

Cognitive Biases: Are They Present in Nonclinical  
Socially Anxious and Depressed Subjects

by

Derrick K. Larsen

A Thesis

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in Partial Fulfilment of the Requirements  
for the Degree of

Master of Arts

Department of Psychology  
University of Manitoba  
Winnipeg, Manitoba

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0623

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## Subject Categories

### THE HUMANITIES AND SOCIAL SCIENCES

#### COMMUNICATIONS AND THE ARTS

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### THE SCIENCES AND ENGINEERING

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General ..... 0306  
Anatomy ..... 0287  
Biostatistics ..... 0308  
Botany ..... 0309  
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Ecology ..... 0329  
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Limnology ..... 0793  
Microbiology ..... 0410  
Molecular ..... 0307  
Neuroscience ..... 0317  
Oceanography ..... 0416  
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#### Biophysics

General ..... 0786  
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#### EARTH SCIENCES

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Chemistry .....  
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Geotechnology ..... 0428  
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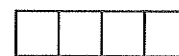
#### PSYCHOLOGY

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Nom \_\_\_\_\_

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## Catégories par sujets

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| Enseignement agricole .....                     | 0517 |
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| Asie, Australie et Océanie .....                                          | 0332 |
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#### SCIENCES BIOLOGIQUES

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| Alimentation et technologie<br>alimentaire ..... | 0359 |
| Culture .....                                    | 0479 |
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| Physiologie végétale .....                       | 0817 |
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| Anatomie .....                                   | 0287 |
| Biologie (Statistiques) .....                    | 0308 |
| Biologie moléculaire .....                       | 0307 |
| Botanique .....                                  | 0309 |
| Cellule .....                                    | 0379 |
| Écologie .....                                   | 0329 |
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| Génétique .....                                  | 0369 |
| Limnologie .....                                 | 0793 |
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| Physiologie .....                                | 0433 |
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| Minéralogie .....            | 0411 |
| Océanographie physique ..... | 0415 |
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| Paléozoologie .....          | 0985 |
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#### SCIENCES DE LA SANTÉ ET DE L'ENVIRONNEMENT

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| Sciences de l'environnement .....        | 0768 |
| Sciences de la santé                     |      |
| Généralités .....                        | 0566 |
| Administration des hôpitaux .....        | 0769 |
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| Chimiothérapie .....                     | 0992 |
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| Enseignement .....                       | 0350 |
| Immunologie .....                        | 0982 |
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| Obstétrique et gynécologie .....         | 0380 |
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| Pathologie .....                         | 0571 |
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| Pharmacologie .....                      | 0419 |
| Physiothérapie .....                     | 0382 |
| Radiologie .....                         | 0574 |
| Santé mentale .....                      | 0347 |
| Santé publique .....                     | 0573 |
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##### Sciences Pures

|                                          |      |
|------------------------------------------|------|
| Chimie                                   |      |
| Généralités .....                        | 0485 |
| Biochimie .....                          | 0487 |
| Chimie agricole .....                    | 0749 |
| Chimie analytique .....                  | 0486 |
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| Chimie nucléaire .....                   | 0738 |
| Chimie organique .....                   | 0490 |
| Chimie pharmaceutique .....              | 0491 |
| Physique .....                           | 0494 |
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| Mathématiques                            |      |
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| Fluides et plasma .....                  | 0759 |
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| Optique .....                            | 0752 |
| Particules (Physique<br>nucléaire) ..... | 0798 |
| Physique atomique .....                  | 0748 |
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| Physique nucléaire .....                 | 0610 |
| Radiation .....                          | 0756 |
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| Génie aérospatial .....                       | 0538 |
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| Génie électronique et<br>électrique .....     | 0544 |
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| Génie mécanique .....                         | 0548 |
| Génie nucléaire .....                         | 0552 |
| Ingénierie des systèmes .....                 | 0790 |
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#### PSYCHOLOGIE

|                                    |      |
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| Généralités .....                  | 0621 |
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| Psychobiologie .....               | 0349 |
| Psychologie clinique .....         | 0622 |
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| Psychologie du développement ..... | 0620 |
| Psychologie expérimentale .....    | 0623 |
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| Psychologie physiologique .....    | 0989 |
| Psychologie sociale .....          | 0451 |
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COGNITIVE BIASES: ARE THEY PRESENT IN NONCLINICAL  
SOCIALY ANXIOUS AND DEPRESSED SUBJECTS

BY

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MASTER OF ARTS

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## Abstract

Although previous research has shown that anxiety and depression each influence cognitive processes, it appears that different cognitive processes are affected by these two emotional states. Specifically, anxiety has been associated with attentional biases; whereas depression seems to exert its strongest influence on memory processes. The present study examined both attention and memory among university students identified as moderately depressed or socially anxious. Based on self-report scores, 16 subjects were selected into one of three groups: (1) moderately depressed; (2) moderately socially anxious and, (3) control (i.e., neither depressed nor socially anxious). Each subject then participated in a testing session that assessed "mood-congruent" attention and memory. Attention was assessed by measuring subject's response latencies to a computer-generated probe, which periodically appeared in the same visual space previously occupied by a socially anxious, depressed, or neutral-content adjective. Memory was assessed by the incidental recall of stimulus words presented in a self-referent task. The results showed that socially anxious, depressed and control subjects did not differ in their response latencies to computer probes, regardless of word content. Although the depressed group rated more depressed and socially anxious adjectives as self-referent, they did not differ from the socially anxious and control groups on their recall of these adjectives. The implications of these results and suggestions for future

research are discussed.

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Cognitive Biases: Are They Present in Nonclinical  
Socially Anxious and Depressed Subjects

One of the more influential theories in clinical psychology over the past twenty years has been the "cognitive" model, which hypothesizes that social-cognitive factors play a causal role in the onset of many psychological disorders. For instance, several investigators have suggested that cognitive factors are significant in the etiology of some psychopathological states, or that they are important in perpetuating or intensifying emotional distress once initiated (Smith & Greenberg, 1981; Ingram & Smith, 1984). Thus, many therapeutic treatments for emotionally distressed individuals are directed towards modifying some aspects of the subjects cognitive processes (e.g., Beck, Rush, Shaw, & Emery, 1979; Kendall & Hollon, 1979; Emery, Hollon, & Bedrosian, 1981).

Beck's Cognitive Theory of Depression and Anxiety

Beck's (1967, 1976, 1987) cognitive theory of depression and anxiety is built upon the concept that mental processes are organized around cognitive "schemas." According to Beck et al. (1979), schemas form the foundation for screening out, distinguishing, organizing and coding the various stimuli that face the individual. As an example, in any given circumstance a multitude of stimuli are present. When a person is faced with a particular situation, he or she will selectively attend to certain stimuli, blend them into a pattern, and form his or her own concept of the situation. Thus, different people may conceptualize the

same situation in different ways. Nevertheless, an individual's responses to similar events tends to be consistent and governed by decision rules that the individual has developed from experience. That is, the consistent responses are the result of stable cognitive patterns which are termed "cognitive schemas" (Beck et al., 1979).

