxious reaction at a pre-attentional and attentional level despite the fact that defensiveness is often seen as low anxiousness.

1.3 Three Models of Anxiety

This research was based on three models of anxiety, from Eysenck, (1992, 97), Williams et al., (1988, 97) and Mogg and Bradley (1998). All of these models used trait and state anxiety to examine attentional and interpretive processes. While this research approach is useful and productive, in this present thesis social anxiety was used and followed the suggestion by Mogg and Bradley (2002) who proposed that social anxiety is a greater predictor of attentional orientation to perceived social threat than trait anxiety (see also Garner, Mogg, & Bradley, 2006). There are several differences between these models, which provide the context for this research. Importantly, Eysenck’s model is the only one that considers defensiveness as a separate category. The models by Williams et al., (1992, 97) and Mogg and Bradley (1998) only use anxiety and low anxiousness as categories. This discrepancy does not allow for an easy comparison and questions the concept of defensiveness as an authentic and separate label. Eysenck (1997) advocates a model based on opposite attentional and interpretive processes where vigilance or avoidance is an initial response to perceived threat, depending on whether one is anxious or defensive. He found that low-anxious individuals do not have an attentional bias either
way. William’s (1988, 97) model proposes that high trait-anxious individuals are vigilant and low-trait anxious individuals are avoidant. However, the distinction between defensiveness and low-anxiety is not made. Their premise is that low-anxious individuals continue to be avoidant as threat increases. This is different again to Mogg & Bradley (1998) who felt that trait anxiety does not determine the direction of attention but merely amplifies or attenuates vigilance depending on the nature of the threat. Individuals in this model are understood to have a ‘quiescent’ avoidance bias, a bias that counters incidental and spurious interference and allows the individual to continue to be goal directed. For low-anxious individuals this bias is stable. When the threat is real however, low-anxious individuals become vigilant to the threat and remove attention away from current goals. As with William’s (1988, 97) model, defensiveness is given low priority. All of these models emphasise the differences between high and low-anxious individuals, but Eysenck’s (1997) model includes defensiveness as a characteristic frequently ignored in anxiety research. The questions in this research are based on the differences in these trait models but in the social context. It is in the social context that defensiveness becomes an important consideration.

1.4 Three Areas of Interest

The above raises three areas for discussion. First, is there a paradoxical relationship between the cognitive and behavioural processes in socially-
anxious individuals and repressors? Namely, that pre-attentional and attentional cognitive process is opposite to one another in each predisposition, which manifests itself in different behavioural coping strategies. Second, if the behaviours of low-anxious and repressor individuals are similar, are they often mislabelled in psychological research? Derakshan and Eysenck (1998) propose that even if an individual scores low on trait anxiety it does not mean that individuals should be labelled as low-anxious as defensiveness is also an important consideration. Both low-anxious individuals and repressors behave positively and sociably, however the motivations underpinning these behaviours appear to be very different. Third, are the interpretive and implicit belief structures of socially-anxious individuals and repressors different? The question as to what implicitly motivates individuals to attend to or avoid social situations is also important. Given the role of attentional and/or memory-driven processes in social anxiety, the differences between social defensiveness and low anxiety is important from a clinical perspective, and provided the impetus for this thesis. A more detailed consideration of these issues follows.

1.5 A Paradoxical Relationship between Social Anxiety and Repression?

The behaviour of socially anxious individuals and repressors appears, at first glance, to be quite different and distinct. However, both appear to be
associated with very similar goals - achieving a satisfactory level of personal self-regulation and coping in social relationships. Both use very different cognitive and behavioural strategies when compared to low-anxious individuals. These strategies appear to be paradoxical in nature. Eysenck (1997) proposes that trait-anxious individuals and repressors have opposite attentional and interpretive biases. At a pre-attentional (perceptual) level, anxious individuals are vigilant to social threat while repressors avoid this threat. At an attentional (conceptual) level however, they do the opposite (the anxious individual avoids social situations while the repressor engages in them).

Socially-anxious individuals preferentially facilitate social threat (i.e., they are attentionally hyper-vigilant towards social situations or social threat), while repressors have a pre-attentional bias to inhibit it by directing their attention towards the social environment (i.e., repressors vigilantly avoid processing threat situations and distract themselves through socially desirable behaviours) (Eysenck & Derakshan, 1997a; Mogg & Bradley, 2002; Mogg et al., 2000; Rapee & Heimberg, 1997). Those with social anxiety overestimate potential threat and repressors underestimate it (Clark & Wells, 1995; Eysenck, 1997; Foa & Kozak, 1986; Lucock & Salkovskis, 1988). Where socially-anxious individuals avoid the company of others, repressors use socially desirable behaviours to maintain social relationships (Burgess et al., 2001; Clark & Wells, 1995; Weinberger, 1990). Socially-anxious individuals underrate their
own public performance while repressors do the opposite (Derakshan & Eysenck, 1997a; Rapee & Lim, 1992). Both over-estimation and under-estimation of threat have detrimental consequences in social situations (Rapee & Heimberg, 1997). Those who continually overestimate social threat will reinforce their vigilance to similar stimuli. Moreover, they will interpret benign or ambiguous social situations as unsafe. Alternatively, those that underestimate social threat will be vulnerable by prematurely dismissing the real danger. For these individuals there would be a sense of naivety or ‘disassociation’ from the reality of the situation when compared to those who appear more vigilant and realistic about their environment (Paulhus, Fridhandler, & Hayes, 1997). The different and opposite nature of these two predispositions was of interest in this thesis in that both socially-anxious individuals and repressors have the same physiological reaction to social threat but their implicit cognitive strategies and explicit coping behaviours are opposite to one another. This thesis compared these distinctions to examine the cognitive behavioural processes inherent in socially-anxious individuals and repressors. The following discussion compares the behaviours of low- anxious individuals and repressors. Eysenck (1997) was the only researcher who addressed this issue in detail, suggesting that defensiveness was a significant element of anxiety and is frequently mislabelled as low anxiousness (see Broomfield & Turpin, 2005).
1.6 Comparing the Behaviours of Low-anxious Individuals and Repressors

Theorists have difficulty in distinguishing defensiveness (repressors) from low-anxious individuals because the self-reported behaviours of both are similar (Eysenck, 1997). Repressors present similarly to low-anxious individuals in that they display socially desirable behaviours and appear confident, if not over confident, of their abilities (Derakshan & Eysenck, 1997a; Furnham, Petrides, & Spencer-Bowdage, 2002). Yet there is data to suggest that repressors are, in fact, anxious individuals ‘pretending’ to be sociable (Paulhus, 2001; Palyo & Beck, 2005). Frequently they are labelled as optimists, extroverts and outgoing (Ceschi, de Linden, & Pihet, 2005; Myers & Brewin, 1996; Myers & Reynolds, 2000). They cope with their anxiety by ‘acting out’ in social situations. However, they appear to do this in a ‘dishonest’ way, a way that they themselves are not aware of (Derakshan & Eysenck, 1999; Myers, 2000; Newman, Duff, & Baumeister, 1997). Commentators have described these defensive individuals as “impression managers”, “fake goods”, “liars” and “self-deceivers” (Derakshan & Eysenck, 1999a; Paulhus, Fridhandler, & Hayes, 1997). Paulhus (1984) suggests that repressors have a heightened “need for approval” that promotes socially desirable behaviours. This motivation reduces genuineness and balances in social interaction, in that, repressors are not aware of their own relational style. According to Paulhus (1984) other individuals become aware of this lack of genuineness after some weeks of association.
These behaviours appear to override the fear of social threat. It appears as if repressors experience anxiety at a pre-attentional level. Rather than being vigilant to social threat, they use cognitive avoidance as an initial response, focusing on receiving the approval of others. Low-anxious individuals, by way of contrast, do not have this need and respond appropriately to the nature of the social situation. A repressor’s interactions with the social group is opposite to socially-anxious individuals, who, rather than respond optimistically, tend to be apprehensive and consequently would rather avoid social situations. Clark and Wells (1995) also suggest that individuals with social anxiety are also impression managers but are afraid to show it (Clark, 2001; Clark & Wells, 1995).

1.7 Introduction and Background

Contrary to previous attentional research, which uses trait anxiety as a measure, this thesis proposes that social anxiety is particularly pertinent to social defensiveness (Derakshan & Eysenck, 1997a; MacLeod & Rutherford, 1992; Mogg & Bradley, 2002). Social anxiety although highly correlated with trait anxiety carries with it the specific social connotations and comorbidity with other psychological labels (avoidant personality disorder, shyness, social phobia) (Rapee, 1995; Sanderson, DiNardo, Rapee, & Barlow, 1990) which is pertinent to social defensiveness. Where trait anxiety is seen as an enduring personality characteristic that predisposes individuals to interpret situations in a threatening and dangerous way, social anxiety focuses more on elevated anxiety.
when under the scrutiny of others. Furthermore, repressors, although often labelled as low-anxious individuals, display the same physiological reactions to social threat as anxious individuals which suggests that they are implicitly socially-anxious individuals but who manage to behave in a similar manner to low-anxious individuals.

Several research areas shed light on the relationships between the socially-anxious, repressor and low-anxious individuals and are used to formulate the questions for this thesis. First, to consider is a brief review of the historical relationship between anxiety and defensiveness (Eysenck, 1997; Freud, 1915/1957; Weinberger, 1990; Westen, 1998). Second is the difficulty in defining social anxiety considering the comorbidity with other labels associated with anxiety in social situations (Henderson & Zimbardo, 2001; Rapee, 1996; Rapee & Heimberg, 1997). Third to consider is that questions generated in this thesis stem from three very different trait anxiety models, namely models by Williams et al., (1988, 97), Eysenck (1992, 97) and Mogg and Bradley (1998). Fourth, it is important to note that, regarding vigilance and avoidance of feared stimuli, social anxiety models depend on trait anxiety assumptions, even though social anxiety is quite different to trait anxiety (Eysenck, 1997; Rapee, Sanderson, & Barlow, 1988). Comparing these models provided the questions for this thesis.
1.8 **Historical Reasons for Using Social Defensiveness**

Anxiety and repression in a social context has a rich historical tradition that sets the context for current clinical research (Hock, 1993; Krohne, 1993; Weinberger, 1990; Westen, 1998). Although most of Freud’s deliberations were based on parental and early sexual/social interactions manifesting themselves at particular ages, he found that individuals used both anxious and defensive behaviours in social relationships (Freud, 1915, 57). These experiences initiated future anxiety symptoms and/or produced memories that were repressed but which influence present social behaviour. Initially he regarded repression as "motivated forgetting, intentional failure to access information stored in memory"; and eventually he came to define repression as a "systematic avoidance of potentially threatening material in thought or social experience" (Singer & Sincoff, 1990, p474). He initially considered that repression led to anxiety, however he later suggested that repression was the alleviation of anxiety (Freud, 1953). Freud suggested that anxiety is associated not only with vigilance to potential threat but also avoidance. It is argued that avoidance, denial or dissociating oneself from potential threat does not alleviate anxiety symptoms rather, avoidance may just as well increase anxiety (two sides of the same coin). For example, in the social context, when one attends to potentially threatening stimuli, avoidance of other possible threatening stimuli (or unknown stimuli) is naturally present. By its very nature, vigilance includes avoidance which is another source of anxiety. In this thesis it is suggested that hyper-
vigilance can apply to both attention and avoidance (see also Mogg, Stopa, & Bradley, 2001).

When considering the social anxiety literature the problem of attention and avoidance is also prominent. The debate as to whether socially-anxious individuals vigilantly monitor the social environment, direct their attention to themselves, or use other strategies to avoid attending to social scrutiny is still continuing (Rapee, 1996; Rapee & Heimberg 1997). Amir and Foa (2001) concluded that attentional and interpretative biases are responsible for the development and maintenance of social anxiety/phobia. More specifically, the authors suggest that socially-anxious individuals show a vigilance-avoidance pattern of information processing of threat-relevant information which may contribute to the maintenance of the problem (Amir & Foa, 2001). The deliberations mediating ‘hyper-vigilant’ attention and ‘flustered’ escape, in one sense, appear to set the pre-attentional and interpretive process on an irreconcilable, irretrievable, and uninterruptible pattern of social anxiety. It is acknowledged that the label of ‘social anxiety’ spans several psychological categories with ongoing debate as to specificity (Clark & Wells, 1995; Crozier & Alden, 2001; Rapee, 1996; Wilson & Rapee, 2005).
1.9 Social Anxiety and the Problem of Comorbidity

The problem of comorbidity with other labels such as shyness, social phobia and avoidant personality disorder exists (Hofmann, Heinrichs, & Moscovitch, 2004). Rapee (1995) believes that if avoidant personality disorder represents the upper end of the continuum, and shyness the lower end, social phobia is towards the upper end of the continuum (Crozier & Alden, 2001). Chavira, Stein, and Malcarne (2001) in their spectrum, suggest gradations of shyness where ‘average’ levels of shyness are considered normative and are placed at one end of a continuum (40-60th percentile) increasing in severity where generalized social phobia and avoidant personality disorder are scored in the upper decile (>90th percentile).

Little empirical support exists for the notion that some individuals may meet the criteria for avoidant personality disorder without also meeting the criteria for social phobia (Hofmann & DiBartolo, 2001; Widiger, 2001). Interestingly, in the Widiger (2001) study, very shy individuals with a major depression diagnosis were more likely to have a social phobia diagnosis than those without a major depression diagnosis. Eysenck (1997) in his new theory of trait anxiety suggests a widespread comorbidity among anxiety disorders where social phobia’s main emphasis is on self-focussed negative behaviours. Rapee, Sanderson, & Barlow, (1988) also report that generalised anxiety disorder
(GAD) is associated largely with social anxiety. Therefore, it can be reasonably assumed that trait anxiety is evident in social anxiety (Rapee & Barlow, 2001).

1.10 The Relevance of Social Anxiety and Social Defensiveness

It is proposed that both social anxiety and social defensiveness are integral to healthy social relationships. Both elements in mild degrees contribute to and facilitate social interaction. Excess of either lead to psychopathology. As already mentioned, much of the previous attentional research uses trait anxiety and defensiveness rather than social anxiety. Although trait anxiety is prevalent in all types of anxiety, it is argued in this thesis that social anxiety is more pertinent since both anxiety and defensiveness is significantly prevalent in social interaction (Bradley et al., 1997; Derakshan & Eysenck, 1997a; MacLeod & Rutherford, 1992; Mogg & Bradley, 1999). Keeping in mind that repressors report low trait anxiety, Mogg and Bradley (2002) argue that social anxiety is a better predictor than trait anxiety of attentional bias in social situations. Socially-anxious individuals were very much faster to respond to masked threat faces compared to neutral faces. They reported that a vigilance effect appeared primarily as a function of social anxiety and social avoidance (Eysenck, 1997; Mogg, Philippot, & Bradley, 2004; Stopa & Clark, 2000).
With social defensiveness there appears to be an opposite effect when compared to social anxiety. Mogg et al. (2000) found that highly defensive individuals (repressors) avoided processing of social threat words and were faster to respond to neutral words. Furthermore, they were also more efficient in colour naming social threat and physical threat words in the Stroop test (Jansson, Lundh, & Oldenburg, 2005). This suggests that social defensiveness is associated with ignoring or overriding threatening stimuli. In other studies, repressors (and low-anxious individuals) showed no bias to either threat or positive stimuli (Brosschot, de Ruiter, & Kindt, 1999; Ioannou, Mogg, & Bradley, 2004). Repressors self-report show low scores on the Taylor Manifest Anxiety Scale (TMAS; Taylor, 1953) and the Spielberger State Trait Anxiety Inventory (Spielberger et al., 1983) tests. In fact, Byrne (1964) suggested that trait anxiety measures were closely correlated with repressor’s low scores on these scales. Compared to socially-anxious individuals the repressor’s cognitive style appears opposite, and similar to low-anxious individuals. However, it is proposed in this thesis that social anxiety and social defensiveness are ‘two sides of the same coin’ where both of these opposite characteristics are arbitrated in social relations depending on the level anxiety present.
1.11 Three Models of Trait Anxiety

Figure 1.1: Contextual Development of Questions in this Study

Three Models Of Trait Anxiety


Historical Perspectives on Defensiveness (Repressors)

Justification for using social anxiety rather than trait anxiety

Three Models of Social Anxiety (related to attentional differences)

Attention to social threat (Asmundson & Stein 1994; Mogg & Bradley, 2002)

Attention away from social threat (Clark & Wells, 1995; Mansell et al., 1999)

Multi task paradigm (Rapee & Heimberg, 1997)

Present Research Questions and Hypothesis

1) Paradoxical and opposite attentional processes in socially-anxious individuals and repressors.

2) The difference between low-anxious individuals and repressors.
The questions generated in this thesis emanate from three trait anxiety models, Williams et al. (1988, 97), Eysenck (1992, 97) and Mogg and Bradley (1998). However, this thesis asks questions from a social anxiety perspective, specifically, is social anxiety and social defensiveness paradoxical in nature, and why are repressors often not considered, or mislabelled as low-anxious in social anxiety research?

Williams, Watts, MacLeod and Mathews’ (1988) anxiety model integrated the schema and network models of Beck and Bower (Beck et al., 1985; Bower, 1981). Williams et al. (1988) proposed an anxiety model which incorporated a preconscious affective decision network based on affective valence of threat stimuli (also see Graf and Mandler’s, (1984) theory\textsuperscript{13}). This model emphasised two processes, namely an Affective Decision Mechanism (ADM), which monitors the environment for threat and tags the stimulus as threatening or non-threatening, and a Resource Allocation Mechanism (RAM), which directs attention towards threat stimulus, or away from it, depending on the trait predisposition of the individual. If the individual is a high-trait anxious person, attentional vigilance is directed toward the threat stimuli whereas a low-anxious individual’s attentional bias is directed away from the threat stimuli.

In a later revision of their model, Williams et al. (1997) suggested that the Internal Decision Mechanism was not a stable mechanism but that encoding
and recall of threat stimulus was based on more subtle tagging (biological preparedness/learning) to input units (threat valence) (see also Bond & Siddle, 1996; Ohman, 1996). In this revision, the Task Demand Unit (TDU) rather than the Resource Allocation Mechanism (RAM) allocates attention resources toward or away from stimuli that has been identified as threatening. In Williams’ (1988) earlier model the RAM component determined the direction of attention depending on whether the person was high or low in trait anxiety depending on flagged ‘threat’ or ‘non-threat’ conditions. In Williams’ (1997) model it was acknowledged that it was not simply an issue of flagged threat value but that there were numerous contributors to what constituted threat (environmental, state anxiety, etc.,). He renamed this component as the TDU acknowledging the connectionist aspects of threat evaluation.

Williams et al. (1997) emphasised the preconscious attentional bias to threat anxiety. At a pre-attentive level, the highly anxious are permanently sensitised to threat while the low-anxious waste few resources attending to it. Both preconscious and strategic cognitive factors are involved in the attention, appraisal and resource allocation according to the Williams’ (1997) model (see also Beck & Clark, 1988 and MacLeod, 1998). It is important to note that defensiveness was not considered as a separate condition in Williams’ models though defensiveness could be understood to be incorporated under the low anxious label. Defensive individuals are often viewed as low anxious.
Furthermore, in trait anxiety models, generally high or low anxiety labels are used, neglecting the concept of defensiveness. The Williams’ et al. (1988, 97) model is widely accepted and is incorporated in subsequent models of anxiety.

Eysenck’s (1992) hyper-vigilant model was similar to Mathews (1990), which was based on Williams et al. (1988). Eysenck (1992) associated trait anxiety with generalised anxiety disorder and postulated a selective attentional and interpretive bias for threat stimuli. In Eysenck’s (1997) ‘four factor theory’ of anxiety he distinguished between low-anxious individuals and repressors. Eysenck (1997) proposed a trait anxiety model that emphasised defensiveness, suggesting that repressors, although portraying the behaviours of low-anxious individuals, responded physiologically in a similar manner to high-anxious individuals when confronted by social threat. However, in terms of attentional and interpretive bias, repressors avoided social threat and interpreted ambiguous stimuli as non-threatening whereas high-anxious individuals were vigilant towards social threat, and interpreted ambiguous stimuli as threatening (Eysenck, 1997; Derakshan & Eysenck, 1997b). Low-anxious individuals, according to Eysenck, did not display a bias either to attend or avoid (see also Fox, 1993, 94). Important in Eysenck’s model is that low-anxious individuals are not predisposed to an attentional bias. Contrary to the Williams’ (1988, 97) model, Eysenck (1997) appeared to view avoidance as a ‘defensive stature’, implying that effort was required to avoid distracting threat stimuli. Low-
anxious individuals did not have the implicit need to be defensive, they could simply ignore spurious stimuli without spending resources. This is different to Mogg & Bradley (1998) where the low-anxious individual is ‘quiescently’ biased away from distracting stimuli to goal-directed behaviour but will pay attention if the threat is real. Defensiveness as a separate label seems not to have been considered. However, they postulate a vigilant /avoidance pattern of attentional bias likely to attend to the increased detection of minor threats in the absence of prolonged exposure (monitoring of threat vs. avoidance; reduction of subjective discomfort) (Mogg & Bradley, 1998). The idea that an individual would always avoid or escape/hide/disassociate when under extreme stress is not addressed in this model.

Mogg and Bradley (1998) proposed a cognitive motivational model of anxiety. Distinctive within this cognitive framework is emotional valence and goal engagement. Parallel components of biological preparedness, prior learning, state anxiety, situational context and the stimulus input are presented to a Valence Evaluation System (VES). Trait anxiety levels bias the VES towards a level of vulnerability to high or low threat. A Goal Engagement System (GES) then suggests that low-anxious individuals do automatically avoid threat stimuli but it depends on the nature of the goals being pursued. The GES default position is that people pursue their current goals until interrupted by a genuine threat. The resting bias of low-anxious individuals is, however,
towards avoidance of threat (Mogg & Bradley, 1998). The level of genuine threat is biased by levels of valence, evaluation (and state anxiety) and trait anxiety. Low trait-anxious individuals would be more likely to pursue their goals rather than be distracted by spurious and non-threatening stimuli, whereas high trait-anxious individuals are constantly vigilant to threat. The idea that low-anxious individuals are biased to avoid threat until real threat is sensed is an important aspect of Mogg and Bradley’s (1998) model because under this condition, spurious distractions are dismissed, and current goals are pursued until threat is real. It is important to note that models of social anxiety neglect defensiveness as a viable alternative to low anxiousness however, some models do suggest that socially-anxious individuals vigilantly direct their attention away from social threat situation towards their own physiology when perceived to be under scrutiny from others (Mansell, Clark, & Ehlers, 2003).

Repressors are observed by Eysenck (1997) to have an opposite attentional and interpretive bias compared to trait anxious individuals. Rather than vigilance to threat stimuli, they ‘vigilantly’ avoid threat. When compared to low-anxious individuals, repressors interpret public speaking situations as being exciting or challenging (Derakshan & Eysenck, 1997b). Williams (1988, 97) does not address defensiveness but suggests that the trait predisposition of an individual determines the direction of their attentional bias. Low trait-anxious individuals can be considered repressors in this context. The
implication is that the higher the social threat the greater the avoidance. This seems unreasonable as it can be viewed as ‘putting one’s head in the sand’. This is unlike Mogg & Bradley’s (1998) model where low-anxious individuals do attend to threat when it becomes real. Mogg and Bradley (1998) likewise neglect defensiveness, however, as previously suggested low-anxious individuals are biased to get on with their goals until the nature of the threat becomes real and only then will they become vigilant to the threat stimuli. It could be surmised that if repressors (overly defensive) did exist in Mogg and Bradley’s (1998) model they would be immediately launched into one of two attentional coping strategies if under social threat. Either these are towards goal-directed behaviour (seeking social approval/extraversion) or a second option is that they may become more avoidant than low-anxious individuals similar to Eysenck’s model.

Defensive avoidance of social threat may be as great a contributor to anxiety as vigilance (Holmes, 1990; Weinberger, 1990). This was Freud’s predicament and he changed his mind several times when considering these processes (Freud, 1915/57; Singer & Sincoff, 1990; Westen, 1998). This begs the question - are anxiety and defensiveness two sides of the same coin? Both vigilant attention and/or vigilant avoidance contribute to anxiety. The aim of this research is to examine the attentional and interpretive processes of socially-anxious individuals and repressors compared to low-anxious individuals.
1.12 Implicit and Explicit Attentional Processes

The notion that implicit processing of threat can elicit a physiological response that is then translated into differing strategic coping responses, suggests a central ‘decision making mechanism’ that unthinkingly directs an individual to a course of action that is difficult to inhibit (Ohman, 1996). However, successive stages of information processing become more consciously motivated to strategically manage and control behaviours. Pre-attentive bias toward threat then, is a perceptual process, which automatically orients toward threat stimuli. The second attentional stage is where more strategic and conceptual processes are engaged (see Beck and Clark, 1997; MacLeod, Mathews, & Tata, 1986; Mogg, Mathews, & Eysenck, 1992; Mogg & Bradley, 1999a).

In summary, social anxiety and social defensiveness are an inherent part of managing social situations. Facilitating and inhibiting interactions in social situations are complex skills and assist in authentic communication with others. Overestimating orunderestimating social threat distorts communication and leads to dysfunctional cognitive processing (Mendolia et al., 1996; Rapee & Heimberg, 1997). The following questions, while based on the previous research, attempt to reconcile conflicting theories and, more precisely, delimit definitions. The following hypotheses are based on theories relating to anxiety
and defensiveness and the different (and opposite) nature of attentional and interpretive cognitive process within these two predispositions.

The following series of tests aim to clarify these relationships. The prediction of this thesis is that socially-anxious individuals, at a pre-attentive level will be vigilant towards social threat and, repressors, will avoid social threat at a pre-attentive level. However, at a more attentional strategic level, they will do the opposite, namely, socially-anxious individuals will avoid social situations, but repressors will orient toward social threat, based on the premise that repressors are socially desirable responders in social situations (Clark & Wells, 1995; Paulhus, 1991; Rapee & Spence, 2004; Weinberger, 1990). The examination of these ‘paradoxical’ processes may shed light on the nature of social anxiety and defensiveness in the light of different theoretical positions, models and other considerations.

1.13 Summary

The aim of this thesis is to examine the nature of defensiveness in repressors when compared to social anxiety. This thesis suggests that the beliefs and cognitive biases (attentional and interpretive) in these predispositions are fundamentally different and opposite to one another both at a preconscious (implicit) and conscious (explicit) level. For example, both socially-anxious individuals and repressors react physiologically to social threat yet their coping
behaviours are opposite to one another. Whereas the socially-anxious individuals tend to avoid social situations, the repressors involve themselves with socially desirable behaviours. Furthermore, at an implicit level there is evidence to suggest that socially-anxious individuals are vigilant to social threat but the repressor avoids processing threat at this level (Ioannou, Mogg, & Bradley, 2003). This implies that there is a fundamental difference and apparent bias occurring preconsciously when compared to conscious processing. Consciously, socially-anxious individuals are avoidant of social situations but repressors engage in them.

A second aim is to examine the difference in attentional and interpretive processing between repressors and low-anxious individuals. Both repressors and low-anxious individuals display similar positive behaviours however, this thesis suggests that these social behaviours are differently motivated. At an implicit level, both avoid distracting stimuli, however, repressors, because of their defensiveness tend to continue to avoid threat whether it is perceived or real (Eysenck, 1997). That is, compared to low-anxious individuals, repressors appear to be more avoidant (vigilantly so) at an implicit level, than low-anxious individuals. Mogg & Bradley (1998) show low-anxious individuals as having a ‘quiescent’ avoidance bias that ignores spurious, potentially distracting stimuli that allow them to ‘get on with the job’ (goal-congruent behaviour). However, they will direct their attention to threat that is real. It can be speculated that, if
‘threatened repressors’ were included in Mogg and Bradley’s (1998) model, one of two things might happen. They will either continue to avoid (similar to low anxious individuals in Williams’ model) or, they may become engrossed in their goal directed behaviour, namely seeking social approval. This thesis suggests that most of a repressor’s social desirable behaviours are anxiety-based with a primary ‘approval seeking’ motive. The question needs to be asked, is this an extreme form of avoidance behaviour? It could be suggested that the repressor’s goal (approval seeking) may be an extreme form of avoidance that is displayed as extraversion, but based upon a lie (Eysenck & Derakshan, 1999; Paulhus & John, 1998). However the other notion is that defensive individuals do not avoid social threat at all but make it a primary goal to override their anxiety by becoming socially involved.

The basis for this idea is the difference in cognitive processing between the three trait models as previously discussed. Eysenck (1997) includes an implicit avoidance bias for repressors while the other models do not incorporate the notion of defensiveness at all. Low-anxious individuals in Eysenck’s (1997) model are unbiased, that is, not biased toward attending or avoiding stimuli. Another source for these predictions is based on the Freudian notions of repression where there is the premise of ‘pre-inoculative learning’ (a preconscious ‘turning away’ from negative social situations based on forgotten memories and previous learning-reaction formation) (Baumeister & Cairns,
1992; Erdelyi, 1990; Myers & Brewin, 1995). On this basis the repressor automatically avoids negative affect and portrays behaviours that are socially desirable and acceptable to the group. Although these speculations are open to debate, it does raise questions as to the nature of social defensiveness, especially in models of anxiety that do not include repressors.

Is it possible that repressors dissociate themselves implicitly from social threat whereas socially-anxious individuals are vigilant to it? In fact, is it possible that socially-anxious individuals become so implicitly vigilant that the result is phobia. Alternatively, repressors seem naive to this social threat. As previously suggested, one consideration could be that repressors utilise a cognitive processing style based on forgotten memories on which they now act, and may in fact be ‘inoculated’ against experiencing conscious fear reactions in social situations rather, displaying competent social behaviour (Davis & Schwartz, 1987). These automatic avoidance behaviours then can be viewed from either a ‘phobia’ perspective or a ‘dissociative’ perspective. These differences raise important questions as to the nature of cognitive processing in social anxiety and defensiveness.

Further questions and speculation as to the reason for these differences are based on the notion that social anxiety (with its phobias) is generated from a ‘trait type’ biological (evolutionary) system (amygdala), whereas the repressor’s
reactions are based more on learning and memory loss (hippocampus), where particular memories are preconscious (out of awareness) but still automatically acted on (see Phan, Fitzgerald, Nathan, & Tancer, 2006; Tomarken & Davidson, 1994). These speculations need to be clarified elsewhere but were considerations when formulating predictions for this thesis.

There is one more area of research which suggests that, in some cases, socially-anxious individuals act very similarly to repressors in that they can override their anxiety. That is, they have the ability to engage proficiently when under extreme social stress. For example, it has been shown that when socially-anxious individuals are set a task (speech/performance), they can overcome their anxiety, or at least use the anxiety, to give the ‘perfect’ speech (see Amir, et al., 1996 and Mathews & Sebastian, 1993). Rather than the usual anxiety symptoms (blushing, hesitation etc.), the socially-anxious individual gives a sterling performance despite the level of stress. However, it is argued that repressors have a fundamental different motivation in this context. The proposition is that the socially-anxious individual’s perfection tendencies are driven by personal fear of negative evaluation whereas the issue for repressors is one of naivety and being unaware of his/her anxiety. That is, although the performance might be important, what is at stake is not the ‘perfect speech’ but rather social approval (Clark & Arkowitz, 1975; Eysenck, 1997; Woody, 1996). It is argued that these two motivations stem from different needs. For example,
where a low-anxious individual’s goal may be more ‘task driven’ rather than seeking social approval or a neurotic need for perfectionism.

A further research question is related to the difference between repressors and low-anxious individuals who, in the main, behave similarly in social situations. Personality and psychometric tests have difficulty in separating them as both display and report positive social behaviour. The fact that the repressor reacts physiologically to social threat and the low-anxious individual does not, suggests a fundamentally different impetus. It is important that these distinctions be made in research and the reason why they have been of interest in this thesis. In a clinical setting, this distinction could be important where defensiveness may become an impediment to restoring mental health.

For all the reasons stated previously it is important to distinguish between the personality and cognitive styles of socially-anxious individuals, repressors and low anxious individuals. The overall purpose of this thesis is to examine these ‘fine-grained’ aspects of attentional and interpretive cognitive processing, both at the preconscious (implicit) and conscious (explicit level). The aim is to tease out the implicit beliefs and associations that socially-anxious, repressors and low anxious individuals have. Further, to investigate whether, at a fundamental level, socially-anxious individuals and repressors are both socially-anxious but
have chosen different conscious strategies to cope with their social environment.

It is predicted that there is a ‘paradoxical’ process at work in that socially-anxious individuals will be pre-attentively vigilant to implicit social threat, but at a conscious (attentional) level will be biased to avoid social threat. Repressors on the other hand, will be pre-attentively vigilant to avoid social threat but, at a conscious and behavioural level, cope by increasing socially desirable behaviours. Furthermore, it is predicted that low-anxious individuals and repressors are fundamentally different groups, where low-anxious individuals will be less avoidant of negative social stimuli than repressors.

1.14 Tests Used In This Thesis

To examine these questions, a series of tests focusing on the attentional, interpretive and memory processes of socially-anxious individuals, repressors and low-anxious individuals will be used. Each predisposition\[14\] was tested in the light of previous research with its own hypothesis and outcomes.

In the context of the previous discussions these tests are aimed at clarifying the differences and similarities of implicit cognitive biases between socially-anxious individuals and repressors and further, to ascertain differences between repressors and low-anxious individuals. It appears that repressors, as
with low-anxious individuals, report low anxiety however their physiological reactions to social threat tell a different story. These tests are aimed at examining implicit cognitions associated with these predispositions and to tease out, in the light of different theories (models of trait anxiety, Freudian theory and models of social anxiety) whether there is a fundamental difference in the way that these predispositions manage their social environment sub-consciously and consciously. Therefore, these tests are utilised to examine different aspects of these predispositions with a goal to gain a better understanding and overall theory as to what motivates these individuals and what behavioural strategies they use to cope in their social environment.

Initially, the Eysenck Personality Questionnaire (EPQ-R) is used to examine some of the personality characteristics of socially-anxious and repressor individuals as compared to low-anxious individuals (see Appendix A). Repressors generally score high on the lie scale and extroversion, while socially-anxious individuals scored high on neuroticism and introversion (also see Eysenck & Eysenck, 1985, Furnham & Traynar, 1999 and Stemberger, Turner, Beidel, & Calhoun, 1995).

The first study utilises the Dot Probe Test to examine the attentional biases of socially-anxious individuals and repressors (MacLeod, Mathews, & Tata, 1986). This test examines the reaction time of participants to emotional
faces at an implicit and explicit level. Both masked (23ms/67ms) and unmasked (500ms) facial stimuli (threat, happy, sad) are used to compare these biases.

The second study uses the Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998). The focus of this study examines the implicit belief (or association) structures and dysfunctional thinking styles that underpin both socially-anxious and repressor individuals. For example, socially-anxious individuals overestimate the probability of occurrence of negative social events while repressors appear to underestimate them (Eysenck, 1997; Rapee & Lim, 1992). Moreover, repressors are regarded as individuals who tend towards social situations and positive social relationships (extroverted). To be able to show the implicit motivation that underpins different social coping behaviours when social threat is imminent is important in the light of the previous theoretical discussions.

The third study was a memory task used to investigate whether socially-anxious individuals and repressors remember emotional faces in the same way. If socially-anxious individuals are vigilant to social threat it might be anticipated that they remember these faces more efficiently. However, there is a real lack of research evidence that memory biases exist in social anxiety (Rapee et al., 1994; Wenzel & Holt, 2003). Moreover, the repressor’s need for approval
might motivate them to remember reassuring or happy faces. Lundh and Ost (1997b) for example, suggested that socially-anxious individuals might better remember critical faces, however, Perez-Lopez (1999), suggest the opposite. This study focused on the difference between the recall of emotional faces and the familiarity of these faces. The test used was the Remember and Know Test (Tulving, 1985; Gardiner, 1988). The aim was to clarify whether underlying implicit memories motivate these two predispositions.

The fourth study was a face-rating task. The aim was to determine whether socially-anxious individuals rate emotional faces more intensely than repressors. Many studies have examined interpretive biases of anxious individuals however, attributional bias may also be an important aspect of assessing emotional faces. Because of the increased ‘need of approval’ and the propensity for repressors to avoid negative affect, the attribution made to the intensity of negative faces may be reduced when compared to low-anxious and socially high-anxious individuals. Alternatively, socially-anxious individuals would be more apt to attribute greater intensity to threat faces.

A subsequent attributional task was based on the errors that participants made when identifying faces. Based on the theory that repressors would be inclined to be more positive (or less negative) in their interpretation of faces, they would be more inclined to attribute this to faces in general. The prediction was that
repressors when making errors would make a more positive attribution to negative faces. For example, an angry (negative – critical) face would be more likely to be attributed as a more positive face (happy face) or less critical faces (sad). Alternatively, socially-anxious individuals would make the opposite attribution, namely, where errors were made in identifying faces, positive faces would be attributed as less positive ones (e.g., happy face to sad or angry faces). This hypothesis was made on the basis that socially-anxious individuals and repressors have opposite interpretive biases and would be more likely to make opposite attributions. These biases are associated with maximising and minimising emotional stimuli (Eysenck, 1997).
CHAPTER TWO

ATTENTIONAL PROCESSING OF EMOTIONAL FACES

2.1 Pre-attentional and Attentional Processing of Emotional Faces

The first study examines attentional processes in socially-anxious individuals, repressors and low-anxious individuals. It is important to discriminate between implicit and explicit attentional processing of these predispositions. This study will show the different implicit and explicit reactions that individuals have to social threat (emotional faces). This will help clarify difference in vigilance and attentional allocation both at a pre-attentional (preconscious) and attentional (conscious) level. Based on previous models (Eysenck, 1997), it is expected that socially-anxious individuals show vigilant attention to social threat stimuli (angry faces) at a pre-attentional level and avoid threat at an attentional level. Moreover, it is expected that socially-anxious individuals will avoid happy faces at an attentional level.