Beck et al. (1979) have suggested that the schemas of anxious and depressed persons are biased. Specifically, depressed persons' schemas are characterized by a "cognitive triad;" they view themselves, their experiences, as well as their futures in a negative way. Furthermore, they demonstrate faulty information processing, such as overgeneralizing negative experiences, feeling personally responsible for negative events, and selectively abstracting negative details out of context. Anxious persons, on the other hand, are believed to falsely exaggerate the degree of threat related to particular situations and underrate their ability to cope (Beck & Emery, 1985). It has been suggested that these biased schemas are involved in the etiology and maintenance of both depression (Beck, 1976; Beck et al., 1979) and anxiety (Beck & Emery, 1979; Beck, Emery & Greenberg, 1985), respectively.

Beck (1967, 1976, 1987) has predicted that the maladaptive schemas of depressed and anxious people are likely to affect quite fundamental psychological processes of attention, information-processing and memory. In particular, Beck has predicted that the attention of anxious or depressed persons will be biased towards

material congruent with their particular affective state. For example, "an anxious patient will be hypersensitive to any aspects of a situation that are potentially harmful, but will not respond to its benign or positive aspects" (Beck & Emery, 1985, p.33). Moreover, maladaptive schemas not only bias one's attention towards mood-congruent material, but also facilitate the processing of that material. That is, mood-congruent material is encoded and stored more easily than incongruent material. Conversely, according to Markus (1977), information that does not conform with the preexisting schemas will be less easily attended to and processed. Beck (1967, 1976, 1987) has also predicted that the maladaptive schemas of depressed and anxious persons enhance the recall of mood-congruent material once it has been committed to memory. However, empirical results obtained thus far in attention and memory experiments are inconclusive.

#### Empirical Evidence for Beck's Cognitive Theory

##### Cognitive Processes in Anxiety

###### Attention

Attention in anxious subjects has been investigated using numerous paradigms, such as the dichotic listening paradigm and the modified Stroop colour-naming paradigm.

The premise behind the dichotic listening paradigm has been described by Foa and McNally (1986). They suggest that fear is an instinctive response to threat and that the fear generated by a particular threat may be assessed by the proportion of alertness an

organism allocates towards the threatening stimuli. Since a quick response is beneficial to survival, the faster a threatening stimulus is detected, the better the chances are that one can flee to safety. Therefore stimuli that are particularly threatening will be noticed more readily, whereas nonthreatening material may be ignored. According to Foa and McNally (1986), this makes the dichotic listening paradigm a sound methodology for studying attention. In this paradigm, subjects are concurrently presented with two prose passages, one in each ear. They are told to repeat aloud (shadow) a prose passage delivered to one ear, while ignoring a simultaneous passage presented in the other ear. They are also asked to detect certain target words embedded in each prose passage. Researchers usually find that subjects have no difficulty in detecting target words in the attended passage, but do have difficulty in detecting target words contained in the unattended passage. However, if the target words are in some way threatening to the subject, they tend to be detected more readily in the unattended channel relative to non-threatening material (Treisman & Geffen, 1967).

Studies using dichotic listening paradigms have consistently shown that anxious subjects process threatening and neutral cues differently. For instance, Bergess, Jones, Robertson, Radcliffe and Emerson (1981) found that agoraphobic and social phobic patients detected more fear-related words (i.e., fear words specific to their particular phobia) than neutral words in the

unattended channel. Similar results have been obtained in studies using generalized anxiety patients (Mathews & MacLeod, 1986) and obsessive compulsive patients (Foa & McNally, 1986). Therefore, results from dichotic listening studies have provided support for biased cognitive schemas in clinically anxious subjects, which operate at the level of selective attention.

As mentioned previously, the Stroop colour-naming paradigm is another method that has been used to investigate selective attention. In a typical colour-naming task, subjects are presented two separate lists of coloured words (one list containing threatening words and the other neutral words) and are asked to indicate aloud, as fast as possible, the colours of the words in each list. The basis for this approach is that if the content of the word is threatening or relevant to the subject's mood or emotional state, it will attract more attention than does the content of a neutral word and thus produce a greater interference in the subject's ability to name the colour of the words. In general, the results obtained in studies employing colour-naming paradigms with clinically diagnosed anxious subjects are similar to those found with dichotic listening paradigms: spider phobic (e.g., Watts, McKenna, Sharrock & Trezise, 1986), panic disorder (e.g., Ehlers, Margraf, Davies & Roth, 1988), socially anxious (Hope, Rapee, Heinberg & Danbeck, 1990), and generalized anxiety patients (e.g., Mogg, Mathews & Weinman, 1989; Mathews & MacLeod, 1985) were found to be slower at colour-naming lists of threatening

material relevant to their respective disorders than at colour-naming lists of nonthreatening material. Specifically, spider phobic patients were slower at colour-naming spider-related words, panic disorder patients were slower at naming physically threatening material, socially anxious patients were slower at color-naming socially threatening words, and subjects with generalized anxiety disorder were slower at colour-naming physically or socially threatening material.

It should be noted, however, that although results from the Stroop task have traditionally been interpreted in terms of attentional processes, there is a lack of consensus among researchers as to the actual mechanisms underlying the interference. Some investigators (e.g., Seymour, 1977) have suggested that interference effects in anxious patients may be the result of a response bias rather than attentive bias per se (e.g., Gotlib, MacLachlan & Katz, 1988; MacLeod, Mathews & Tata, 1986). Therefore, a visual attention task that clearly assessed attention bias was needed.

Navon and Margalit (1983) have suggested that paradigms which simultaneously present a primary threat-relevant task and a secondary neutral task allow determination of attention allocation to various stimuli. They suggested that if greater interference effects occur on the secondary task only when threat cues are present then attention biases towards threat cues are implicated. One such paradigm that assesses attention biases and incorporates

the aforementioned parameters has been created by MacLeod et al. (1986). In their study, clinically anxious and depressed subjects were asked to pay attention to a series of word pairs displayed on a computer screen (i.e., the primary threat-relevant task). One word would appear above the other and subjects were asked to read the top word out loud - thus, initially focusing the subject's attention on the top word. Visual attention was measured by recording reaction time to a computer generated probe that periodically appeared in the same visual space previously occupied by the upper or lower word (i.e., the secondary neutral task). The distribution of visual attention is therefore assessed by probe detection latency which, according to Navon and Margalit (1983), is a sensitive measure of visual attention allocation. MacLeod et al. (1986) hypothesized that words that are threatening or emotionally significant to the subject would attract the subject's attention. Therefore, when a threatening or emotionally significant word is in the top position, the subject's attention will remain focused on the top word. If the bottom word is threatening or emotionally significant to the subject, his or her attention will shift from the top to the bottom word. Therefore, subjects will respond quicker to probes that appear in the visual space previously occupied by threatening or emotionally significant words compared to non-threatening or emotionally insignificant words.

MacLeod et al. (1986) demonstrated that anxious patients responded quicker to probes that followed either physically or

socially threatening words, whereas depressed patients did not show any attentional biases. Similarly, Asmundson, Sandler, Wilson and Walker (1992) examined selective visual attention in panic disorder patients. They found that these patients responded more quickly to probes following physically threatening material than to probes following socially threatening or neutral material. In other words, the attention of the panickers had been directed towards physically threatening material.

In general, these findings suggest that anxious patients are attending more towards threatening material than to non-threatening material. Thus the evidence to date, at least with clinical subjects, is consistent across paradigms, and offers strong evidence that anxiety produces anxiety-relevant attentional biases.

#### Memory

In contrast, regardless of the methodology used to study memory processes in anxious subjects, the majority of the results have shown no recall biases. Although there have been a few positive findings, the results have been inconsistent. Nunn, Stevenson and Whalan (1984) found that, compared to control subjects, clinically diagnosed agoraphobics did in fact recall more phobic-relevant material that had been presented previously in either a prose passage or a word recall task. However, the results of that experiment could not be replicated by Pickles and van de Broek (1988). Similar results to those of Nunn et al. (1984) were found by Norton, Schaefer, Cox, Dorward and Wozney (1988). They

conducted a study of free recall for anxious material among nonclinical subjects with occasional panic attacks. These investigators reported that, compared to nonpanickers, the panickers tended to recall a larger proportion of anxious words at some point in the experiment, although the effect was not robust enough to achieve conventional levels of statistical significance.

In contrast, other researchers like Watts, Tresize and Sharrock (1986) found that non-clinical spider phobics actually had poorer recognition memory of phobic words compared to controls. Mogg, Mathews and Weinman (1987) have also found that clinically anxious patients had the poorest recall for threatening material in an incidental recall task. More recently, Mogg and Mathews (1990) tested generalized anxiety patients and control subjects on their ability to recall self- versus other-referenced adjectives that were either descriptive or nondescriptive of an anxious mood. They too failed to find any mood-congruent recall effects for anxious individuals. Overall, there seems to be no compelling empirical evidence for mood-congruent memory effects in either non-clinical or clinically anxious subjects.

### Cognitive Processes in Depression

#### Attention

Colour-naming and probe-detection paradigms have also been employed to measure attentional biases in depressed subjects. In general, however, the findings have been mixed, and seem to depend on the specific task used. For example, Gotlib and McCann (1984)

found that mildly depressed university students took longer to colour-name depressed- compared to manic- or neutral-content words, a finding that was later replicated with clinically depressed patients (Gotlib & Cane, 1987). Thus, according to these results, it would appear that the attention of depressed persons is indeed directed towards negative material in a manner comparable to that of anxious subjects. Nevertheless, these results have been criticized.

As noted earlier, Gotlib et al. (1988) suggested that the colour-naming paradigm may not be an appropriate methodology for investigating attention. These authors suggest that depressed subjects and normal subjects may attend equally to various stimuli, but differ in the way this information is dealt with at later stages of the information processing sequence. Specifically, they argued that interference effects in colour-naming words may be due to a delay in cognitive processes that occur long after one has already attended to the word, and not because of any attentional biases per se. Therefore, Gotlib et al. (1988) used a modified version of MacLeod et al.'s (1986) probe detection paradigm to investigate visual attention in mildly depressed and normal subjects. With this paradigm, it was observed that the depressed subjects did in fact attend equally to depressed-, manic- and neutral-content words. In a similar study, Hill and Dutton (1989) tested subclinically depressed subjects with MacLeod et al.'s (1986) procedure. They also found that the depressed group showed

no attentional biases towards depressive-content words. It appears, therefore, that when employing the computer probe-detection latency paradigm, depressed subjects do not show a specific attention biases for mood-congruent information, although they may differ from non-depressed subjects in the way in which that information is subsequently processed.

### Memory

Many methodologies have been used to investigate recall in depressed subjects and most have provided evidence for mood-congruent recall effects. In some of the earliest and most influential work addressing this topic, Derry and Kuiper (1981) tested recall for depressed and nondepressed adjectives among clinically depressed patients and nondepressed control subjects. The depressed subjects displayed enhanced recall for the depressed adjectives that were rated as self-referent. A similar study conducted by Bradley and Mathews (1983) again found that clinically depressed subjects recalled more negative compared with positive self-referent adjectives.

In subsequent work, Kuiper and Derry (1982) investigated the recall of depressed and nondepressed content adjectives with mildly depressed and normal subjects. In their first experiment, half the adjectives were rated for self-descriptiveness and the other half for semantic attribute; that is, subjects were asked to rate whether the words were related to a specific situation or meaning. After the rating task, subjects were given an incidental recall

task. Normal subjects showed enhanced recall of nondepressed self-referent adjectives, whereas depressed subjects recalled nondepressed and depressed content self-referent adjectives equally. In line with these findings, Kuiper and Derry (1982) suggest that mildly depressed subjects may show enhanced recall for both depressed and nondepressed self-referent adjectives. However, in a follow-up experiment, semantic ratings of the adjectives were replaced with an other-referent rating (i.e., does this word describe Pierre Trudeau?). Here, the mildly depressed subjects showed greater self-referent recall, relative to other-referent recall, for depressed content adjectives only. Kuiper and Derry (1982) then concluded that mildly depressed subjects only show mood-congruent recall effects when they are forced to distinguish whether the depressive content adjectives describe themselves or someone else.

Recently, Hill and Dutton (1989) measured subclinically depressed subject's recall biases by testing their ability to recall material previously presented in an attention task based on probe detection latencies. They found that depressed subjects recalled more depressed-content adjectives compared to normals, even though their probe-detection data showed no attention biases.

In summary, it appears that there is a sizeable body of research that links depressive mood states to recall biases for mood-congruent information. Nevertheless, it should be noted that some investigators have found no such mood-congruent recall

effects. For example, Dobson and Shaw (1987) indicated that depressed psychiatric subjects did not differ in their ability to recall depressed self-referent words compared to nondepressed subjects. Furthermore, Hasher, Rose, Zacks, Snaft and Doren (1985) found that mildly depressed college students' recall of stories in which the protagonist experienced good, bad and neutral events were no different from those of nondepressed subjects. Nevertheless, Beck and Clark (1988) conclude that the weight of evidence -- particularly from studies using self-referencing tasks -- have supplied adequate support for the existence of active negative schema in depressed subjects which may influence the manner in which information is stored and retrieved from memory.