Repressors are expected to have an opposite attentional bias. At a pre-attentive level they will avoid threat and, at an attentive level, will be attracted to social faces. Moreover, repressors will be more attracted to happy faces than threat faces.
Low-anxious individuals are expected to have an avoidant attentional bias, both at a pre-attentional level and attentional level, as predicted by Williams’ et al. (1988, 97) and Mogg and Bradley’s (1998) models. Compared to repressors, it is predicted that low-anxious individuals will be less avoidant to threat stimuli in both the pre-attentive and attentive conditions. However, repressors will be more attentive to positive faces at the attentional level.

**Overview of Hypothesis**

<table>
<thead>
<tr>
<th>HYP</th>
<th>IMPLICIT</th>
<th>EXPLICIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>That SA will react to Threat faces</td>
<td>Attend vigilantly</td>
</tr>
<tr>
<td>2</td>
<td>That R will react to Threat faces</td>
<td>Avoid vigilantly</td>
</tr>
<tr>
<td>3</td>
<td>The LA will react to Threat faces</td>
<td>Avoid*</td>
</tr>
<tr>
<td>4</td>
<td>That SA will react to Happy faces</td>
<td>Attend vigilantly</td>
</tr>
<tr>
<td>5</td>
<td>That R will react to Happy faces</td>
<td>Avoid vigilantly</td>
</tr>
<tr>
<td>6</td>
<td>That LA will react to Happy faces</td>
<td>Attend*</td>
</tr>
</tbody>
</table>

* = LA reactions are similar to R however R are intensely more avoidant and attentive
2.2 Introduction to Attentional Biases

The existence of attentional biases is well established in anxiety research (Eysenck, 1992, 97; MacLeod, 1998; Mathews, May, Mogg, & Eysenck, 1990; Wells & Mathews, 1994; Williams, et al., 1988, 97). These biases show preferential processing of threat information and increase the likelihood of clinical anxiety disorders in socially-anxious individuals (review MacLeod, Mathews, & Tata, 1986; Mathews & MacLeod, 1994). These biases are also prevalent in repressors (socially-defensive individuals) where, rather than vigilant attention to threat, there is avoidance of threat (Eysenck, 1997; Fox, 1994; Mogg, et al., 2000). For example, Bonanno, Davis, Singer and Schwartz (1991) showed that repressors are able to maintain an attentional focus away from material that they may wish to ignore. In a dichotic listening task, repressors were requested to listen to words presented in one ear and asked to ignore words in the other ear. Repressors were better than non-repressors at maintaining their attention on the shadowed channel, with fewer attentional shifts to the unattended channel, suggesting they were able to avoid processing unwanted information. Likewise, Fox (1994) found that repressors were particularly efficient at inhibiting threatening information, whereas high-anxious individuals were not. More recently, Broomfield and Turpin (2005) found with eye-saccade research that there was a differential pattern of
attentional disengagement to threat modulated by anxiety. Repressors made few such eye movements compared to anxious individuals suggesting that these attentional processes, even at a pre-attentional level could be inhibited (see also Mogg Bradley, & Millar, 2000).

These attentional biases operate at both a preconscious, and conscious level (MacLeod & Mathews, 1988; Mogg & Bradley, 1998). Many of these biases are specific to areas of concern and particular anxiety disorders (Eysenck, 1997; McNally, 1995; Clark & Wells, 1995). For example, Clark and Wells (1995) suggest that individuals with social anxiety, rather than being vigilant to social threat, have a selective bias to shift their attention away from social situations and instead become highly self-focussed. Clark (1999) proposed that an attentional avoidance of social threat maintained and increased social anxiety. The notion being that avoidance of potential threat decreased the opportunity for socially-anxious individuals to disconfirm the reality of the threat. Continual avoidance of attending to social threat may, ‘paradoxically’, increase social-anxiety. This view is opposed by other research, which suggests that attentional vigilance to the threat increases surveillance that increases social anxiety symptoms (Dalgleish & Power, 1999; Mogg, Philippot, & Bradley, 2004; Williams, Watts, MacLeod, & Mathews, 1988). For example, Mogg & Bradley (2002) found that masked threat faces automatically captured attention and this vigilance was primarily a function of those with social anxiety rather than trait anxiety. However, Rapee & Heimberg (1997) suggest that attentional
processing in social anxiety (phobia) is more complex than simple attentional allocation to or away from social threat. They suggest the subject is often caught in a multi-task paradigm where simultaneous monitoring of external threat, internal monitoring and the task at hand interferes with effective information processing (also see Mellings and Alden, 2000 and Woody, 1996).

Therefore there is still some debate within the social-anxiety literature as to the attentional orientation of socially-anxious individuals (Amir & Foa, 2001; Clark & Wells, 1995; Mansell, Clark, Ehlers, & Chen, 1999; Mogg & Bradley, 2002; Rapee & Heimberg, 1997). Generally, attentional vigilance rather than avoidance is expected in threatening situations, however, in social-anxiety research, these findings have not been reconciled. The complex nature of attentional processing is not only evident in the general anxiety and defensiveness literature but also within the social anxiety literature. Moreover, it addresses vigilance in both attention and avoidance.

2.3 Pre-Attentional and Attentional Processing

An important aspect of what might begin to explain this processing is the distinction between conscious attentional processing in anxiety and the contribution of pre-attentive processes. Pre-attentional processing is the automatic, preconscious (implicit) unnoticed attention that is given without conscious attention to threat stimuli. Generally, the appraisal of and orientation
towards potential threat stimuli is seen as a preconscious process that initiates subsequent conscious strategies to manage potential threat (Beck & Clark, 1997; LeDoux, 1995). For example, LeDoux (1995, 96), advocates an initial preconscious assessment of threat via the amygdala, and then subsequent strategic information processing, which increases discrimination of the stimuli in its context and increases more conscious attentional strategies. That is, there is perceptual vigilance of the environment at a preconscious level where routine monitoring takes place but not to the extent that it takes up conscious cognitive attentional processing. At a conscious level however, attention is considered to be strategic or conceptual in nature, and is part of a decisional reaction (response) to manage the threat stimuli. Likewise, Ohman and Soares (1993) argue an evolutionary autonomic perspective, where preconscious processing of threat stimuli plays a critical role in safety behaviour. For example, spiders, snakes and angry faces are seen as important evolutionary threat stimuli. In Ohman’s (1996) model, threat is detected by a Significance Evaluator, which is biased by an expectancy and preparatory system. Ohman (1996) draws a distinction between animal and social phobias in relation to dominance theories, where social anxiety may involve a cognitive appraisal of fear-eliciting situations (angry faces). He suggests that individuals with social phobias will be far more debilitated than other phobias since the individual continually places himself/herself in situations that elicit fear and anxiety. A tension arises as the individual needs the group but also wants to avoid it. Ohman (1993) argues that,
especially in social encounters, these preconscious fear reaction tendencies are
difficult to control by cognitive interventions (also see Gilbert and Trower,
2001).

2.4 Literature Review of Attentional Processing

There have been numerous studies examining the attentional processes
in social anxiety and repression. Face-in-the-crowd, Stroop and dot probe
studies have been prominent in anxiety studies but, there is still debate as to just
what aspects of cognitive attentional processing they address (Macleod, 1991;
MacLeod & Rutherford, 1998). Despite these debates, these studies have
produced convincing evidence of cognitive and attentional processing
associated with different psychopathologies and specific phobias. A brief
review of these studies follows to set the context of social anxiety and
defensiveness.

2.4.1 Face-in-the-Crowd Studies

Hansen and Hansen (1988) suggest that pre-attentional face processing
is highly efficient. From an evolutionary perspective, facial emotions are
generally more biologically and spatially based. Attention to facial features is
extremely efficient and appears early in the lifespan sequence and tends to be at
a pre-attentive level (see LeDoux, 1996 and Ohman, 1993 for further
evolutionary and dominance perspectives). When compared to word stimuli,
bias for faces is related to the external cues of a social interaction, whereas a bias for words is more closely related to thoughts about self-perception. Facial stimuli may have greater ecological value than words, especially for individuals with social anxiety who frequently rely on facial expression as social evaluation (Ekman & Friesen, 1975). In a pop out task, angry faces were found more efficiently in neutral and/or happy crowds (anger superiority effect). They suggest that faces are pre-attentively processed for features of facial threat. In a face-in-the-crowd experiment, Veljaca and Rapee (1998) found that socially-anxious individuals detected negative faces more easily in an audience situation. Low-anxious individuals showed an opposite pattern. Gilboa-Schechtman, Foa and Amir (1999) reported that on a visual search task, patients with social phobia showed better detection of angry faces than happy faces within arrays of neutral faces. Happy faces also attracted attention when compared to neutral faces, however angry faces appeared to be detected more quickly than happy faces. Lund and Ost (1996b) found that socially-anxious individuals, when asked to look for critical faces, have a recognition bias for critical faces rather than accepting ones. Low-anxious individuals’ recognition bias was for accepting faces. Attentional bias to angry faces however, was not found where participants were asked to rate the ‘quality of contact’ with critical and accepting faces (Lund & Ost, 1996a). Lund and Ost (1996b) suggest that encoding is an important aspect of whether a face is remembered. The type of instructions and context are also significant factors in recalling facial
expression. Fox, Russo and Dutton (2002), using ambiguous jumbled schematic faces, found that angry as well as jumbled faces were rated more highly than neutral faces by high trait-anxious individuals. Fox et al. (2002) suggest that the emotional expression on the face is a more important determinant of detectability than any visual feature of the face. Happy faces also attract attention when compared to neutral faces, however, angry faces appear to be ‘searched out’ more quickly than happy faces by anxious individuals. Furthermore, threat faces or ambiguous cues lead to delayed disengagement (attentional capture) of visual attention in anxious individuals where, once attention is directed to the faces, it captures attention until a more salient cue disrupts this or sufficient time has passed and interest diminishes.

2.4.2 Stroop Test in Social Anxiety and Repressors

The Stroop task is a primary tool used for studying attentional biases. Information processing in humans has a limited capacity and individuals can only attend to certain stimuli at any given time. Allocation of attention to immediate areas of concern, especially involving personal threat, is adaptive in that it enables preparation for defensive action (Gray, 1985). The general conclusion from research is that Stroop interference is shown in both social anxiety and defensiveness. The interference effect is demonstrated by longer latencies. It is interpreted as being the result of prolonged processing of the semantic content of colour words, while suppression of interference indicates
that no apparent meaningful information is inferred with the colour naming of that word (Mathews & MacLeod, 1986; Macleod, 1998).

Hope, Rapee, Heimberg and Dombeck (1990) found that individuals with social phobia took longer naming the colour of social-threat words when compared to neutral words. Mattia, Heimberg and Hope (1993) replicated these findings but also found that after cognitive behavioural therapy and medication (phenelzine) Stroop interference diminished. Hope et al. (1990), using Stroop tests, compared individuals with social phobia and panic disorder and found significance interference to words relating to their own specific psychopathologies. Maidenberg et al. (1996) also found that patients with panic disorder exhibited longer latencies to all threatening word types, whereas patients with social phobia demonstrated longer latencies to social-threat words. Specific attentional biases were recorded for specific areas of concern. Chen, Lewin and Craske (1996) suggested that an increase in state anxiety increased interference. The use of spider related words increased interference in spider phobic individuals, however similar results were found for positive and neutral words, suggesting an ‘emotionality’ effect. In more recent research Spector, Pecknold and Libman (2003) found longer colour naming latencies for individuals with social phobia. Words relating to negative evaluative words (criticise) and descriptions of anxiety words (blushing) were used. Negative
evaluative words were found to be better predictors of longer latencies, although increased latencies were also recorded with neutral words.

Amir et al. (1996) however, found that Stroop interference was suppressed with high anxiety (see also Mathews and Sebastian, 1993). Amir et al. (1996) used both physical and social words in the Stroop test and postulate that low-anxiety conditions should produce interference whereas high state anxiety conditions should increase the effort to overcome. That is, socially-anxious individuals compensate by increasing effort under stress conditions. They suggest that increased effort and overriding effects are present under the more urgent conditions. Amir et al. (1996) asks whether socially-anxious individuals under stress are more adept in avoiding threat words. It is important to note however, that the difference between avoiding and suppression of semantic content needs further research (de Ruiter & Brosschot, 1994).

Colour-naming interference is also evident with positive words (joyful) as well as threat words (lonely) (Martin, Williams, & Clark, 1991; Mogg & Marden, 1990). Riemann & McNally (1995), using idiographic lists of words relating to their area of interest, asked participants to choose two of the most positive and two of the most negative aspects of their area of interest. Stroop interference was detected on both positive and negative stimuli. Williams, Mathews and MacLeod (1996) report in their reviews that high-anxious
individuals who do not demonstrate Stroop interference are generally also quicker to name the colour of neutral words.

2.4.3 Stroop Effect in Repressors Show Conflicting Results

There is also evidence that repressors selectively avoid processing aversive information and also show a high level of colour interference on threat words (Dawkins & Furnham, 1989). They found that both repressors and high-anxious individuals were significantly slower at naming colours of emotional words compared to low anxious individuals. Fox (1994) also showed this where interference occurred when coloured social threat words were displayed as distracters, however, no difference was found between low-anxious individuals and repressors.

Myers and McKenna (1996) differed from Dawkins and Furnham (1989) in that repressors were the only group not affected (no interference) in the Stroop test. They found that low-anxious individuals were significantly slower than both high-anxious individuals and repressors in naming colours. Myers & McKenna (1996) suggested that extreme scoring and the type of emotional words might have been responsible for these differing results and also that the method of presentation may have influenced priming effects. Mogg et al. (2000) also found that repressors were more efficient at overriding semantic content when compared to high-anxious individuals. Repressors
showed significantly less interference in colour naming threat words (relative to neutral words) compared with both the low-anxious and high-anxious individuals. They did not significantly differ from each other in threat bias scores but threat words led to significantly greater interference than neutral words in the high-anxious group. Mogg et al. (2000) report that their findings are consistent with the view that high defensiveness combined with low trait anxiety (the repressor) is associated with an avoidant attentional style. Newman and McKinney (2002) also found repressors efficient in colour naming personality trait threat words. They suggest that repressors use avoidance as a strategy to ignore the semantic nature of the words and consequently failed to display Stroop interference effects when presented with threatening stimuli. These results are consistent with the claim by Fox (1994) that “repressors are not simply high-anxious individuals who lie on self-report measures but can also be distinguished from high-anxious individuals in terms of attentional functioning” (p.169). For example, Jansson, Lundh and Oldenburg (2005) found that higher social desirability scores predicted faster responses to colour-naming masked illness words relative to masked neutral words. They suggest that defensiveness, operationalised in terms of social desirability (repressors), is associated with automatic unconscious processes rather than conscious strategic ones. The implication is that a form of perceptual defence exists. The defensive behaviour of repressors appears to be in the service of self-protection (Davis, 1995; Mendolia et al., 1996). Repressors in their study seem to be immune from
distraction by both threat and non-threat material (Newman & McKinney, 2002). That is, the emotional meaning of the word did not capture their attention. This, however, was contrary to Dawkins and Furnham (1989), who showed greater interference in colour naming of threat rather than neutral words (also see Broomfield and Turpin, 2005).

It is difficult to interpret these results about repressors. Dawkins and Furnham (1989) did present emotional stimuli (block presentations) in their research and that may have primed the subjects to display Stroop affect. Most research however, has found that repressors are the least likely to be affected by Stroop affect and are efficient avoiders of emotional stimuli.

2.4.4 Attentional Capture or Perceptual Avoidance?

The question in Stroop studies is whether the interference represents attentional ‘capture’ or ‘perceptual’ avoidance of the threat stimuli. These Stroop studies provide mixed results and question the nature of cognitive processes in socially-anxious individuals. It is possible that Stroop testing is an inadequate measure to detect attentional direction. De Ruiter and Brosschot (1994) propose that colour naming interference is generated by attentional avoidance rather than attentional capture of threat stimuli. However, De Ruiter and Brosschot (1994) have argued that because the task itself cannot determine the locus of interferences that may arise (because of either encoding or response
competition), increased colour-naming latencies for negatively valanced material should not necessarily be taken as an indication of a bias in attentional processing. Alternatively, Amir, Elias, Klumpp and Przeworski (2003) suggest that individuals who show significantly longer response times may have difficulty disengaging their attention (attentional capture) from socially-threatening material.

Despite the fact that the Stroop task cleverly indicates the competitive nature of cognition, interpretation of these results is not clear-cut. Stroop involves competitive processing of a single stimulus within the focus of attention while the dot probe task requires decisions that are more attentional where visual orientation to threat cues in different spatial locations would tap different underlying cognitive mechanisms. As discussed by Williams, Mathews, and MacLeod (1996) when Stroop effects are not found it is difficult to know whether the stimuli simply does not attract attention or that individuals use strategies to override its effects (see MacLeod, 1991 and Williams, Mathews, and MacLeod (1996) for a thorough review of Stroop). From this perspective, Visual Dot Probe (VDP) studies are important in social anxiety and repression. Although Stroop is a robust test there are some difficulties (strategic override, previous learning) and a more direct measure is required. The visual dot probe task does not rely on interference effects. Attentional orienting responses to word stimuli are not in direct competition for processing resources.
With the dot probe there is no direct response-conflict and faces, rather than words can be used.

### 2.4.5 Visual Dot Probe (Social Anxiety)

The Visual Dot Probe Task provides a clearer measure of allocated attention to threat stimuli (words and pictures) (McLeod et al., 1986; MacLeod & Mathews, 1988). The notion is that spatial attention can be assessed directly via speed of a manual response to visual probes (MacLeod, Mathews, & Tata, 1986, 96; Posner, Snyder, & Davidson, 1980). The dot probe task is used where attentional allocation is measured via evaluation of response latencies (reaction time by a participant on a computer keyboard) to a dot stimulus that is presented immediately after a word or face stimulus. When compared to the Stroop, the Dot Probe Task provides a more direct measure of shifts in selective attention towards and away from the spatial location of emotional stimuli.

Mogg and Bradley (1999a) found that under conditions of restricted awareness, social threat for high-anxious individuals was detected, showing a preconscious bias towards threat cues. Bradley et al. (1998) found that high-anxious participants (compared with low-anxious participants) showed increased vigilance for threat faces, which was evident from faster reaction times to probes replacing angry faces relative to probes replacing neutral faces. Mogg and Bradley (2002), using a masked face dot probe paradigm, found that
both trait-anxious individuals and socially-anxious individuals showed an attentional bias to threat stimuli. Pairs of masked threat, masked happy and masked neutral faces were presented for 17ms (milliseconds) with a backward mask of 68ms. The probe classification task was used to increase reliability of reaction times (Mogg & Bradley, 1999). Mogg and Bradley (2002) found that individuals with social anxiety (as measured by the Fear of Negative Evaluation Scale) orient their attention towards (-) the spatial location of a threat face when presented under conditions of restricted awareness. They point out that social anxiety is a better predictor of social threat cues than trait anxiety. The Visual Dot Probe task provides an effective way of measuring both pre-attentional and attentional biases in anxiety disorders.

Rapee and Heimberg (1997) proposed that socially-anxious individuals show enhanced selective attention to threat cues (signals of social disapproval or criticism). Asmundson and Stein (1994) found that individuals with social phobia devoted disproportional attentional resources to social threat words but not to physical threat or neutral words in a dot probe task. Individuals with generalised forms of social phobia were faster to react to probes that followed social threat cues than probes that followed either neutral cues or physical threat cues. Muza et al. (2003) have also provided evidence for enhanced attention to negative socially-evaluative words using dot probe. They found that patients with social phobia showed an attentional bias toward social threat words while
non-patients showed an avoidance response. Mogg, Philippot, and Bradley (2004) demonstrated that when attentional responses are assessed 500ms after the onset of the faces, individuals with clinical social phobia show an attentional bias toward angry faces, relative to neutral and happy faces. The control group as a whole showed no bias for angry or happy faces in the 500ms condition. Correlations, however, suggest that vigilance for angry faces was associated with social anxiety (FNE scores) within a sample of normal volunteers. Using a 1250ms, exposure produced no significant attentional bias. Pishyar, Harris, and Menzies (2004) using a dot probe task also found attentional bias toward threat faces and an attentional bias avoiding positive faces by individuals with high levels of social anxiety. Low socially-anxious individuals avoided negative faces and were drawn to positive faces. This is consistent with the findings reported by Gilboa-Schechtman et al. (1999), where a face in the crowd paradigm was used.

There is still debate as to the attentional direction of socially-anxious individuals (Heinrichs & Hofmann, 2001). Some research suggests vigilant attentional bias to potential social threat (Asmundson & Stein, 1994; Mogg & Bradley, 2002). Other research suggests avoidance of social threat (Clark, 1999; Mansell, et al., 1999). Mansell et al. (1999) found that high FNE individuals (under social evaluative threat) showed an avoidance of emotional faces (both positive and negative) using the Visual Dot Probe Task (500ms). Both low and
high socially-anxious individuals did not differ in their attentional bias when social evaluative threat was removed. The implication is that at 500ms exposure, avoidance of social faces is already prevalent. Consistent with Bradley et al. (1997), Mansell et al. (1999) did not find an attentional bias under conditions where no social evaluative threat was present. Bradley et al. (1997), using a modified dot probe task (500ms) used face pairs (neutral/ happy: neutral/angry). They found no support for a bias towards threat faces with high socially-anxious individuals with dysphoric mood, though Bradley et al. (1997) suggest that depression scores may have affected these results.

Chen, Ehlers, Clark, and Mansell (2002) found greater avoidance of facial stimuli when compared to household objects in patients with social phobia. Low-anxious individuals did not exhibit an attentional preference. They suggest this avoidance reduces processing of social cues that maintain social anxiety, reaffirms the notion of self-focussed attention and reduced processing of external social cues in maintaining social anxiety. This is also consistent with clinical observations of gaze aversion in this patient group (Clark & Wells, 1995; Hope, Gansler, & Heimberg, 1989; Schlenker & Leary, 1983). These results are in line with recent theories on the maintenance of social phobia that emphasise the role of increased internal focus and reduced processing of external social cues (Clark & Wells, 1995; Pineles & Mineka, 2005; Rapee & Heimberg, 1997; Woody, 1996).
Yuen (1994) using a Dot Probe Task found that individuals in heightened states of anxiety (public speaking) took longer to react to a probe when the probe replaced a negative face rather than a neutral face. The Dot Probe Task was used as a reaction time test where individuals could identify the face (presentation time 1000ms). Individuals with heightened anxiety appeared reluctant to identify these faces quickly. That is, there was a tendency to avoid angry faces compared to neutral faces. Yuen (1994) also reported that there were no differences in response times to the two kinds of stimuli among low-anxious controls. These results suggest that socially-anxious individuals may actually be avoiding negative faces, at least when they are aware of the threat face (Clark, 1999). Clark and Yuen (1998) also found that participants who scored high on the Fear of Negative Evaluation Scale (Watson & Friend, 1969) directed their attention from negative and positive faces (to neutral) when threatened by being asked to give a speech, whereas low FNE participants did not selectively attend to either neutral or negative faces. This suggests that anxious individuals selectively attend to general emotional material, irrespective of valence (Martin et al., 1991). The evidence is not clear-cut as some studies suggest that the personal relevance of the word stimuli is important (Mathews & Klug, 1993; Riemann & McNally, 1995). Furthermore, this suggests that any emotional expression triggers a reaction to seek out less (or more) emotional stimuli possibly due to participant’s stress level and/or researcher demands (The Emotionality Hypothesis – Martin et al., 1991). For example, Bradley et al.
(1997), who did not threaten participants with giving a speech, did not find any effects of FNE on their attention to threatening faces.

So, a further question can be raised concerning the relationship between socially-anxious individuals (who appear to use self-focused avoidance as a coping strategy), and repressors (who appear to avoid attending to negative stimuli). If, as Clark and Yuen (1998) suggest, socially-anxious individuals avoid social stimuli as an initial response, how is this different from repressors? The difference appears to be in their coping behaviours. Unlike socially-anxious individuals, repressors direct their attention toward socially desirable behaviours and others, whereas the socially-anxious individuals direct their attention to themselves. The difference between attention to self, or others distinguishes the socially-anxious individuals from repressors. Socially-anxious individuals tune into themselves to avoid threat by self-monitoring (distancing themselves) from others’ reactions to them, while repressors merely attend to others’ behaviours in an overly positive manner. These types of responses (self or other-focus) seem to be an important factor in determining anxiety symptoms where self-focussed monitoring may amplify anxiety responses considering the absence of external disconfirming (positive) cues (Clark & Wells, 1995). It appears however, that repressors attenuate negative (self-focussed) interpretations of social stimuli and direct their attention to positive aspects of social situations whereas socially-anxious individuals ‘escape’ from processing
social stimuli by focussing on themselves and imaging how others (negatively) perceive them (Eysenck & Derakshan, 1997; Rapee & Heimberg 1997; Rapee & Lim, 1992). These differences are important as it suggest that repressors avoid attending to their own (unacknowledged) internal anxiety and ‘dissociate’ to a more social-approval agenda.

Mansell, Clark and Ehlers (2003) using a dot probe detection task aimed to measure the balance of attention between internal (self-focus) and external (other-focus) stimuli for individuals with social phobia. High and low, socially-anxious individuals were asked to detect two probes. The external probe was superimposed on computer pictures of faces (happy, neutral and angry), or household objects. The ‘internal’ probe was a pulse to the finger, to which participants were led to believe represented significant changes in their physiology. The study was based on research that suggests that self-focused attention in socially-anxious individuals is associated with the generation of negative, distorted views of the self, inferring that they are coming across less well than in reality (Bogels & Mansell, 2004; Clark & Wells, 1995; Pineles & Mineka, 2005). Their results indicated an enhanced selective attention to internal focused stimuli for social phobics under conditions of high social-evaluative threat (speech about a controversial subject). This is consistent with an earlier study that found the selective avoidance of facial expressions by high-socially-anxious individuals was specific to negative and positive faces, in
contrast to neutral facial expressions (Mansell et al., 1999). This reinforces the notion that emotional faces (positive and negative) initiate an avoidance of the social environment and vigilance-to-self pattern in social phobics. It can be anticipated that socially-anxious individuals may be avoidant rather than attentive to emotional faces based on this research. However, Pishyar et al. (2004) found that even when one’s own profile was on the screen, threat attention did not subside. It was anticipated that attention to oneself might have been important, however seeing oneself on the screen did not influence evaluative threat in the way that it was intended. It could be argued that socially-anxious individuals focus more on their physiology and emotional state rather than a visual cue of themselves. These findings also contrast with studies of generalized anxiety disorder, which have typically found vigilance for angry faces in anxious individuals on visual dot probe tasks (e.g., Bradley, Mogg, Falla, & Hamilton, 1998; Bradley et al., 1999; Mogg & Bradley, 1999a). Mogg and Bradley (2002) suggest that in the context of other anxiety research it is unusual that socially-anxious individuals would avoid, rather than be vigilant to social threat. “As social anxiety and generalized anxiety are commonly correlated, the finding of avoidance of social threat is surprising” (Mogg & Bradley, 2002, p.1403). Therefore, it is important to examine the precise nature of attentional processing, not only in repressors, but also within the social anxiety literature itself. It could be argued however that excessive vigilance
(either attentive or avoidant) of social threat would itself initiate anxiety symptoms.

### 2.4.6 Vigilance and/or Avoidance (Social Anxiety)

Therefore, research on attentional direction in anxiety is mixed (Mogg et al., 1997). Some researchers propose that attention is initially directed to threat cues but is not necessarily captured by them and that, after initially orienting to threat, anxious individuals may even show subsequent avoidance of further anxiety-provoking stimuli. That is, a ‘vigilant-avoidant’ pattern of attentional bias (e.g., Calvo & Eysenck, 2000; Mogg, Mathews, & Weinman, 1987; Mogg & Bradley, 1998; Williams, Watts, MacLeod, & Mathews, 1988, for further relevant empirical evidence) (see also Amir, Foa, and Coles, 1998, Bradley et al., 1998 and Mogg, Bradley, de Bono and Painter, 1997).

Amir and Foa (2001) espouse a vigilance-avoidance pattern in social anxiety that contributes to the maintenance of social anxiety. They suggest that both heightened vigilance and premature avoidance of threat minimise authentic information processing. Subsequent attentional avoidance may be an attempt to alleviate anxiety. Initial vigilance followed by strategic avoidance does not allow processing of the disconfirming cues especially if the avoidance reaction involves complete self-focus. Therefore, it is important to note that the debate concerning attentional allocation within the social anxiety literature is far from
conclusive and requires further examination. The present study investigates biases in initial orienting versus maintained attention by manipulating the exposure duration of the face stimuli. This examines not only the attentional route (implicit to explicit) of socially-anxious individuals but also repressors. From the previous literature, it can be hypothesised that initial vigilance followed by prolonged avoidance is a strategy for socially-anxious individuals, but this route may be the opposite for repressors.

2.4.7 Visual Dot Probe (Repressors)

Eysenck’s (1997) four-factor model predicts that repressors have an opposite attentional and interpretive bias to those with high anxiety. Fox (1993) used a dot probe task to assess the attentional patterns of repressors, high-anxious and truly low-anxious participants. She found that the high-anxious group was faster to detect probes replacing social threat words relative to neutral words, which suggests vigilance for social threat. The repressor group on the other hand, was relatively slower, which suggests attentional avoidance of social threat. The truly low-anxious group showed no bias. Fox (1994) suggests that repressors are particularly efficient in inhibiting threat information. She goes on to suggest that those with a repressive coping style are no better at inhibiting distracting information than low-anxious individuals (who are at a greater advantage when distractions are threat-related). According to Fox (1993) low-anxious subjects are characterised by indifference rather than
a defensive attentional style. This is similar to Eysenck’s (1997) model that suggests that low-anxious individuals are not committed to attentional biases. Similarly, Mogg et al. (2000) using dot probe for words, report that repressors avoided social threat while low-anxious individuals (without defensiveness) had an unbiased attentional style. Both of these findings are predicted by Eysenck’s (1997) cognitive theory of anxiety, which proposed that attentional biases for threat-related information are influenced by more than one personality variable - probably anxiety proneness and defensiveness.

Mogg and Bradley (2000) found that repressors were biased in allocating processing resources away from social threat stimuli. Repressors were faster in colour-naming (Stroop) social threat than neutral words and they were faster in detecting dot probes (500ms) which replaced neutral rather than social threat words - these results followed Fox’s (1993) findings and are consistent with the view that high levels of defensiveness combined with low trait anxiety promote an avoidant attentional style.

However, it must be noted that Brosschot, de Ruiter and Kindt (1999) failed to reach these conclusions using social and physical threat word stimuli. They examined the attentional patterns of repressors, true low-anxious, high-anxious and defensive high-anxious individuals in a visual probe task and Stroop but failed to find any group differences involving the repressor or
defensive high-anxious groups. They conjecture that state anxiety may be a contributor and that ‘emotionality’ rather than specific emotions may be a better indicator of attentional bias. Brosschot et al. (1999) concluded that attentional avoidance of threat might not be a reliable characteristic of repressors.

Ioannou, Mogg, and Bradley (2003) found that high-trait anxious individuals showed vigilance for threat faces (500ms) compared to low-anxious individuals and repressors. Low-anxious individuals and repressors showed no bias to either threatening or happy faces, in either of the (500ms.1250ms) exposure condition. In both conditions high-anxious individuals were slower to react to probes that replaced happy faces with neutral faces, showing an attentional preference for neutral faces relative to happy faces. In both exposure conditions (500ms/1250ms), defensive high-anxious individuals showed a preference for happy faces. Ioannou, Mogg, and Bradley (2004) therefore suggest that defensiveness is important and should not be neglected in anxiety research (see also Mogg, et al., 2000). They suggest that defensiveness may suppress attentional bias in high-anxious individuals, as with Fox (1993) who suggests that repressors are very efficient at avoiding threat faces. Ioannou, Mogg, and Bradley’s (2004 research found little evidence of attentional bias by repressors or low-anxious individuals in avoiding threat faces.
Summarising these studies, the dot probe tasks appear to provide a relatively fragile index of anxiety-related attentional biases in non-clinical studies, particularly when using word stimuli that have relatively mild threat value. However, it is reassuring that more persuasive evidence of such biases was found in non-clinical samples that used more salient stimuli, such as angry faces. One possibility is that, for mild stimuli such as single threat words, repressors and socially-anxious individuals may find it easier to use strategies that counteract their avoidant/vigilant tendencies, thus explaining the difficulty in reliably demonstrating such vigilance in non-clinical studies using the dot probe task.

### 2.4.8 Vigilance-Avoidance Patterns in Repressors

In a predictive inference task, Calvo and Eysenck (2000), using a time-course paradigm, proposed that high-anxious individuals have a relatively stable bias towards threat processing, whereas low-anxious individuals have a relatively stable bias towards non-threat processing. In contrast, repressors show a more complex pattern, in which early bias toward threat processing is followed by an apparent avoidance of threat stimuli. Calvo and Eysenck (2000) argue that any interpretive bias in threat-related predictive inferences exhibited is not automatic or pre-attentional, but reflects the resource consumption criterion of automaticity (see Wells and Mathews, 1994). That is, repressors need to be cognitively aware to initiate avoidance strategies. Thus, repressive
coping presumably facilitates post lexical selection of a threat-related meaning from the context, following initial activation of threat and non-threat meanings. Calvo and Eysenck (2000) contend that repressors show avoidance of threat processing. After initially determining the non-threat nature of the stimuli, repressors strategically avoid further elaborating the information. So perhaps repressors have a unique strategy to counteract threat appraisals once it has been determined that it is no longer threatening. Hock, Krohne, and Kaiser (1996) also argue that repressors initially recognise the simultaneous presence of threatening and non-threatening implications of ambiguous events and that they may have a bias towards threat interpretations in early processing, followed by an immediate avoidance bias. Mogg et al. (2000) however, found attentional bias away from threat using 500ms exposure on the visual dot probe test. Mogg and Bradley (1998) suggest that,

“vigilance–avoidance pattern of attentional bias (e.g., Mogg et al., 1987; Williams et al., 1988) is likely to result in increased detection of minor threats in the absence of prolonged exposure (the maintenance of attention would be subject to conflicting responses tendencies” (p. 820).

The vigilance-avoidance debate is not confined to the anxiety and repressor domain alone. It also permeates the social anxiety literature (Amir, Foa, & Coles, 1998; Clark, 1999; Mansell, Clark, Ehlers, & Chen, 1999; Mattia,
Heimberg, & Hope, 1993; Mogg & Bradley, 2002). These vigilant-avoidant responses would be especially prevalent in social anxiety, where extremes in facilitating or inhibiting of social threat stimuli needs to be effectively managed to achieve a satisfactory attentional equilibrium (Rapee & Heimberg, 1997). In this context, ‘over-facilitation’ of external social threat would increase anxiety symptoms however, self-focussed monitoring may also amplify anxiety responses considering the absence of external disconfirming (positive) cues (Clark & Wells, 1995).

The contention that, ‘vigilance-avoidance’ or ‘avoidance–vigilance’ cognitive strategies are prevalent, not only in repressors but in social anxiety itself, makes this area of research important considering the different behavioural predispositions of these individuals. Furthermore, both vigilance and avoidance strategies may be prevalent in both repressors and social anxiety, the difference being that socially-anxious individuals direct their avoidance attention to themselves (internally) and repressors direct their attention externally. Are these both avoidance strategies manifest in different ways? Low-anxious individuals appear to be exempt from this dichotomy. Interestingly, this also relates back to the Freudian view of anxiety and defensiveness as being two sides of the same coin, both components contributing to anxiety (vigilance and/or avoidance) (Freud, 1915, 57). So, it can be expected that increased vigilance to potential threat creates increased
arousal and scanning (hyper-vigilance) of the social environment, whereas excessive avoidance creates conditions which then become a source for more anxiety (as in phobias). These are interesting questions. The ‘vigilance – avoidance’ patterns may be opposite for repressors where the initial response is avoidance and subsequent response is vigilance.

2.5 Considering These Processes in the Light of Trait Models

As can be seen from the previous review and general introductory discussion in chapter one there are a number of conflicting theories related to attentional processing and the different methodologies examining these processes. There is also a discrepancy in the trait anxiety models where Eysenck (1997) considers defensive repressors as a separate entity whereas others do not. The Williams’ et al. (1988, 97) model and the Mogg and Bradley (1998) cognitive motivational model do not make allowances for repressors but Williams et al., (1988, 97) if prompted, might suggest that repressors are simply low-trait anxious individuals who continue to avoid threat. Mogg and Bradley (1998) propose that low-anxious individuals have a “quiescent” attentional bias to avoid threat (goal engaged). However, if the threat becomes real enough, attention will be directed to the threat stimuli. So it can be extrapolated from this model (if repressors were included) that, as threat increases, repressors would increasingly avoid threat processing at a pre-attentive level and consciously increase their socially desirable activities, which consequentially,
can also be considered their goal-directed behaviour since their inherent need is to seek social approval (at the cost of the task) (Paulhus, 2001). Mogg and Bradley’s (1998) model implies that repressors’ attentional bias becomes more avoidant than low-anxious individuals and they would therefore take much longer to attend to the threat stimuli, or, as with Williams (1988) model, repressors would continue to avoid regardless of the level of threat. Repressors, at a strategic level, engage in socially desirable behaviours and appear to ignore threat stimulus suggesting a level of ‘dissociation’ when compared to low-anxious individuals (Brewin, 1997; Brosschot & Jansen, 1998; Eysenck, 1997; Mogg et al., 2000; Singer & Sincoff, 1990; Weinberger & Davidson, 1994). This is different to socially-anxious individuals who are vigilant to social threat and can become phobic, similarly avoiding task related behaviours. A further difference is that repressors elicit a physiological response (similar to socially-anxious individuals) when confronted by social threat (Eysenck, 1997; Gudjonsson, 1981; Ohman, 1993; Weinberger, 1990). Physiological response to threat faces suggests that the threat had been detected and attended to by the repressor however, others would argue for a ‘perceptual defence’ perspective where, after a brief exposure to threat stimuli avoidance reaction is ‘preconsciously’ initiated (Erdelyi, 1990; MacLeod, 1998; Shevrin, 1990). So, despite the fact that repressors and low-anxious individuals display similar social behaviours, the repressor’s attentional processes are quite different.
2.6 Two Propositions

In light of the above discussions two propositions follow and are proposed in this study. First, that socially-anxious individuals and repressors have an attentional bias which are opposite in nature and second, that repressors, although behaviourally similar to low-anxious individuals, are more attentionally avoidant of threat stimuli in both pre-attentive and attentive states.

To summarise, the first proposition concerns the difference in threat response styles between the socially-anxious and repressors. It is based on Eysenck’s (1997) model in which socially-anxious individuals are pre-attentively biased to detect social threat and are attentively (consciously) biased to avoid it. That is, socially-anxious individuals preferentially process threat information but tend to avoid social situations. Alternatively, repressors have an opposite attentional bias namely, a pre-attentive bias to avoid social threat but are more likely to then engage in social situations. The presumption is that social anxiety is a better predictor than trait anxiety of attentional bias towards threat. Furthermore, repressors are defensive, primarily in social situations. Repressors act out their positive behavioural strategies in the social context. Both socially-anxious individuals and repressors react physiologically when confronted by social threat. Each predisposition has an opposite attentional bias in both their pre-attentive and attentive time frames. From this perspective a secondary hypotheses is also presented predicting that socially-anxious
individuals will pre-attentively attend to positive (happy) faces (similar to threat faces) and attentively avoid positive faces. Repressors will do the opposite. This hypothesis predicts the same attentional sequence as with social threat.

The second proposition is that although low-anxious individuals and repressors are behaviourally indistinguishable (sociable, friendly, optimistic) they have very different levels of defensiveness. It could be anticipated that repressors would be much slower to react to threat stimuli than low-anxious individuals. Repressors’ avoidance would be greater than low-anxious individuals, because of their defensive nature. That is, at a pre-attentive level, it is predicted that low-anxious individuals would be more attentive to threat faces than repressors. However, this does not suggest that repressors do not attend at all. The physiological responses of both socially-anxious individuals and repressors to masked threat faces suggest that some form of attentional bias is present in both predispositions. Mogg and Bradley (1998), for example, suggest that that everyone orients to stimuli that are judged to be significantly threatening.\textsuperscript{15}

A corollary hypothesis is that, at a pre-attentive level, low-anxious individuals will have an avoidant attentional bias (as predicted by Williams’ et al., 1988, 97 and Mogg and Bradley’s, 1998 models), but repressors will be more avoidant at this level. At an attentional level it is expected that repressors
will be more attentive to happy stimuli than low-anxious individuals based on the notion that repressors need social approval.

These propositions are made to clarify some of the limitations of existing models as reviewed in chapter one. Perhaps mislabelling of anxiety states contributes to apparently contradictory results.

Summary of Hypothesis

<table>
<thead>
<tr>
<th>Hypothesis (HYP)</th>
<th>Implicit (Masked) social threat /positive stimuli</th>
<th>Explicit (Unmasked) social threat/positive stimuli</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYP 1</td>
<td>Socially-anxious Vigilant</td>
<td>Avoidant</td>
</tr>
<tr>
<td>HYP 2</td>
<td>Repressors Avoidant</td>
<td>Vigilant</td>
</tr>
<tr>
<td>HYP 3</td>
<td>Low anxious Mildly Avoidant</td>
<td>Mildly avoidant</td>
</tr>
</tbody>
</table>

2.7 METHOD

2.7.1 Participants

A pool of 820 student volunteers, from two campuses at the University of Western Sydney, completed a pre-screening questionnaire comprising the Marlowe Crown Scale (MC: Crown & Marlowe, 1960), Taylor Manifest
Anxiety Scale (TMAS: Taylor, 1953) and the Fear of Negative Evaluation Scale (FNE: Watson & Friend, 1969) to ensure sufficient participants with extreme TMAS and MC scores. Based on these scores 323 students were invited to participate in a variety of questionnaires and memory and reaction time (RT) tests. The final pool consisted of 94 individuals where mean age was 22.6 years (M=16; Fm = 78).

2.7.2 Materials

2.7.2.1 Tests Used and Selection Criteria

The following questionnaires were used to select four specific groups in this research. Two of these groups were low-anxious (LA- low anxious, low defensiveness), and repressors (REP- low anxious, high defensiveness). The other two were socially high-anxious groups including high socially-anxious (HSA – high anxious, low defensiveness), and defensive high anxious (DHA-high anxious, high defensiveness). These groups were selected using the Marlowe Crowne Scale, Taylor Manifest Anxiety Scale and the Fear of Negative Evaluation Scale. These three instruments are widely used and the FNE has a high internal consistency (0.94), good test–retest reliability (r=0.78) and good discriminate validity (p<0.01) when compared with a measure of social desirability (Marlowe Crowne Scale: Crowne & Marlowe, 1964).
Participants were allocated to four groups according to their scores on these three tests. The FNE was used to specifically identify those individuals with social evaluation fears. The FNE was used to identify socially-anxious individuals, those who had a specific fear of being evaluated unfavourably by others. FNE is commonly used to determine the degree to which people experience apprehension at the prospect of being negatively evaluated. As the nature of the construct predicts, people who score highly on the FNE scale tend to behave in ways designed to avoid the prospect of being evaluated negatively and therefore would rather avoid those situations. According to Leary (1983), individuals with a high FNE prefer a positive asymmetrical relationship, that is, being liked is most important. They are out to make a good impression and try harder during face-to-face conversations. In addition, those scores correlate highly 0.77 (p>0.01) with social approval seeking as measured by Jackson’s Personality Research Form (Watson & Friend, 1969). Those high on FNE tend to be more socially anxious than those low on FNE (Leary, 1983; Watson & Friend, 1969).

Other questionnaires were completed by participants to check the validity of these three measures and for other aspects of the research reported in the following chapters. These included the State Trait Anxiety Inventory (STAI: Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), Beck Depression Inventory (BDI-2: Beck & Steer, 1993), Anxiety Sensitivity Index (ASI-S:
Reiss, Peterson, Gursky, & McNally, 1986) and the Eysenck’s Personality Questionnaire (EPQ-R Short Scale: Eysenck & Eysenck, 1985).

The following scoring criteria were used for each group:

- **Low-Anxious Individuals (LA):** MC <10, TMAS < 8 & FNE < 10
- **Repressors (REP):** MC >22, TMAS < 8 & FNE < 10
- **High Socially Anxious (HSA):** MC <10, TMAS >18 & FNE > 23
- **Defensive High Anxious (DHA):** MC <10, TMAS > 18 & FNE >17

### 2.7.2.2 Preparation of Face Stimuli

A total of 395 photographs were used. These photographs were selected from two sources.

Initially other researchers were approached for their face stimuli, which they were reluctant to release so new face stimuli, were created. One source of photographs was from a pool of 650 faces taken on a digital camera in a local supermarket and from several drama groups who also volunteered to pose for these pictures. Individuals were requested to portray specific facial expressions. These photographs were then digitised. All of the photos were retouched with Adobe Photoshop software to standardise frame size, contrast and luminosity. Individuals were also requested to sign a permission form to use their photographs in the current research (Appendix C). The second source of the
photographs was a selection from a standard set of previously rated and validated faces from the web site http://www.macbrain.org/faces/faceform.html.

2.7.2.3 Rating of the Face Stimuli

The face stimulus was then shown, via a computer program (Power Point), to 79 University of Western Sydney (UWS) psychology students who were selected as ‘raters’ where identification (type of emotion) and intensity of emotion was assessed and recorded. These students viewed each digitised slide of a face for 10 seconds with the instruction to (1) identify the emotion and (2) to indicate, on a Likert scale, the degree of intensity of the emotional face. From these ratings four (4) categories of emotional face stimuli were identified (angry, happy, sad and neutral). Raters were asked how intense (how angry, how happy etc.) they thought the face was from 0 (mildly angry) to 6 (extremely angry). Finally, four categories of facial expressions were chosen for this study, the angry (critical-negative), happy (positive), sad (non-critical, negative) and neutral (see Appendix D).

Photographs rated with an average of 3.0 and above on the Likert scale were judged to be suitable for the test. For neutral faces, a mean of 2.75 –3.25 was used to identify appropriate faces and level of intensity. One-third (16) of the emotional faces were threatening, one third sad (16) and one-third happy
(16) as well as the neutral equivalents (48), making 96 in total. Both male and female faces were equally represented in each emotional category. T-tests showed a significant difference between emotional face rating (3.19, p< 01).

Each threat face had a mean of 3.68 and above, with a mean rating of less than 2 on happy and sad faces scales. Each neutral picture had a rating of 2.25 or less on each scale. The mean threat, happy and sad ratings were 4.7, 1.0 and 1.1, respectively, for threat faces (n = 16). 1.0, 5.1, and 1.0 for happy faces (n =16) 1.0, 1.0, and 4.3 for sad faces (n = 16), and 1.2, 1.1, and 1.2 for neutral faces (n = 48).

2.7.2.4 Preparation and Presentation of Masked and Unmasked Face Stimuli

The final presentation of face stimuli consisted of pairs of photographs of 48 different individuals (Appendix D). The photographs were processed into standard bitmap images using Photoshop and made 50mm X 30mm appropriate for display on the computer monitor. Each pair consisted of different faces matched for gender and age where one face showed an emotional expression (angry, sad, happy) paired with another face displaying a neutral expression. Each trial of face types was not restricted to age, where both older and younger individuals were matched for age and gender. Each trial consisted of 96 presentations. This included four variations of one face/neutral pair in relation
to face position (2), dot position (2) and probe position (2). Each emotional face (angry, sad, happy) was presented equally often on the left as it was on the right and were presented in random manner. The final test comprised 12 practice trials, a pause, and then two sessions of 48 presentations. This was done so participants could take a spell at the halfway mark. Each session (48 faces) was alternated for different participants.

### 2.7.2.5 Masked and Unmasked Criteria

Two sessions of face presentations were prepared, namely, a masked version and an unmasked version. The masked version consisted of 65mm by 50mm digitised photographs, which were presented with 23ms exposure followed by a 69ms mask. The masks comprised faces cut in sections and pasted in a random manner so that they did not represent any type of face, gender or expression. The unmasked version consisted of face stimuli being presented for 500ms.

The face stimuli were prepared so that two faces would be shown horizontally, side by side. The size of each picture was 65mm X 50 mm; the distance between the inner edges of the face squares was 100mm. These faces were presented on a 15-inch colour monitor managed by an Intel 2.4GHz computer system. DMDX software
(WWW.MRC_CBU.CAM.AC.UK/~MATT.DAVIS/DMDX.HTML/SHAREWARE) was used to program the computer to display the faces. As well as its versatility in self-programming, this program allowed fast reaction times to be measured (these programs are available on request). Accurate exposure times of the face stimuli were also cross-checked with a high-speed photodiode and Tektronix oscilloscope to ascertain the speed and accuracy of the time taken to present these stimuli.

2.7.3 Procedure

Two sessions (masked and unmasked) of the visual probe task were presented. Each test consisted of 12 practice trials and 96 actual trials, with each emotional face (threat, sad or happy) shown four times, in synchrony with a corresponding neutral face, in different combinations (left/right, probe on/probe off) in random order. Each test began with a central fixation cross for 500ms, followed by a face pair, with one third threat–neutral pairs, one third happy–neutral pairs and one third sad-neutral pairs. At the start of each trial the participants were instructed to look at a cross at the centre of the screen. Clear written instructions were also presented on the computer monitor prior to the practice trial and actual test. After the practice, trial there was a short pause and the instructions to start when ready. Immediately following the display of the face pair, the probe stimulus (which was a pair of dots, either : or .) replaced the face stimuli and remained for 1200ms (see Mogg & Bradley, 1999b, re
probe position task). Participants were instructed to press one of two keys to indicate the position of the probe as quickly as possible while avoiding mistakes. The right index finger was used for one probe (.), which corresponded to the Right Shift Key on the keyboard, while the left index finger was used for the other probe (:), which corresponded to the Left Shift Key. Participants’ response latencies were recorded.

The 12 practice trials were also an awareness check, and participants were asked to guess the gender of the displayed faces. This was done verbally with the experimenter. Only two participants showed significant accuracy in identifying gender when exposure times were shown at a subliminal level (17ms exposure followed by a 68ms mask). Despite the remoteness of being able to identify these faces, these participants were removed from the sample since they did not meet the criterion.

The same method was used in the unmasked (500ms) visual dot probe situation. In this study however, new sets of faces were used and selected from the same pool and criterion as for those in the masked condition. The gender balance was the same and the spread and sequence of presentation was identical to the masked version of this test. Using a new set of faces was an important consideration since memory priming is frequently an issue with subliminal exposure (as in the masked presentation) (Fox, 1994; Holender, 1986; Graf &
Mandler, 1984). While the previous masked version utilised a 17ms exposure and a 68ms mask, the stimuli in the unmasked study was 500ms. The 500ms time allows for conscious (conceptual) recognition of the face and gender type. Trials were presented in random order for each participant. Participants sat approximately 30 cm from the screen.

In both versions of the task (masked and unmasked) steps were taken in programming to ensure that the allocation of the face stimuli to the two exposure conditions was counterbalanced and that no two faces were duplicated across both tasks. Face type and probe appeared in either location with equal frequency.

At the end of the session, participants completed questionnaires assessing mood and personality including the State-Trait Anxiety Inventory and the Beck Depression Inventory.

2.8 RESULTS

2.8.1 Preparation of Reaction Time Data

To summarise attentional bias, a bias score was calculated for threat-neutral, happy-neutral and sad-neutral faces. These scores represent the reaction times to probes that appeared in two different locations following either an emotional face or a neutral face, that is, when the probe appeared in the same
position as the emotional stimulus (congruent), versus trials when it occurs in
the opposite position (incongruent) (Field, 2000; MacLeod & Mathews, 1988;

Data from trials with procedural errors were discarded (2.4% of data).
Box and whisker plots were used to inspect the RT data from the whole sample.
Reaction times less than 200ms or more than 800ms were discarded because it
was thought that these were simply random guesses. However, reaction times
marginally above the three deviations were adjusted to meet statistical integrity.
The percentage of data lost as outliers was 5.6 %.

The correlating experimental measures show significant differences
between Marlowe Crowne (MC) and anxiety scores. Beck Depression Inventory
scores were negatively correlated with the MC.

### Table 2.1 Correlation between Questionnaire Measures.

<table>
<thead>
<tr>
<th></th>
<th>MC</th>
<th>FNE</th>
<th>TMAS</th>
<th>BDI</th>
<th>STAI</th>
<th>STRAIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC</td>
<td>1</td>
<td>-0.27**</td>
<td>-0.37**</td>
<td>-0.28**</td>
<td>-0.33**</td>
<td>-0.42**</td>
</tr>
<tr>
<td>FNE</td>
<td>1</td>
<td>0.67**</td>
<td>+0.38**</td>
<td>+0.48**</td>
<td>+0.62**</td>
<td></td>
</tr>
<tr>
<td>TMAS</td>
<td>1</td>
<td>0.68**</td>
<td>+0.64**</td>
<td>+0.83**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BDI</td>
<td>1</td>
<td>0.63**</td>
<td>+0.77**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAI</td>
<td>1</td>
<td>0.77**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRAIT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
A one way ANOVA of group differences on each of the experimental measures show significant differences between group participants’ defensiveness and anxiety measures. Notably depression scores were positively and significantly associated with all of the anxiety groups but not the low-anxious and repressors groups. See Table 2 for group details.
Table 2.2. Mean Questionnaire Scores (standard deviations in brackets) for the Four Groups.

<table>
<thead>
<tr>
<th></th>
<th>LA (n=26)</th>
<th>REP (n=29)</th>
<th>HSA (n=23)</th>
<th>DHA (n=16)</th>
<th>F (1,90)</th>
<th>p</th>
<th>Mean (sig) comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STATE</strong></td>
<td>34.88 (11.24)</td>
<td>29.17 (8.58)</td>
<td>47.74* (9.61)</td>
<td>44.19* (10.10)</td>
<td>18.11</td>
<td>&lt;0.001</td>
<td>L.A. (-HSA,-DHA). REP (-HSA,-DHA). HSA. (+LA,+REP). DHA. (+LA, +REP)</td>
</tr>
<tr>
<td><strong>TRAIT</strong></td>
<td>34.77 (7.0)</td>
<td>29.14* (8.5)</td>
<td>55.91* (3.66)</td>
<td>49.54* (6.98)</td>
<td>95.16</td>
<td>&lt;0.001</td>
<td>L.A. (+REP,-HSA,-DHA). REP. (-LA,-HSA,-DHA). HSA. (+LA,+REP,+DHA). DHA. (+LA +REP –HSA)</td>
</tr>
<tr>
<td><strong>BDI</strong></td>
<td>6.62 (5.4)</td>
<td>5.62 (3.60)</td>
<td>19.26* (7.44)</td>
<td>17.56* (10.99)</td>
<td>25.98</td>
<td>&lt;0.001</td>
<td>L.A. (-HSA,-DHA). REP. (-HSA,-DHA). HSA. (+LA,+REP). DHA. (+LA, +REP)</td>
</tr>
<tr>
<td><strong>MC</strong></td>
<td>8.23 (2.21)</td>
<td>24.38* (2.44)</td>
<td>8.26 (2.20)</td>
<td>19.69* (2.33)</td>
<td>322.80</td>
<td>&lt;0.001</td>
<td>L.A. (-REP,-DHA). REP. (+LA,+HSA,+LA). HSA. (-REP,-DHA). DHA. (+LA, -REP,+HSA)</td>
</tr>
<tr>
<td><strong>TMAS</strong></td>
<td>5.00 (2.5)</td>
<td>4.28 (2.26)</td>
<td>21.61* (2.5)</td>
<td>19.31* (3.42)</td>
<td>289.61</td>
<td>&lt;0.001</td>
<td>L.A. (-HSA,-DHA). REP. (-HSA,-DHA). HSA. (+LA,+REP,+DHA). DHA. (+LA, +REP,-HSA)</td>
</tr>
<tr>
<td><strong>FNE</strong></td>
<td>4.27 (2.77)</td>
<td>5.00 (3.05)</td>
<td>27.17* (2.29)</td>
<td>23.44* (5.50)</td>
<td>300.17</td>
<td>&lt;0.001</td>
<td>L.A. (-HSA,-DHA). REP. (-HSA,-DHA). HSA. (+LA,+REP,+DHA). DHA. (+LA, +REP,-HSA)</td>
</tr>
</tbody>
</table>

Groups: Low-anxious (LA), Repressor (REP), High Socially Anxious (HSA) and Defensive High Anxious (DHA).

Note: STATE=Spielberger State-Trait Anxiety Scale, BDI=Beck Depression Inventory, MC = Marlowe Crowne (Social Desirability Scale), TMAS = Taylor Manifest Anxiety Scale, FNE = Fear of Negative Evaluation Score

* Standard deviations (SD) in brackets

* = p < 0.05 Significant mean differences.
Table 2.3. Mean Response Latencies (in msec) for each Face Condition (congruent vs. incongruent) in the Masked Visual Probe Task for the Four Groups.

<table>
<thead>
<tr>
<th>Masked Face Type</th>
<th>Congruence vs. Incongruence</th>
<th>Group</th>
<th></th>
<th></th>
<th></th>
<th>Total Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LA (n= 26)</td>
<td>REP (n= 29)</td>
<td>HSA (n = 23)</td>
<td>DHA (n = 16)</td>
<td></td>
</tr>
<tr>
<td>Threat</td>
<td>Congruent</td>
<td>536.6 (61.7)</td>
<td>594.6 (44.9)</td>
<td>564.8 (53.8)</td>
<td>566.4 (68.5)</td>
<td>566.9 (59.6)</td>
</tr>
<tr>
<td></td>
<td>Incongruent</td>
<td>565.9 (56.3)</td>
<td>624.4 (40.7)</td>
<td>601.5 (51.4)</td>
<td>610.3 (50.4)</td>
<td>600.6 (53.8)</td>
</tr>
<tr>
<td>Happy</td>
<td>Congruent</td>
<td>530.4 (62.6)</td>
<td>591.0 (48.2)</td>
<td>572.0 (48.9)</td>
<td>579.9 (56.6)</td>
<td>568.1 (58.4)</td>
</tr>
<tr>
<td></td>
<td>Incongruent</td>
<td>564.7 (58.3)</td>
<td>607.3 (53.1)</td>
<td>591.8 (58.1)</td>
<td>594.6 (52.7)</td>
<td>589.7 (57.2)</td>
</tr>
<tr>
<td>Sad</td>
<td>Congruent</td>
<td>549.9 (56.6)</td>
<td>607.3 (52.0)</td>
<td>591.8 (55.8)</td>
<td>594.1 (51.7)</td>
<td>578.6 (57.2)</td>
</tr>
<tr>
<td></td>
<td>Incongruent</td>
<td>555.1 (55.1)</td>
<td>615.3 (50.6)</td>
<td>603.3 (53.2)</td>
<td>597.2 (51.1)</td>
<td>592.9 (57.1)</td>
</tr>
</tbody>
</table>

Groups: Low-anxious (LA), Repressor (REP), Socially High Anxious (SHA) and Defensive High Anxious (DHA).

Time for Masked condition (23msec exposure and 68msec mask).
SD in brackets.
Table 2.4. Mean Response Latencies (in msec) for each Face Condition (congruent vs. incongruent) in the Unmasked Visual Probe Task for the Four Groups.

<table>
<thead>
<tr>
<th>Unmasked Face Type</th>
<th>Congruence vs. Incongruence</th>
<th>Group</th>
<th>Total Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LA (n= 26)</td>
<td>REP (n= 29)</td>
</tr>
<tr>
<td>Threat</td>
<td>Congruent</td>
<td>543.2 (66.9)</td>
<td>585.7 (62.0)</td>
</tr>
<tr>
<td></td>
<td>Incongruent</td>
<td>547.5 (66.9)</td>
<td>632.5 (60.1)</td>
</tr>
<tr>
<td>Happy</td>
<td>Congruent</td>
<td>544.1 (73.1)</td>
<td>585.8 (59.7)</td>
</tr>
<tr>
<td></td>
<td>Incongruent</td>
<td>561.8 (68.9)</td>
<td>632.1 (71.1)</td>
</tr>
<tr>
<td>Sad</td>
<td>Congruent</td>
<td>544.6 (72.8)</td>
<td>584.9 (60.5)</td>
</tr>
<tr>
<td></td>
<td>Incongruent</td>
<td>555.1 (55.1)</td>
<td>615.3 (50.7)</td>
</tr>
</tbody>
</table>

Groups: Low-anxious (LA), Reppressor (REP), High Socially Anxious (HSA) and Defensive High Anxious (DHA).
Time for Unmasked condition (500ms exposure).
SD in brackets.

The attentional bias scores were entered into a 4 × 2 × 3 × 2 × 2 repeated measure design analysis (ANOVA) with the groups as between subject variables (LA, REP, HSA, DHA), and within subject variables (2) exposure durations (mask vs. unmasked), (3) emotional face type (angry, happy, sad), (2)
face position (left/ right) (2) probe positions (left/ right). Assumptions of homogeneity of covariance were met (Field, 2000; Tabachnick & Fidell, 1996).

There was a significant effect of the exposure duration \[F (3, 83) = 7.01, p < 0.01\] as reaction times to probes were faster for the masked condition than the unmasked condition (mean difference 10.28ms). There was also a main effect for face and probe interaction showing a significant difference between congruent and incongruent displays (mean difference of probes ‘on’ emotional face compared to ‘off’ equalled 32.02ms) \[F (3, 83) = 178.53, p < 0.001\]. The reaction times for all conditions were recorded for the congruent condition first on the right side (right face/right probe) of the monitor and second, for the left side (left face/left probe) (mean difference in reaction times 559.9/ 578.6ms respectively). In the incongruent condition right probe/right face side reaction times were shorter than left probe/left face (592.7/ 609.8 respectively).

When both of these factors were examined there was main effect found between congruence (probe/face) and masked/unmasked data showed that, for all groups reaction times were significantly shorter with the masked (congruent than incongruent) condition, and in the unmasked condition. \[F (3,83) = 7.83; p< 0.01\]. Shorter reaction times were measured for congruent condition over all. That is, congruence was a significant contributor to these results with congruent
(face/probe) presentations both masked and unmasked preceding the incongruent masked and unmasked respectively (Appendix E).

There was a main significant effect for emotional categories \[ F(3,83) = 3.69; p< 0.05 \]. The difference between anger and happy emotion was significant \( p< 0.01 \) as was the happy vs. sad \( p< 0.05 \). However for the two negative emotions (angry/sad), this distinction did not reach significance \( p < 0.38 \ ns \). Further, the interaction of emotion (3) and congruence (2) was also significant \( F(3,83) = 9.36; p< 0.01 \). This interaction remained significant when masked and unmasked differences were included (i.e., emotion; (3) X mask (2) X congruence (2) \[ F(3,83) = 4.46; p < 0.05 \] (Table 5).

Mean RT scores taken for each type of face presentation (i.e., masked/unmasked vs. emotional face) showed that there was a significant relationship between different predispositions (LA, REP, HSA, DHA). Low-anxious individuals however reacted significantly faster to all types of emotional faces both in the masked and unmasked condition \( F(3,83) = 4.23, p < 0.05 \). Repressors show significantly longer reaction time to emotional stimuli when compared to the other predispositions (Table 5; Figure 2).
Table 2.5. Mean reaction times scores for masked and unmasked emotional face-neutral pairs neglecting congruence/incongruence.

<table>
<thead>
<tr>
<th>Masked/Unmasked</th>
<th>Emotion</th>
<th>Group F Scores</th>
<th>Group Differences Pairwise (comparisons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masked</td>
<td>Anger</td>
<td>[F (3,84) = 5.85; p &lt; 0.001]</td>
<td>LA &lt; REP (-58.25ms) (p &lt; 0.001)</td>
</tr>
<tr>
<td>Masked</td>
<td>Happy</td>
<td>[F (3,84) = 4.62; p &lt; 0.01]</td>
<td>LA &lt; REP (-51.60ms) (p &lt; 0.01)</td>
</tr>
<tr>
<td>Masked</td>
<td>Sad</td>
<td>[F (3,84) = 4.22; p &lt; 0.01]</td>
<td>LA &lt; REP (-50.02ms) (p &lt; 0.01)</td>
</tr>
<tr>
<td>Unmasked</td>
<td>Anger</td>
<td>[F (3,84) = 3.99; p &lt; 0.01]</td>
<td>LA &lt; REP (-50.24ms) (p &lt; 0.01)</td>
</tr>
<tr>
<td>Unmasked</td>
<td>Happy</td>
<td>[F (3,84) = 4.50; p &lt; 0.01]</td>
<td>LA &lt; REP (-56.73ms) (p &lt; 0.01)</td>
</tr>
<tr>
<td>Unmasked</td>
<td>Sad</td>
<td>[F (3,84) = 2.69; p &lt; 0.05]</td>
<td>LA &lt; REP (-44.03ms) (p &lt; 0.05)</td>
</tr>
</tbody>
</table>

Adjustment for multiple comparisons: Bonferroni.

Mean Reaction Time for each Face Type

Figure 2.1: RT’s Masked Angry Faces

Figure 2.2: RT’s Unmasked Angry Faces
Mean Reaction Times for Masked Happy Faces

Figure 2.3: RT’s Masked Happy Faces

Mean Reaction Times for Unmasked Happy Faces

Figure 2.4: RT’s Unmasked Happy Faces

Mean Reaction Times for Masked Sad Faces

Figure 2.5: RT’s Masked Sad Faces

Mean Reaction Times for Unmasked Sad Faces

Figure 2.6: RT’s Unmasked Sad Faces
Between subjects, MANOVA showed a significant effect (mask X emotion X congruence) and were compared across the four predispositions (LA, REP, HSA, DHA) in the group [F (3,83) = 3.15; p < 0.05]. To examine the results in more detail, separate analyses were conducted for each face type. However, as a general observation it is noted that the main interaction was between low-anxious individuals and repressors where the low-anxious predispositions were faster to react to emotional faces than repressors (Table 6).
Table 2.6. Group Differences, with Mask (2) X Emotion (3) X Congruence (2)

<table>
<thead>
<tr>
<th>Masked / Unmasked</th>
<th>Emotion</th>
<th>Congruence</th>
<th>Group F scores</th>
<th>Group differences (Pairwise comparisons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masked</td>
<td>Anger</td>
<td>Congruent</td>
<td>$F (3,84) = 4.60; p &lt; 0.05$</td>
<td>LA &lt; REP (-58.03ms) (p &lt; 0.002)</td>
</tr>
<tr>
<td>Masked</td>
<td>Anger</td>
<td>Incongruent</td>
<td>$F (3,84) = 6.26; p &lt; 0.001$</td>
<td>LA &lt; REP (-58.48ms) (p &lt; 0.001) LA &lt; DHA (-44.31ms) (p &lt; 0.039)</td>
</tr>
<tr>
<td>Masked</td>
<td>Happy</td>
<td>Congruent</td>
<td>$F (3,84) = 5.84; p &lt; 0.001$</td>
<td>LA &lt; REP (-60.60ms) (p &lt; 0.001) LA &lt; DHA (-49.60ms) (p &lt; 0.033)</td>
</tr>
<tr>
<td>Masked</td>
<td>Happy</td>
<td>Incongruent</td>
<td>$F (3,84) = 2.58; p &lt; 0.058$ ns</td>
<td>LA &lt; REP (-42.60ms) (p &lt; 0.036)</td>
</tr>
<tr>
<td>Masked</td>
<td>Sad</td>
<td>Congruent</td>
<td>$F (3,84) = 2.42; p &lt; 0.071$ ns</td>
<td>LA &lt; REP (-39.86ms) (p &lt; 0.049)</td>
</tr>
<tr>
<td>Masked</td>
<td>Sad</td>
<td>Incongruent</td>
<td>$F (3,84) = 6.14; p &lt; 0.001$</td>
<td>LA &lt; REP (-60.19ms) (p &lt; 0.001) LA &lt; HSA (-48.28ms) (p &lt; 0.015)</td>
</tr>
<tr>
<td>Unmasked</td>
<td>Anger</td>
<td>Congruent</td>
<td>$F (3,84) = 2.39; p &lt; 0.074$ ns</td>
<td>NS difference</td>
</tr>
<tr>
<td>Unmasked</td>
<td>Anger</td>
<td>Incongruent</td>
<td>$F (3,84) = 4.23; p &lt; 0.01$</td>
<td>LA &lt; REP (-58.01ms) (p &lt; 0.004)</td>
</tr>
<tr>
<td>Unmasked</td>
<td>Happy</td>
<td>Congruent</td>
<td>$F (3,84) = 2.70; p &lt; 0.052$ ns</td>
<td>NS difference</td>
</tr>
<tr>
<td>Unmasked</td>
<td>Happy</td>
<td>Incongruent</td>
<td>$F (3,84) = 5.51; p &lt; 0.01$</td>
<td>LA &lt; REP (-70.24ms) (p &lt; 0.001) LA &lt; HSA (-47.86ms) (p &lt; 0.056) ns</td>
</tr>
<tr>
<td>Unmasked</td>
<td>Sad</td>
<td>Congruent</td>
<td>$F (3,84) = 2.28; p &lt; 0.085$ ns</td>
<td>NS difference</td>
</tr>
<tr>
<td>Unmasked</td>
<td>Sad</td>
<td>Incongruent</td>
<td>$F (3,84) = 2.80; p &lt; 0.05$</td>
<td>LA &lt; REP (-47.75ms) (p &lt; 0.041)</td>
</tr>
</tbody>
</table>

Adjustment for multiple comparisons: Bonferroni.

The results show that there was an overall effect of low-anxious individuals being faster to react to probes replacing emotional faces and neutral faces. In both congruent and incongruent conditions, and the masked and unmasked exposures, low-anxious individuals were significantly faster to react
to probes. The exception being the unmasked congruent conditions, where there was a non-significant reaction time difference for all emotional faces between groups. As emotional facial stimuli become more salient, the difference in reaction times between these groups diminished. In the unmasked incongruent condition, low-anxious individuals reacted significantly faster to neutral faces than repressors.

In the masked condition there were several significant results. For masked angry faces (negative-critical) in the incongruent condition, low-anxious individuals were significantly faster to react to neutral faces compared to repressors and defensive, high-anxious individuals. That is, low-anxious individuals were faster to attend to probes that appeared away from the emotional face. This suggests that the attention of repressors and defensive high-anxious individuals was captured by the emotionality of the face, slowing reaction times.

Similarly, with masked sad (negative, non-critical) faces in the incongruent condition, low-anxious individuals were significantly faster to react to sad faces compared with both repressors and socially-anxious individuals. That is, repressors and socially-anxious individuals were significantly slower to react when the probe was off the sad faces. This result was also similar for the masked (congruent) happy (positive) faces where low-anxious individuals were
significantly faster to react than both repressors and defensive high-anxious individuals. Both repressors and defensive high-anxious individuals were retarded in responding to probes that replaced happy faces. In the unmasked (incongruent) condition both repressors and socially-anxious individuals were significantly slower than low-anxious individuals to respond to happy faces. Reaction times were inhibited when the probe replaced the neutral face. Low-anxious individuals were generally faster than all other groups to detect probes that replaced emotional and neutral faces.

### 2.8.2 Direction of Attentional Bias

To simplify the analyses, attentional bias scores were calculated from the reaction time data for each type of emotional face and exposure condition (MacLeod & Mathews, 1988). The bias score is calculated by subtracting the mean RT when the emotional face and the probe were in the same position, from the mean RT when the emotional face and the probe were in different positions. Thus, bias scores for threat faces were calculated separately for each participant from their mean RTs to probes on trials with threat–neutral face pairs. (Bias score = 0.5 × (FLPR + FRPL – FLPL – FRPR) where FL (Face Left), FR (Face Right), PL (Probe Left) and PR (Probe Right) (incongruent minus congruent)). Positive values of the bias score reflect faster RTs when probes appear in the same position as the threat rather than neutral faces (i.e.,
vigilance for threat), whereas negative values of the bias score reflect avoidance of threat faces. Bias scores for happy and sad faces were calculated in the same way (Figure 3).

**Masked and Unmasked Attentional Biases for Emotional Faces**

**Figure 2.7:** Attentional Bias for Masked Angry faces.

**Figure 2.8:** Attentional Bias for Unmasked Angry Faces.
Reaction Times for Masked Happy

Figure 2.9: Attentional Bias for Masked Happy Faces.

Reaction Times for Unmasked Happy

Figure 2.10: Attentional Bias for Unmasked Happy Faces.

Reaction Times for Masked Sad

Figure 2.11: Attentional Bias for Masked Sad Faces.

Reaction Times for Unmasked Sad

Figure 2.12: Attentional Bias for Unmasked Sad Faces.
Attentional bias scores (ms) for emotional faces presented under the masked and unmasked exposure condition, for the four groups: low-anxious (LA), repressor (REP), high socially-anxious (HSA), and defensive high anxious (DHA).

Mask = 23ms exposure and 68ms mask. Unmasked = 500ms exposure.

Time (msec).

Increased time = increased attention

Bias scores calculated according to the above formula show the detection latency where positive values show an attentional bias (vigilance) towards faces while negative scores show avoidance of face stimuli. These results show no avoidance of face stimuli rather degrees (more or less) of attention. Mean difference scores of the incongruent minus congruent scores suggest that all predispositions show an attentional bias to emotional faces to a greater or lesser degree. As a general observation, in both the masked and unmasked angry condition all predispositions were attentive to threat faces but no significant difference between them.

A 2 × 3 × 4 analysis of variance was carried out with the emotional faces (angry, happy, sad) and exposure duration (masked or unmasked) in each group (LA, REP, HSA, DHA). Main effects were observed between exposure conditions masked and unmasked \[F (3, 83) = 7.83, p < 0.01\] where masked faces showed significantly faster reaction times than unmasked faces (10.48 msec). Main effect for emotional faces \[F (3, 83) = 6.41, p < 0.05\]. Pairwise
comparisons show a significant difference between the happy and negative faces.