#### Summary of Empirical Findings

In summary, there seems to be clear evidence that anxiety biases one's attention towards threatening words that are specific to the particular anxiety condition. However, there is no clear evidence for an anxiety-congruent bias in memory studies with anxious subjects. There is, on the other hand, evidence indicating that clinically and mildly depressed subjects do not show pronounced attention biases towards depressive material, but do show enhanced self-referent recall biases for depressed content material.

#### Purpose and Hypotheses

It appears that anxiety and depression seem to affect different cognitive processes. Specifically, anxious subjects show

attention biases, whereas depressed subjects show minimal evidence of attention biases, but do show recall biases. More importantly, these findings indicate that depressed and anxious subjects differ dramatically in the way they attend to and process mood-congruent material. Unfortunately, however, very little of the existing research has included direct comparisons of the cognitive processes of anxious and depressed subjects. When MacLeod et al. (1986) investigated attention biases in depressed and anxious subjects, they found different patterns of cognitive performance for individuals suffering from anxiety compared to those suffering from depression. The present study provided further elaboration of this issue by undertaking a direct comparison of both attentive behaviour and memory performance by anxious and depressed subjects. A modified version of MacLeod et al.'s (1986) method was used to assess selective attention. Mood-congruent recall was assessed by an incidental recall of the stimulus words presented in a self-referent task. It was hypothesized that socially anxious subjects would show attention biases towards socially anxious material and no recall bias in the self-referent task. Further, it was hypothesized that depressed subjects would show no attention bias but would show enhanced recall of depressed self-referent material.

#### Method

##### Subjects and Subject Selection

Forty-eight subjects (24 male and 24 female), ranging in age from 18 to 45 ( $M=21.2$ ) were selected to take part in the study.

They were drawn from an initial group of 615 undergraduate psychology students (from the subject pool of the University of Manitoba) who had been screened with a questionnaire battery that included the Social Phobia and Anxiety Inventory (SPAI; Turner, Beidel, Dancu & Stanley, 1989) and the Inventory to Diagnose Depression (IDD; Zimmerman, Coryell, Corenthal & Wilson, 1986; see appendix A). Each group (i.e., the depressed, socially anxious, and control group) comprised sixteen subjects (8 females and 8 males). There were only sixteen subjects who had volunteered to participate in the experiment and met the criteria for Major Depressive Disorder (MDD) on the IDD and scored below the mean for the SPAI. Similarly, there were only sixteen subjects who volunteered to participate in the experiment and scored at least .95 standard deviations above the mean on the SPAI and did not meet IDD criteria for MDD. The control group consisted of subjects who scored at least .95 standard deviations below the mean for SPAI and did not meet IDD's criteria for MDD. For the control group sixteen subjects were randomly chosen to participate out of a larger group of individuals. This categorization was established to ensure that each group was moderately homogeneous with respect to the nature of their primary emotional concern (i.e., socially anxious, depressed or neutral).

#### Apparatus and Materials

##### Questionnaires

The SPAI is a 45-item self-report scale devised to assess

social phobia which is divided into two subscales: a Social Phobia (SP) subscale, which assesses behavioural, cognitive and somatic manifestations of social phobia, and an Agoraphobia (Ag) subscale, which assesses fear in situations generally avoided by agoraphobics. The Ag subscale aids in separating social phobia from social anxiety that often accompanies agoraphobia. Turner et al. (1989) have indicated that the SPAI has a high test-retest reliability and good discriminative ability among patient groups. Additionally, it has been shown that the SPAI has good concurrent and external validity (Beidel, Turner, Stanley & Dancu, 1989).

The Inventory to Diagnose Depression (IDD) is a 22-item self-report scale designed to assess Major Depressive Disorder (MDD) according to DSM III criteria. The IDD has a high test-retest reliability and good internal consistency. Furthermore, diagnostic consensus between IDD and clinicians' diagnosis of MDD was as high as other studies investigating interrater reliability of diagnosing MDD based on structured or clinical interviews (Zimmerman et al., 1986).

#### Stimuli and Visual Probe

A list of 72 target adjectives were used as stimuli for both the attention task and the self-referent recall task. Each adjective was previously rated for its socially anxious and depressive content by three clinical psychologists at the University of Manitoba. These ratings were used to categorize the words as representing a primary content that was either socially

anxious, depressed or neutral. Thus, the list contained 24 socially anxious, 24 depressed, and 24 neutral content adjectives.

For the attentional task, 72 neutral-content words were added to the original list of 72 target adjectives. Each of the target adjectives, as well as each of the neutral content words was paired with a neutral-content word (see appendix B). Each pair of words was matched for word length and usage frequency using the American Heritage Word Frequency Book (1971). In total, then, there were 144 word pairs. Four lists consisting of the same 144 word pairs (but differing in their order of presentation) were used. This made it possible to counterbalance the ordering of the word pairs for all three groups.

Four differently ordered word lists, each consisting of the original 72 target adjectives mentioned above, were used as stimuli for the self-referent recall task (see appendix C).

#### Procedure

Initially subjects were mass screened for social anxiety and depression via questionnaire. General information about the study (i.e., what the questionnaire assessed, confidentiality, etc.) was presented on the cover page of the questionnaire (see appendix D). Subjects indicating a willingness to return for further experiments left their names and telephone numbers on the second page of the questionnaire (see appendix E). Subjects who met the criteria for the socially anxious, depressed or control groups, and who had indicated a willingness to return for further study, were contacted

by telephone and a laboratory appointment was made.

### Attention Task

Each subject was tested individually in the laboratory. All subjects were given the attention task first. They were instructed that word pairs would be displayed on the computer monitor and that one word would appear above the other in the centre of the screen (See appendix F for instructions). Each word pair was displayed for 750-ms and the top word was separated vertically from the bottom word by 3-cm. Subjects were instructed to read the top word out loud as soon as it appeared, thus focusing their attention to the visual space occupied by the top word. Subjects were told that when the word pairs disappear from the screen a dot probe (.) would occasionally appear in the visual space previously occupied by either the top or bottom word. When the dot probe did appear subjects were asked to press the space bar on the key board as quickly as possible. In fact, dot probes appeared 25-ms after display offset for all 72 target adjectives. The probe had an equal chance of appearing in the visual space previously occupied by the upper or lower word. For half of these target trials, the probe appeared in the space of the affectively relevant word, while for the other half it appeared in the position of the neutral word. For the remaining 144 trials no probe appeared. In this case a new word pair was displayed 1-s after the offset of the previous word pair.