Separate ANOVAs carried out on attentional bias scores in both the masked and unmasked condition showed a significant relationship for the unmasked happy face condition \( F(3,83) = 3.15; p < 0.05 \). Repressors were more attentive to happy faces when compared to low-anxious individuals in the unmasked condition. In the masked happy condition although there was not a significant difference, this trend reversed; low-anxious individuals were more attentive when compared to the repressors. In the masked sad face condition socially-anxious individuals were more attentive to these faces when compared to low-anxious individuals \( F(3,83) = 4.10, p < 0.01 \). Socially-anxious individuals were significantly more attentive to sad faces compared to low-anxious individuals. In the unmasked condition there was no significant difference between these predispositions (Appendix J).

2.9 Discussion

The results do not support the view that socially-anxious individuals and repressors have a paradoxical relationship between pre-attentional and attentional biases. The socially-anxious individuals were equally attentive to threat stimuli in both masked and unmasked conditions. This was not expected; rather it was anticipated that in the masked condition socially-anxious
individuals would be significantly more attentive than low-anxious individuals and more avoidant in unmasked conditions. This was similar for happy faces; attentional bias increased in the unmasked condition suggesting greater attention when faces were more recognisable, rather than avoidance. Although not predicted, there was a significant difference between socially-anxious and low-anxious individuals in the masked sad condition. These faces were included to make the distinction between negative faces and negative critical (threat) faces and to test whether ‘emotionality factor’ rather than specific emotions were more important. In this research, socially-anxious individuals were significantly more attentive to sad faces in the masked condition. This would have been expected more for angry faces than sad faces. No predictions were made in relation to sad faces, despite the fact that these faces were included in the research. It would have been expected that angry faces (negative-critical) rather than sad faces (negative) would command attention. This critical rather than the negative aspect may play an important part in attention of avoidance reaction of socially-anxious individuals.

Likewise with repressors, the view that they would avoid emotional faces in the masked condition and be attentive in the unmasked condition was only partly supported. In the masked condition it was predicted that repressors would have a pre-attentional avoidance to emotional faces and be more vigilant in the unmasked condition. Contrary to predictions repressors were vigilant to
emotional faces in the masked condition. Rather than less, they showed increased vigilance to emotional faces when compared to low-anxious individuals. This was not expected for the masked condition. Repressors were predicted to become more avoidant than low-anxious individuals based on Eysenck’s (1997) models and implied by Mogg and Bradley’s (1998) model.

In the unmasked condition however repressors were more vigilant to emotional faces but this only reached significance with happy faces when compared to low-anxious individuals. Interestingly, in the masked condition low-anxious individuals were more attentive to happy faces but these differences diminished in the unmasked condition. This result was non-significant although it did imply an opposite attentional bias to happy faces for low-anxious individuals when compared to repressors. Overall, repressors were generally more vigilant in the unmasked condition when compared to the masked condition.

A further observation concerned the masked sad and happy conditions. Low-anxious individuals were significantly more vigilant to happy faces compared to masked sad faces. This implies that at a pre-attentive level, low-anxious individuals are more vigilant to positive faces, whereas this is more inhibited for negative sad faces.
The second hypothesis was that repressors would be more avoidant than low-anxious individuals to masked threat faces. Based on the theory that repressors are greater avoiders of threat faces than low-anxious individuals it was anticipated that repressors would pre-attentionally avoid angry faces to a greater extent than low-anxious individuals. All of the trait models (except Eysenck, 1997) predict that low-anxious individuals will avoid threat stimuli. In Eysenck’s (1992, 97) model low-anxious individuals were unbiased whereas repressors were the ultra avoiders. Based on this theorising (plus historical definitions of defensiveness in social situations) it was expected that repressors would be dissociative rather than anxious avoiders. Contrary to expectations both low-anxious individuals and repressors were vigilant to angry faces in the masked condition. This was also true for socially-anxious individuals.

However, the point of interest in this hypothesis was the results of the difference between low-anxious individuals and repressors. From this perspective low-anxious individuals appear to be no different than repressors in that both appear to be vigilant to threat faces at a pre-attentional level. No prediction was made with regards to the unmasked condition as this concerned the previous hypothesis. In this hypothesis it was predicted that repressors would be significantly more attentive to emotional faces, especially happy faces, since they depict social desirability and need for approval aspects. Indeed
repressors in the unmasked condition were significantly more vigilant than low-anxious individuals.

The interesting outcome for both of these hypotheses is that repressors were expected to be vigilant to emotional faces (in the unmasked condition) based on the social desirability aspect. This was partly fulfilled in that repressors were vigilant to unmasked faces. In the second hypothesis, the repressor was predicted to become avoidant of threat stimuli in the masked condition based on the notion of perceptual defensive (Erdelyi, 1990), Freudian dissociation and opposite attentional biases (Eysenck, 1997). It was expected that they would be more avoidant than low-anxious individuals in this condition. Although low-anxious individuals and repressors had the same attentional bias, it was opposite to what was expected. Both were vigilant to threat faces suggesting initial attention. It can be understood for repressors, since they elicit a physiological response to threat stimuli, however the low-anxious individuals did not have this reaction. On this basis an expectation of differences in pre-attentional process was not realised.

### 2.9.1 Review of the Results

When congruence and incongruence conditions were included in the analysis, several trends were observed, and the main findings are as follows:
First, low-anxious individuals showed significant vigilance to emotional faces when compared to repressors. Repressors were significantly slower to react to all emotional faces in both masked and unmasked conditions, and especially in the incongruent conditions (where the probe replaced a neutral face). In both masked and unmasked incongruent conditions, low-anxious individuals were significantly faster to respond to probes than repressors for all three emotions. This suggests that a repressor’s attention may have been ‘captured’ by emotional faces whereas low-anxious individuals were quicker to disengage from emotional faces and respond to the probe.

Second, for each of the three emotions, in all unmasked congruent conditions (when the probe replaces the emotional face), responses were non-significant. It appears that as emotional facial stimuli become more recognisable, the differences in reaction times between these groups diminish. In the masked congruent conditions, low-anxious individuals were faster to respond to dot probes than all other predispositions, and, significantly faster than repressors. Socially-anxious individuals were also slower to react to emotional faces, but did not reach statistical significance when compared to low-anxious individuals. The measure of defensiveness in repressors as measured by Marlowe Crowne appears to contribute to slower reactions, suggesting that the emotional faces ‘capture’ the attention of highly defensive
individuals. These findings did have some specific differences in relation to
different emotional expressions.

For angry faces, low-anxious individuals were faster to react to masked
faces than repressors, and defensive high-anxious individuals were significantly
slower than low-anxious individuals were in the incongruent condition. This
suggests that defensive high-anxious individuals and repressors have their
attention captured by threat stimuli when compared to low-anxious individuals.
However, this was not the case when the probe replaced a more recognisable
angry face (unmasked congruent condition) where attentional differences
diminished. In fact, probe reaction times increased for all predispositions in the
unmasked condition. Overall, low-anxious individuals were significantly faster
to react to angry faces in the masked and unmasked incongruent conditions.
Socially-anxious individuals, as with repressors, were slower than low-anxious
individuals but this did not reach statistical significance (p < 0.085).

For happy faces, low-anxious individuals were faster to react to masked
happy faces than repressors. In masked incongruent conditions defensive high-
anxious individuals were significantly slower to react to probes that replaced
happy faces. As discussed, increased defensiveness produces a slower reaction
time when compared to low-anxious individuals. In unmasked incongruent
conditions, repressors again were significantly slower than low-anxious
individuals. Socially-anxious individuals also showed a similar trend which again did not reach statistical significance (p<0.056). While statistically, it should be taken as no difference there is some suggestion that attention is ‘captured’ by the happy face when the probe replaces a neutral face. This also indicates that defensiveness and also anxiety (to a greater degree), increased response times to probes, especially when probes did not replace the happy face (the incongruent conditions).

For sad faces in the masked condition, repressors were significantly slower to react than low-anxious individuals in both the congruent and incongruent conditions. In the masked incongruent condition, socially-anxious individuals also showed significantly longer times than low-anxious individuals, however, less so than repressors. This indicates that socially-anxious individuals also have attentional ‘capture’ when presented with sad faces.

Repressors responded significantly slower than low-anxious individuals to the emotional faces where effort was required to detect the stimuli, namely, masked and unmasked emotional faces in the incongruent positions. Fox (1994) also found that repressors respond slower in detecting probes replacing social threat words, which she interpreted as attentional avoidance of social threat. Fox (1994) proposed that repressors are particularly efficient at inhibiting threat related information however, there was little evidence that they were better at
inhibiting threat related information than low-anxious individuals. Low-anxious individuals according to Fox (1994) are characterised by indifference rather than a defensive attentional style. This was not the case in this study. Repressors’ reaction time was significantly slower in both congruent and incongruent conditions when compared to low-anxious individuals. Longer reaction times in the incongruent condition suggest that attention was ‘captured’ by the emotional face and longer reaction times in the congruent position can be interpreted as avoidance of emotional faces. That is, a delay in responding to a probe that replaced an emotional face. These biases need to be reconciled.

According to this rationale, attentional bias should be slower for incongruent trials but faster for congruent. This was not shown in this study. In both congruent and incongruent conditions repressors and socially-anxious individuals were slower to react to probes than low-anxious individuals. Low-anxious individuals were significantly faster to respond to probes not only in the congruent position but also in the incongruent condition. Mogg et al. (2000) also found that avoidance of social threat was significant for repressors. However, there is considerable evidence in Stroop studies that repressors are proficient at ignoring colour social threat words (Fox, 1993; Myers & McKenna, 1996). This is curious, as one could expect that repressors would be proficient at avoiding emotional stimuli in the dot probe test. Mogg et al. (2000) propose that there is a fundamental difference between Stroop and dot probe.
Where dot probe uses visual scan and search paradigms, the Stroop requires the inhibiting of semantic cognitive processes by naming the colour of a stationary word (see MacLeod, 1998). Mogg et al. (2000) found that repressors were faster to react to incongruent probes. In their study, repressors were significantly slower than low-anxious individuals were. Brosschot, de Ruiter, and Kindt (1999), however, failed to find any group differences involving repressor or defensive high-anxious groups. Brosschot et al. (1999) concluded that attentional avoidance of threat is not a reliable characteristic of repressors. They found that high-anxious individuals were slower to respond to the probe in the incongruent position, similar to this present study. It took longer to disengage from the emotional stimulus. In the congruent position, however Brosschot et al. (1999) found no difference, suggesting that socially-anxious individuals were no faster to attend than other groups. In this study, socially-anxious individuals acted similarly to repressors in that they were slower than low-anxious individuals to respond to probes that replaced emotional faces. In fact, in this present study both socially-anxious individuals and repressors were slower than low-anxious individuals in both congruent and incongruent positions.

This problem of disengagement (attentional capture) from emotional stimuli increases the complexity of analysing these results. If, for example, attention is directed towards an emotional face, in the incongruent condition it would take longer, while in the congruent condition it would be shorter. This
study showed that low-anxious individuals were faster to respond to the probe both in the congruent and incongruent condition. Koster, Grombez, Verschuere, and de Houwer (2004) argue that findings in dot probe tests are ambiguous. Results are interpreted with difficulty because of the difficulty to disengage. They found that for low-anxious individuals congruence effect (faster when probe is on emotional face, slower when off) was found both for high and low threat stimuli. In a subsequent dot probe test they found that both low and high trait individuals attend when time is less that 100ms however differential responses were noticed at 500ms where low-anxious individuals showed less bias to mild threat pictures (Koster, Verschuere, Crombez, & Van Damme, 2005). Fox, Russo, and Dutton (2002) found that participants did not show significant variations across the different expressions (angry/ happy) in a congruent trial but this changed in the incongruent condition where there were longer response times for both happy and angry faces. Rather than facial expressions (valence) it may be the intensity of the emotion that is important (emotionality hypothesis). In this present research low-anxious individuals were both faster to attend to probes that replaced emotional faces but also to probes that replaced neutral faces (i.e., probes off the emotional face). Therefore, it was important to examine mean reaction times in both congruent and incongruent conditions.
2.9.2 Attentional Direction

To overcome the problem of the congruency effect, measures of attentional bias were calculated to determine the direction of attention by subtracting congruent from incongruent times (Macleod & Mathews, 1988). In this study it was found that mean difference scores (incongruent minus congruent scores) showed an attentional bias toward emotional faces in varying degrees, for all predispositions. Three significant relationships were evident.

The first was in the unmasked happy face condition where repressors, compared to low-anxious individuals, displayed an attentional bias toward happy faces \([F (3,83) = 3.15; p < 0.05]\). Second, in the masked condition, socially-anxious individuals were significantly more attentive to sad faces than low-anxious individuals \([F (3,83) = 4.10, p<0.01]\). Third, there was a significant difference between attentional bias of low-anxious individuals when comparing masked happy and masked sad faces. Low-anxious individuals were more attentive in the masked happy condition \([F (3,83) = 8.80, p<0.05]\).

In response to happy faces, low-anxious individuals showed the greatest attentional bias to happy faces in the masked condition, when compared to the three other dispositions. In the unmasked condition however, repressors increased attentional bias considerably (reaching statistical significance) when compared to low-anxious individuals. Between the masked and unmasked
happy exposures there was considerably more attention given to happy faces not
only by repressors but also by socially-anxious individuals. This supports the
prediction that repressors attend to social positive faces and have a bias to
engage emotional faces (social desirability). Although socially-anxious
individuals also increased attentional bias when compared to low-anxious
individuals, this was not statistically significant and does not support the
prediction that socially-anxious individuals would become more avoidant of
happy faces in the unmasked condition.

Interestingly, and contrary to expectation, rather than an avoidance bias,
low-anxious individuals were more attentive to masked happy conditions but
decreased attention in the unmasked condition. This suggests that at a
perceptual level low-anxious individuals are faster to attend to positive stimuli
and are more biased to attend to that stimulus. Low-anxious individuals became
less attentive to happy faces as these faces became more recognisable.

Eysenck’s (1997) proposition of opposite attentional biases in anxious and
repressor individuals was not supported as both attended to happy faces in the
unmasked condition. Furthermore, low-anxious individuals were more attentive
to happy faces in the masked condition. Rather than low-anxious individuals
being non-directional or unbiased, there was a non-significant orientation to
happy stimuli in the pre-attentional condition.
In response to sad faces, when compared with low-anxious individuals, socially-anxious individuals were more attentive to masked sad faces \( [F (3,83) = 4.10, p<0.01] \). In the unmasked condition there were no significant differences between these predispositions. Perhaps there was a trend for these predispositions for increased attention to sad faces in the unmasked condition? Again, this was a non-significant trend.

In response to angry faces, all predispositions showed an attentional bias to faces both in the masked and unmasked condition. Low-anxious, socially-anxious, defensive high-anxious and repressors’ attentional bias did not change significantly between these conditions.

2.9.3 Attentional Processes

The original hypothesis was that socially-anxious individuals would be vigilant to angry faces in masked conditions and avoidant of threat in unmasked conditions and, repressors would do the opposite, namely avoid processing threat in the masked condition but attend to unmasked emotional stimuli (Eysenck, 1997; Mogg & Bradley 2002; Pishyar, Harris, & Menzies, 2004). The theory is that socially-anxious individuals at an attentional (strategic) level would avoid recognisable social faces and repressors would be attracted to them based on the need for approval and social desirability (Paulhus, 2001).
The second prediction was that low-anxious individuals would be biased to avoid emotional faces at a pre-attentive level, but be more attentive than repressors (based on models by Eysenck, 1997 and Mogg and Bradley, 1998) however, repressors would be more attentive to happy stimuli in the unmasked condition. This prediction was partly fulfilled where low-anxious individuals were more vigilant to positive faces in the masked condition, more so than repressors. In the unmasked condition repressors were significantly more vigilant to happy faces compared to low-anxious individuals. This supports the claim that repressors are less vigilant (or more avoidant) than low-anxious individuals of masked emotional stimuli but more vigilant in unmasked conditions for the happy face condition. This did not occur for negative (sad, angry) faces. In this study an avoidance bias was not observed for repressors, rather an attentional bias which was slower than low-anxious individuals. In response to angry and sad faces, repressors did increase their attention in the unmasked condition but so did socially-anxious individuals.

Socially-anxious individuals showed an attentional bias to all emotional faces, as was the case for the other three dispositions in this research. Significant difference occurred with the masked sad faces where socially-anxious individuals were more attentive than low-anxious individuals. Surprisingly this did not occur with angry faces where the evidence is that socially-anxious individuals are faster to respond to probes that replace angry
faces (Mogg & Bradley, 2002; Mogg, Philippot, & Bradley, 2004; Pishyar, Harris, & Menzies, 2004). The difference between sad (negative) and angry (negative and critical) may have affected these results. In this study socially-anxious individuals had similar responses to repressors in that they were all more attentive to emotional stimuli.

There is some debate as to the direction of attentional resources with socially-anxious individuals. Rapee and Heimberg (1997) propose that socially-anxious individuals show enhanced selective attention to threat cues. Asmundson and Stein (1994) found that individuals with social phobia devoted disproportional attentional resources to social threat words. This was also reported by Amir and Foa (2001) and Muza, Lepine, Clark, Mansell, & Ehlers, (2003). They propose that both heightened vigilance and premature avoidance of threat stimuli contribute to the maintenance of social anxiety and minimise the opportunity for authentic information processing of the stimuli. Muza et al. (2003) report enhanced attention to negative socially evaluative words using dot probe. They found that individuals with social phobia showed an attentional bias towards social threat words while non-patients showed an avoidance response. A third group (social phobia with concurrent depressive disorder) reacted like non-patients suggesting that concurrent depressive disorder eliminates attentional bias (see Rinck and Becker, 2005). Pishyar, Harris, & Menzies (2003) found that socially-anxious individuals were vigilant to social
threat but avoidant of happy faces. The vigilance – avoidance effect was not realised in this research, rather vigilance in both the masked and unmasked conditions prevailed. This is similar to former findings in studies of generalised anxiety, which have typically found vigilance for angry faces in anxious individuals on visual probe tasks (e.g., Bradley, Mogg, Falla, & Hamilton, 1998; Bradley, Mogg, White, Groom, & de Bono, 1999; Mogg & Bradley, 1999). Mogg, Philippot, and Bradley (2004) suggest that social anxiety and generalized anxiety are commonly correlated and the finding of “avoidance of social threat cues in social anxiety seem surprising” (p.160). It was predicted that socially-anxious individuals would avoid processing angry faces in the unmasked condition, however this was not supported in this present study. Other studies have reported avoidance of threat faces (Chen, Ehlers, Clark, & Mansell, 2002; Mansell, Clark, Ehlers, & Chen, 1999).

2.9.4 Summation

The expectation that socially-anxious individuals would be more attentive to masked angry faces than other predispositions was not met. All predispositions were vigilant to masked angry faces. The prediction that socially-anxious individuals would avoid social threat in the unmasked condition likewise was not met. Low-anxious individuals were faster to respond to probes in both the congruent and incongruent conditions, suggesting that emotional faces do not inhibit low-anxious individuals. Moreover, they are
attentive at a masked level. Low-anxious individuals appear to be the most ‘attentionally flexible’ in this regard.

With regards to vigilance and avoidance, it was found that all predispositions attended to all emotional faces, however, there were some significant differences. Repressors were vigilant to happy faces in the unmasked condition and socially-anxious individuals were vigilant to sad faces in the masked condition. Contrary to other studies (Pishyar, Harris, & Menzies, 2004; Chen, Ehlers, Clark, & Mansell, 2002), avoidance bias for low-anxious individuals was not evident in this study.

In relation to Mogg & Bradley (1998) and Williams’ et al. (1988, 1997) models, the prediction of an avoidance bias by low-anxious individuals and repressors did not eventuate. It is important to note, however, that repressors were significantly slower than low-anxious individuals in detection of faces when congruency effect was included. This was also true for socially-anxious individuals. When the congruency effect was calculated all predispositions showed attention to emotional faces. Contrary to expectations low-anxious individuals did not display an avoidance bias as with repressors, who were expected to show even greater avoidance in the masked condition. In the unmasked condition however both socially-anxious individuals and repressors showed increased attention to emotional faces.
When comparing these results with the hypothesised expectations based on Eysenck’s+ (1997) and Mogg and Bradley’s (1998) models, these did not eventuate. Both the prediction of a paradoxical relationship between socially-anxious individuals and repressors needs further examination especially in relation to interpretive and attributional biases to social situations. Moreover, the prediction that repressors are vigilant avoiders compared to low-anxious individuals (as mild avoiders) in the masked condition was not realised. In the unmasked condition repressors were as vigilant as socially-anxious individuals. Although this was expected it was not predicted for socially-anxious individuals who were expected to avoid emotional faces (at the strategic level).

2.9.5 Methodological Considerations

It is important to note that there are some methodological considerations that should be made concerning this study. First, in the dot probe paradigm face stimuli were presented based on gender and age. That is, the faces were not of the same person with different expressions. Despite the initial rigorous discrimination between faces, presenting two different faces (emotional and neutral) in the one exposure may have influenced results. Furthermore, face pairs were randomly presented where the variety of age and gender, may have generalised the results. However, in defence of this it can be suggested that this variety of faces simulate a ‘more normal’ social environment. A further
consideration is that the 500ms unmasked condition may have been too short to engage strategic cognitive processing and may have been better as 1000ms (Mogg, Philippot, & Bradley 2004).

Another aspect that needs consideration is level of state anxiety. State anxiety is important in research. In this study participants were attached to a galvanic skin recorder (GSR) and were informed that their physiological responses would be monitored. With self-report mechanisms (State-Trait Anxiety Inventory; STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) it is difficult to estimate accurately levels of state anxiety.

A final issue is that participants in this study were not a clinical population. It would be expected that clinically diagnosed socially-anxious participants might produce different results. Furthermore, the diagnostic labels attributed to social anxiety encompass, and has comorbidity with, other avoidance disorders including depression.
CHAPTER THREE
IMPLICIT ASSOCIATION TEST

3.1 Review and a Different Perspective

The predictions of the last chapter (Dot Probe Test) of opposite attentional processes were not satisfied rather it was found that both socially-anxious individuals and repressors were vigilant to emotional faces both at an implicit and explicit level. The original hypotheses were that there would be a ‘paradoxical’ effect (opposite and different) where at an implicit level socially-anxious individuals would be highly vigilant and repressors highly avoidant of social threat and at an explicit level the socially-anxious individuals would avoid social faces and the repressors engage with them (social desirable behaviours). It was found that socially-anxious individuals were still vigilant at the conscious attentional level as was the case with repressors. Repressors were as vigilant as socially-anxious individuals to all emotional faces suggesting that emotionality of faces, rather than specific facial expressions were important (Byrne & Eysenck, 1995).

In addition, it was found that low-anxious individuals were faster to both respond and disengage from emotional faces and neutral faces than repressors (and SA). The tendency was rather that repressors and socially-anxious
individuals’ attention was ‘captured’ by the faces and had difficulty in removing their attention from emotional faces in general.

**Summary of Hypothesis for the Dot Probe Test**

<table>
<thead>
<tr>
<th>Hypothesis (HYP)</th>
<th>Implicit (Masked social threat/positive stimuli)</th>
<th>Explicit (Unmasked social threat/positive stimuli)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYP 1</td>
<td>Socially-Anxious</td>
<td>Vigilant</td>
</tr>
<tr>
<td>HYP 2</td>
<td>Repressors</td>
<td>Avoidant</td>
</tr>
<tr>
<td>HYP 3</td>
<td>Low Anxious</td>
<td>Mildly Avoidant</td>
</tr>
</tbody>
</table>

In one sense this seems reasonable, all people would initially take notice of facial stimuli however, whether the face initiates an anxious response or not is a subsequent consideration. It appears that for repressors and socially-anxious individuals ‘attentional capture’ was prominent for all faces while low-anxious individuals were more flexible to attend and avoid these faces regardless of the facial expression. That is, low-anxious individuals were not long distracted either in the masked or unmasked condition.
It is important to note that previous research makes a categorical distinction between the explicit attentional/behavioural responses of socially-anxious individuals and repressors. That is, whereas the repressor has a tendency towards social desirability the socially-anxious individual has a tendency to avoid social situations. Although this was not borne out in the Dot Probe Task where both socially-anxious individuals and repressors were vigilat, the important question for this thesis is the nature of these implicit beliefs and motivations. Do these motivations stem from negative or positive beliefs? Are they similar or different (considering the three models of trait anxiety and Freudian theory of anxiety and repression) considering that both of these personalities behave in an opposite manner socially, but react physiologically in a similar way?

By way of summarising the above discussion (Dot Probe Test), it must be said that these propositions and their related tests when taken in aggregate are very complex. While this reflects the stated aim of the thesis, to examine these relationships in ‘fine grained detail’, reporting the various strategies in aggregate proved fairly indigestible. To make the following discussion more accessible, it was decided to depart from the normal psychology thesis conventions and report each study separately from initial theorisation through results to discussion. It should be noted that although these experiments were performed sequentially, analysis of the results was not undertaken until all were
complete. For this reason, the final discussion integrates the various investigations, while in practice each experiment stood alone and did not inform the following.

We turn now to a consideration of the first of these experiments, namely the Implicit Association Test, a test designed to tap the implicit beliefs and cognitive association of individuals.

3.2 Introduction: Implicit Beliefs?

An important aspect of social anxiety research is the implicit beliefs that underpin and reinforce dysfunctional thinking and associated behaviour. Beck, Emery, and Greenberg (1985) claimed that anxiety disorders stem from dysfunctional memory schemas that activate negative appraisals of the dangerousness of certain situations and impair the ability to manage them. Furthermore, that the content of these schemas is linked to the specific type of anxiety present. From this perspective it is important to examine the cognitive processes in socially-anxious individuals and repressors and their implicit belief structures. The purpose of this section is to clarify some of these implicit belief structures associated with the socially-anxious and repressors using the Implicit Association Test (IAT).
3.3 Nature of the Implicit Association Test

The Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998) (IAT) is used for assessing memory-based cognitive structures referred to as implicit belief theories. The IAT measures automatic associations in memory. These are automatic in the sense that such evaluations occur outside conscious control and, at times, outside conscious awareness that they share many of the qualities ascribed to one’s implicit beliefs. In one sense, the IAT provides a measure of strength of automatic associations. It uses reaction time tests that preclude reflection and contemplation of a category, rather requiring a subject to react to (and make a decision about) two presented items as quickly as possible. One could argue that the Stroop test has the same competitive features however, rather than reacting to naming colour from a semantic context, the cognitive factors in the IAT are proactive in that facilitating or inhabiting semantic connections depends more on semantic competition between two words rather than competitively reacting colour coding.

The test is used increasingly to study constructs such as social prejudice and the instrument has adequate psychometric properties (for a review see Greenwald and Banaji, 1995; Dasgupta, McGee, Greenwald, and Banaji, 2000). For example, when asked if they had stereotypical beliefs about race, gender etc. researchers found that there was a profound difference between a person’s

Therefore, the IAT seems appropriate to tease out the differences between socially-anxious individuals and repressors. The self-report of these individuals would be biased considering their personality differences (Derakshan & Eysenck, 1997b; Rapee & Spence, 2004; Stopa & Clark, 2000). Furthermore, tests used in cognitive research are insufficient to address implicit beliefs. While, both the Stroop and dot probe tests tap particular cognitive functions they do not discrimination between classes of words. It is therefore important to approach implicit beliefs from another perspective.

Some of the other well-known problems with self-report measures are that they depend on the subjects’ willingness to report private knowledge and the subjects’ ability to report such knowledge accurately. In a research environment experimental demand characteristics may distort self-report. Moreover, dysfunctional thinking may not be accessible to consciousness and so cannot be assessed by way of introspection (Eysenck, 1992). Consequently, self-report measures may be biased when respondents are unwilling or unable to report accurately. Therefore, an implicit reaction time test is appropriate in this context.
The IAT is a computer based reaction-time task that reflects strength of association between memory concepts. Specifically, the task involves comparing the time taken to classify stimuli when paired categories match a person’s automatic associations, versus the time taken when paired categories contradict automatic associations. The reaction times are measured and compared showing reliable differences as to the implicit belief preferences and attitudes of the participants. According to Egloff and Schmukle (2002) the reliability and internal consistency of the IAT is high. They found that the IAT was unaffected by faking instructions and able to predict implicit attitudes in questionnaire measures of anxiety and social desirability (Greenwald, 1992; Greenwald et al., 2002). It is in this context that the implicit beliefs of socially-anxious individuals and repressors will be examined.

3.4 Differences between Socially-Anxious Individuals and Repressors

As previously reported, both socially-anxious individuals and repressors appear to respond physiologically in similar ways to social threat. However, as we have seen socially-anxious individuals will report fear of social situations while repressors report the opposite (Eysenck, 1997; Myers & Brewin, 1994). Socially-anxious individuals will frequently acknowledge the irrationality of their explicit beliefs underlying their overly avoidant behaviour, suggesting that they can access their beliefs about their circumstances (Clark & Wells, 1995). However, the irrationality of their social behaviours suggests that at a
preconscious level their belief is different. Alternatively, repressors will report positively, engage in socially desirable behaviours and deny any personal anxiety or irrationality associated with social interaction yet, show physiological signs of an anxious predisposition (Paulhus, Fridhandler, & Hayes, 1997; Weinberger, 1990). Repressors have been labelled as self-deceivers and ‘fake goods’ suggesting another agenda is going on, that is, they are not in touch with their beliefs, so it is important to examine the nature of the implicit motivations supporting these irrational belief structures. For example, Myers and Brewin (1996) suggest that repressors mask their internal anxiety states by unrealistic optimism and overly positive self-evaluations. Perhaps in valuing social desirability repressors not only report low levels of social threat ‘but believe it’ despite their physiological state telling them otherwise (Ceschi, de Linden, & Piher, 2005; Derakshan & Eysenck, 1999; Weinberger & Davidson, 1994). Although repressors do not seem to experience anxiety ‘consciously’ they do suffer from a wide range of psychosomatic illnesses (Bahnson & Bahnson, 1966; Kraft, 1999; Garssen, 2004). Therefore, it is important to briefly review the nature of these two personalities.

### 3.4.1 Personality Differences

Perhaps with the previous differing perspectives these studies are linked to personality. Dysfunctional thinking is associated with both socially-anxious individuals and repressors, and self-report may be influenced by specific
personality characteristics. For example, in response to the Eysenck Personality Questionnaire (EPQ-R), repressors score high on the extroverted and lie scales whereas socially-anxious individuals are introverted and neurotic (Eysenck & Eysenck, 1975) (see Appendix A). Studies show that repressors have physiological reactions that are equivalent if not greater than highly-anxious individuals (Abdul-Karim, 1999; Eysenck, 2000; Newton & Contrada, 1992). This discrepancy between self-report and actual arousal, according to Kneier and Temoshok (1984), may contribute to poor health in repressors (Bonanno & Singer, 1990). Both repressors and socially-anxious individuals deal with anxiety by biased information processing and, as suggested previously, both interpret and respond differently when confronted by social threat (Clark & Wells, 1995; Derakshan & Eysenck, 1997; Leary, 2001). Socially-anxious individuals tend to avoid social situations while repressors engage in them (Rapee & Spence, 2004; Stopa & Clark, 2000; Weinberger, 1990). The preconscious motivations of these two personalities are important and we briefly review their explicit cognitive styles as it may point to their implicit thinking.

Eysenck (1997) proposed in his cognitive theory of anxiety that repressors have a cognitive bias opposed to the processing of threat, whereas high trait-anxious individuals have a bias in favour of threat, and low trait-anxious individuals have no bias at all (see also Derakshan and Eysenck,
While socially-anxious individuals over-estimate social threat, repressors under-estimate it (Myers & Brewin, 1995; Rapee & Heimberg, 1997; Weinberger, 1990). The cognitive reactions of each personality suggest that different dysfunctional beliefs fuel these behaviours. With these two different information-processing styles in mind, it is appropriate to question the nature of the implicit beliefs and non-conscious preferences of these groups.

3.4.2 Social Anxiety

Socially-anxious individuals also appear to use dysfunctional cognitive and coping styles. Social anxiety is developed and maintained by negative beliefs about one’s social ability (Heimberg, Liebowitz, Hope, & Schneier, 1995; Muza & Lepine, 2000; Rapee & Heimberg, 1997). These beliefs are not challenged even when contrary cues are available.

For example, in Rapee and Heimberg’s (1997) model of social anxiety emphasises that there is a discrepancy between mental representations of self and others standards. They focus on mental representations that are set up with the anticipation of a social encounter. These representations consist of imagines or schemata of how others will see them. Attentional resources are allocated to the salient aspects of negative self-image:

“The representation of how audiences are expected to view the individual and the appraisal of the audience’s presumed situational
standards are compared to provide an estimate of the audience’s perception of the individual’s current performance” (and, by extension, of the individual him/herself) (Rapee and Heimberg, 1997, p.744).

Contributors to this representation are long-term memory and recollections of negative events, monitoring of internal symptoms, and external cues such as the audience’s feedback. These contributions underpin a mental representation that formulates a prediction on how one is supposed to act in front of that social environment. Individuals with social anxiety are not only monitoring their own internal performance but also others’ evaluation of them, which keeps them vigilantly monitoring both internal and external cues (Rapee & Heimberg, 1997). Vigilant monitoring of others is crucial in reinforcing existing schemas based on interpretations of other behaviours in a negative self-deprecating fashion. Both internal (proprioceptive/autonomic information) and external cues (verbal/non verbal) are imagined in terms of one’s own perceived level of inadequate social performance, which is exaggerated and reinforced based on this negative representation. The predictable negative self-evaluation gives rise to anxiety with its physiological, cognitive and behavioural aspects which in turn influence the mental representation of his/her performance (appearance, behaviours, perceptions of others and the cycle is renewed (Musa & Lepine,
As a result, individuals with social anxiety perceive their own social performance more poorly, even when they have had positive feedback (Rapee & Lim, 1992; Rapee & Spence, 2004; Stopa & Clark, 1993) and report more negative than positive cognitions in social situations compared to low-anxious individuals (Kocovski, Endler, Rector, & Flett, 2005; Musa & Lepine, 2000; Turner, Beidel, & Larkin, 1986). For example, threatening faces, criticism, self-consciousness, dysfunctional beliefs about their own social performance and coping ability in public spaces, are some of the negative self-reports associated with social anxiety (Edwards, Rapee, & Franklin, 2003). A desire not to look foolish or feel embarrassed in a crowd is another motive to avoid social interaction. These dysfunctional beliefs may include cognitions that reflect themes such as ‘if I blush people will think I am incompetent’, ‘I am easily rejected by other people,’ or, ‘people are inclined to think badly of me’ (Baldwin & Fergusson, 2001; Beck, Emery, & Greenberg, 1985). Self-talk scenarios, which emphasise themes of incompetence, humiliation and embarrassment, are likely to reinforce beliefs and become self-fulfilling (Rapee & Heimberg, 1997; Rapee & Spence, 2004). More recently, Kocovski, Endler, Rector, and Flett (2005) found individuals with high social anxiety were more likely to ruminate rather than distract negative thoughts and, dwell on themes of
‘if only’. These negative interpretations and cognitions result in unconditional dysfunctional thinking and beliefs about themselves and about social performance and evaluation, which become self-fulfilling (Clark & Wells, 1995). The question is, does this type of thinking lay the foundation for implicit beliefs or visa-versa? De Jong, Pasman, Kindt and van de Hout (2001) using an Implicit Association Test found that highly socially-anxious women showed the predicted deterioration of task performance when social situations were related to negative outcomes. Low-anxious women did the opposite and associated social situation with positive effects. Garner, Mogg, and Bradley (2006) found that socially-anxious individuals over represented negative social cues in a post-event study. Although the initial ‘on-line’ expectancy bias (of aversive outcomes) was extinguished, where low anxious individuals maintained a positive bias socially-anxious individuals reported more negative social cues.

There is another view that suggests that socially-anxious individuals are implicitly positive about themselves. Clark and Wells (1995) suggest that socially-anxious individuals do not have low self-esteem, despite overestimating how negatively others evaluate their performance. Furthermore, they argue that “the core of social phobia appears to be a strong desire to convey a particular favourable impression of oneself to others however has a marked insecurity about one’s ability to do so” (p. 69). The notion by Stopa and
Clark (1992), that individuals with social phobia do not closely monitor other people’s responses and rather focus on their negative self-evaluation, may in fact, mean that they are not focusing on external cues at all. This may have nothing to do with low esteem. Rapee and Heimberg (1997) argue that individuals with social phobia attach a fundamental importance to being positively appraised by others but assume that others are inherently prone to evaluate others negatively, the notion being that ‘at the core of it’ socially-anxious individuals have self-esteem but fear the ridicule of others. De Jong (2002) in his research found that individuals with social anxiety are characterised by a high positive self-image but also with a slight favouring of others over and against themselves. Clark and Wells (1995) further suggest that individuals with social anxiety are impression managers but are afraid to show it (Clark, 2001; Clark & Wells, 1995). They go on to suggest that those individuals with social phobia become preoccupied with their internal anxious responses and thoughts, to the neglect of other disconfirming external cues (see Pineles and Mineka, 2005). Questions are: do the implicit beliefs of socially-anxious individuals positive rather than negative. Much of the social anxiety literature highlights the self-deprecating thinking styles of socially-anxious individuals despite their previous positive propositions (Rapee & Lim, 1992; Stopa & Clark, 1993). Therefore, the implicit beliefs associated with social anxiety are an important consideration because it may explain the explicit avoidance behaviours of this group. Repressors, on the other hand, manage
their social environment in a different manner despite the fact that they respond physiologically similar to socially-anxious individuals.

### 3.4.3 Repressors’ Coping Style

As previously reported, repressors seem to cope with negative affect by spontaneously distracting themselves with positive, pleasant thoughts (Boden & Baumeister, 1997; Kline, Schwartz, Fitzpatrick, & Hendricks, 1997; Myers, 1998). They are also less pessimistic than low-anxious individuals who in turn are significantly more optimistic according to Myers and Steed (1999). Weinberger (1990) suggests that repressors are highly distressed individuals who consistently shift their thinking and behavioural style to cope with stress. Weinberger (1990) proposes that repressors engage in social relations as a method of reducing their anxiety while Paulhus (2001) argues that this motivation for social desirability is the ‘need for social approval.’ For example, Eysenck’s EPQ-R Personality Questionnaire shows repressors as rating highly on the lie and extraversion scales while Derakshan and Eysenck (1999) and Paulhus and John (1998) suggest that repressors unknowingly deceive themselves and others. From a cognitive perspective, Weinberger (1990) suggests that repressors subdue their negativity by reasoning that ‘it could be worse’ or ‘it is not that bad.’ Taylor (1983) describes this cognitive manoeuvring as illusionary where facts are not necessarily negated but interpreted in a certain light to enhance a sense of mastery, social desirability
and meaning (Myers & Brewin, 1994, 96). Weinberger (1990) suggests that repression should not be seen as conscious suppression of a particular negative thinking style, rather this cognitive process is forgotten and non-conscious. Repressors by definition show dissociation between reported anxiety and physiologically recorded signs of anxiety (Bonanno & Siddle, 1996; Brosschot & Janssen, 1998; Newton & Contrada, 1992). Egloff and Schmukle (2002) suggest that social desirability measures do not distinguish between implicit and explicit anxiety. They found the IAT anxiety measure independent of both explicit anxiety measures as well as both components of social desirability (self-deception vs. impression management). Therefore, it is important to clarify these distinctions. Impression management was independent of the explicit anxiety measures whereas self-deceptive enhancement showed a moderate (non-significant) negative relationship to anxiety measures. Paulhus (2001) proposes that repressors are impression managers but that self-deception is a greater predictor of a repressor’s motives but these implicit beliefs appear to be unavailable to recall (see also Derakshan and Eysenck, 1999, Milham and Kellogg, 1980, Myers, 2000, and Weinberger and Davidson, 1994). From this perspective, implicit memory may be an important contributor to the implicit beliefs of both socially-anxious individuals and repressors. However, there is little evidence of memory-type biases in social anxiety or repressors. From this perspective it is important to understand the nature of preconscious beliefs or
associations in repressors and socially-anxious individuals, with the endeavor to see how they affect different behaviours.

3.5 Further Questions

One question that arises is, if implicit beliefs are based on memory, why is there is little evidence to show that these are prevalent in repressors or socially-anxious individuals? Bowers (1990) proposed that repression was based on forgotten memories where the only visible remanet is the automatic coping behaviour based on social desirability (possibly a form of reaction – formation). Paulhus (2001) proposes that repressors are impression managers but that self-deception is a greater predictor of a repressor’s motives and these implicit beliefs appear to be unavailable for recall (Derakshan & Eysenck, 1999; Milham & Kellogg, 1980; Myers, 2000; Weinberger & Davidson, 1994). Repressors avoid reporting negative memories compared to low-anxious individuals (Myers, 2000). Alternatively, there is little evidence of memory bias in social anxiety. Socially-anxious individuals, unlike repressors, recall information both of a negative and a neutral nature as accurately as low-anxious individuals (Rapee et al., 1998). However, this research is mixed as in some research faces are better remembered than words (see a review in Chapter 4). One theory is that memory processing is limited for socially-anxious individuals rather their implicit behaviours are based more on autonomic and primed processes. Heightened states of vigilance and avoidance prevent
appropriate memory and coping responses to develop. Integrative memory rather than elaborative memory structures may allow quick access to automatic associations but not elaborate this to encompass a wider range of (disconfirming) information (Graf & Mandler, 1984; MacLeod & Rutherford, 1998; Mogg & Bradley, 1998; Williams et al., 1997). The notion of priming (as an integrative process) rather than explicit memory processing (elaborative process) in social anxiety and defensiveness is important when considering implicit beliefs or associations and will be addressed more fully in the Chapter Four.

3.6 The Aim of This Study

The aim of this study is to examine the implicit beliefs of socially-anxious individuals and repressors. While other tests (dichotic listening, lexical decision, Stroop, dot probe) tap different aspects of cognitive information processing, they do not address the associations between two classes of words. The Implicit Association Test (IAT) will be used to examine the implicit beliefs and preferences of socially-anxious individuals and repressors. According to Weinberger (1990), investigating the implicit nature of socially-anxious individuals and repressors is important. How we reach our conscious emotional states is a more important theoretical question than describing emotional states (Weinberger, 1990). The point being that investigation into the implicit motivation of socially-anxious individuals and repressors may shed light on the
reason for their irrational, neurotic and defensive responses that seem opposite in nature.

The different coping strategies associated with socially-anxious individuals and repressors suggest that there is an implicit (non-conscious) impetus or automatic attentional bias that motivates personal coping strategies to show preference for or against social or non-social involvement. For example, a socially-anxious individual may prefer solitary activities as their implicit beliefs reinforce their avoidance. Repressors do the reverse. Their underlying impetus is on social involvement. That is, the implicit beliefs for socially-anxious individuals may focus on avoidance of social activities and preference for solitary activities (reading, watching TV, showering, etc.), whereas, a repressor’s implicit beliefs may focus on social (desirable) activities with others (friends, crowds, night club, etc.). The underlying belief structure that motivates these behaviours is important, considering the ‘paradoxical’ relationship that appears to exist between these predispositions.

Based on Eysenck’s (1997) premise that anxious individuals and repressors have opposite attentional and interpretive biases, it may be that the implicit beliefs of these two predispositions are also opposite to one another in that one would prefer to do activities by themselves while the other prefers the social group. In this study it is proposed that both socially-anxious individuals
and repressors implicitly would prefer to be associated with solitary activities, primarily because social activity compels both of these predispositions to react in a manner that increases anxiety. Therefore, despite Eysenck’s theory it is predicted that both predispositions would implicitly prefer solitary environments.

Both socially-anxious individuals and repressors react physiologically to subliminal social threat. However, they react with different cognitive and behavioural expressions. It could be expected that avoidance of social threat would be a natural ‘next’ response to a physiological discomfort but it is hypothesised that, at an implicit level, both socially-anxious individuals and repressors, despite their self-report, are anxious and would rather avoid social situations and have preference to be involved in solitary activities. That is, at an implicit level, they will positively associate themselves with solitary activities rather than activities that require interaction with others. This is important in the light of the last chapter where it was found that both socially-anxious individuals and repressors were vigilant to emotional faces both in the masked and unmasked condition. This evidence does not alter the proposition that socially-anxious individuals and repressors have different coping behaviours in social environments. Repressors, although described as ‘liars, self deceivers or fake goods’ appear unaware of their implicit motivation to be engaged with others. They are not aware that this need comes from the ‘approval motive’ and
‘at the heart of it’ would rather avoid these social situations to reduce the unacknowledged (subconscious) anxiety that they feel. Moreover, the physiological response that is elicited by repressors on the presentation of an emotional face suggests that anxiety is present, has been detected and that attention has been directed to that source. So despite their extroverted behaviour, at an implicit level it is hypothesised that repressor’s desire for peace and non-involvement with others is as great as the socially-anxious individual who displays this behaviour at an explicit level. It is further hypothesised that low-anxious individuals will be more biased toward social activities.

The Implicit Association Test will be used to investigate the predisposition of these three groups. The hypothesis is that, ‘at the core’, repressors are socially-anxious individuals who would implicitly prefer to avoid others to alleviate their anxiety. The notion is that their explicit socially desirable responses are in fact a social defensive manoeuvre to overcome their anxiety. The prediction is that repressors are anxious individuals who portray themselves as low-anxious socially extraverted individuals.

The hypotheses of this study is that both socially-anxious individuals and repressors implicit beliefs would associate positive words with ‘solitary’ activities and negative words would be associated with ‘social’ activates.
3.7 Method

3.7.1 Participants

Group members were chosen on the criteria outlined for the Dot Probe test. The four groups consisted of Low Anxious (N=26), Repressors (N=29), High Socially Anxious (N=23) and Defensive High Anxious (N=19). They were selected from a larger sample (N=890) based on their scores on Marlowe Crowne (MC), Taylor Manifest Anxiety Scale (TMAS) and the Fear of Negative Evaluation Scale (FNE). The FNE was used to specifically identify those individuals with social evaluation fears. In all 97 (M =16; Fm = 78) students from the University of Western Sydney participated in this research. Their average age was 22.6 years.

3.7.2 The Nature of the Test

The IAT is a reaction-time task that reflects the strength of association between memory concepts. Specifically, the task involves comparing the time taken to classify stimuli when paired categories match a person’s automatic associations, versus the time taken when paired categories contradict automatic associations. The IAT measures strength of associations between concepts by comparing response times in two combined discrimination tasks. Participants

---

1 The FNE was specifically used to identify socially anxious individuals, those who had a specific fear of being evaluated unfavourably by others. Those high on FNE tend to be more socially anxious than those low on FNE (Leary, 1983; Watson & Friend, 1969).
are required to sort stimuli representing four concepts using just two responses, each assigned to two of the four concepts. Basic assumption of the IAT is that, if two concepts are highly associated, the sorting task will be easier (i.e. faster) when the two associated concepts share the same response key than when they share different response keys (Egloff & Schmukle, 2002).

The IAT is a computer task, with four different stages. During all four stages, participants are required to respond as fast as possible by pressing one of two keys when a word appears at fixed positions on the computer screen. The first is a learning phase. During this stage participants learn to differentiate between two word categories (e.g. positive vs. negative adjectives) by pressing the left shift key (A) when a word of the positive category appears and the right shift key (B) when a word of the negative category appears. Similarly, participants differentiate between two other word categories (e.g. insect vs. flower words) during stage two. For example, when an insect word is shown participants learn to press key B, and when a flower word appears they learn to press key A. This learning or practice cycle allows the participants to familiarize themselves with the test and also to associate particular keys with word categories.

During the third stage, all four-word categories are randomly displayed. During this stage, two types of words actually share a response key (e.g.,
positive valanced words + flower words, negative valanced words + insects words). Yet, the relationship between a certain word category and a certain response key is still the same as during stages one and two. In the crucial fourth stage of the IAT, the connect keys for one set of categories is switched, whereas the word-key relationship for the other set of categories is left unchanged. For example, if participants have learned during the previous stages to respond with key A when positive adjectives appeared, they have to respond with key B during stage 4 (and vice versa for negative adjectives). Meanwhile, the required response pattern for flower and insect words remained the same. In the current example insect words are always associated with key B and the flower words always with key A, whereas during stage 4, the correct keys for positive and negative adjectives are opposite to the keys associated with these word categories during the previous stages of the IAT.

Participants’ reaction times (RT) for the switched words (e.g. positive and negative adjectives) are typically slower during stage four, which is not very surprising. Interestingly under some conditions, reaction times for switched categories may be affected by the procedure. For example, the RT for insect words were slower when these words shared the response key of negative adjectives during the learning stages (1-3) but the response key for positive words during the fourth (target) stage showed longer RT. Perhaps this slowing is due to the fact individuals are almost universally inclined to have negative
ideas concerning insects. Therefore, it would be relatively easy to use the same response key for negative adjectives and insect words (stage 3) but relatively difficult to use the same key for positive adjectives and insect words (stage 4).

In line with the idea that prior beliefs, and not facilitated responses, were responsible for the typical retardation (and increased error rate) during stage four switching the required response type from belief-incompatible to compatible was found to result in far less interference effects than from compatible to incompatible (description of IAT adapted from De Jong, Pasman, Kindt and van den Hout, 2001).

**Table 3.1:** Conceptual Outline of the procedure as basic components of the Implicit Association Test (IAT).

<table>
<thead>
<tr>
<th>Sequence</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Description</td>
<td>Concept Discrimination</td>
<td>Initial Attribution Discrimination</td>
<td>Initial Combined Task</td>
<td>Reverse Attribute Discrimination</td>
<td>Reverse Combined Task</td>
</tr>
<tr>
<td>Left Key Response</td>
<td><strong>Insects</strong></td>
<td><strong>Negative Words</strong></td>
<td><strong>Insects &amp; Negative Words</strong></td>
<td><strong>Positive Words</strong></td>
<td><strong>Insect &amp; Positive Words</strong></td>
</tr>
<tr>
<td>Right Response Key</td>
<td><strong>Flowers</strong></td>
<td><strong>Positive Words</strong></td>
<td><strong>Flowers &amp; Positive Words</strong></td>
<td><strong>Negative Words</strong></td>
<td><strong>Flowers &amp; Negative Words</strong></td>
</tr>
<tr>
<td>Random Presentation times 2</td>
<td>* ant</td>
<td>* ignore</td>
<td>rose</td>
<td>* sad</td>
<td>* roach</td>
</tr>
<tr>
<td></td>
<td>rose</td>
<td>* happy</td>
<td>* ant</td>
<td>* pleasure</td>
<td>tulip</td>
</tr>
<tr>
<td></td>
<td>ditto</td>
<td>ditto</td>
<td>ditto</td>
<td>ditto</td>
<td>ditto</td>
</tr>
</tbody>
</table>
Table 3.2: This experiment classifies two categories of words, namely attributional (positive and negative) words, and target (social and non-social) environments.

<table>
<thead>
<tr>
<th>Attributional (positive)</th>
<th>Attributional (negative)</th>
<th>Target (solitary activities)</th>
<th>Target (social environment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = happy</td>
<td>1 = boring</td>
<td>1 = reading</td>
<td>1 = party</td>
</tr>
<tr>
<td>2 = delightful</td>
<td>2 = ignored</td>
<td>2 = writing</td>
<td>2 = dancing</td>
</tr>
<tr>
<td>3 = cheerful</td>
<td>3 = nervous</td>
<td>3 = studying</td>
<td>3 = nightclub</td>
</tr>
<tr>
<td>4 = engaging</td>
<td>4 = hesitant</td>
<td>4 = showering</td>
<td>4 = restaurant</td>
</tr>
<tr>
<td>5 = attractive</td>
<td>5 = awkward</td>
<td>5 = thinking</td>
<td>5 = crowds</td>
</tr>
<tr>
<td>6 = confident</td>
<td>6 = inadequate</td>
<td>6 = sleeping</td>
<td>6 = dating</td>
</tr>
<tr>
<td>7 = friendly</td>
<td>7 = inferior</td>
<td>7 = bathing</td>
<td>7 = committee</td>
</tr>
</tbody>
</table>

These words were selected from Francis-Kucera’s (1982) norms, in turn, derived from the University of Western Australia’s psycholinguist database (www.psy.uwa.edu.au/mrcdatabase).

It was presumed that compatible categories consisted of positive words and social activities, and negative words and non-social activities. The incompatible categories consisted of positive social words and non-social activities, and negative social words and social activities.
3.7.3 Procedure

The IAT test was administered on a computer using Inquist 1.7 (Millisecond Software, 1999; http://www.millisecond.com/; (+) Greenwald, Banaji & Schwartz, 2002). Each participant was seated in front of a screen and verbally instructed about the nature of the test and the procedure involved. Participants were told that they would be making a series of ‘category decisions’ and that it was important to focus on the stimulus words and react as quickly as possible without making mistakes (specific instructions were displayed on the computer screen. If their selection was incorrect, they saw a red ‘X’ and needed to make the right selection. Before the trial started, a cross was centred on the screen so they could focus. In each trial, a stimulus word was displayed in the centre of the screen. Categories were displayed on the left and right sides of the screen. Participants used the left shift key and the right shift key for their responses. On each trial the participant was asked to respond as per instruction on the screen. Marked labels were attached to the relevant shift keys. Further, each word remained visible until a response was made. If an incorrect response was made the word ‘error’ appeared in red for 200ms. The entire task took about 15 minutes.

The IAT consisted of seven trials (see Table 3.3). The first two trials were practice where responses sought attributional (happy, boring) and target words (reading, party) respectively. In trial one, participants learned to
differentiate between two attributional word categories (positive and negative emotions) and to respond by pressing the left and right shift key when the appropriate social word appeared. Similarly, in trial two, participants learned to differentiate between target word categories, solitary activities (reading) and a social environment (party). The third trial was also a practice session where both attributional and target words were used. The fourth trial was the test where attributional and target words were presented in the incompatible/compatible mode. The final three tests were the same but reversed. Reaction times were measured to both target and attributional words in the reversed positions. (For actual trials, see table 3.3). Both compatible and incompatible (practice and tests) sequences were alternated in each IAT test to offset biases in responding (order effect). For example, the first participant would encounter the compatible test first and then the incompatible, where this was reversed for the second participant. During all sessions, participants were asked to respond as fast as possible by pressing one or another ‘shift key’ when a word appeared on a fixed position of the screen.
Table 3.3: Task sequence of the IAT valanced words (positive and negative) and social environment (social and alone) words.

<table>
<thead>
<tr>
<th>Block</th>
<th>No. of Trials</th>
<th>Task</th>
<th>Category label</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Left Shift Key</td>
<td>Right Shift Key</td>
</tr>
<tr>
<td>1</td>
<td>24</td>
<td>Attribute discrimination (practice)</td>
<td>Happy                 Boring</td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>Target discrimination (practice)</td>
<td>Reading                Party</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
<td>Initial combined task (practice)</td>
<td>Happy Reading          Boring Party</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>Initial combined task (TEST)</td>
<td>Boring Party           Happy Reading</td>
</tr>
<tr>
<td>5</td>
<td>24</td>
<td>Reversed Target Discrimination (practice)</td>
<td>Happy Reading          Boring Party</td>
</tr>
<tr>
<td>6</td>
<td>36</td>
<td>Reversed combined task (practice)</td>
<td>Happy Party            Boring Reading</td>
</tr>
<tr>
<td>7</td>
<td>49</td>
<td>Reversed combined task (TEST)</td>
<td>Happy Reading          Boring Party</td>
</tr>
</tbody>
</table>

3.8 Results

Four participants were removed because they had an error rate above 10 percent. The data for each trial included response latency (in milliseconds) and if it was correctly categorised. The first trial of each block was considered a practice trial and was removed from the analysis because of its typically
lengthened latency. Response latencies below 300ms and above 3000ms were re-coded to 300ms and 3000ms respectively. This was done to remove outliers. Furthermore, the test was constructed to allow participants to become familiar with the test by practice on different combinations of these words. A log transformation was to be performed to improve the symmetry of latency distributions, improving central tendency but this proved unnecessary and the results are based on unadjusted mean reaction times.

3.8.1 The IAT Measure

IAT effect was computed via difference scores between responses to target words at trial four and trial seven. The effect was computed by subtracting the mean response latency of the incompatible scores from the mean response latency of the compatible scores. Compatible mean reaction time scores were significantly greater than non-compatible (397.24 ms) \( [F (1, 81) = 29.06, P<0.001] \) across all groups. When group differences were assessed, the low-anxious, (LA; \( m=343.59, \text{ sd}=248.50 \)), repressor, (R; \( m=457, \text{ sd}=308.36 \)), high socially-anxious, (HSA; \( m=392.43, \text{ sd}=164.28 \)), and defensive high-anxious (DHA; \( m=395.63, \text{ sd}=203.66 \)) there was no significant differences between these scores. The mean IAT effect was 400.03 ms (260.81).

When groups were compared in the compatible context alone there was a non-significant result between low-anxious individuals and repressors.
where repressors were slower than low-anxious individuals when associating positive words with non-social activities and negative words with social words. Although the trend for repressors reaction times was retarded in this category, it was non-significant. The indication is that repressors, at an implicit level were more avoidant than low-anxious individuals of associating positive emotions with social environments. The trend was similar for socially-anxious individuals where repressors were 150ms slower to respond suggesting that socially-anxious individuals were more prone to associating positive words with non-social activities and negative words with social activities.

Figure 3.1: IAT difference scores (compatible minus incompatible).
In all groups the compatible (negative to social/positive to alone) order was slower than in the incompatible. In the IAT effect (compatible group) the difference between low-anxious and repressors almost reached significance $t(3,81) = 2.20, p < 0.094$. This suggests that where negative attribution was associated with a social target, a positive attribution was made to solitary target. Perhaps repressors were slower than low-anxious individuals to associate these categories. The indication here is that repressors, at an implicit level were more avoidant than low-anxious individuals in associating positive emotions with solitary environments and negative emotions with social environments.

Although the trend for repressors reaction times was retarded in this category, it was not significant.

**Figure 3.2:** Differences between compatible and incompatible scores.
The means associated with the IAT compatible were significantly higher than the IAT incompatible scores. This shows that across all groups participants took ‘implicitly’ longer to associate (social environment and negative words / solitary environments and positive words). Alternatively, the IAT incompatible scores show lower reaction time means, suggesting that these associations (social environment and positive words/solitary environments and negative words) were more quickly responded to. This suggests that across the four groups there was a general predisposition to associate negative words with solitary environment and positive words to social environments.

3.9 Discussion

The hypothesis for this second study was that, at an implicit level, both socially-anxious individuals and repressors prefer to be alone and not engaged in social activities. This theory was based on the observations that both predispositions respond physiologically when confronted by social threat, and that both are anxious individuals but for different reasons. Socially-anxious individuals prefer to avoid social situations because of ‘humiliation’ issues and repressor’s anxiety is based on ‘need for approval’, yet both of these anxieties can be placated in solitary situations. Yet this hypothesis was not realised.
The results show, that across all groups, participants preferred social environments to solitary categories. However, these associations were not significant when comparing individual groups. These results were surprising as the hypothesis was that both repressors and socially-anxious individuals ‘at the core’ would have had a positive preference for being alone. This was based on the notion that physiology and the associated social anxiety would subconsciously and automatically motivate individuals to avoid those situations. This is contrary to the previous attentional study where vigilance for emotional faces was found. Different in this study is that class distinctions had to be made on an implicit preference basis. It was presupposed that word (class distinction) stimuli (as opposed to face stimuli) contain the semantic content to show these implicit preferences. This study suggested that both personalities preferred the social environment contrary to the hypothesis. De Jong, Pasman, Kindt, and van de Hout (2001) using an IAT found that high socially-anxious women showed increased interference (longer response times) when social situations are related to negative outcomes. In this study however, both socially-anxious individuals and repressors tended toward social activities. Low-anxious women in de Jong’s et al. (2001) research associated social situation with positive effects.

For socially-anxious individuals it appears that there is an implicit desire to associate with others despite their avoidance tendencies. Clark and Wells (1995) state that, “the core of social phobia appears to be a strong desire to
convey a particular favourable impression of oneself to others and marked insecurity about ones’ ability to do so” (p.69). The suggestion is that socially-anxious individuals are drawn to be with others at an implicit level, but frightened to do so in the real world. De Jong (2002) found this using an IAT. He reports that despite self-reports of low levels of self-esteem, at the implicit level, both low and high socially-anxious individuals were characterised by positive self-image and esteem, however, unlike low-anxious individuals, socially-anxious women were prone to favour others over themselves. At an explicit level, social anxiety is associated with negative self-evaluations and is assumed to play an important role in social phobia. However, in line with de Jong’s (2002) research, an over-emphasis on safety and self-protection in social anxiety may indicate that there is something worth protecting. Could it be that the self-focussed negative evaluations of socially-anxious individuals may be an indication that one is falling short of perfection or, has excessively high standards?

Weinberger, Schwartz, and Davidson (1979) found that repressors exhibited greater somatic responses to stress than did low-anxious individuals, suggesting that repressors are physiologically anxious, despite self-reports of low subjective anxiety. Thus, repressors may resemble high-trait anxious individuals in terms of their physiological and cognitive responses to threat but may consistently under-report their anxiety levels because of a concern to make a positive impression on others. An alternative view is that repressors have a
defensive bias in selective attention i.e., a cognitive filter, or schema, which results in avoidance of negative or threatening cues (Bonanno, Davis, Singer, & Schwartz, 1991). Indeed, Eysenck (1997) specifically proposed in his new cognitive theory of anxiety that repressors have a cognitive bias opposed to the processing of threat, whereas high trait-anxious individuals have a bias in favour of threat and low trait-anxious individuals have no bias (Derakshan & Eysenck, 1997b). In this present research both socially-anxious individuals and repressors associate, at an implicit level, positive words with social activities and negative words with solitary activities, suggesting that both are inclined towards sociability.

Furnham, Petrides, and Spencer-Bowdage (2002) proposed that in terms of social desirability, repressors are higher on trait emotional intelligence, self-esteem and healthy coping styles and lower on ruminations and unhealthy coping styles (as might be expected in socially-anxious individuals). However, they could not delineate whether repressors were more ‘impression managers’ than ‘self-deceivers’. Paulhus (2001) suggests that self-deception in socially desirable responders is important for repressors who have a high need to be included in the social group (Weinberger & Davidson, 1994). As Ohman (1996) argues, the need to belong to the group is a fundamental evolutionary tension and a source of anxiety for those who perceive others as a threat and wish to avoid those situations. The results from this present study are surprising
considering that physiological responses indicate an initial alarm and that at an implicit level, avoidance of the social environment should be the first reaction to social threat (Le Doux, 1995, 96; Ohman, 1993). The present IAT results indicate faster reaction times to social rather than solitary activities by all predispositions. This may reflect a basic desire to belong to the group and that being alone is a secondary consideration.

A further consideration is that the reaction times in the IAT may reflect a secondary rather than an initial response. Beck and Clark (1997) espouse a more elaborative sequence of information processing where three ‘windows’ of response are initiated – first, when confronted by threat (initial registration and orienting of threat is pre-attentional, automatic and perceptual); second, immediate preparation, (where the priority is maximising safety and minimising danger); and third, a more elaborative and strategic process (semantic evaluation/ secondary elaborative processing and attribution). Reaction times may have been in the first window, however this seems unlikely considering the neurological processes (decision-making) that are required to respond to word categories. Sackeim and Gur (1979) propose that self-deception is a significant characteristic of psychopathology and even at a strategic level, individuals are prone to misreport. The idea that implicit association is similar with one or all of these windows is a subject for further research.
Methodologically, the Implicit Association Test appears to be a reliable way to assess implicit associations and would be useful in conjunction with other implicit tests (stem–word, dichotic listening, Stroop, masked dot probe, etc.). Compared to the De Jong, Pasman, Kindt, and van de Hout’s (2001) five trials, this study had seven trials and practice effects may have influenced the results. To focus specifically on implicit self-esteem and social-desirability between repressors and socially-anxious individuals will clarify some of these underlying trends (de Jong, 2002). IAT performance is also a useful way to measure preconscious (implicit) self-esteem (Farnham, Greenwald, & Banaji, 1999). Further work in investigating the implicit differences between facilitating or inhibiting threat stimulus using the IAT is important, considering the debate as to the existence and nature of attentional and memory processing in these predispositions.

3.10 Summary and Review

The previous tests were designed to tease out the differences between implicit and explicit cognitive processes in socially-anxious individuals and repressors. The first chapter predicted a 'paradoxical' effect in that the implicit process of socially-anxious individuals would be directly opposite to the repressors. That is, pre-attentionally, socially-anxious individuals would be vigilant to implicit social threat but repressors would be vigilantly avoidant (when compared to low-anxious individuals). Alternatively, at an explicit level
the opposite would occur namely socially-anxious individuals would avoid social situations and repressors would be drawn to social situations. This hypothesis was based on three models of anxiety, difficulty in distinguishing low-anxious individuals and repressors, and the Freudian theory of anxiety and repression. The results showed vigilance both for socially-anxious individuals and repressors where attention was captured by emotional faces, whereas the low-anxious individuals were more attentionally flexible and able to engage and disengage emotional faces significantly quicker than the other two groups. This second chapter involved the Implicit Association Test, a reaction time test where discrimination between word stimuli was used to examine the nature of implicit beliefs reinforcing socially-anxious individuals and repressors’ motivations. It was predicted that both socially-anxious individuals and repressors would have an implicit desire to avoid social situations. This was based on the theory that physiological response, rather than being played out by either over avoidance (as in the case of socially-anxious individuals) or over attendance (repressors), at an implicit level, the desire to have a solitary environment might be more preferable. However, this prediction did not stand, rather at a sub-conscious level both personalities preferred social environments to solitary ones. The results suggest that repressors are anxious individuals with a behavioural style similar to low-anxious individuals but use socially desirable responding to placate their anxiety. Even at an implicit level this seems to be true as it was for the socially-anxious individuals. It was predicted that socially-
anxious individuals would implicitly enjoy solitary activities however this proved not to be the case. What can be made of this? Is it possible that both socially-anxious individuals and repressors rely on social environments for their identity? Implicit self-worth or self-esteem may motivate both of these groups to seek out social company despite the fact that they are anxious in doing so.

This leads into the next study directed towards implicit and intuitive knowledge about the difference between ‘remembering’ and ‘knowing’. This test is used to examine whether explicit or implicit memory biases exist that influence first, the hypothesised ‘paradoxical’ behaviours of repressors and socially-anxious individuals, and second, whether these biases are similar for repressors and low-anxious individuals. This is an important aspect of what motivates there two predispositions to their unique way of responding in social environment. A Remember and Know Test is used to examine these presumptions. The prediction is that the socially-anxious individual will be better at knowing angry and sad faces but not in remembering them. Alternatively, repressors will be better at remembering angry and sad faces but will not ‘know’ them (dissociative effect) and further, they will be better at remembering happy faces. Repressors are regarded as defensive individuals who, despite their positive demeanour, are regarded as being out of touch with their implicit memory. Another prediction is that low-anxious individuals will remember more faces overall regardless of their emotional expression.
In general, it is anticipated that socially-anxious individuals would remember or know previously seen threat faces and repressors would remember or know more happy faces. Low-anxious individuals would be the most accurate in remembering or knowing all emotional faces.
CHAPTER FOUR

REMEMBER AND KNOW
(AN IMPLICIT AND EXPLICIT MEMORY TEST)

4.1 Introduction

This study addresses implicit and explicit memory using the ‘Remember’ and ‘Know’ Test. Unlike the previous two reaction time studies, this memory task was used to examine implicit and explicit memory in low-anxious, repressor, socially-anxious and defensive high-anxious individuals. The aim of this chapter is to examine if there are specific memory biases associated with these predispositions that would support the hypothesis that socially-anxious individuals and repressors are ‘paradoxically different’. Further, that repressors despite their similar behaviours to low-anxious individuals would also have similar memory biases. These biases then will be examined from a memory perspective rather than an attentional or semantic distinction as with the previous chapters.

The Remember and Know Test will be used to investigate differences between socially-anxious, repressors and low-anxious individuals. This test delineates between two memory process, namely explicit ‘remember’ (recall autobiographical) and implicit ‘know’ (semantic/familiarity) of particular emotional faces. Remembering and knowing are said to reflect separate
memory processes, namely explicit (episodic) and implicit (semantic) (Mandler, 1980; Tulving, 1985).

4.2 Distinction between Remembering and Knowing

The distinction between remembering and knowing was introduced by Tulving (1985) and proposed that remembering is a reflection of the episodic memory system, whereas knowing reflects output from the semantic memory system. People often have a sense that they simply ‘know’ something without specific recollection (see Gardiner and Richardson-Klavehn, 2000). There is a ‘feeling of familiarity’ that leads one to feel that the item has been encountered previously (Jacoby, 1991). These two memory types reflect different brain functions. Blaxton (1995) suggests that there are specific dissociations between implicit and explicit memory as shown in amnesic patients. Evidence suggests that remembering but not knowing is influenced by conceptual factors like effortful encoding and rehearsal and that knowing and not remembering is influenced by perceptual factors (Blaxton, 1989; Gardiner & Richardson-Klavehn, 2000; Rajaram & Roediger, 1997). Gardiner, Gawlik, and Richardson-Klavehn (1994) found that:

“remembering and knowing are also differentially affected by type of rehearsal; ‘remembering’, but not knowing, increased the
elaborative rehearsal; ‘knowing’ but not remembering, increased the maintenance of rehearsal” (p. 388).

Parkin, Gardiner, and Rosser (1995) found that individuals were better at ‘knowing’ faces when they were given a divided attention task but better at remembering when given a spaced repetition task, the notion being that spaced repetition facilitated elaborative processing whereas divided attention did not. Encoding is seen as an important feature of these memory processes (see also Heinrichs and Hofmann, 2004).

This distinction between implicit and explicit memory using the ‘remember and know’ paradigm will allow examination of memory biases from another perspective. For example, repressors (also described as self-deceivers based on the notions of ‘dissociation’ and forgotten childhood memories) may implicitly ‘know’ but do not recall negative aspects of their past relationships and would remember only the more positive experiences (Derakshan & Eysenck, 2004; Myers, 2000). Alternatively, socially-anxious individuals may be in a position where they are not aware (as with phobias) why they avoid emotional faces and yet are inclined to remember them. Although there is little overall support for explicit memory biases (word based studies) in social anxiety there is greater evidence with memory for facial stimuli. However, MacLeod and McLaughlin (1995) did find evidence using a word identification task. They replicated a
study by Mathews, Mogg, May, and Eysenck (1989) and found support for an implicit memory bias for negative emotional words among individuals with high trait anxiety. Several face recognition studies have also found evidence for memory bias toward threat in social phobia (Gilboa-Schechtman, Amir, & Freshman, 2000; Lundh & Ost, 1996b). The Remember and Know test may clarify distinctions between memory tasks (recall vs. recognition).

4.3 The Nature of Implicit and Explicit Memory

The nature of implicit and explicit attentional and memory biases in anxiety is little known. Even the terminology reflects the complexity of this dichotomy (i.e., preconscious vs. conscious, pre-attentional vs. attentional, automatic vs. strategic, integration vs. elaboration, implicit vs. explicit, interference vs. non-interference (Stroop), perceptual vs. conceptual, semantic vs. procedural, remembering vs. familiarity) (Gardiner & Richardson-Klavehn, 2000). This complexity is also applicable to social anxiety and repression where both attentional and memory biases have been examined from these perspectives (Boden & Baumeister, 1997; Coles & Heimberg, 2002; Derakshan & Eysenck 1997a; Eysenck, 1997; Lundh & Ost, 1996a; Mogg & Bradley, 2002; Rapee et al., 1994; Williams et al., 1988, 97).

According to Schacter (1992):
"Implicit memory is revealed when previous experiences facilitate performance on a task that does not require conscious or intentional recollection of those experiences (stem completion, perceptual identification). Explicit memory is revealed when performance on a task requires conscious recollection of previous experiences" (p. 501).

For example, Roediger and McDermott (1993) suggest that individuals exposed to information under anesthesia have shown priming effects and memory of this information. The nature of implicit memory biases in social anxiety is important but there is a lack of evidence of these biases suggesting that anxiety may not be a memory-based phenomena but rather more autonomic in nature. That is, heightened vigilance and avoidance processes prevent appropriate memory assessment and strategic coping responses to develop. Integrative memory rather than elaborative memory structures may allow quick access to automatic associations but disallow considered cognitive processing to encompass and deliberate on a wider range of knowledge and (disconfirming) information. The evidence via autobiographical memory and self-report, suggests that socially-anxious individuals do have postmortems on negatively perceived social situations and can imagine themselves involved in these situations (Kocovski, Endler, Rector, & Flett, 2005; Rachman, Gruter-Andrew, & Shafran, 2000; Rapee & Heimberg, 1997). However, little is learned from
these postmortems to change their socially anxious behaviour. It can be anticipated that if one can reflect on their own irrational behaviours, strategies can be put in place to change them. That is memories of what does and doesn’t work ought to be in place and acted upon. This does not generally occur, frequently socially-anxious individuals increase their tendency towards phobia. One speculation is that a vigilant-avoidance pattern develops where socially-anxious individuals automatically orient their attention to threat but because of their hyper-vigilance, quickly avoid ‘elaborative’ processing the potential threat missing the opportunity to evaluate their behaviors in the light of what is actually occurring. That is, memory of more appropriate coping strategies are not learned or exercised and in fact the anxious individual is primed to make threatening material more accessible but less retrievable.

Williams et al. (1988) draw upon this model as proposed by Mandler (1980) to describe the relationship between anxiety and memory biases (interaction hypothesis). Mandler suggests that experiences are processed in two ways, via automatic integration (perceptual process) and through effortful elaboration (conceptual process) of more abstract, meaning-based representations (see also MacLeod, 1998). This vigilant-avoidance perspective advocates that while the perceptual process is in place (with its increased priming) the conceptual (strategic) cannot develop due to the lack of elaborative processing. The idea that this priming (implicit and automatic process) is distinctly different from the
more conscious reactions suggests that there are two distinctly different memory encoding processes that either facilitate or inhibit learning. Jacoby (1991) advocates a process dissociation model where implicit and explicit memories are viewed as two distinct entities.