Subjects were first given a practice trial before performing

in the experiment proper. The word pairs used in the practice trial consisted of numbers written out in full (e.g., nine, twenty; see appendix G).

#### Self-Referent Recall Task

After completion of the attention task, subjects were given the self-referent recall task. Here, each of the 72 target adjectives (i.e., the same 72 socially anxious, depressed and neutral content words given in the attention task) were presented individually on the computer screen. Subjects were asked to indicate, using a YES/NO format whether each word was self-referent (i.e., whether that word could accurately be used to describe him or her; see appendix H for instructions). Subjects were further asked to rate how well this word described him or her by responding on a five point scale (1 = not at all and 5 = extremely). Each word was displayed in the middle of the screen until the subject responded yes or no to the self-referent question. Then after the subject finished rating the word on the five point scale a .5 s prompt was given as a ready signal for the next word.

Upon completion of the self-referent task subjects were asked to start counting backwards, aloud, from 1000 by three's for two minutes (see appendix I for instructions). This served as a distracter task.

After the completion of the distracter task, subjects were instructed to try to recall as many words as possible that had been presented in the self-referencing task, and to write them down on

the paper provided (see appendix J for instructions).

### Analysis

#### SPAI Scores

A one-way analysis of variance (ANOVA) was used to analyze subjects' SPAI scores in order to ensure group differences.

#### Probe Detection Latencies

Probe-detection latency data were analyzed by a 3x3x2x2 mixed factor ANOVA, with repeated measures. The between-subjects variable was group classification (depressed vs socially anxious vs control) and the within-subject factors were adjective content (socially anxious vs depressive vs neutral), probe position (upper vs lower), and word position (upper vs lower).

#### Self-Referent Scores

Analysis for the self-referent task consisted of separate one-way analyses of variance (ANOVAS) for each dependent variable (i.e., number of adjectives rated as self-referent, average rating of self-referent adjectives on a five point scale, and proportion of self-referent adjectives recalled). For all analyses in the self-referent task, except the proportion of self-referent adjectives recalled, the between subject variable was group classification (socially anxious vs depressed vs control) and the within-subject variable was adjective content (socially anxious vs depressed vs neutral). The proportion of self-referent adjectives was analyzed by a 3x3x2 mixed factor ANOVA, with repeated measures. The between-subjects variable was group classification (depressed

vs socially anxious vs control) and the within-subject factors were adjective content (socially anxious vs depressive vs neutral) and self-referent rating (yes vs no).

## RESULTS

### Social Phobia and Anxiety Inventory Scores

Group means for the socially anxious, depressed and control subjects' scores on the SPAI are displayed in Table 1.

Table 1

Table of Means and ANOVA for Social Phobia and Anxiety Inventory (SPAI) by Group

| Mean SPAI Scores |           |          | F      | Prob.  |
|------------------|-----------|----------|--------|--------|
| Anxious          | Depressed | Controls |        |        |
| 91.8*            | 32.8*     | 18.7*    | 147.01 | <.0001 |

Note: \* post hoc (Tukey) significantly different,  $p < .05$

The ANOVA showed a main effect for group  $F(2,48)=147.01$ ,  $p<.0001$ . As anticipated, the socially anxious group scored significantly higher than the depressed and control group on the SPAI,  $p<.05$ , and the depressed group scored significantly higher than the control group on the SPAI,  $p<.05$ .

#### Probe Detection Latencies

Mean probe detection latency data are displayed in Table 2.

Table 2

Table of Means and Anovas for Reaction Times

| Variable         | Reaction Times (ms) | F     | p      |
|------------------|---------------------|-------|--------|
| Group            |                     |       |        |
| Socially Anxious | 437.5               | 1.58  | n.s.   |
| Depressed        | 408                 |       |        |
| Controls         | 413                 |       |        |
| Word Position    |                     |       |        |
| Upper            | 410                 | 19.16 | <.0001 |
| Lower            | 429                 |       |        |
| Probe Position   |                     |       |        |
| Upper            | 414                 | 15.72 | <.005  |
| Lower            | 426                 |       |        |
| Word Content     |                     |       |        |
| Socially Anxious | 415*                | 3.87  | <.05   |
| Depressed        | 420                 |       |        |
| Neutral          | 424*                |       |        |

Note: \* post hoc (Tukey) significantly different,  $p < .05$

The ANOVA of the probe detection latencies showed no main effect for group  $F(2,45)=1.58$ ,  $p>.10$ . However, there was a significant main effect for word position  $F(1,45)=19.16$ ,  $p<.0001$ . That is, regardless of probe position, probe detection latencies were shorter when the target adjective appeared in the upper position of the word pair (where the subjects had been instructed to attend) than in the lower position (410-ms vs 429-ms). There was also a main effect for probe position,  $F(1,45)=15.72$ ,  $p<.0003$ . That is, regardless of target word position, probe detection latencies were shorter when the probe appeared in the upper position of the display (where subjects had been instructed to attend) than in the lower position (414-ms vs 426-ms). In addition, there was a main effect for word content  $F(2,90)=3.87$ ,  $p=.0245$ . Further analysis of word content showed that probe detection latencies were significantly shorter when socially anxious content adjectives were displayed than when neutral content adjectives appeared (415-ms vs 424-ms),  $HSD=8.78$ ,  $p<.05$ . Depressed-content adjectives occupied an intermediate position, and were not significantly different than either of the other two categories. However, the interaction of group and word content was not significant,  $F(4,90)=2.12$ ,  $p>.10$ , nor were any other interactions,  $ps>.10$ .

### Self-Referent Encoding Task Scores

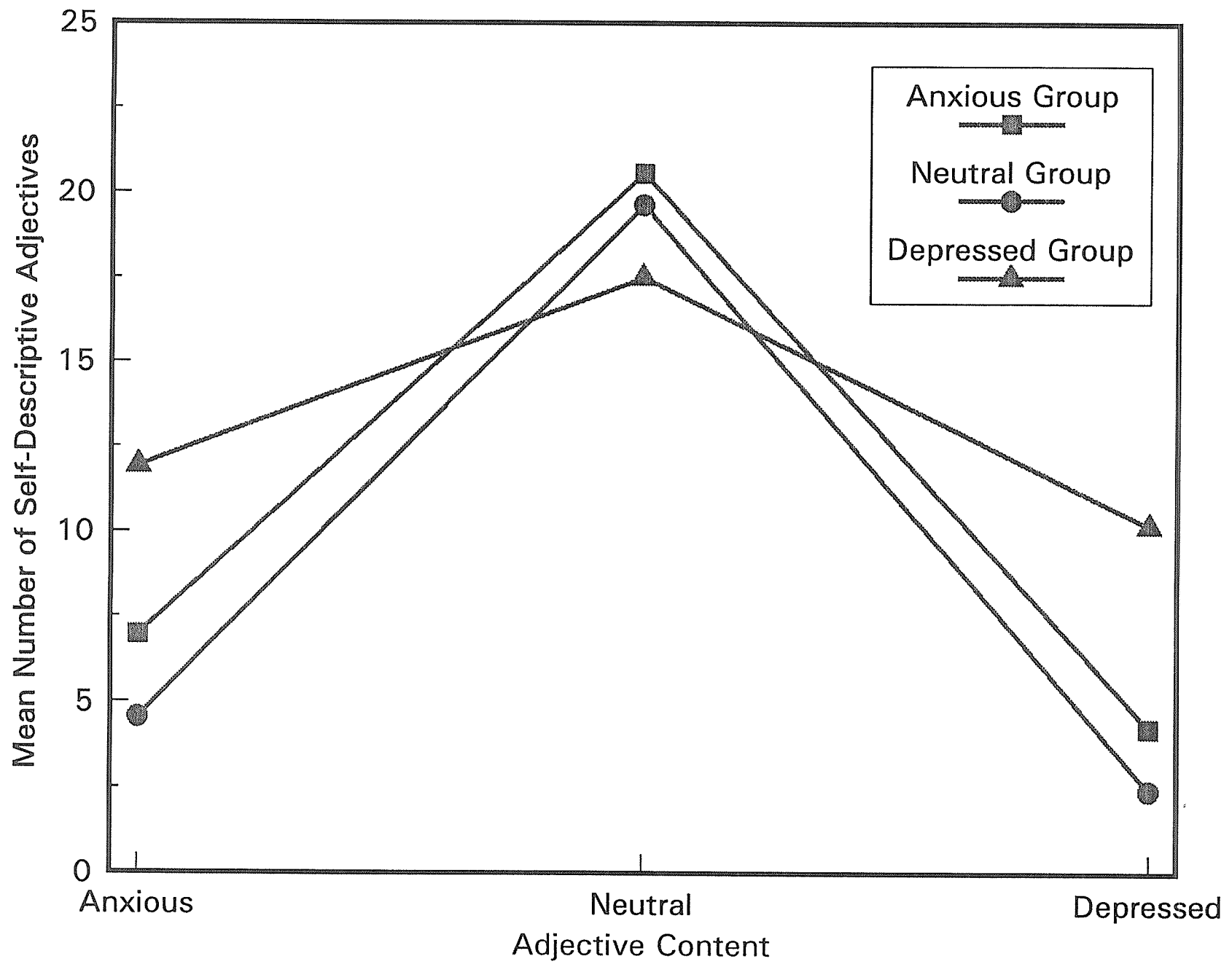
#### Self-Referencing Effects

The analyses for the self-referent recall task consisted of separate analyses of variance (ANOVA) for each dependent variable

(i.e., number of adjectives rated as self-referent, average rating of self-referent adjectives on a five point scale and, proportion of self-referent adjectives recalled). The ANOVA designs for the number of adjectives rated as self-referent, and average rating of self-referent adjectives on a five point scale were 3 (groups) x 3 (adjective content) split plot factorials.

#### Adjective Ratings

The analysis of the number of adjectives rated as self-referent revealed a main effect for adjective content,  $F(2,44)=162.45$ ,  $p<.0001$ , indicating that overall, neutral words were rated as most self-descriptive. An adjective content x group interaction was also found,  $F(4,88)=8.76$ ,  $p<.0001$ . The means for the main effect and interactions are shown in figure 1.



Tukey's Method of planned comparisons (Marascuilo & Serlin, 1988) showed that the depressed group rated significantly more depressed adjectives as self-referent than either the socially anxious or control groups. Similarly, the depressed group rated significantly more socially anxious adjectives as self-referent than either the anxious or control group. The socially anxious group also rated significantly more neutral adjectives as self-referent than the depressed group. Differences in the mean number of adjectives rated as self-referent were also analyzed within groups. These analyses revealed that the socially anxious, depressed and control groups all rated significantly more neutral words as self-referent than depressed or socially anxious content words.

#### Word Recall

Rogers, Kuiper and Kirker (1977) have indicated that most studies find that yes-rated words in a self-referent task are recalled better than no-rated words; therefore, the proportion of yes rated words recalled by each group (i.e., socially anxious, depressed or neutral groups) were calculated by dividing the total number of yes-rated adjectives in that word category (i.e., either socially anxious, depressed or neutral adjectives) by the number of yes-rated adjectives recalled in that word category. The proportion of no rated adjectives was calculated in the same manner. Mean proportions of adjusted recall data are displayed in Table 3.

Table 3

Table of Means for Adjusted Proportion of Adjectives Recalled

| Self-Referent Adjectives     |         |         |           |
|------------------------------|---------|---------|-----------|
| Group                        | Anxious | Neutral | Depressed |
| Socially Anxious             | .175    | .186    | .179      |
| Depressed                    | .169    | .155    | .172      |
| Controls                     | .129    | .172    | .231      |
| Non Self-Referent Adjectives |         |         |           |
| Group                        | Anxious | Neutral | Depressed |
| Socially Anxious             | .116    | .205    | .120      |
| Depressed                    | .255    | .199    | .168      |
| Controls                     | .217    | .277    | .146      |

The results of a 3x3x2 ANOVA (Group x Adjective Content x Yes or No Self-Referent Rating) showed no main effect for group  $F(2,45)=.67$ ,  $p<.5178$ ; adjective content  $F(2,90)=.77$ ,  $p<.4674$ ; or yes or no self-referent rating  $F(1,45)=1.20$ ,  $p<.2796$ .

### Discussion

Over the last several decades it has been hypothesized that social cognitive factors can precipitate the onset of a variety of psychological disorders. In addition, it is believed that these social cognitive factors can further perpetuate or intensify emotional distress once initiated.

One of the most influential theories describing the cognitive process in psychopathology is Beck's (1967, 1976, 1987) cognitive theory of anxiety and depression. Beck suggested that the cognitive schemas of anxious and depressed people are biased towards perceiving, processing, and remembering material that is congruent with their specific emotional state. However, the available empirical evidence only partially supports this view. Specifically, past research has shown that anxiety and depression do bias cognitive processes, but the picture is complicated by the apparent fact that different cognitive processes are influenced by these two emotional states. That is, anxiety has been associated with attention biases and depression with memory biases. Thus, the validity of the cognitive model as a general theory linking cognition and psychopathology may be limited, in

the sense that there seems to be a greater degree of specificity than originally proposed with regard to which emotions affect which cognitive processes. Unfortunately, there has been little research that has included direct comparisons of anxious and depressed subject's cognitive processes.