Westen (1998) contends that much of the implicit and explicit memory research in the current cognitive domain relies on Freudian concepts and that much of the Freudian terminology is still used today but labelled in more clinical terms. Westen draws distinctions between procedural memory (motor, automatic learning) and associate memory (masked/priming) as implicit processes to delineate implicit and explicit memory processes. Furthermore, he suggests that priming, even under the most surreptitious (subliminal) conditions is remembered and associated with unseen stimuli. Kihlstrom and Hoyt (1990) refer to the ‘dissociative’ aspects of repressive memories, drawing on distinctions between episodic and semantic memory but add that these process are difficult to interpret. The notion of dissociation between implicit and explicit memory, where both are distinctly different memory processes, has also been suggested by Gardiner and Richardson (2000) (see Jacoby, 1991, Jacoby, Toth and Yonelinas, 1993, and Tulving, 1985).

In the light of the above studies, the question for the present thesis is how do repressors and socially-anxious individuals behave in this domain? Do
implicit or explicit memory biases exist that influence first, the different
behaviour of repressors and socially-anxious individuals, and second, whether
these biases are similar for repressors and low-anxious individuals? The theory
that socially-anxious individuals overestimate threat and repressors
underestimate threat suggests that dysfunctional thinking patterns predispose
these individuals to perceive and respond to social threat in a biased manner
(Clark & Wells, 1995; Eysenck, 1997; Weinberger, 1990).

4.4 The Existence of Memory Biases

The existence of memory biases in social anxiety has received mixed
reports (Coles & Heimberg, 2002). While memory biases are prevalent in
depression, they are not so prevalent in anxiety states (MacLeod & Rutherford,
referent recall task between depressed, sad and low-anxious individuals, found
that depressed individuals showed significant recall of both positive and
negative information, whereas socially-anxious and low-anxious individuals
showed a positive recall bias (Macleod, 1998: Williams et al., 1997).

However, social anxiety research is less conclusive. Lundh & Ost
(1996a) using a face recognition task in which individuals were asked to
estimate ‘their quality of contact’ when viewing photographs of 20 faces, found
that those with social phobia rated quality of contact significantly lower than
controls and they were no better in recognising these faces in a memory task. In contrast, Lundh and Ost (1996b) using a face recognition task found that individuals with social phobia, when asked to rate 20 faces according to how critical or reassuring they were, recognised more critical than accepting faces when compared to controls. In contrast, low-anxious individuals recognised more accepting faces. The difference between these two studies was probably one of encoding, where the instruction in one study directed the participant to determine which face was critical (or accepting), as opposed to the instruction in the other study asking for preference for that face (Lundh & Ost, 1996a) (see also Coles and Heimberg, 2005, and Heinrichs and Hofmann, 2004). These findings taken together suggest that socially-anxious individuals may preferentially remember and attend to threat information relevant to their concerns and, that the type of encoding (instruction to participants) is important.

4.4.1 Minimal Evidence of Memory Bias in Social Anxiety

Several studies have failed to find memory bias in social phobics (Cloitre et al., 1995; Lund & Ost, 1997; Mansell & Clark, 1999; Rapee et al., 1994; Wenzel & Holt, 2003). Perez-Lopez and Woody (2000) presented participants with face stimuli (threatening and reassuring) in a forced recognition task while anticipating giving a speech. Participants viewed pairs of photos, one seen during the encoding phase and another of the same individual with an expression opposite to the one shown previously. Individuals with
social phobia and controls did not differ in terms of overall response latency. More importantly there was poor recognition and discrimination of these faces. The authors suggest that this lower accuracy may have been due to an elevated state anxiety (the anticipation of giving a speech). Social phobics though, appeared to be slightly biased towards reassuring faces (Perez-Lopez & Woody, 2000).

Mathews, Mogg, May, and Eysenck (1989), using both implicit (word stem) and explicit (recall) memory tests, found little evidence of memory bias in anxiety. Wenzel and Holt, (2003) in their study of memory bias to threat information in social phobia found that individuals with social phobia are characterised by a memory bias against threat. Using prose passages as encoding stimuli, individuals with social phobia recalled fewer words from the threat passage than non-anxious individuals. However, Rapee et al. (1994), tested individuals with social anxiety using ‘cued recall’ and ‘stem completion’ tasks (explicit and implicit memory tests), and concluded that “the four studies consistently failed to demonstrate a memory bias for social threat information in social phobics” (p.98) (see also Bradley, Mogg and Williams, 1995). Lundh and Ost (1997) presented participants with a series of 64 words with different emotional tones. They had to reflect on situations in which these words might be found. The recall and stem completion tests showed no implicit memory bias for social phobics when compared to low-anxious individuals. However, a
subgroup, social phobics, were found to have significant implicit memory (word-stem) for social threat words as well as positive words, when compared to low-anxious individuals. This study included both implicit and explicit tests as well as using real life stories and hypothetical contexts.

Cloitre et al. (1995) used a memory paradigm to test whether the findings of threat-biased memory in a semantic memory task (free recall) and a perceptual memory task (high-speed recognition) were able to be generalised to individuals suffering social phobia. No evidence of threat-related memory bias among these individuals was found. Becker, Roth, Andrich, and Margraf (1999) using incidental recall (that is, to create a visual scene from word stimuli, which enhanced recall), found no explicit memory bias in either generalised anxiety disorder or social phobia, however, physical threat words were better remembered (see also Heinrichs and Hofmann, 2004 and Perez-Lopez and Woody, 2001). Heinrichs and Hofmann (2004) suggested that low-anxious individuals were more specific with encoding strategies of threatening information when compared to socially-anxious individuals.

As suggested previously, this lack of evidence of memory biases in social anxiety may be due to the vigilance–avoidance process. Williams et al. (1988) suggested that anxious individuals may be characterised by a pattern of initial vigilance to threat followed by the avoidance of further elaboration,
thereby making threatening information more accessible but less retrievable. Mogg, Mathews, and Weinman (1987) found poorer memory for threatening rather than non-threatening material with anxious individuals, despite others’ findings of greater attentional bias towards threat in anxious individuals. Russo, Fox, and Bowles (1999) in a literature review suggest that despite Williams’ et al. (1988/97) predictions that memory should facilitate detection of a bias in anxious individuals, there was minimal evidence of implicit memory in anxious individuals. Russo et al. (1999) using both word fragment completion and word identification (implicit and explicit memory tests) found no criteria indicative of an implicit memory bias for threat-related information in high trait anxiety participants. Russo et al. (1999) draw a distinction between the lack of mood congruent bias in implicit memory tests as relating to trait anxiety. If one assumes that trait anxiety is instrumental in favouring a better perceptual integration of threat-related targets it is evident that such a process does not induce a priming\(^{16}\) bias for this type of information. It appears from this that anxious individual may be less susceptible to priming (or elaboration) when exposed to social threat.

4.4.2 Evidence of Memory Biases in Social Anxiety

Lundh and Ost (1996a) argue that it seems reasonable to assume that a person who is attentive to certain stimuli should be better able to remember
these stimuli. Amir, Foa, and Coles (2000) using a noise paradigm, demonstrated an implicit memory bias for individuals with generalised social phobia. These individuals rated stimuli as less loud when associated with social threat. The findings suggest that socially phobic individuals may preferentially attend to and remember threat information relevant to their concerns. This preferential processing may underlie the maintenance of social phobia by strengthening the individuals’ belief of their social imperfections, covertly implying that they will be rejected by others (Gilboa-Schechtman et al., 1999). Gilboa-Schechtman, Freshman, Amir, and Foa (1997) reported that when compared to controls, social phobics remembered negative facial expressions (anger, disgust) better than neutral and happy faces. Their second unpublished study found that social phobics and control groups recalled happy faces better than either angry or neutral faces. In another study, Foa, Gilboa-Schechtman, Amir, and Freshman (2000) presented faces and names to be learned. Participants were then presented with these faces with different emotional expressions and again asked to name the faces. In a subsequent recall test the names were supplied but the emotional expressions had to be remembered. It was found that social phobics had a better recall for facial expressions than controls. In a second test, participants were shown faces with different expressions and then were presented with the same faces interspersed with other faces. Recognition of faces and facial expressions was better for social phobics than controls. A preliminary study by Amir and Foa (2001) however, found that
socially-anxious and non-anxious individuals did not differ on overall recognition rates, or false hit rates for threat and non-threat words. However when recognition was broken down into remember and know components, the socially-anxious individuals were more likely to use ‘feelings of familiarity’ when they correctly recognized the words, or when they had false alarms. This effect was most robust for threat words.

The evidence for memory bias in anxiety is mixed. It may be premature however, in the light of literature concerning the nature of attentional and memory processes, to label beliefs based on memory, as the influence of attentional associations must be considered (Beck, Emery, & Greenberg, 1985; Graf & Mandler, 1984; MacLeod, 1998; Rapee & Heimberg, 1997; Williams et al., 1988).

4.4.3 Vigilant-Avoidant Perspective

Another perspective is that socially-anxious individuals who show an immediate vigilant attentional bias to threat information have also developed avoidance strategies that restrict elaborative processing of that information (Williams et al., 1988). Foa and Kozak (1986) argue that anxious individuals tend to inhibit, or even completely avoid, deep processing of threatening information, leading to a form of ‘cognitive avoidance of threatening stimuli’. They suggest that overestimated probabilities and exaggerated costs of
threatening activities initiate avoidance strategies, which are instrumental in the maintenance of anxiety disorders in general. Williams et al. (1988) likewise propose that, in early (automatic) stages of processing, anxious individuals tend to orient their attention towards the location of threat, thereby increasing priming of this information. However, in later elaborative (or strategic) stages of processing, anxious individuals tend to orient their attention away from threat, thereby decreasing the degree to which this information would be retrievable (see also Mathews, Mogg, May and Eysenck, 1989). Anxious individuals were therefore proposed to be uniquely characterised by a pattern of initial vigilance to threat followed by avoidance of further elaboration of this material, thereby making threatening information at once more accessible but less retrievable (see also Mogg and Bradley, 1998). This is interesting in the light of post-event processing in anxiety where rumination and self-reflection seem to increase avoidance behaviours (phobia) rather than address disconfirming cues (however see Field, Psychol and Morgan, 2004 for a more adaptive calming role of post-event processing in social anxiety)

### 4.4.4 Evidence of Repressors’ Memory Bias

Repressors, by definition, show disassociation between their reported anxiety and physiological signs. They also demonstrate a poorer memory for a range of events and stimuli including unpleasant feedback and emotional damage from personal history. They have more difficulty in retrieving negative
autobiographical material than non-repressors (Davis & Schwartz, 1987; Myers & Brewin, 1994). Furthermore, the age of the earliest recalled negative memory is significantly older than that of non-repressors and they recalled fewer negative early experiences than non-repressors (Myers, Brewin, & Power, 1997; Newman & Hedberg, 1999). Boden and Baumeister (1997) found that repressors protected themselves from unpleasant events by generating pleasant thoughts. Boden and Dale (2001) observed that repressors were efficient regulators of emotion but found no difference in memory bias when compared to low-anxious individuals. Bjork (1989) proposed that ‘retrieval inhibition’ is an adaptive mechanism in human memory and suggests that some repressive phenomena may be initiated to achieve some goal such as ‘the avoidance of a painful recollection’. Repressors engage in less elaborate processing of their own unpleasant emotional experience at the time of encoding (Baumeister & Cairns, 1992). They spend less time processing negative information and use implicit distraction strategies diverting attention from negative stimuli. Bower (1990) proposed that repressors might be subject to motivated non-learning (or non-rehearsal) rather than retrieval inhibition and retrieve fewer self-related unpleasant emotional experiences from memory than non-repressors.

Davis, Singer, Bonanno and Schwartz (1988) however, disagree and found that despite reports of conservative memory responses, repressors memory biases were similar to non-repressors. They used a detection paradigm
that required participants to remember affect-related sentences. The results failed to support the view of memory deficits previously observed in repressors (Davis, 1995; Davis & Schwartz, 1987).

Bonanno, Davis, Singer, and Schwartz (1991) using a dichotic listening task, showed that repressors were more capable of ignoring threatening words. Moreover, the authors concluded that repressors were skilful in avoiding threat-related words. Oldenburg, Lundh, and Kivisto (2002) compared explicit and implicit memory for physical threat words, social threat words, positive words and neutral words in trait-anxious individuals and repressors. They found no implicit or explicit memory bias in trait-anxious individuals or repressors, however, with the repressor’s coping style, they found a negative association between anger/irritability and implicit memory bias. They concluded however that the repressive coping style has a general tendency to process information at a more explicit level.

Davis and Schwartz (1987) observed that repressors recalled significantly fewer positive childhood experiences than did non-repressors. They reported that repressors had more difficulty remembering past personal events of an unpleasant nature and later went on to argue that that repressors' less elaborate processing of both negative and positive emotional stimuli results in later memory failure.
Brosschot, De Ruiter, and Kindt (1999) when testing memory deficits between repressors and low-anxious individuals (using a recall and recognition task) found no proof of poorer recall, or recognition of threatening words in repressors. However, they suggest that increased emotional intensity or state anxiety, might be factors that increase avoidance of these words in repressors.

So, lacking evidence for consistent memory biases in socially-anxious individuals and repressors, another approach was taken to resolve these biases. Considering the initial proposition of ‘paradoxical’ coping responses of repressors and socially-anxious individuals, angry faces might be better remembered by socially-anxious individuals and happy faces might be better remembered by repressors (Eysenck, 1997). It is argued however that socially-anxious individuals would attend to critical and happy faces but not actually remember them. This argument is based on research showing a lack of memory bias and that socially-anxious individuals who avoid social situations are more prone to focus internally and neglect to seek out disconfirming external evidence (Clark & Wells, 1995; Rapee et al., 1994). Coles and Heimberg (2002) report:

“the majority of failures to find explicit memory biases on free-recall tasks come from studies of general anxiety disorders and
social phobias two disorders for which there was little overall support for explicit memory biases” (p. 620).

A second proposition is that repressors would be more prone to ‘know’ angry faces but will remember happy faces (based on social desirability and need for approval research) (Myers, 1998; Paulhus, 2001; Weinberger, 1990).

4.5 Hypothesis

Repressors are regarded as defensive individuals who, despite their positive demeanour, are out of touch with their implicit motivation. That is, they are ‘self deceivers’ seeking social approval (Derakshan & Eysenck, 1999; Paulhus, 2001). Socially-anxious individuals show an implicit vigilance to social threat and explicitly wish to avoid social situations. The prediction is that the socially-anxious individual would be better at ‘knowing’ angry and sad faces but not ‘remembering’ them. Alternatively, repressors will be better at ‘remembering’ angry and sad faces but will not ‘know’ them and also will be better at ‘remembering’ happy faces. A third prediction is that low-anxious individuals will remember more faces regardless of the emotional expression.
Summary of Hypothesis in the Remember and Know Paradigm.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Implicit Memory Bias</th>
<th>Explicit Memory Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYP 1</td>
<td>Better at knowing negative-critical faces (familiar with angry faces).</td>
<td>Less well at remembering (Threat faces and emotional faces in general).</td>
</tr>
<tr>
<td>HYP 2</td>
<td>Less at knowing negative faces (less familiar with angry faces).</td>
<td>Better at remembering positive faces (happy faces). However less for negative faces.</td>
</tr>
<tr>
<td>HYP 3</td>
<td>Better at remembering all emotional faces.</td>
<td>Better at remembering all emotional faces.</td>
</tr>
</tbody>
</table>

4.6 Method

4.6.1 Participants

Group members were chosen on the previous criteria reported in the Dot Probe test. The four groups consisted of Low-Anxious (N=26), Repressors (N=29), High Socially-Anxious (N=23) and Defensive High- Anxious (N=19). They were selected from a larger sample (N=890) on the basis of their scores on
Marlowe Crowne, Taylor Manifest Anxiety Scale and the Fear of Negative Evaluation scale.

### 4.6.2 Procedure

Each participant was connected to a galvanic skin conductance probe and was informed that his or her skin moisture content was being measured. This was used to raise the level of anxiety of the participant. The self report state and trait anxiety measures indicate higher anxiety measures for the socially-anxious than the repressors or low-anxious individuals (Spielberger et al., 1983). The experiment was divided into a presentation period, an intermediate interval and a test period. In the first stage of the session, participants were instructed that they would be presented with a series of faces on a computer screen and they were required to remember the faces they had seen. They were also requested to identify the emotion on the faces and rate the intensity of that emotion on a (pencil and paper) Likert scale (0 –7) where 0 equated to low intensity and 7 high intensity. Each face was shown for 10 seconds.

Twenty-four faces were shown. Face stimuli consisted of six angry faces, six happy faces, six sad faces and six neutral faces. Each face was displayed on the screen for 10 seconds. Before the main test, instructions and
brief practice session ensured that participants understood and were familiar with the responses they had to make. The first instruction required them to concentrate on a cross in the centre of the screen and to start when they were ready by pushing the Tab key. The test took approximately four minutes to complete (available on request).

Following this procedure participants were given a distraction task (other unrelated tasks, namely completing a personality questionnaire, etc.) that lasted approximately one hour. This was done to reduce priming effects. Following this interval the participants were asked to sit down at another computer in a different room. A brief practice session ensured that participants understood the nature of the test and were thoroughly familiar with the responses they had to make. The following instructions were given:

‘You are going to be presented with another series of faces. Some faces you have seen before and some faces are new. Press the ‘YES’ key, if the face was from the previous series, or the ‘NO’ key, if it was not. If you said YES you will be asked to then press the ‘R’ Remember key, if you consciously recall details of the face, or the ‘K’ Know key, if the face seems familiar but you cannot recall specific details. Press the space bar to start’ (adapted from Gardiner & Richardson-Klavehn, 2000).
4.7 Results

Comparisons were measured between the ‘remember’ and ‘know’ tests. There were no significant differences for all predispositions for all of the emotional faces. One type of emotional face was no better remembered or known than any of the others.
Table 4.1: Remember and Know Proportional (hits)

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Group</th>
<th>Remember/</th>
<th>Know hits</th>
<th>False hits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angry</td>
<td>LA</td>
<td>0.84 (0.23)</td>
<td>0.12 (0.14)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>REP</td>
<td>0.92 (0.11)</td>
<td>0.14 (0.13)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HSA</td>
<td>0.91 (0.11)</td>
<td>0.09 (0.12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DHA</td>
<td>0.88 (0.15)</td>
<td>0.13 (0.13)</td>
<td></td>
</tr>
<tr>
<td>Happy</td>
<td>LA</td>
<td>0.87 (0.21)</td>
<td>0.06 (0.10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>REP</td>
<td>0.86 (0.19)</td>
<td>0.08 (0.12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HAS</td>
<td>0.88 (0.16)</td>
<td>0.05 (0.15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DHA</td>
<td>0.82 (0.18)</td>
<td>0.09 (0.14)</td>
<td></td>
</tr>
<tr>
<td>Sad</td>
<td>LA</td>
<td>0.86 (0.20)</td>
<td>0.07 (0.11)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>REP</td>
<td>0.93 (0.13)</td>
<td>0.09 (0.15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HSA</td>
<td>0.88 (0.19)</td>
<td>0.07 (0.02)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DHA</td>
<td>0.82 (0.20)</td>
<td>0.05 (0.08)</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>LA</td>
<td>0.84 (0.24)</td>
<td>0.08 (0.14)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>REP</td>
<td>0.87 (0.14)</td>
<td>0.11 (0.13)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HSA</td>
<td>0.89 (0.16)</td>
<td>0.11 (0.18)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DHA</td>
<td>0.76 (0.24)</td>
<td>0.05 (0.07)</td>
<td></td>
</tr>
</tbody>
</table>

LA = Low-anxious; REP = Repressor; HAS = High Socially Anxious; DHA = Defensive High Anxious.
4.8 Discussion

The ‘Remember & Know’ experiment described in this research is the first attempt to delineate differences between these predispositions and four types of emotional faces. Both ‘remembering’ and ‘knowing’ appear to be valid measures of explicit and implicit measures of memory (Rajaram & Roediger, 1997). Based on the theory of opposite attentional and interpretive processes it was expected that these trends may be shown within the Remember and Know paradigm (Eysenck, 1997), where knowing responses were the implicit memory, and remembering responses, the explicit memory processes. Unfortunately, there was no difference between these two memory processes. The results did not support the view that socially-anxious individuals would be better at knowing negative faces (angry and sad) or that repressors would be better at remembering happy faces.

Based on the theory of implicit vigilance and explicit avoidance of social threat it was also predicted that socially-anxious individuals would be more competent at knowing rather than recalling these faces. This prediction was not supported. Furthermore, the prediction that repressors would avoid negative stimuli at an implicit level but facilitate positive social stimuli at explicit levels was also not supported. All predispositions had similar responses in remembering and knowing emotional faces. This was also true for low-
anxious individuals where it was predicted that they would be better at remembering all types of emotional faces.

The Remember and Know Test provides a viable framework to study states of awareness that accompany different memories, however in this study no significant differences emerged between low-anxious, repressors, socially-anxious and defensive high-anxious individuals. One of the known problems with the Remember and Know test is encoding where there is a lack of specific instruction given. According to Rajaram and Roediger (1997), clear instructions need to be given when participants attempt the Remember and Know test. In this study particular attention was given to introducing the test with clear explicit instructions and a longish practice sequence.

Future research should repeat this study but possibly use Jacoby’s (1991) process dissociation task, which focuses more on inclusion and exclusion responses that relying on first person judgements. The notion that divided attention (at encoding) increases ‘know’ responses and that spaced repetition (rehearsals) increases ‘remember’ responses could be applied in the context of memory research with repressors and socially-anxious individuals. The theories surrounding implicit and explicit cognitive processing of these two predispositions suggest that both are anxious individuals who use different behavioural strategies to manage their anxiety. Therefore, it is important to
know what memories motivate these individuals at an implicit and explicit level (Heinrichs & Hofmann, 2004; Myers, 2000; Parkin, Gardiner, & Rosser, 1995; Rapee & Heimberg, 1997; Weinberger, 1995). Furthermore, the fact that there is minimal evidence for specific memory biases proposes that anxiety underpins the behaviours of both predispositions and is more likely to be autonomic than memory based. From this perspective, patterns of how these individuals interpret social situations and the deductions they make, are important and the subject of the next study (Eysenck, 1997).
CHAPTER FIVE

INTERPRETIVE BIAS INSOCIA LLY-ANXIOUS INDIVIDUALS AND REPRESSORS

5.1 Introduction

This study examines interpretive facial biases in socially-anxious individuals and repressors. Previous anxiety research has claimed that socially-anxious individuals and repressors have opposite interpretive biases. Socially-anxious individuals overestimate social threat and repressors underestimate social threat when compared to low-anxious individuals (Derakshan & Eysenck, 1997b; Rapee & Heimberg, 1997; Stopa & Clark, 2000; Weinberger, 1990). These opposite interpretive biases may affect how these individuals rate emotional faces and may even misattribute one emotional expression for another. For example, a socially-anxious individual may rate the threat value of a face much higher than a low-anxious individual. Furthermore, they may identify happy faces as angry. It is important to see how these two predispositions interpret the facial expressions of other individuals given their anxious predisposition and to see how they monitor their social environment.
5.2 Socially-Anxious Interpretive Style

Eysenck’s (1997) four-factor theory proposes opposite attentional and interpretive processes in trait-anxious individuals and repressors as suggested previously. High anxious individuals have an attentional and interpretive bias that facilitates social threat stimuli whereas repressors inhibit threat and tend to minimise it by social involvement (Palyo & Beck, 2005). This is similar to socially-anxious individuals who appear to interpret ambiguous social situations and facial stimuli in a negative way (Amir, Foa, & Coles, 1998; Clark & Arkowitz, 1975; Heinrichs & Hofmann, 2004; Mogg & Bradley, 2002; Stopa & Clark, 2000). Clark and Arkowitz (1975) found that socially-anxious individuals rated their own performance lower than low-anxious individuals. These negative appraisals, according to Stopa and Clark (2000), tended to be ‘catastrophised’ given the quite unambiguous, mild, negative events. Lucock and Salkovskis (1988) showed that, compared to low-anxious individuals, social phobics overestimated the probability of negative outcomes. Constans, Penn, Ihen, and Hope (1999) suggest it is not so much that socially-anxious individuals interpret negatively but rather lack positive interpretation when compared to low-anxious individuals. Further, they suggest this is related more to trait anxiety than mood.
Stopa and Clark (1993) suggest that one difference between low-anxious and socially-anxious individuals is that the latter showed a tendency to underestimate their own social performance. Winton, Clark and Edelmann (1995) showed slides of negative and neutral expressions and found that socially-anxious participants identified more negative faces than low-anxious individuals. Moreover, they are faster to recognise negative faces in a crowd (Fox, Russo, & Dutton, 2002; Gilboa-Schechtman, Foa, & Amir, 1999; Rapee & Lim, 1992). Lund & Ost (1996b) found that individuals with social phobia identified a significantly higher number of critical faces, whereas low-anxious individuals tended to remember accepting faces. The notion that socially-anxious individuals are more prone to interpret faces negatively suggests that they may prefer to avoid these faces.

Foa, Gilboa-Schechtman, Amir, and Freshman (2000) suggest that individuals with social phobia have a better memory for faces but also for negative faces (anger, disgust). However, Perez-Lopez and Woody (2001) showed that when individuals with social anxiety experienced state anxiety, it was difficult for them to recognise previously shown emotional faces. D’Argembeau, van de Linden, Etienne, and Comblain (2003) used a Remember and Know Test to examine recognition biases in high and low socially-anxious individuals. They found no difference between the two predispositions in relation to face recognition. Brendle and Wenzel (2003) argue that the
memories of socially-anxious individuals are similar to low-anxious individuals except that socially-anxious individuals interpret faces negatively. Negative interpretations of ambiguous social situations increase overestimation of danger and contribute to reinforcing anxious beliefs (Muza & Lepine, 2000). Rapee and Heimberg (1997) argue that negative long term memories are initiated each time an individual with social anxiety is confronted by a negative social event or face (Beck, Emery, & Greenberg, 1985). D’Argembeau, van de Linden, Etienne, and Comblain (2003) suggest that most people preferentially elaborate positive rather than negative stimuli that are important to self, and that this tendency may be reduced in high socially-anxious individuals because of the negative meaning they tend to ascribe to positive social information. In all, the socially-anxious individuals seems more adept to detecting and remembering negative faces and appear to be vigilant for these expressions. These interpretations increase overestimation of danger and reinforce anxious beliefs and increase vigilance to this social stimuli. On the other hand, repressors do the opposite where they seem to minimise or avoid negative affect, focussing more on positive aspects of social situations.

5.3 Repressors Interpretive Style

Repressors avoid attending to social threat by engaging in socially desirable behaviours (Derakshan & Eysenck, 1997a; Fox, 1993; Paulhus, Fridhandler, & Hayes, 1996). Fox (1993) found that repressors attended less to
socially threatening words than to neutral words, whereas low-anxious participants showed no tendency to avoid. Weinberger (1990) suggests that repressors, despite the label of ‘self deceivers,’ honestly claim a low-anxious experience despite their similar anxious physiological reaction when confronted by threat (Baumeister & Cairns, 1992; Derakshan & Eysenck, 1997b, 99). Myers (1998) proposes that repressors use more distraction techniques and significantly fewer self-punishment strategies than low-anxious individuals. Hock, Krone, and Kaiser (1996) argued that repressors are consistent avoiders ‘blunters’ who would tend to make non-threatening interpretations of ambiguous sentences. However, they found that repressors took longer to provide a rating than low-anxious individuals. Hock (1996) proposes that repressors “try to divert attention from the threatening implications or try to impose a non threatening interpretation on such material” (p.1063). Calvo and Eysenck (2000) in a predictive inference paradigm found that repressors showed an early bias towards threat processing followed by an apparent avoidance of threat processing. They report that repressors no longer predict threatening outcomes after they had been able to infer the degree of threat. This interpretive style is suggestive of an automatic orientation to threat but a strategic inhibitory bias intervenes to interpret these situations less negatively (vigilant – avoidant style). Strategic processing appears to be based on post-lexical summation of the nature of the threat rather than perceptual avoidance (Mogg & Bradley, 1998; Williams, 1997). It is clear that repressors differ substantially from low-
anxious individuals in their processing of threat-related information. High and low defensiveness demarcates these two predispositions. Creswell and Myers (2002) propose that it depends largely on direct or indirect encoding as to whether repressors attribute negative events internally or externally. With indirect encoding repressors are more likely to attribute negative events to themselves, however with direct encoding, they attributed negative events externally. This suggests that at an implicit level repressors attribute negative events to themselves. Myers and Steed’s (1999) research showed that repressors displayed less pessimism when compared to high-anxious and low-anxious individuals. However, low-anxious individuals were more optimistic than repressors. Repressors have a predisposition that will interpret negative situations into less negative ones, especially when it concerns themselves. These somewhat contradictory studies suggest that repressors have an initial self-referencing response before they begin to externalise their experience. That is, there is an ‘implicit internal to explicit external’ process referencing going on similar to the vigilant-avoidance paradigm in anxiety (Mogg & Bradley, 1998).

Mendolia, Moore, and Tesser (1996) proposed that, whether positive or negative, the issue is really one of self-referencing. Hypersensitivity is related more to the personal implications of how one would be seen rather than positive or negative valence of the stimuli. This is the case, particularly for socially-anxious individuals. However, repressors rather than become self-focussed, distract and minimise social threat and place a positive interpretation on their
own behaviours (Eysenck, 1997; Mogg & Bradley, 2002; Rapee & Heimberg, 1997; Stopa & Clark, 1993; Weinberger, 1990). These time-based phenomena may be important when considering how repressors view the faces of others in general. However, Eysenck (1997) posits that repressors tend to minimise the ‘threatfulness’ of cues over the longer period and consistently interpret ambiguous cues in a non-threatening manner (termed opposite interpretive bias) (Calvo & Eysenck, 2000).

The defensive behaviours of repressors appear to reflect this desire for ‘social desirability’ and a ‘need for approval’, whereas socially-anxious individuals wish to avoid social situations. There is still some debate, however, as to where socially-anxious individuals direct their attention. Several models debate the attention and avoidance issues as well as the intermediatory position (Beck, Emery, & Greenberg, 1985; Clark & Wells, 1995; Rapee & Heimberg, 1997). The vigilance-avoidance debate likewise is countered by the view that social threat, for the socially-anxious individual, commands attention, from which it is difficult to disengage (Amir et al., 1998; Fox, Russo, & Dutton, 2002; Koster et al., 2003). This may also be the case for repressors however they may be more adept to committing resources to avoid social threat in the long run. Some would suggest that social anxiety lends itself to ‘high monitoring’ of the environment, whereas, others suggest that the focus is intensely directed at oneself (sensitisers) disallowing any new or contrary
information to be assessed to dispute the reality of their fears (Clark & Wells, 1995; Heinrichs & Hofmann, 2001; Krone, 1993; Rapee & Heimberg, 1997). Repressors on the other hand, appear to be efficient ‘blunters’ and direct their attention to external sources in the context of social desirability and the need for approval (Myers & Derakshan, 2000; Weinberger, 1990). Myers and Derakshan (2000) describe repressors as “information avoiders” and “low monitors” (p.118) rather than blunters of information because they still elicit a physiological response when confronted by a stressful film (Millar, 1991).

This was questioned by other views on impression management and self-deception (Ashley & Holtgraves, 2003; Paulhus, 2001; Paulhus, Fridhandler, & Hayes, 1997). Weinberger, Schwartz, and Davidson (1979) propose that repressors report low anxiety on self-report scales but express high anxiety behaviourally and physiologically (compared to low-anxious individuals). Fox (1994) claims that repressors are extremely efficient at ignoring threat stimuli. However, she did report some interference by repressors on the Stroop test. Hansen, Hansen, and Shantz (1992) observed that repressors were more discriminative of dominant emotions at the expense of less dominant emotions. They suggested that repressors selectively encoded dominant emotions. For example, repressors did not differ from non-repressors in their perceptions of happy faces (the dominant emotion) but perceived them to be less fearful and less angry (non-dominant emotions). This ‘discreetness’
according to Davis and Schwartz (1987) is related to their later failure to remember negative emotional memories. This is consistent with the view that repressors are overly defensive to emotional stimuli and require control of these categorisations. A similar pattern of results was obtained for positive emotional stimuli (Mendolia, Moore, & Tesser, 1996). They argue that repressors are hypersensitive to both negative and positive emotional events but they distance themselves when the situation might threaten their self-evaluation. However, in recent research, using a bogus pipeline paradigm Derakshan and Eysenck (2005) found that repressors, when focussing their internal emotional state became more aware of their affective state and therefore report anxiety. This suggests that if distraction can be countered and the repressors feel they have been ‘found out’ they will admit to a degree of anxiety when asked to monitor their own feelings.

In summary, there is enough evidence to suggest that both socially-anxious individuals and repressors interpret social situations and emotional facial stimuli in different ways and act on these interpretations. Where socially-anxious individuals appear to be high monitors of potential negative social stimuli, repressors appear to avoid this monitoring and act in a socially adept manner. Therefore, it is important to examine the interpretive styles of these predispositions at an explicit level to see if they actually interpret facial
expression similar or different to one another compared to low-anxious individuals.

5.4 The Aim of This Study

The aim of this study is to examine the interpretive bias of socially-anxious individuals and repressors. The prediction is that socially-anxious individuals would rate an emotional (angry) face more intensely than repressors. Researchers have argued for an initial vigilance and secondary inhibition of elaboration for both predispositions, suggesting that both use the same strategy to manage social threat but place different interpretations on them (Brendle & Wenzel, 2003; Eysenck, 1997). If anxious individuals reduce processing external social cues it can be anticipated that critical faces are in fact avoided and not assessed fully to come to terms with the actual severity of the critical face. Unlike repressors, they become internally and negatively self-focused, whereas repressors become distracted by focussing on externally positive material. However, the notion that repressors become externally focussed, has not been conclusively established (see Davis, 1987).

The second component of the study examines attribution biases when incorrect identification of faces was made. That is, rather than interpretation of facial stimuli the emphasis is on what emotion they attribute to that faces when
they misidentify a facial expression. For example, an angry face may have been perceived as a happy face, or, a neutral face may have been designated a happy face. The aim is to examine what type of misattribution bias each predisposition tended to make. If these misattribution biases are significant, it may support the assertion that socially-anxious individuals would be more likely to attribute mis-identified happy faces as angry, or that repressors might attribute neutral faces as happy. These attributional biases involve both face intensity and face attribution tasks. Both of these tasks will further clarify the nature of any interpretive biases in these two predispositions.

The hypothesis for the first task is that socially-anxious individuals will interpret more faces as threatening and repressors will rate more faces as less threatening. The second hypothesis is that socially-anxious individuals will rate faces as more intensely threatening than repressors. Furthermore, that repressors will rate happy faces more intensely than socially-anxious and low-anxious individuals. The third hypothesis is that socially-anxious individuals will tend to make more negative attribution when errors are made in face identification and that repressors will be biased to interpret these faces positively, in that they will make more positive attributions of facial expressions. It is further hypothesised that low-anxious individuals will make the least errors overall and will not show a bias to either positive or negative emotional facial expressions.
### Table 5.1: Summary of Hypothesis of Interpretive and Attributional Bias

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Interpretive Bias</th>
<th>Attribution Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYP 1</td>
<td>That SA will interpret facial stimuli more negatively than repressors.</td>
<td>The SA will have a tendency to attribute more negative faces when making errors in identifying faces.</td>
</tr>
<tr>
<td>HYP 2</td>
<td>That repressors will interpret facial stimuli more positively than SA.</td>
<td>The repressors will have a tendency to attribute more positive faces when making errors in identifying faces.</td>
</tr>
<tr>
<td>HYP 3</td>
<td>That low-anxious individuals will make the least errors in interpreting facial expressions.</td>
<td>That low-anxious individuals will make the least errors in attribution of facial expressions when faces are wrongly identified.</td>
</tr>
</tbody>
</table>

### 5.5 Method

#### 5.5.1 Participants

Ninety-four participants were allocated to four groups according to their scores on Marlowe Crowne (MC), Taylor Manifest Anxiety Scale (TMAS) and the Fear of Negative Evaluation scale (FNE). The four groups consisted of Low-Anxious (N=26), Repressors (N=29), High Socially-Anxious (N=23) and Defensive High-Anxious (N=19). They were selected from a larger sample.
(N=890) on the basis of their scores. Their mean age was 22.6 years (M=16; Fm = 78).

5.5.2 Materials

Face stimuli were shown via a 15-inch monitor using DMDX shareware software (www.mrc-cbu.cam.ac.uk/~matt.davis/dmdx.html /shareware) to program the computer system to display the faces (Appendix H: available on request).

Face stimuli consisted of 24 faces divided between angry, happy, sad and neutral expressions. The six faces in each emotional category were matched for gender and age (three males and three females of approximately the same age). These faces were selected using the selection criteria used in the face rating exercise (first study). The 24 faces were shown in a random fashion.

5.5.3 Procedure

Each participant was seated in front of the visual display and viewed each digitised slide of an emotional face for 10 seconds with the instruction to (1) identify the emotion and (2) to indicate, on a Likert scale, the degree of intensity of the emotional face. Zero on the Likert scale indicated low emotional intensity and six, extreme high intensity of the face. The procedure took four minutes.
5.6 Results

Data analysis consisted of rating the mean emotional intensity of each of the four emotional expressions between low-anxious, repressors, high socially-anxious and defensive high-anxious groups. Incorrect judgements were analysed on the basis of which emotional expression was selected. Attributional biases were based on the number of incorrect identifications of emotional faces or what type of facial expression was chosen when individuals incorrectly identified these faces. The possible combination of attributions were:

Angry To Sad
Angry to Happy
Angry to Neutral
Sad to Angry
Sad to Happy
Sad to Neutral,
Happy to Angry
Happy to Sad
Happy to Neutral
Neutral to Angry
Neutral to Sad
Neutral to Happy
5.6.1 **Interpretive Results**

First, results show no significant difference between groups when judging face intensity for the four emotional faces.

**Table 5.2: Means of Face Intensity rating**

<table>
<thead>
<tr>
<th>Face Emotion</th>
<th>Groups</th>
<th>Mean (Sd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA</td>
<td>24.11  (5.86)</td>
<td></td>
</tr>
<tr>
<td>Anger REP</td>
<td>23.10  (6.23)</td>
<td></td>
</tr>
<tr>
<td>HSA</td>
<td>20.43  (7.25)</td>
<td></td>
</tr>
<tr>
<td>DHA</td>
<td>22.78  (4.85)</td>
<td></td>
</tr>
<tr>
<td>Happy LA</td>
<td>22.90  (4.25)</td>
<td></td>
</tr>
<tr>
<td>REP</td>
<td>24.69  (4.56)</td>
<td></td>
</tr>
<tr>
<td>HSA</td>
<td>22.15  (4.82)</td>
<td></td>
</tr>
<tr>
<td>DHA</td>
<td>22.07  (4.12)</td>
<td></td>
</tr>
<tr>
<td>Sad LA</td>
<td>14.15  (5.31)</td>
<td></td>
</tr>
<tr>
<td>REP</td>
<td>14.90  (5.09)</td>
<td></td>
</tr>
<tr>
<td>HSA</td>
<td>13.35  (4.42)</td>
<td></td>
</tr>
<tr>
<td>DHA</td>
<td>16.03  (4.92)</td>
<td></td>
</tr>
<tr>
<td>Neutral LA</td>
<td>13.73  (6.30)</td>
<td></td>
</tr>
<tr>
<td>REP</td>
<td>16.29  (4.61)</td>
<td></td>
</tr>
<tr>
<td>HSA</td>
<td>16.13  (5.47)</td>
<td></td>
</tr>
<tr>
<td>DHA</td>
<td>16.63  (5.53)</td>
<td></td>
</tr>
</tbody>
</table>
LA = Low-anxious, REP = Repressors, HAS = High Socially Anxious, DHA = Defensive High Anxious.

There was no significant difference as to the ratings of emotional intensity of faces for all predispositions, however trends showed that low-anxious individuals interpret angry faces more intensely than socially-anxious individuals ($p < 0.16. \text{ns}$). This was similar for repressors who tended to rate happy faces more intensely when compared to socially-anxious individuals ($p < 0.24 \text{ns}$). These results are far from significance.

There were differences in mean intensity ratings where both angry ($M = 22.60$) and happy faces ($M = 22.95$) were higher when compared to sad ($M = 14.60$) and neutral faces ($M = 15.69$) for all predispositions (see Table 5.1). This suggests that all participants rated the angry and happy emotions more intensely. Despite these differences, these results did not reach significance.

### 5.6.2 Attributional Results

The results of the face attribution task showed the average number of errors made when assessing emotional faces (24) for each predisposition: Low-anxious = 8.1%, Repressors = 9.0%, Socially High-Anxious = 7.2% and Defensive High-Anxious = 5.0%. These errors highlighted that socially-anxious individuals attributed sad faces to angry faces while repressors did the
opposite. Socially high-anxious individuals were significantly more prone than low-anxious, repressors and defensive high-anxious individuals, to attribute sad faces to angry faces \( (F = [3, 24] = 3.37, p < .05) \). However, repressors when making these errors were more likely to attribute angry faces to sad faces \( (F = [3, 19] = 7.44, p < .01) \). This suggests that socially-anxious individuals tend to minimise the critical nature of the face whilst repressors do the opposite.

### 5.7 Discussion

The first prediction that particular predispositions would rate faces differently was not supported. Although there were trends in the dominant emotions (angry/sad vs. sad /neutral) these differences were not significant.

When assessing face intensity there is no significant difference in the way individuals assess faces, however when they make errors there may be a preference as to which emotional label they use. Face-in-the-crowd paradigms suggest that angry faces command attention. These faces are detected more quickly than neutral or positive faces presumably because of the threat (critical) value of the expression. However, it can also be envisaged that not only is the type of emotion important, but also the intensity (mild – severe) of emotion, which may also influence detection (Fox et al., 2000; Gilboa-Schechtman, Foa, & Amir, 1999).
Coles and Heimberg (2005) found that individuals with social phobia identified a significantly higher number of critical faces whereas low-anxious individuals tended to remember accepting faces (Lundh & Ost, 1996b). These memory differences may reflect the temperament or the primary concern of these individuals but this was not evident in the present study. D’Argembeau, van de Linden, Etienne, and Comblain (2003) propose that although most people preferentially elaborate positive faces important to themselves, this tendency may be lessened in high socially-anxious individuals because of the negative meaning they tend to ascribe to positive social information. In this study, no difference was found in the intensity of faces.

The view that particular individuals interpret the same face differently can be questioned especially if faces are viewed long enough (i.e., in an explicit rather than an implicit manner). Viewing an emotional face long enough diminishes its threat value and may even contribute more to mood than attention where after an initial assessment people become disinterested (Bradley & Mogg, 1994; Bradley et al., 1999). This is somewhat similar to Williams’ et al. (1988, 97) idea that the facial expression might trigger accessibility at a perceptual level rather than availability at a conceptual level. When anxiety is high, dwelling on emotional faces is curtailed because of increased vigilance (attention and avoidance). Heightened scanning of the environment disallows considered (conceptual) assessment of the face (Le Doux, 1996; Ohman, 1996). However, i
when initial assessment (perceptual and conceptual process; e.g., within 500ms) of a face is made, and the face is clearly recognisable, the subsequent processing (post-event) and deliberation may reduce both attentional and interpretive biases. In this present study, participants were given 10 seconds to assess a face. It could be argued that this is not a conceptual or elaborative process rather it has become one of deliberation and reflection to the point that the face might remind them of someone else. This is a possible reason why no significant group differences in identifying the emotional faces and rating their intensity were found.

While attentional vigilance and response biases, rather than memory access, is an important distinction here, the differences between emotional expression and the perceived intensity of the emotional face is still an important area for further research between individuals that facilitate social threat and those that tend to inhibit it. This is especially so if the degree of threat (e.g., critical faces ranging from condescending to outright rage) may initiate facilitation or inhibition of that face. It can be predicted that a mildly critical expression (compared to an enraged face) may initiate different reactions in repressors and socially-anxious individuals (Maidenberg et al., 1996; Mathews, Ridgeway, & Williamson, 1996). Fox (1993) for example, found that repressors are more efficient at inhibiting angry faces and interpreting these faces as less negative. That is, they do not appear to elaborate on the angry face. However, as suggested previously,
if the ‘elaborative’ time has been exhausted then it is conceivable there would be no differences as to how these individual predispositions rated these faces (Lundh, 1979). This would be especially true in research paradigms.

The attributional results show that socially-anxious individuals have a tendency to interpret angry faces as sad faces when compared to the other groups. The implication is that socially-anxious individuals avoid threatening stimuli but still interpret the face as negative. These results were unexpected in the light of the hypothesis but as Study One showed, socially-anxious individuals were significantly more attentive to sad faces than angry faces at an implicit level. Is this avoidance of threat faces? The implication is that negativity rather than criticalness captures the initial attention of the socially-anxious individual. It appears that the socially-anxious individuals may minimise criticalness. However, Lund & Ost (1996b) found that when participants were asked to look at critical faces they remembered more but when they were instructed to simply evaluate (quality of contact) they found no difference between socially-anxious and low-anxious individuals (Lund & Ost, 1996a). Not only is the time factor important but also the instructions given. In this present study participants were simply asked to rate the faces for 10 seconds without specific instructions. If the instructions were the same as in Lund & Ost’s (1996a/96b) study these results may have been different.
Whereas socially-anxious individuals attributed sad faces to angry faces, repressors did the opposite. In this present study, they attributed angry faces to what were otherwise designated as a sad faces. This suggests that negative faces were seen as critical. In other words, they maximised the criticalness of faces. This ‘criticalness aspect’ may be an (implicit) primary motive for the repressor’s desire for social approval. However, happy or neutral faces were not attributed as critical or sadder.

Based on Eysenck’s (1997) model of anxiety it was hypothesised that socially-anxious individuals and repressors would have opposite interpretive biases, namely that socially-anxious individuals would maximise (exaggerate) negativity and repressors would minimise negativity to threat faces. In this present study it appears that socially-anxious individuals emphasised the negativity over criticality and repressors the criticality over negativity of the faces.

The view that socially-anxious individuals are vigilant to threat words and faces and interpret ambiguous information in a negative fashion has been well researched (Amir, Foa, & Coles, 1998; Constans, Penn, Ihen, & Hope, 1999; Hope, Rapee, Heimberg, & Dombeck, 1990; Mattia, Heimberg, & Hope, 1993; Mogg & Bradley, 2002). Constans et al. (1999) suggested this may not be an increase in negativity but rather a lack of positivity but these trends were not
found in this present study. Rather there was threat avoidance. Lopez and Woody (2001) found that individuals with social phobia were less accurate that low-anxious individuals in identifying facial expressions and they found a small bias towards remembering reassuring faces. Lucock and Salkovskis (1988) show that, compared to low-anxious individuals, socially phobic individuals overestimate the probability of negative social outcomes. There is little evidence as to which attributions socially-anxious individuals make when confronted by a threat face. Models of social anxiety debate where socially-anxious individuals direct their attention, however little is suggested as to the attributions they would make for different emotional expressions. The view that angry (critical, negative) faces are seen as sad (negative) faces gives some support to Constans et al.’s (1999) notion that faces are interpreted as being less negative. However, it is not clear if this applies to critical faces and/or negative emotions. Research does show that critical faces initiate vigilance and attentional avoidance strategies with socially-anxious individuals (Clark & Wells, 1995; Mogg & Bradley, 2002; Rapee & Heimberg, 1997). The idea that angry faces are misattributed as sad faces suggests that there is a tendency to minimise threat faces by socially-anxious individuals while maintaining the negativity attribute. This is difficult to explain and one could speculate that negative valence is a more fundamental emotion than the critical scrutiny of others.
This is similar to repressors, where researchers concluded that they are skilful at avoidant processing of threat-related information (Bonanno, Davis, Singer, & Schwartz, 1991; Weinberger, 1990; Derakshan & Eysenck, 1997b). Fox (1994), when instructing participants to ignore threat words, found that repressors were better at this than high-anxious individuals whose attention was captured by the threat stimuli. Yet in this present study repressors misattributed angry faces as sad faces suggesting that they perceived these emotions as being more critical than negative. This too was unexpected, as the prediction was that repressors would interpret faces in a positive fashion. Repressors have been linked to the encoding of dominant emotions over less dominant emotions. Hansen, Hansen, and Shantz (1992) found that repressors, when viewing emotional expressions, were more likely to appraise non-dominating emotions as less intense. This ‘black and white’ thinking may not be able to distinguish one negative emotion from another. There appears to be no real justification that repressors would attribute anger to a sad face based on previous evidence, especially in the light of Eysenck’s (1997) view, where opposite interpretive processes between social anxiety and repressors are proposed.

Attribution is only one aspect of the interpretive process but it is possible that there is not much difference between attribution and interpretation of a face. Both processes are involved in the assessment of social situations and trial and error is a valid way of discerning facial expression. Then again, making a
wrong interpretation of facial expression and attributing another expression in a consistent way suggests that there are particular biases that motivate these individuals to do so. Both socially-anxious individuals and repressors appear to have different attributional strategies in managing their environment and this leads to more speculation as to the nature and history of social anxiety and the different coping responses individuals use to manage their anxiety.

Several researchers suggest that socially-anxious individuals avoid elaborating social threat situations and processing external stimuli by focussing internally. In one sense they dissociate from their perceived reality (or belief) of others’ critical scrutiny. This may be similar for repressors. Strategic avoidance of social threat appears to be a prominent theme in these predispositions, however, one tends toward negativity and self-focus and the other towards positivity and an external focus. There is still some way to go in finding where these biases emanate from but attribution is a valuable insight into information-processing biases.

Several aspects of this research need further attention. First, despite the significance of these results, the number of faces viewed may have given insufficient power. Second, another potential problem needing clarification is that despite an average of 24.5 participants there were few male participants. Third, as a conscious design decision attribution was not thoroughly explored
despite many publications on interpretation. These concepts are slightly different in that interpretation is about assessment, perceiving stimuli in a positive or negative manner, whereas attribution is about naming, and control. Most of the other studies focus on interpretive biases. Making attributions, although initially based on the interpretation of face stimuli, has more to do with how one is affected by that face. In this present research, socially-anxious individuals appear to minimise critical aspects of a negative face, while repressors maximise critical aspects. This could be due to repressors’ personality with their need for approval and also that socially-anxious individuals at a fundamental level avoid negative rather than critical aspects in their scrutiny (even happy faces are viewed suspiciously by socially-anxious individuals). These are concepts for further research.

Another methodological issue important for future research is the timing exposure of the faces and the number of faces that are shown. In this study, faces were observed for 10 seconds suggesting that the vigilance-avoidance, or the levels of engagement/disengagement is not applicable in an attentional sense. Initial observation for a shorter period might be more advantageous in making emotional assessment more reliable. That is, if an individual is exposed to subliminal or momentary facial threat a reflexive strategic process would occur - the longer the exposure, the greater the time for frontal lobe assessment.
of threat potential and of resources to manage it. Conversely, giving specific instructions may also change outcomes.

A second recommendation is that more emotions be used to increase reliability. Using Ekman and Friesen’s (1975) six basic emotions may give better insight to the personalities of those studied in this thesis. A further consideration might be to increase the number of faces shown. As previously suggested, this study compared different genders and faces in the one context rather than the same face with different expressions. In this study 24 (six times four different emotions) divided by gender (2) were shown, and although balanced for age and gender, this may not have given enough power to make a dependable prediction. If the same face were shown with different expressions, generalised and arbitrary factors (age, gender mix) would be reduced (see Bradley and Mogg, 1997). Nevertheless, the current study highlights the importance of research from a naturalistic perspective.
CHAPTER SIX
FINAL DISCUSSION

6.1 Review of the Perspective Taken

In summary, this study set out to test the hypothesis that socially-anxious individuals were pre-attentively vigilant and at an attentional level avoidant of social risk; to the contrary, repressors would demonstrate diametrically opposing behaviours. This hypothesis was grounded in the Freudian notions of defensive repression of anxiety and based on the three dominant models of trait anxiety current in the literature (i.e., Eysenck, 1997, Mogg and Bradley, 1998, and Williams et al., 1997). A careful comparison of these models suggested that defensiveness might be the key variable in accounting for differences in the way social anxiety is defined and studied. Whereas Eysenck acknowledges the importance of defensiveness, the other models minimise its importance. This provided the starting point for this present research where it was thought that repressors would appear similar to low-anxious individuals but that this was perhaps illusory. At a pre-attentive level, they might be vigilant to social threat but unaware that they were preconsciously avoiding recognising or acknowledging this threat. Though they appeared to be socially engaged, this was thought to be defensive and as Eysenck and Derakshan (1999) suggest they are ‘self deceivers.’ Literature finding little difference between the behaviour of repressors and low-anxious
individuals perhaps fails to recognise the importance of pre-attentive defensive structures. At a conscious level, socially-anxious individuals were well aware of social threat and their responses to it. At a pre-attentive level they perhaps experience as much social threat as repressors but become captured by their internal physiological response and at a conscious level become preoccupied with reducing these stressors.

This raises several important questions for the social anxiety literature. Is it the case that low-anxious individuals are as pre-attentively avoidant and defensive as repressors? While the low-anxious person may be as vigilant as the socially-anxious, do they differ from repressors in fundamental ways? Speculatively, perhaps low-anxious individuals may not be just ignoring social threat as suggested by Mogg and Bradley and Williams but rather pre-attentively aware but not overcome by it. The overarching question underlying this starting speculation was why do repressors and socially-anxious individuals differ from the low-anxious? Considering the literature at length gave few answers but did point to a degree of theoretical confusion, or perhaps theoretical difference, in how this question should be addressed.

In constructing the research agenda it was decided that the complexity of these questions dictated a series of tests that differentially addressed the attentional, memory and interpretive aspects of social threat. These tests would
encompass a spectrum of cognitive processes identifying key differences between these predispositions. Of all the questions that could be asked of this fascinating area it was decided that the immediate study would be an attentional study examining the preconscious versus conscious aspects of vigilance and avoidance of social stimuli.

First, a dot probe test was used with facial stimuli. This reaction time test examined attentional direction at both a preconscious and conscious level by asking where a socially-anxious, repressor, or low-anxious individual would directed their attention. This attentional study would give an initial and subsequent reaction time indication whether vigilant attendance or vigilant avoidance were initiated by these predispositions. This provided insight into what attracted or captured attention and whether this attention was discarded or maintained. Similar cognitive studies were used in the past to show where these attentional priorities lay.

The second test was also reaction time but examined stereotypical attitudes. Rather than attending to facial stimuli, word choices had to be made. Reaction time differences attending to these classes of words would indicate a participant’s preconscious preference, association, or implicit beliefs. This test was used to ‘get to’ their underlying motivations, to see whether they preconsciously prefer social or solitary activities. It was thought that this test
would discriminate between participants’ preconscious desire for these circumstances. For example, it was anticipated that repressors, despite their social demeanour, would implicitly prefer to be alone. This indication would have verified that they were social chameleons and ‘at heart’ wanted to avoid social situations.

The third test was a Remember and Know test. This test also examined the nature of memory in the context of ‘familiarity with’ rather than remembering autobiographical information. These two processes are said to be distinct, different and dissociated from one another and that they would give a clear indication of differences between implicit and explicit memory processes. It was hoped that this test would give insight into the nature of this thesis’ paradoxical hypotheses with familiarity and remembering being distinctly different for socially-anxious individuals and repressors. A further reason was that there is little evidence for threat in memory biases in social anxiety studies and if repressors would have been a memory-based phenomena then this test may show this difference. Some researchers would suggest that repression is more related to depression based on forgotten memory syndrome; however, repressors avoid negative memories and do not appear to dwell on self-focused, repetitive negative thinking styles (Ashley & Holtgraves, 2003; Myers, 1998).
The fourth and fifth tests were more of an interpretive nature and were aimed at examining the way socially-anxious individuals and repressors interpreted the valence and intensity of emotional facial stimuli. Furthermore what facial emotion they would attribute to faces that they had incorrectly identified. These tests were important to see whether repressors minimised negative faces and exemplified positive ones while socially-anxious individuals did the opposite. This interpretive bias is prevalent in these predispositions. Again this was based on the ‘paradoxical’ (different and opposite ways of cognitive processing) notion that socially-anxious individuals and repressors would interpret faces differently.

Taking the view that attention, memory and interpretation would give a good insight into the nature of these predispositions it was decided that these tests would be useful in teasing out differences of these predispositions. Each of these tests would provide insight into what was of importance and interest to each predisposition. It would tell whether their interest was amplified or attenuated with the progress of time, suggesting frontal lobe involvement. Moreover these tests would show differences in implicit preference for social or non-social environments. Further, they might show whether implicit and explicit memory was a factor predisposing the opposite behavioural reactions of these two predispositions - whether memory of particular faces might have been a factor that influenced social behaviour. Following from Freudian theories of
dissociation, would avoiding memorising of faces leave repressors free to engage in seemingly social behaviours atypical of those associated with anxiety. There is a lack of evidence in anxiety research concerning memory biases. Unlike depression, repression may be more anxiety-based than memory-based. Finally, interpretation at an explicit level should also hint at which way these predispositions interpret and attribute emotion in the social environment.

6.2 The Results Taken Together

The results of each of these studies has already been discussed within their chapters and much of the findings is in accord with the existing literature and not repeated here. Therefore, what do these studies reveal in aggregate?

Science proceeds by refining the evident and excluding the supposed. It may be said of this study that many of the hypothesised relations were not confirmed by the results. Therefore, it was not the case that the socially-anxious individuals were any more vigilant to social threat than the repressors at a pre-attentive level. Both predispositions’ attention was captured by emotional faces. Imagining a paradoxical relationship between the two is now unlikely. What did emerge clearly, shedding light on this unexpected finding, was that low-anxious individuals processed social stimuli far more quickly than either predisposition, whose attention was captured by social threat. Taken in aggregate the literature reviewed in the introduction suggests that low-anxious individuals are far
quicker pre-attentional processors of facial stimuli etc., as they have no reason to hesitate in assessing social information. It seemed as if the low-anxious individuals were able to assess and dismiss facial stimuli far more quickly, perhaps having not been disabled by previous adverse life experience. Fox et al. (2002) suggested similarly that engagement and disengagement from potentially threatening social stimuli was far harder for trait-anxious individuals. This was demonstrated in the present study where both predispositions dealt with their social anxiety with fine grained attention to the treat, although their subsequent strategic coping mechanisms differ. Further, the Dot Probe test demonstrated that they became even more vigilant to emotional faces as facial recognition increased (e.g., unmasked condition/500ms vs. 23ms exposed 67ms masked). As the face became more visible attention was captured more.

Repression is a far more primitive defence mechanism than conscious denial and it was hypothesised in this present study that they were more likely as a consequence to be ‘consciously naive’ to social threat as they were unaware of the extent of their problem. That repression involves dissociated ‘forgetting’ of the problem might lead to a hypothesis that repressors are less likely to preconsciously attend (avoid) social threat. They minimise it through their defensive adjustment and so spend less time dwelling on social information. This hypothesis was not supported, suggesting at a preconscious or implicit
level they are as well aware of threat as the socially-anxious individual. Taken together both preceding paragraphs suggest that repressors are as socially anxious as the formally socially-anxious individual.

These findings raise the interesting theoretical question as to why repressors differ from socially-anxious individuals in their explicit response to social threat if implicit processes are identical? Many suppositions might be advanced. However, the reviewed literature suggests that repressors are not socially anxious, as they are not socially avoidant. This may be the case but the present study demonstrates they are implicitly more attentive (vigilant) and by implication more socially threatened. It may be the case that both predispositions are socially anxious but repressors, in line with Freudian theorising, have other reasons for avoiding their anxiety. Instead they engage in social activity to mask their implicit anxiety, perhaps using the defence of reaction formation. Derakshan and Eysenck (1999) and Paulhus (2001) both have labelled repressors as self-deceivers and the results of this study bear this out.

One further question remains from this present study. Contrary to the literature there were no differences in the way both predispositions react at the explicit level on the various distinguishing tests (dot probe, implicit association test, remember and know test and interpretive test). While the literature
concentrates on explicit behavioural differences between the two predispositions, in this study the explicit is essentially a cognitive process. For example, the masked/unmasked 500ms condition gave participants sufficient time on the dot probe test to recognise and name facial stimuli but not to react behaviourally. Thus within the artificial confines of the experimental situation there is disjunction between their cognitive (attentional) responses and the very different behavioural reactions that distinguish the two groups socially.

Further support for this was obtained by reanalysing the data. In the light of the above the results for the dot probe test were analysed for just the reaction times. As might be expected from the results, in the masked condition the low-anxious individuals were faster making judgements than repressors. What was of more interest was analysing reaction times in the unmasked condition. This was done to examine any difference that might occur when the predispositions could make informed judgements (with more time). While the formulae of Study One assessed avoidance versus attention, this simpler measure assessed capture versus non-capture. It was found that low-anxious individuals were significantly faster to react to probes that replaced neutral faces in the explicit condition compared to repressors but not the socially-anxious individuals. However, in the congruent condition, where the probe replaced emotional faces there were no significant differences between the three predispositions. This suggests that attention to the emotional face was similar for all three
predispositions but that the repressors took much longer to avoid the capture by the emotional face when they had to move to the probe that replaced the neutral face. This is in line with theorising that suggests that repressors are anxious individuals who have a more primitive method of dealing with their social anxiety than the socially anxious.

6.3 The Social Anxious Perspective

What of social anxious reaction times? In the masked (implicit) condition there were no significant differences between low-anxious individuals and socially-anxious individuals except in response to sad faces. Two questions arise. Why are socially-anxious individuals responding similarly to low-anxious individuals when implicit stimuli are presented and why are they captured by sad faces only when incongruent stimuli are presented?

What emerges from the overall results is that repressors are far more threatened by their underlying anxiety condition than socially-anxious individuals. Put another way the socially-anxious individuals are using a more adaptive response to their social anxiety and perhaps this reduces the overall threat value and hence capture by the stimuli. Fox (1994) suggests that the repressive coping style is particularly efficient at inhibiting threat-related information. That is, they deal with social threat by inhibiting or avoiding threat related information. However, Fox also found that anxious patients do not seem
to be able to avoid processing this information. While this may be seen as a negative condition, it may also indicate a more adaptive response. Intuitively, it seems that acknowledging the source of one’s discomfort is a more positive reaction than dissociative forgetting, even when one’s coping strategy is simple avoidance.

Ioannou, Mogg, and Bradley (2003) in their review of this issue note both Fox’s findings and also Eysenck’s four factor theory of anxiety. What is of importance is that Eysenck identifies between the ‘true socially-anxious’ and the low socially-anxious, noting both are often confused given their similarity of reactions and that the former are poorly researched at present. Mogg et al. (2000) found some evidence that repressors are hyper-vigilant to social threat and repress relative to other predispositions but other studies (e.g., Brosschot, de Ruiter & Kindt, 1999) failed to find these differences. Ioannou et al. (2003) likewise found that repressors did not show the expected avoidance and suggest that increased state anxiety may produce increased avoidance. Other studies show a trend that sees distinct differences between repressors on the one hand and the socially-anxious, the high-defensive socially-anxious and low-anxious on the other. At present this issue is suggestive but not resolved.

Why then do the socially-anxious individuals react significantly slower to sad faces than the low-anxious individuals relative to neutral and angry faces
and only in the masked (implicit) and incongruent condition? When
congruence and incongruence issues were eliminated and the formulae applied
to assess relative attention/avoidance the same result was again quite evident. Is
this preferential attention to sad faces by the socially-anxious individuals a
significant finding? Is there something about sad faces than slows reaction times
relative to other stimuli? Further light comes from the final study, the
interpretive and attributional test. In this study participants were asked to
identify and rate facial emotions. Although the three dispositions show no
differences in their ratings, it was also hypothesised that any errors made by
these dispositions would differentially reflect their bias. That is, any errors
made by the socially-anxious individuals would maximise the negativity of the
facial stimuli – in effect changing sad faces to angry faces and repressors would
do the opposite, changing angry faces to happy or sad faces. This hypothesis
was not supported and the exact opposite was found. The socially-anxious
individuals reattributed angry faces as sad faces thus minimising negativity. The
repressors did the reverse. This ‘paradoxical’ relationship perhaps explains why
the socially-anxious individuals reacted slower to incongruent implicit sad
facial stimuli in the reaction time analysis. Part of the answer is that the
socially-anxious individuals swiftly recognise threat (angry face) and can move
from it. Misattributing angry faces allows speedy processing and threat
avoidance. Similar speculations/findings were reported by Mansell et al. (1999)
but this does not explain why the default is to sad rather than neutral stimuli.
The answer may lie with repressors' responses. When they make errors they see sad faces as angry ones. Given that repressors are significantly slower processors across all facial stimuli relative to low-anxious individuals, it might be said that repressors are working harder to deal with social threat. It is not too great a leap to see repressors as more damaged emotionally than the socially-anxious individuals. Clark and Wells (1995) among others suggest that the socially-anxious individuals have relatively high self-esteem but are afraid to show it. Thus they deal with whatever esteem issues they may have by selectively interpreting these facial stimuli. It is implicit in much of anxiety testing that face stimuli work because of the self-identification participants make with the stimuli. Perhaps the socially-anxious see themselves as sad rather than damaged relative to repressors? Therefore, sad stimuli are particularly germane to socially-anxious individuals and identification may be stronger and so capture in the incongruent condition more likely.

These results are further reinforced by the findings of the Implicit Association Test Study, which hypothesised, that at an implicit level both socially-anxious individuals and repressors would prefer solitary activities. This hypothesis was not supported and the results were in line with general findings that all three dispositions had a strong preference for social activities. This reinforces evolutionary and other explanations that stress the essential social
nature of our species. Given these results it is little wonder that both repressors and socially-anxious individuals would selectively reinterpret their bias in favour of outcomes which minimise social distance. The other results of the thesis did not support the hypotheses and as such were mainly useful in confirming the general direction of ongoing anxiety research (as discussed in the separate studies).

6.4 Concluding speculations

How might this thesis be summarised as a contribution to knowledge? First, it is clear the both repressors and the socially-anxious are highly anxious individuals. Second, both predispositions are working harder than the low-anxious to deal with social threat information. Third, repressors and the socially-anxious are, to some extent, captured by these threats at an implicit subliminal level.

These findings raise interesting speculations. The social anxiety literature is interested in issues of attention and avoidance. Whether these strategies are best understood as conscious attempts to avoid the pain of social embarrassment or as more autonomic implicit processes is moot. However, perhaps the real issue is intentionality. Even if a process is subliminal, it does not necessarily imply that it is not purposive. Depending on the perspective one takes of cognition, one changes from conscious to non-conscious intentionality when implicit
processes are investigated. These are not dualist issues of the mind versus the brain but rather the degree of conscious reflection on adaptive strategies. Put another way, the subliminal brain is as intentional as consciousness but in different ways. If this perspective is granted for sake of argument then the findings of this thesis become issues of intentionality versus capture and to what extent social threat stimuli take over and impose their own logic. It may well be that the significant finding of this thesis is that there is a substantial element of capture as part of the coping strategy of both predispositions and that this slows their responses relative to the low-anxious individuals. Whether this is so, is for future research to decide but raises interesting speculations.

If capture is a significant aspect of ‘attentional slowing’ then issues of avoidance may become issues of degree of capture rather than intentional removal from threatening stimulation. What was significant in this thesis is that there was very little evidence for avoidance. Was there evidence for capture?

### 6.4.1 Attentional Capture or Perceptual Avoidance?

Repressors demonstrated clear evidence of attentional capture by emotional faces when compared to low-anxious individuals both at an implicit and explicit level. For socially-anxious individuals this was only evident for implicit sad faces but there was also a near significant result (0.056ns) for explicit happy faces. It is as hard to explain these results as simple perceptual
avoidance as it is to say they only demonstrate complete capture. Clearly, both processes are at work. Otherwise how do we explain these results by suggesting that the repressor’s attention was captured by all emotional faces (implicit and explicit), whereas the socially-anxious individual’s attention was specific to implicit sad and explicit happy conditions. Why is this so?

Stroop studies have been an important measure in answering this question. However, researchers have begun to question whether the measured interference represents attentional ‘capture’ or avoidance of the threat stimuli. Stroop studies often provide ambiguous results and this raises questions about what processes anxious individuals are using. Is it possible that Stroop testing by itself is an inadequate way to detect attentional direction? De Ruiter and Brosschot (1994) propose that colour naming interference is generated by attentional avoidance rather than attentional capture of threat stimuli. However, they also argue that the task itself cannot specify the locus of interference because it is either encoding or response competition. Therefore, increased colour-naming latencies (interference) for negative stimuli should not necessarily be taken as an indication of biased attentional processes. For example, Amir, Klumpp, and Przeworski (2002) demonstrated that individuals who show significantly longer response times might have difficulty disengaging their attention (attentional capture) from socially threatening material.
Despite the fact that the Stroop task cleverly indicates the competitive nature of cognitive resource allocation, interpretation of the results are often not clear cut. It was for this reason that the present study used several additional methods to assess the nature of these attentional processes. Stroop involves competitive cognitive processing of a single stimulus within the locus of attention; dot probe requires considerably more decision-making, where orienting to threat cues in different locations tap different underlying cognitive mechanisms. As discussed by Williams, Mathews and MacLeod (1996) when Stroop effects are not found it is difficult to know whether the stimuli simply did not attract attention, or that individuals used other strategies to override the effects. While interference in Stroop is related to processing delays involved in considering the semantic nature of words, dot probe has the advantage of measuring reaction times to pictorial stimuli. In this present research dot probe data suggests that attentional capture causes this interference and is not so much vigilant attention, or vigilant avoidance, as was originally hypothesised. This capture effect was particularly noticeable for repressors who were significantly slower to respond to emotional and neutral faces compared to low-anxious individuals. This suggests that repressors have a greater investment in all faces both at an implicit and explicit level. Their need for approval and the extra effort required to manage social relations leads to an element of capture. While much of their response is attentional they are also captured by the triggering of potential threat and the necessity of managing more input that the
socially-anxious individuals. Therefore, the fundamental difference between repressors and socially-anxious individuals is that repressors have to become something else to manage their social anxiety while the socially-anxious individuals have to simply manage it. The socially-anxious individuals may have a fundamental impetus to avoid social stimuli making them more akin to low-anxious individuals - while low-anxious individuals engage and dismiss faces quickly, socially-anxious individuals just as quickly avoid them. This explains the lack of significant difference found in this present study. While their response times etcetera are similar, perhaps this is for differing reasons.

That the low-anxious individuals were ‘quickly processing’ while the socially-anxious individuals were ‘avoiding’ is also hinted at by the error analysis of the attributional studies where the socially-anxious individuals misattributed sad as angry faces – a strategy clearly aimed at minimising threat by avoidance. Bradley, Mogg, and Millar (2000) demonstrated that state anxiety and the type of negative face (sad versus angry) were strong predictors of attention. Avoidance of happy faces increased as anxiety increased. The pattern of bias for happy faces was opposite to that for negative faces because, as anxiety scores increased, the tendency to avoid happy faces increased. They suggest this provides clear evidence against the emotionality hypothesis - that anxious individuals selectively attend to emotional material in general,
irrespective of valence (but not repressors). Further discussion of this point is found in Fox et al. (2000).

There is clear evidence in the social anxiety literature that avoidance of emotional stimuli is a socially anxious trait. For example, socially-anxious rather than trait anxious individuals showed a significant avoidance of emotional faces under conditions of social evaluative threat (Mansell, Clark, Ehlers, & Chen, 1999) (see also Clark and Yuen, 1998). These studies appear to support the role of socially-anxious individuals emphasising self-focused attention and reduced processing of external cues, thus maintaining social anxiety (e.g., Clark & Wells, 1995; Hope et al., 1989). This might account for the present study’s non-significant results where threat faces were concerned.

Another view might be that socially-anxious individuals are particularly efficient in overriding social threat. For example, Amir et al. (1996) found that individuals with social phobia showed a reduction in Stroop interference by suppressing threat words. That is, responses were faster when they were anxious. They interpreted these results to suggest that individuals with social phobia are able to moderate their attention using strategic (effortful) suppressing of this interference (when anxious, patients may be able to ignore rather than be captured by the threat stimuli) (see also Chen, Lewin and Craske, 1996 - spider
Stroop suppression, and Mathews and Sebastian, 1993 - social phobia suppression).

It is difficult to decide if we are seeing avoidance and/or suppression since there is evidence to suggest that socially-anxious individuals avoid processing angry faces. In fact, they are faster to turn away from critical faces at an implicit level (500ms) but there are also studies that demonstrate socially-anxious individuals are significantly faster to attend to threat faces. When reviewing the literature in the light of this thesis’ data it seems most likely that attentional capture is predominant rather than vigilant pre-attention or attention.

Whichever speculation holds, this still leaves the significant findings for implicit sad faces and near significance for the happy faces to be explained. ‘Face in the crowd’ studies suggest that happy faces are as emotionally salient as angry faces when compared to neutral faces. Another reason for this significance is that socially-anxious individuals frequently misinterpret happy (laughing faces) as being derogatory. Veljaca and Rapee (1998) found that socially-anxious individuals detected negative faces in a crowd more easily in an audience situation (cf. Stopa and Clark, 2000). Gilboa-Schechtman, Foa, and Amir (1999) using a face in the crowd (pop out) task found that individuals with general social anxiety were quicker to detect angry rather than happy faces in a sea of neutral faces. Socially-anxious individuals had shorter reaction times for angry faces compared to happy faces. Hanson and Hanson (1988) also found
that an angry face in a happy crowd was found faster than a happy face in an angry crowd. They argued that threat faces ‘pop out of crowds’ is due to a pre-attentive, parallel search (cf. Hampton, et al., 1989). However, Bradley et al. (1999) found that anxious patients showed enhanced vigilance to happy faces at an explicit level. They suggested that happy faces might actually represent threat (mocking) to an anxious individual. Pishyar et al. (2004) found socially-anxious individuals vigilant to threat faces but tended to avoid happy faces (500ms) (cf. Bradley, et al., 1998 and Mogg, et al., 2004). This might account for the difference - capture at an implicit (sad) and explicit (happy) condition.