#### Attention Task

The current study employed MacLeod et al.'s (1986) probe detection latency paradigm to investigate visual attention biases in non-clinical socially anxious, depressed and control subjects. The results of the attention task for the mildly socially anxious group are unlike those reported by MacLeod et al. (1986), who found that clinically anxious patients responded quicker to visual probes following physically and socially threatening words compared to neutral words. The present results indicated that mildly socially anxious, depressed and neutral groups did not respond differentially to probes, regardless of the content of the target words. These results essentially fail to replicate those studies examining auditory attention (i.e., dichotic listening paradigms; e.g., Bergess, et al., 1981; Mathews & MacLeod, 1986; Foa & McNally, 1986) and visual attention (i.e., colour-naming paradigms; e.g., Watts, et al., 1986; Ehlers, et al., 1988; Hope, et al., 1990; and Mogg, et al., 1989), all of which have provided support for a biased cognitive schema in clinically anxious patients and mildly anxious subjects.

One explanation offered to account for this null result

(Hope et al., 1990) argues that attentional biases only occur in socially anxious subjects when their socially anxious schemas are activated. In the present study, it should be noted that the socially anxious group did not rate themselves as being very socially anxious during the actual experiment (i.e., during the self-referent task) and, in fact, the depressed subjects rated themselves as significantly more socially anxious than the socially anxious group. This may indicate that socially anxious schemas were not activated in the socially anxious subjects and therefore precluded their exhibiting an attentional bias towards socially anxious material.

Another possible explanation for these null results have been proposed by Mathews and Klug (1993). They indicated that Stroop interference effects found in anxious subjects can be attributed to how strongly words are semantically linked to the individual's current emotional concerns and not to the material's positive or negative valence nor it's emotional content alone. This proposed view can account for the failure of this study to find attention biases towards threatening material in non-clinically socially anxious subjects. That is, the current emotional concerns of socially anxious students may differ from those of a clinical sample. Therefore, the socially threatening words used in this study may match more closely to the current emotional concerns of a clinical sample and not to the emotional concerns of a non-clinically socially anxious group.

The depressed group, like those in MacLeod et al.'s (1986) study, showed no evidence of attention biases. Unlike the findings in Stroop-color naming paradigms (where depressed individuals do show attentional biases towards depressive content material), depressed individuals did not show any influence on their ability to detect probes when depressed content words were presented.

Although this non-significant finding was expected on the basis of previous results using this paradigm reported by Hill and Dutton (1989) and Gotlib et al. (1988), this general result is different than what has sometimes been found using the Stroop colour-naming task. It is therefore possible that the probe detection latency paradigm operates at the attentional stage of processing, whereas the Stroop paradigm operates at a different level of cognitive processing (Gotlib, et al., 1988; Navon & Margalit, 1983). Future investigations will need to compare directly depressed individuals' performances on the Stroop color-naming paradigm with their probe detection latency paradigm performances. If the same group of depressed individuals show interference effects on the Stroop task and none on the probe-detection latency paradigm, then it is probable that these two paradigms do indeed operate at different processing levels, thus explaining the divergent findings between the two paradigms.

#### Self-Referent Encoding Task

Most studies have found that depressed individuals rate more

depressed or negative content words as self-descriptive than do control subjects (e.g., Bradley & Mathews, 1983; Derry & Kuiper, 1981; Dobson & Shaw, 1987), a finding consistent with results obtained in this study. However, other indices provided by the self-referent recall task (i.e., proportion of self-referent adjectives recalled and average rating of adjectives on a five point scale) generally failed to find evidence that any of the groups exhibited recall biases consistent with their affective states. As reviewed earlier, studies have found that depressed subjects, at least, show enhanced recall of negative or depressed content words (e.g., Bradley & Mathews, 1983; Derry & Kuiper, 1981; Kuiper & Derry, 1982). It is important to note, however, that several other studies have not been able to provide confirming evidence (e.g., Dobson & Shaw, 1987; Hasher et al., 1985). The results obtained in the present study support the latter findings, and thus lend particular support to the conclusions of Dobson and Shaw (1987) who have argued that the incidental recall of trait adjectives may be an unsuitable measure of schema strength. Therefore, recall estimates for self-referencing may not have been sensitive enough to measure depressive self-schemas in this study. Future inquiries should focus on determining which indices of the self-referent encoding task are in fact valid measures of depressive schema strength.

Previous research by Pickles and van de Broek (1988), Watts et al., (1986), Mogg et al., (1987) and Mogg and Mathews (1990)

have overwhelmingly shown that anxious subjects do not possess a self-referent recall bias. The results of this study corroborated previous findings that anxious subjects do not show any recall biases for anxious content adjectives.

In summary, the present study was not able to find any support for the hypothesis that affective psychopathology would produce cognitive biases consistent with the specific quality of that pathology. Given the primarily non-significant nature of the present results, however, these conclusions should be accepted with some caution. It is important to note that although the depressed and socially anxious groups were not drawn from clinical populations they were not given structured clinical interviews and therefore, their true mental health state is undetermined. Indeed, it may be that the predictions drawn from the cognitive model apply only to clinical populations. For example, spider phobic (e.g., Watts, et al., 1986), panic disorder (e.g., Ehlers, et al., 1988), socially anxious (Hope, et al., 1990), and generalized anxiety patients (e.g., Mogg, et al., 1989) have all shown attention biases towards syndrome-specific threat words and clinically depressed patients have shown recall biases for mood-congruent self-referent information (e.g., Derry & Kuiper, 1981; Bradley & Mathews, 1983). Therefore, major issues that remain to be clarified by cognitive psychologists are the precise nature of differing psychopathological states on cognitive processing, and the relative contributions of clinical

parameters such as severity, chronicity, and degree of functional impairment.

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A self-report scale to diagnose major depressive disorder.

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## Appendix A

## INSTRUCTIONS

1. On this questionnaire are a group of 5 statements.
2. Read each group of statements carefully. Then pick out the one statement in each group which best describes the way you have been feeling this PAST WEEK. Circle the number next to the statement you picked.
3. For every group in which you circled #1, 2, 3 or 4 answer the follow-up question as to whether you have been feeling that way for more or less than 2 weeks. Circle either more or less.

- 1) 0 I do not feel sad or depressed.  
1 I occasionally feel sad or down.  
2 I feel sad most of the time, but can't snap out of it.  
3 I feel sad all of the time, and I can't snap out of it.  
4 I am so sad or unhappy that I can't stand it.