Mansell et al. (1999) interpreted similar results in the context of attention and avoidance rather than attentional capture. They found evidence of avoidance of emotional faces (both negative and positive at 500ms) in a non-clinical socially-anxious population under social-evaluative stress. In a study drawn from the same research pool Chen et al. (2002) found that patients with social phobia were avoidant of negative faces as well as positive and neutral faces, relative to household objects. Their notion that the socially-anxious individual might be avoidant of emotional faces was shown by their faster overall responses and not being captured by the emotional stimuli. This was similar for the low-anxious individuals in the present study however, this may be due to lack of emotional capture rather than a vigilant avoidance per se. In research that is more recent however Koster, Crombez, Verschuere, Van Damme, and Wiersema (article in press) report that high trait-anxious individuals strongly engaged their attention
and showed impaired disengagement from highly threatening pictures compared to low-anxious individuals. However they also found that high trait-anxious individuals showed a stronger tendency to attentional avoidance of threat at the 200 and 500 ms picture presentation. They suggest that this data is the first evidence for differential patterns of anxiety-related biases in attentive processing of threat at early versus later stages of information processing. Koster et al. (in press) suggest these findings are in line with a number of studies using the visual search task that have provided evidence for speeded threat detection and selective distraction by threat.

As a final speculative comment, it is important to return to another point already briefly mentioned in relation to attentional capture. There is considerable theoretical debate in the literature about what Stroop tests actually measure. Both Stroop and dot probe studies can be reinterpreted as attentional capture rather than vigilant attention, or vigilant avoidance. If this is the case then there is a fundamental theoretical shift. For example, Koster et al. (2003) and Fox, Russo, and Dutton (2002) challenge the utility of interpreting Stroop effects in terms of vigilance and avoidance, rather suggesting that ‘attentional capture’ is perhaps a better approach to take (see also Amir and Elias, 2002, Amir, Elias, Klumpp, and Przeworski, 2003, Fox, Russo, Bowles, and Dutton, 2001, and Yiend and Mathews, 2001). They suggest that attention involves differentiation, facilitation and inhibition of various spatial cues. The presentation of a face increases alertness and enhances the processing of these
cues making it more difficult to move from one location to another (see Posner, 1980). Whatever the case, all these researchers suggest that the mechanisms underlying this bias are not well delineated.

For example, Yiend and Mathews (2001) using threat and non-threat pictures found that anxious individuals have difficulty disengaging attention from threat-related information. They suggest “the main effect of threatening pictures was to delay attentional disengagement” (pp.674-675). Amir et al. (2002) using word stimuli found that individuals with social phobia have difficulty disengaging their attention from social threat words. As suggested previously this interference may also be prominent in Stroop studies. They concluded that this contrasts with the more usual suggestion that anxious individuals have an attentional bias toward threat rather than an inability to disengage from social stimuli. They suggest that:

“from a theoretical perspective, a tendency to detect sources of threat should be evolutionarily adaptive … therefore, it is unlikely that such a tendency would be disadvantageous for individuals with anxiety. Indeed the often-reported complaint heard from socially phobic patients is not that they tend to detect an extraordinary number of threat cues in their environment … but rather that they have difficulty dismissing such threat cues once they have been detected. Of course, effortful attempts at
dismissing threatening thoughts are far removed from the speeded detection of threat cues and one’s difficulty in disengagement attention from such cues. However, both tasks may be influenced by the same mechanisms (i.e., inhibitory difficulty)” (p. 1331).

6.5 Future Research Directions

Social anxiety and social defensiveness are areas not often compared since repressors and socially-anxious individual’s coping strategies appear paradoxical. These cognitive behavioural aspects are not well researched and it is important that this be approached from a variety of experimental perspectives (physiology, attentional, interpretive, memory, narrative etc.), not only as this relates to anxiety studies, but also as both predispositions are vulnerable to psychopathology and long-term ill health. That repressors are significantly more ‘disease prone’ compared to the general population suggests there is a lot of anxious energy not being recognised, or acknowledged, resulting in behavioural strategies that appear socially desirable but are really used to override or ignore their anxious state with resultant severe health consequences (Derakshan & Eysenck, 1999; Kraft, 1999; Paulhus, 2001; Weinberger, 1990). Repressors, on the other hand do not seem to experience conscious anxiety but suffer from a wide range of psychosomatic disease. The idea that defensive individuals are in fact highly socially anxious but who wear a positive social face, was supported in this thesis. Repressors’ attention was captured for all emotional faces when
compared to low-anxious individuals who were able to engage and dismiss facial stimuli without effortable avoidance or capture effects.

Notwithstanding this present thesis, there is still a broader question about the coping strategies of these individuals - the ‘paradoxical’ view of opposite and different, implicit and explicit, cognitive processes. While in this present study this hypothesis was not realised, it did demonstrate that both social anxiety and defensiveness are anxiety-based despite repressors reporting the opposite. Both predispositions’ public coping strategies were quite different. This theoretical speculation not only brings into focus current social and cognitive research but also questions many theoretical/historical perspectives on repression (e.g., forgotten memories and perceptual defence) (Westen, 1998). These broader questions then, invite researchers to re-evaluate their theories on social anxiety and defensiveness.

That this present research found that repressors were especially ‘glued’ to emotional faces when compared to low-anxious individuals, suggests that repressors are highly anxious individuals who have adapted to coping strategies that, by all accounts, mimic low anxious behaviours. The question then is ‘should socially defensive individuals be subsumed under the mantle of social anxiety?’ After all, social approval seeking may be at the heart of both repressors and socially-anxious individual’s behaviour, despite the fact that they
use different management strategies (Clark & Wells, 1995; Paulhus, 2001). Interestingly, researchers suggest that repressors do not actually know that they are using these extraverted behaviours to reduce their anxiety (Eysenck & Derakshan, 1997). This may be a double bind in that they further dissociate themselves from consciously examining or elaborating the nature of their anxious state (Williams, 1988). This question needs further research as it suggests that these different coping behaviours are automatic, conditioned, generalised and adaptive ways of managing their social environments. Consciously elaborating on the cause and consequences of their social perceptions is abandoned, rather, they utilise different ‘and opposite’ automatic short-term coping strategies that, in the long-term, do not work.

When considering these reactions from a ‘vigilant–avoidance’ perspective, socially-anxious individuals and repressors appear to have different behavioural strategies (Graf & Mandler, 1988; Bradley, Mogg, & Lee, 1997; Williams, 1988). This perspective suggests that automatic orientation to threat may be accompanied by subsequent avoidant action tendencies so that socially-anxious individuals might have their attention automatically captured by an emotional face but then avert their attention from such a cue in order to reduce their subjective discomfort (Mogg, Bradley, & Weinman, 1987; Mathews, 1990). Where the socially-anxious individuals may avoid elaborating on faces repressors appear to minimise negative aspects of the face
simultaneously distracting themselves to more pleasant socially desirable
behaviours. The ability to gauge the reality of social threat and the subsequent
automatic strategic behavioural responses, suggests that these two
predispositions are not in touch in elaborating and managing their environment.
Consequently, they are not able to modify the self-enhancing anxiety responses.
The question that arises from this is, ‘what challenges do repressors and
socially-anxious individuals need to undertake to reduce these self-limiting
processes, and what new learning has to occur for individuals to reduce their
perturbations?’ A further question follows, ‘why is it that phobias are
prominent in the social anxiety environment but there is minimal evidence when
it comes to social defensiveness?’ Moreover, from a Freudian perspective, it can
be argued that repressors are actually ‘dissociated’ from their internal awareness
of their anxiety, whilst socially-anxious individuals are very aware of their fear
of social scrutiny resulting in these phobic-type symptoms. These are broader
questions not necessarily related to intricate cognitive/attentional processing of
social functioning but none the less theoretically important.

A further question is related to the three models of trait anxiety where
defensiveness is included in Eysenck’s model but not explicitly included in
Mogg and Bradley’s or Williams’ models. In these latter models, it appears that
defensiveness is assumed as perceptual avoidance similar to the low-anxious
individuals. To revisit these models with this in mind might shed a different
perspective on the question of anxiety. One could ask the question - how does
defensiveness fit into the Mogg and Bradley (1998) model. Maybe the
‘quintessential avoidance’ bias of the low-anxious individual is greater for the
repressor who will continue to avoid [as with Williams’ et al. (1997) model
(i.e., to literally put one’s head in the sand/denial)]. Alternatively, it could be
speculated that the repressors’ goal related behaviours are actually ‘social
approval’ and therefore because of self-deception, they are not avoiding at all
but their ‘goal engagement’ task is continually focussed on social inclusion (to
speculate on graphical representation information see Mogg and Bradley, 1998,
p.819). The question in the present thesis suggested that low-anxious
individuals and repressors, despite their similar self-report and behaviours are
very different characters. This was borne out in this research and although it
was predicted that repressors would be more attentionally avoidant than low-
anxious individuals, they were significantly slower to react to the probe
replacing all emotional faces. It could be surmised that they were ‘mesmerised’
by the faces taking on average about 45ms longer to respond to emotional faces
in the Dot Probe test. Why were the repressors taking so much longer? Are they
overwhelmingly attached to emotional faces and use their behaviours as an
escape? These are broader questions for future research.

More specific questions arising from the present research arise from the
unsupported hypotheses that suggest there may be a paradoxical relationship
between implicit and explicit cognitive processes based on several theories. However, this was not found. In this present research the socially-anxious and repressors were compared and it was found that repressors were significantly slower than low-anxious individuals to react to emotional faces on the dot probe whereas socially-anxious individuals were not significantly different. However, the repressor’s attention appeared not to be avoidance as much as an inability to disengage. As stated previously, there was significant ‘attentional capture’ effect when compared to low-anxious individuals. It was obvious that repressors were significantly slower to remove their gaze from one face and shift their attention to another. There are several Stroop studies that show no interference in colour naming words for repressors, contradicting this notion of capture or ‘dwell time’ on this stimuli (Brosschot et al., 1999; Williams, Mathews, & MacLeod, 1996). However, some would argue there are different brain mechanisms at work when viewing words or faces. So the question as to whether repressors were implicitly using effort trying to ignore these faces, or that they were ‘glued’ to the facial expression needs to be examined in future research especially in the light of contradictory results of previous Stroop studies.

Further, perhaps that difference between the socially-anxious individuals and low-anxious individuals was that the low-anxious individuals processed faces very quickly without any interference whereas socially-
anxious individuals’ processing might have been based on avoidance rather than efficient processing. That is, socially-anxious individuals may have an implicit avoidance strategy to minimise processing facial stimuli whereas the low-anxious individuals simply process emotional faces without ‘conditions’. This could be considered an avoidance bias, however, when compared to socially-anxious individuals, it seems more a ‘don’t care’ flavour. This is difficult to assess as socially-anxious individuals (although not significant) still tended to be attracted to the emotional face however less so than repressors who were consistently significantly different to low-anxious individuals. This is an important question in social anxiety research as it counters the vigilant attention theory. Unlike the repressors who find it difficult to remove their gaze from emotional faces, perhaps the socially-anxious individuals venture to reduce focussing on emotional faces. These processes may show up as interference on the Stroop test but for different reasons. This is speculative but tapping these cognitive processes may increase insight into the attention and avoidance differences of these two predispositions. Furthermore, there is still considerable debate in the social anxiety literature between attentional vigilance and avoidance to social faces. Some researchers suggest that socially-anxious individuals’ attentional motive is to avoid facial stimuli even at an implicit level (Clark & Wells, 1995; Yeun, 1994 – cf. Asmundson and Stein, 1994, and Mogg and Bradley, 2002 for opposing research). When considering the complex attentional processes associated with social anxiety it may be that
these individuals avoid elaborating on recognising any positive social cues actually denying that these cues exist. Is this a similar process to the repressors except that they direct their attention to social involvement rather than directing their attention to their own physiology (Clark & Wells, 1995; Rapee & Heimberg, 1997)? These questions are important in the context of this present research and need further examination. Interestingly, for low-anxious individuals it is not until the threat becomes real that their attention is directed/attracted towards the stimuli. They may not necessarily be captured or avoidant of this threat but instead elaborate by firstly estimating the degree of danger and their own resources present to counter that threat. This process appears to be missing in the socially-anxious and defensive individuals.

In this research the ‘paradoxical’ hypotheses were not realised, however it was found that from a cognitive perspective, repressors and low-anxious individuals are different despite their similar positive self-report. They have very different attentional and interpretive styles, where low-anxious individuals process facial information quickly while the repressors appear to be captured by the emotional face - slowing information processing. Furthermore, other researchers suggest that repressors minimise negative affect and report less negatively about their own life experience (Derakshan & Eysenck, 1997; Myers & Brewin, 1995). Yet repressors, unlike socially-anxious individuals, are slower to process facial information. It could be that they are attracted to implicit
emotional faces because they are interested in getting social approval. These differences need to be reconciled since vigilant attention and/or avoidance is distinctly different to ‘capture’, ‘inability to disengage’ or ‘inhibition’ when it comes to examining cognitive processing using dot probe. These questions are also raised by Koster et al. (2003) and Fox et al. (2002) where new perspective are presented with regards to vigilant attention, vigilant avoidance and attentional capture. Therefore, rather than dot probe or Stroop, another way needs to be found to investigate these processes. There are some fundamentally different perspectives that need clarification and reconciled so further progress can be made in relation to these ‘interferences’. This is one reason that several different approaches were taken in this present research to investigate the nature of social anxiety and defensiveness.

Yet, another very important aspect of this present research was the manner of displaying faces in the Dot Probe test. Different faces (emotional and neutral) based on age and gender, were chosen and shown in each exposure rather than the same face with different expressions. This is an important difference from previous dot-probe research and it could be argued that this may have been a less rigorous way of discriminating differences between similar stimuli. However, in this present study, it was considered important that these faces were presented in a more naturalistic environment where, rather than the same faces with different emotional expressions, different faces with different
emotional expressions were used. The different face exposure in this present research may have elicited different responses where discrimination may not have been of facial emotions but in competition with the difference of the faces themselves. It could be argued that emotional expression with different faces may have heightened the discriminative/competitive aspect and made this test more sensitive for emotional expression. These differences should be considered in future research.

In summary, and in the light of this present study, future research should revisit the paradoxical question not only to discern the difference between social defensiveness and social anxiety but also within social anxiety literature itself. There is still debate as to vigilant direction (attention/avoidance) within this important area of research. Furthermore, the idea that low-anxious individuals are not avoiders but efficient processors (non-biased) of facial stimuli (as with Eysenck’s model) when compared to socially-anxious individuals and repressors, may further clarify the difference between being an avoider, or one that is preconsciously focussed on attaining their goals (social approval), or one that is simply focussed on an external task. What does the attentional capture of faces by repressors mean in this context? Do repressors inhibit their scanning of emotional faces in the service of seeking social approval? This seems unlikely considering their approval motive. Moreover, do socially-anxious individuals reduce processing emotional faces in the service of
self-preservation? Another interest for further research is the attributions of socially-anxious individuals (minimising) and repressors (maximising) threat faces. This could be an indication of an implicit interpretive bias that attributes emotionality to faces when these individuals are not sure how to interpret these faces. From this perspective it is important to reinvestigate positive (happy), negative (sad) and critical-negative (angry) faces.

The debate within social anxiety research literature as to pre-attentional and attentional biases is still unclear. Some researchers propose attentional vigilance towards social threat while others advocate attentional biases away from threat. The basic premise, however, is that the socially-anxious individuals’ fear is based on being evaluated negatively. With repressors, the anxiety appears to be based on being evaluated positively. With the inclusion of repressors as socially-anxious individuals, these differences will be made clearer because the behavioural repertoire of repressors is distinctly different to socially-anxious individuals. A major question is, are repressors in fact socially-anxious individuals who simply have different coping strategies when compared to the genuinely socially anxious? A further consideration is that repressors and low-anxious individuals have distinctly different motivations despite their similar sociable behaviours. As in Mogg and Bradley’s 1998 model, goal congruency of the low-anxious individuals may not be focussed on ‘social monitoring’ (as with repressors), but rather more task focussed. For this reason it is important to test a clinical population of socially-anxious individuals using
various tests that can delineate and clarify the nature of these processes.

Furthermore, that repressors and low-anxious individuals be clearly defined in anxiety and depression research.

As a final comment it is important that repressors are continually screened for and included in social anxiety research. Although many researchers would not see them as being socially anxious, both predispositions have their own psychopathologies with dire health consequences. Clinical procedures need to incorporate strategies that focus on defensive individuals as it is the nature of repressors to avoid notice until a severe medical conditions occurs. In the light of the present research the inclusion of repressors is important as they are as anxious, if not more so, than socially-anxious individuals.
ENDNOTES:

1 The idea of mixing Freudian metaphors with more current clinical descriptions of anxiety disorders may seem inappropriate (Erdelyi, 1985; Mogg et al., 2000) yet the term ‘Repressor’ is used in this thesis, not only because of its rich historical and research background but also because it carries with it notions of information processing based on trait anxiety, inaccessible memory and dissociative states (Westen, 1998). Freud summed up his concept of repression as turning something away and keeping it at a distance from the conscious (Freud, 1915, 57, p.147). In the early 1900’s he regarded repression as ‘motivated forgetting’ or an intentional failure to access information stored in memory; and eventually in the 1930’s denoted repression as a ”systematic avoidance of potentially threatening material in thought or social experience” (Singer & Sincoff, 1990, p.474). The word repressor will be used in this thesis to refer to low-anxious, highly defensive individuals.

2 The contention that attentional avoidance is based on anxiety (as with phobia) or dissociative (perceptual avoidance) avoidance of social threat is interesting. The notion that repressors distracts themselves to more pleasant stimuli before awareness suggests that it is a memory (amnesic/forgotten) process rather than an attentional-based process (Singer, 1990). Erdelyi (1990) proposed a perceptual defence system where perceptual defence, or inoculation against threat, may be a key component in the repressors’ style of responding to implicit threat. However, it is important to ask the question – why the physiological response if attention has not been drawn to the threat?

3 It is important to contrast trait-anxious and socially-anxious individuals as there is still debate as to which way socially-anxious individuals orientate when confronted by implicit social threat and where they direct their attention. Some commentators suggest that socially-anxious individuals have a pre-attentional bias towards, while others suggest a pre-attentional
bias away from threat (Asmundson & Stein, 1994; Clark, 1999; Mansell, Clark, Ehlers, & Chen, 1999; Mogg & Bradley, 2002; Rapee & Heimberg, 1997). This distinction will be reported on in Chapter Two.

According to Kreitler and Kreitler (1990) those scoring low on self-reported anxiety are not homogenous and should be divided into truly low-anxious (low anxiety, low defensiveness) and repressors (low anxiety, high defensiveness). They suggest that there is no doubt as to the psychological reality of these distinct groups.

Defence mechanism has been one of the most elusive concepts in psychology (Holmes, 1990). Holmes suggests, “the concept of repression has not been validated with experimental research” (p. 97). Its definition as an unconscious process removes it from direct observability, while its very functioning may distort the individual's ability to report on its consequences (Egloff & Hock, 1997). However, this position has changed considerably in recent years (Westen, 1998). There is now convincing evidence from cognitive and personality research that individuals with a repressive coping style have opposite attentional and interpretive biases for both external and internal sources of information (Eysenck, 1997). Myers and Brewin (1996) suggest that repressors avoid negative affect and have illusions of unrealistic optimism and overly positive self-evaluations and are frequently seen as over-optimistic and positive. However, Myers (2000) suggests they are less pessimistic than over-optimistic. Crowne (1979) gradually became convinced that repressors “not only present themselves as adjusted, self-controlled, responsible, self-content but think of themselves that way. When this image is threatened, they recoil in an avoidant retreat to protect it” (Crowne, 1979, p.173). Newton and Contrada (1992) concluded that the repressive coping style is a coping style that regulates emotional responses through self-appraisals involving socially evaluative standards. The notion that repressors react to socially evaluative conditions, rather than social demands, is proposed by Barger, Kircher, and Croyle (1997). According to Weinberger (1990) repressors fail to recognise their own affective
responses, they restrict negative self-concepts, and are likely to adopt a number of strategies to avoid conscious knowledge of their genuine reactions. “Repressors as a group seem actively engaged in keeping themselves, rather than other people, convinced that they are not proven to negative affect” (p.338). Baumeister and Cairns (1992) examined repressors self-deceptive strategies. Repressors in a private reading condition spent less time on negative material about themselves but spent significantly longer time reading negative information if they were aware others might peruse their negative profiles. Repressors avoid negative information in private but cannot ignore it in public.

There are speculations that the repressive coping style generally occurs as a consequence of unhappy and difficult childhood experiences (Myers & Brewin, 1994). Repressors also appeared to score high on paternal care but significantly lower on parental protection. Women also saw themselves as closer to their fathers (Myers, Brewin, and Winter, 1999). Repressors seem to cope with negative affect by distracting themselves with positive and pleasant thoughts (Boden & Baumeister, 1997; Myers, 1998). Ashley and Thomas (2003) suggest that repressors have an impoverished memory for negative recall of their emotional experiences and their automatic coping strategies are based more on implicit self-deceptive beliefs rather than trying to impress others (impression management). Eysenck and Derakshan (1999) used a polygraph with two electrodes measuring physiological arousal and presented these to the individual as a lie detector (a bogus experiment). Repressors lie but do not appear to want to acknowledge this despite claiming they are not out to deceive others. Jamner, Tursky, and Leigh (1986) found that repressors needed twice as much electrical stimulation than non-repressors to elicit judgements of discomfort and pain.

Eysenck (1997) reported that repressors with have an opposite interpretive bias when compared to trait-anxious individuals. Mogg et al. (1994) in an homophone task (berry/bury,
die/dye) using varying levels of trait/state anxiety and social desirability suggested that social approval was the most important variable determining the bias against threat spellings. Neither trait nor state influenced the interpretations of ambiguous information in this non-clinical sample. One explanation was that demand characteristics might be responsible. The notion of social desirability being a confounding effect in trait and state anxiety was posited. Mathews et al. (1989) suggested that the non-clinical population may have given these results. In contrast, Mogg, et al. (1994) found that trait anxiety initially was responsible for negative interpretive bias but as the task progressed social desirability affected these results. The notion that there is competitive processing between initial discrimination and interpretation of threat words, versus the later confounding by demand characteristics (social desirability, or the need to be seen as achieving) is important. Subjects with a high need for social approval may underreport their anxiety symptoms (Weinberger et al., 1979).

Generally, repressors report particularly positive and healthy personalities and coping styles. Despite their calm demeanour, studies show that they have physiological reactions that are equivalent to, if not greater than, high-anxious individuals (Abdul-Karim, 1999; Barger, Kircher, & Croyle, 1997; Eysenck, 2000; Gudjonsson, 1981; Newton & Contrada, 1992). This discrepancy between self-report and actual arousal according to Kneier and Temoshok (1984) may be a contributory to repressors’ poor health (also see Jensen, 1987, and Schwartz, 1983).

Anxiety is conceptualised from both trait and state perspectives. Trait anxiety is seen as an enduring personality characteristic that predisposes individuals to attend to stress situations in a predictable way. Trait-anxious individuals are prone to interpret situations in a dangerous or threatening manner and respond with elevations in intensity of the state anxiety. State anxiety has been defined as “apprehension, tension or uneasiness that stems from the anticipation of danger, which may be internal or external” (American Psychiatric Association, 1987, p.392) and
an “unpleasant emotional state or condition which is characterised by subjective intense apprehension and worry and by activation or arousal of the autonomic nervous system” (Spielberger, 1972, p.29). State anxiety is adaptive in ensuring readiness to use flight or fight mechanisms. Trait anxiety is a prominent contributor to clinical levels of anxiety (Eysenck, 1992; Williams et al., 1988). Eysenck (1992) regards anxious hypervigilance as a threat reaction and a component of cognitive vulnerability to anxiety. Attentional vigilance to threat is a vulnerability factor for anxiety disorders and is evident in those who have high trait anxiety.

The contention that attentional avoidance is based on anxiety (as with phobia) or dissociation (perceptual avoidance) of social threat is interesting. The notion that repressors distract themselves to more pleasant stimuli before conscious awareness suggests that it is a memory (amnesic/forgotten) process rather than an attentional one (Singer, 1990). Erdelyi (1974) proposed a perceptual defence system where perceptual defence or, inoculation against threat, may be a key component in the repressors’ style of responding to implicit threat. It is important to ask the question: ‘why the physiological response if attention has not been drawn to the threat?’

It is important to distinguish between trait-anxious and socially-anxious individuals as there is still debate as to which way socially-anxious individuals orient when confronted by implicit social threat and where they direct their attention. Some commentators suggest that socially-anxious individuals have a pre-attentional bias towards social threat while others suggest a pre-attentional bias away from threat (Asmundson & Stein, 1994; Clark, 1999; Mansell, Clark, Ehlers, & Chen, 1999; Mogg & Bradley, 2002; Rapee & Heimberg, 1997).

There is a significant relationship between defensiveness and disease. Repressors have been found to suffer from a wide range of psychosomatic and physical illnesses (see Myers,
Repression and denial is associated with neoplastic disease, namely cancer (Kraft, 1999). Boden, Hyland and Dale (2005) report that those high in defensiveness had significantly lower levels of symptom reporting when compared to neurotic individuals. The results suggest that defensiveness may act as a buffer against perceiving and reporting illness. Schwartz and Kline (1995) found that participants who minimised their feelings of anxiety reported more organic problems, whereas those that focused on them, reported more psychopathology. Mann and James (1998) found that defensiveness was significantly related to hypertension. Although repressors do not seem to experience anxiety consciously, they do appear to suffer from a wide range of psychosomatic illnesses (Bahnson & Bahnson, 1966; Kraft, 1999).

Anxiety about receiving approval from others may or may not be the same anxiety that socially-anxious individuals experience. Conn and Crowne (1964) suggest that repressors seek favourable evaluations from others in order to protect and enhance a vulnerable self-esteem. “In an attempt to gain affirmation and confirmation of worthiness as protection against alienation and social rejection, the approval seeking person seems to employ repressive defensiveness” (p.292) (see also Paulhus, 2001). Crowne and Marlowe (1964) labelled repressors as ‘approvals dependent’. They avoid situations that might lead to others’ disapproval rather than seeking approval. Repressors not only “present themselves as adjusted, self controlled, responsible and self-content but think of themselves that way - when this image is threatened they recoil in an avoidant retreat to protect that image” (Crowne & Marlowe, 1964, p.173).

Social anxiety is defined as a cognitive affective experience triggered by the perception of a possible evaluation by others (Schlenker & Leary, 1995). It is associated with unpleasant physiological arousal and fear of psychological harm (Leary & Kowalski, 1995). The definition of social anxiety focuses on feeling a state of arousal centred on interactions with others. A more extreme version of social anxiety is social phobia, which is defined in the fourth edition of
the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM-IV) as "a marked and persistent fear of one or more social or performance situations in which the person is exposed to unfamiliar people or possibly 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."


13 Williams et al. (1988) suggest a distinct link between anxiety, depression and memory processing. Williams et al. (1988) using Graf and Mandler’s (1984) distinction between integrative and elaborative information processes suggest there are two processes accounting for cognitive memory processing. The integrative (implicit) process was related to the automatic ease of access to memory, and elaborative (explicit) strategic process involved the association of the target memory to other information in memory (Mandler, 1980; Graf & Mandler, 1984). Elaborated memories have more associations with other information than do unelaborated memories and thus are easier to retrieve. These disparate findings cannot be easily reconciled by either Beck’s model (Beck, 1976; Beck, Emery, & Greenberg, 1986) or Bower’s (1981) theories which propose that both anxiety and depression are associated with mood-congruent biases in all aspects of processing including attention, encoding and retrieval. Subsequent anxiety and depression research have shown attentional and memory biases are significantly different in these two psychopathologies.

14 Often the label ‘predisposition’ rather than trait characteristics will be used in this study. Eysenck’s (1992) work was predominantly based on trait anxiety however, his later research was based more on the theory of emotion (Eysenck, 1997, p.55)
The suggestion that repressors have a perceptual avoidance or dissociative characteristic is still open to debate (Erdelyi, 1990; Shevrin, 1990). The notion of anxiety inoculation still needs to be explored.

Priming relates to the semantic priming paradigm using the lexical decision task or naming task - in which a prime and target occur in close temporal contiguity - is perhaps the dominant use of the term priming. Priming in implicit memory tests occurs over longer intervals (Roediger & McDermott, 1993).
REFERENCES


Heimberg, M. Liebowitz, D. A. Hope & F. Schneier (Eds.), Social Phobia:
Diagnosis, Assessment and Treatment (pp. 69 -93). New York: Guilford
Press.

Attention: Evaluation Using the Face Stimuli in a Dot-Probe Paradigm.
Unpublished manuscript.

Cloitre, M., Cancienne, J., Heimberg, R. G., Holt, C. S., & Liebowitz, M. R.


social phobia; a replication and extension. Behaviour Research and
Therapy, 43, 109-120.

arousal and defensive emulation. Journal of Personality, 32, 183-188.


M. Anderson, & C. MacLeod (Eds.), *Implicit and Explicit Mental Processes* (pp. 57-78). New Jersey: Erlbaum.


*Behaviour Research and Therapy, 28*, 455-468.


Myers, L. B. (2000). Deceiving others or deceiving themselves?
*Psychologist, 13*(8), 400-403.


Constructs in Psychological and Educational Measurement (pp. 49-69). NJ: Erlbaum.


SPPS. (2005) Statistical Package for the Social Sciences (ver 11.0) SPSS.


APPENDICES

Appendix A: Eysenck’s Personality Questionnaire (EPQ-R) Table.
Appendix B: Informed Consent Form.
Appendix C: Face Rating Form.
Appendix D: Example of Photos used in the Dot Probe Test.
Appendix E: Graphical representation of Face and Probe Positions and reaction times.
Appendix F: Graphical Representation of Vigilance to Emotional Faces.
Appendix G: Photos of 48 Faces used in the R and K Test.
Appendix A: EPQ-R Personality Characteristics

As an initial verification of previous literatures, Eysenck’s Personality Questionnaire (EPQ-R) is used to examine four main personality attributes of Low-anxious, Repressors, Socially-anxious and defensive high-anxious. The shortened 48-item version of the Eysenck Personality Questionnaire (Eysenck and Eysenck, 1964, 75) measures personality across four subsets: Extroversion, Introversion, Neuroticism (emotional stability – instability), Psychotism (not caring, solitary).

Table A1: Correlation of EPQ-R categories

<table>
<thead>
<tr>
<th></th>
<th>Neuroticism</th>
<th>Extraversion</th>
<th>Psychotism</th>
<th>Lie scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroticism</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>-0.31***</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychotism</td>
<td>-0.09</td>
<td>0.02</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Lie scale</td>
<td>-0.12*</td>
<td>0.06</td>
<td>-0.11*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*** = p < 0.001; ** = p < 0.01; * = p < 0.05. n = 321
Correlation is significant at the 0.05 level (2-tailed).
Correlation is significant at the 0.01 level (2-tailed).

Table A2: Means of EPQ-R for 4 Personality Types

<table>
<thead>
<tr>
<th></th>
<th>Low Anxious (n = 26)</th>
<th>Repessor (n = 28)</th>
<th>High Social Anxious (n = 23)</th>
<th>Defensive High Anxious (n = 16)</th>
<th>F (3,89)</th>
<th>Significance diff using EPQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroticism</td>
<td>2.81 (2.65)</td>
<td>2.25 (2.20)</td>
<td>9.57 (1.85)</td>
<td>8.56 (2.36)</td>
<td>63.41***</td>
<td>HSA &gt; (LA), (REP)</td>
</tr>
<tr>
<td>Extraversion</td>
<td>8.19 (3.51)</td>
<td>9.32 (3.08)</td>
<td>5.96 (3.82)</td>
<td>8.25 (3.47)</td>
<td>4.09**</td>
<td>REP &gt; (HSA)</td>
</tr>
<tr>
<td>Psychotism</td>
<td>2.85 (1.91)</td>
<td>2.68 (1.93)</td>
<td>2.13 (1.93)</td>
<td>1.94 (1.22)</td>
<td>1.83</td>
<td>NS</td>
</tr>
<tr>
<td>Lie scale</td>
<td>1.88 (1.68)</td>
<td>6.57 (2.47)</td>
<td>2.22 (1.95)</td>
<td>4.75 (2.08)</td>
<td>29.48***</td>
<td>REP &gt; (LA), (HSA), (DHA)</td>
</tr>
</tbody>
</table>

*** = p < 0.001; ** = p < 0.01; * = p < 0.05. SD in brackets.
Appendix B: Informed Consent Form

**QUESTIONNAIRE**

Informed Consent

This unit of research is worth 1.00 credit point for first year Psych students.

**Project Title: Attentional and Interpretive bias in Anxiety and Repression.**

Thank you for your participation.

The current study is a research project undertaken by Arch Tibben, School of Psychology, University of Western Sydney, Bankstown.

The nature of the study stems from the idea that some people have a tendency to worry about the future while others seem to be very positive and don't worry at all. The purpose of this survey is to find out what the general trend is, either facilitating or inhibiting worry.

What you need to do if you wish to participate, is to fill in the attached questionnaire, which takes about 30 - 45 minutes. It is purely voluntary. There are no penalties or adverse consequences for not participating, or withdrawing from the research. If you have any concerns about this, or wish further clarification, please ring Arch Tibben 9772 6405 or home 9543 6565.

You may however be invited to participate in a further study depending on the outcome of this study. All information on these sheets will be treated with confidentiality and data will not be disclosed unless the participant gives permission for this to happen.

**NAME..........................................................................................**

**PHONE NO.................. MOBILE..............................................................**

**STUDENT ID................................. TUTOR AND CLASS..................**

**CAMPUS........................................ DATE.........................................**

Please return completed survey as soon as possible to Arch Tibben.

Location: Bankstown, Building 24. (Psychology Building).

Ground Floor. (Floor 2). Next to Student Notice Board.

On return, Student Manual will be stamped, signed and Credit Point awarded.

My mob no. 0412 263 715. Email a.tibben@uws.edu.au

Best days to return: Monday, Wednesday or Friday between 10.00am and 12.00pm.

Final return date: Friday 4th of April 2003.

If you have any questions regarding this study you may contact the chief investigator:

Arch Tibben. School Of Psychology: Bankstown Campus, Building 24, Level 2, Room. 26.

NOTE: This study has been approved by the University of Western Sydney Human Research Ethics Committee. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Research Ethics Officers (tel: 02 4570 1136). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome. Approval No. He 01/071
Appendix C: Face Rating Forms

EMOTIONAL FACE RATING EXERCISE

Please RATE the emotional expression on the following faces. For example, if you feel that it is a HAPPY face please place a H on the scale.

- HAPPY FACES = H
- ANGRY FACES = A
- SAD FACES = S
- NEUTRAL FACES = N

Please rate the ‘intensity’ of the emotion that you see on the face by marking a letter on the on the scale For example, a mildly happy face rate would rate less that a “really” happy face.

Do your best

There are only 25 slides
Each slide will appear for 20 seconds.

Name……………………………..
Phone number………………………….
Student number.  ……………………….

HAPPY FACES = H  ANGRY FACES = A
NEUTRAL FACES = N  SAD FACES = S

12345

0 LEAST 1 2 3 4 5 MOST 6

* Although copyrighted all scales and images may be used
Appendix D: Photos In The Masked and Unmasked Dot Probe Test.
Appendix E: Emotion X Mask X Face X Probe Relationships

Probe and Face Interaction for Masked and Unmasked Emotional Faces

Fig A1: Probe and Face Interaction for Masked Angry Faces

LA: masked angry faces

REP: masked angry faces

HAS: mask angry faces

DHA: masked angry faces

TOTAL: masked angry faces
Fig A2: Probe and Face Interaction for Masked Happy Faces.

**LA: masked happy faces**

![Graph](image1)

**REP: masked happy faces**

![Graph](image2)

**HAS: masked happy faces**

![Graph](image3)

**DHA: masked happy faces**

![Graph](image4)

**TOTAL: masked happy faces**

![Graph](image5)
Fig A3: Probe and Face Interaction for Masked Sad Faces

LA: masked sad faces

REP: masked sad faces

HAS: masked sad faces

DHA: masked sad faces

TOTAL: masked sad faces
Fig A4: Probe and Face Interaction for Unmasked Angry Faces.

**LA: unmasked anger faces**

![Graph showing response times (RT in ms) for face left and face right under LA condition.](image)

**REP: unmasked anger faces**

![Graph showing response times (RT in ms) for face left and face right under REP condition.](image)

**HAS: unmasked anger faces**

![Graph showing response times (RT in ms) for face left and face right under HAS condition.](image)

**DHA: unmasked anger faces**

![Graph showing response times (RT in ms) for face left and face right under DHA condition.](image)

**TOTAL: unmasked anger faces**

![Graph showing response times (RT in ms) for face left and face right under TOTAL condition.](image)
Fig A5: Probe and Face Interaction for Unmasked Happy Faces.

LA: unmasked happy faces

REP: unmasked happy faces

HAS: unmasked happy faces

DHA: unmasked happy faces

TOTAL: unmasked happy faces
Fig A6: Probe and Face Interaction for Unmasked Sad Faces.

LA: unmasked sad faces

REP: unmasked sad faces

HAS: unmasked sad faces

DHA: unmasked sad faces

TOTAL: unmasked sad faces
Appendix F: Graphical Representation of Attentional Bias

Fig A7: Graphical Representation of Vigilance to Emotional Faces.

Attention to Masked Angry Faces

Attention to Unmasked Angry Faces

Attention to Masked Happy Faces

Attention to Unmasked Happy Faces

Attention to Masked Sad Faces

Attention to Unmasked Sad Faces

Time in ms (milliseconds)
The greater the time the greater the attention.
Appendix G: Photos used in the Remember and Know Test