\*\*\*If you circled #1, 2, 3 or 4: Have you been feeling sad or down for more or less than 2 weeks? more less

- 2) 0 My energy level is normal.  
1 My energy level is occasionally a little lower than normal.  
2 I get tired more easily or have less energy than usual.  
3 I get tired from doing almost anything.  
4 I feel tired or exhausted almost all of the time.

\*\*\*If you circled #1, 2, 3 or 4: Has your energy level been lower than usual for more or less than 2 weeks? more less

- 3)0 I have not been feeling more restless or fidgety than usual.
- 1 I feel a little more restless or fidgety than usual.
  - 2 I have been very fidgety, and I have some difficulty sitting still in a chair.
  - 3 I have been extremely fidgety, and I have been pacing a little bit almost every day.
  - 4 I have been pacing more than an hour per day, and I can't sit still.

\*\*\*If you circled #1, 2, 3 or 4: Have you felt restless and fidgety for more or less than 2 weeks? More less

- 4)0 I have not been talking or moving more slowly than usual.
- 1 I am talking a little slower than usual.
  - 2 I am speaking slower than usual, and it takes me longer to respond to questions, but I can still carry on a normal conversation.
  - 3 Normal conversations are difficult because it is hard to start talking.
  - 4 I feel extremely slowed down physically, like I am stuck in mud

\*\*\*If you circled #1, 2, 3 or 4: Have you felt slowed down for more than or less than 2 weeks? more less

- 5)0 I have not lost interest in my usual activities.
- 1 I am a little less interested in 1 or 2 of my usual activities.
  - 2 I am less interested in several of my usual activities.
  - 3 I have lost most of my interest in almost all of my usual activities.
  - 4 I have lost all interest in all my usual activities.

\*\*\*If you circled #1, 2, 3 or 4: Has your interest in your usual activities been low for more or less than 2 weeks? more less

- 6)0 I get as much pleasure out of my usual activities as usual.
- 1 I get little less pleasure from 1 or 2 of my usual activities.
  - 2 I get less pleasure from several of my usual activities.
  - 3 I get almost no pleasure from most of the activities which I usually enjoy.
  - 4 I get no pleasure from any of the activities which I usually enjoy.

\*\*\* If you circled #1, 2, 3 or 4: Has your enjoyment in your usual activities been low for more or less than 2 weeks? more less

- 7)0 I have not noticed any recent change in my interest in sex.
- 1 I am only slightly less interested in sex than usual.
  - 2 There is a noticeable decrease in my interest in sex.
  - 3 I am much less interested in sex now.
  - 4 I have lost all interest in sex.

\*\*\* If you circled #1, 2, 3 or 4: Has your interest in sex been low for more or less than 2 weeks? more less

- 8)0 I have not been feeling guilty.
- 1 I occasionally feel a little guilty.
  - 2 I often feel guilty.
  - 3 I feel quite guilty most of the time.
  - 4 I feel extremely guilty most of the time.

\*\*\* If you circled #1, 2, 3 or 4: Have you had guilt feelings for more or less than 2 weeks? more less

- 9)0 I do not feel like a failure.
- 1 My opinion of myself is occasionally a little low.
  - 2 I feel I am inferior to most people.
  - 3 I feel like a failure.
  - 4 I feel I am a totally worthless person.

\*\*\* If you circled #1, 2, 3 or 4: Have you been down on yourself for more or less than 2 weeks? more less

- 10)0 I haven't had any thoughts of death or suicide.  
1 I occasionally think life is not worth living.  
2 I frequently think of dying in passive ways (such as going to sleep and not waking up), or that I'd be better off dead.  
3 I have frequent thoughts of killing myself, but I would not carry them out.  
4 I would kill myself if I had the chance.

\*\*\* If you circled #1, 2, 3 or 4: Have you been thinking about dying or killing yourself for more or less than 2 weeks? more less

- 11)0 I can concentrate as well as usual.  
1 My ability to concentrate is slightly worse than usual.  
2 My attention span is not as good as usual and I am having difficulty collecting my thoughts, but this hasn't caused any problems.  
3 My ability to read or hold a conversation is not as good as it usually is.  
4 I cannot read, watch TV, or have a conversation without great difficulty.

\*\*\* If you circled #1, 2, 3 or 4: Have you had problems concentrating for more or less than 2 weeks? more less

- 12)0 I make decisions as well as I usually do.  
1 Decision making is slightly more difficult than usual.  
2 It is harder and takes longer to make decisions, but I do make them.  
3 I am unable to make some decisions.  
4 I can't make any decisions at all.

\*\*\* If you circled #1, 2, 3 or 4: Have you had problems making decisions for more or less than 2 weeks? more less

- 13)0 My appetite is not less than normal.  
1 My appetite is slightly worse than usual.  
2 My appetite is clearly not as good as usual, but I still eat.  
3 My appetite is much worse now.  
4 I have no appetite at all, and I have to force myself to eat even a little.

\*\*\* If you circled #1, 2, 3 or 4: Has your appetite been decreased for more or less than 2 weeks? more less

- 14) 0 I haven't lost any weight.  
1 I've lost less than 5 pounds.  
2 I've lost between 5-10 pounds.  
3 I've lost between 11-25 pounds.  
4 I've lost more than 25 pounds.

If you circled #1, 2, 3 or 4: Have you been dieting and deliberately trying to lose weight? Y or N

\*\*\* If you circled #1, 2, 3 or 4: Have you been losing weight for more or less than 2 weeks? more less

- 15) 0 My appetite is not greater than normal.  
1 My appetite is slightly greater than usual.  
2 My appetite is clearly greater than usual.  
3 My appetite is much greater than usual.  
4 I feel hungry all the time.

\*\*\* If you circled #1, 2, 3 or 4: Has your appetite been increased for more or less than 2 weeks? more less

- 16) 0 I haven't gained any weight.  
1 I've gained less than 5 pounds.  
2 I've gained between 5-10 pounds.  
3 I've gained between 11-25 pounds.  
4 I've gained more than 25 pounds.

\*\*\* If you circled #1, 2, 3 or 4: Have you been gaining weight for more or less than 2 weeks? more less

- 17) 0 I am not sleeping less than normal.  
1 I occasionally have slight difficulty sleeping.  
2 I clearly don't sleep as well as usual.  
3 I sleep about half my normal amount of time.  
4 I sleep less than 2 hours per night.

If you circled #1, 2, 3 or 4: Which of these sleep problems have you experienced? (circle all which apply)

- 1 I have difficulty falling asleep  
2 My sleep is fitful and restless in the middle of the night  
3 I wake up earlier than usual and cannot fall back to sleep

\*\*\* If you circled #1, 2, 3 or 4: Have you been having sleep problems for more or less than 2 weeks? more less

- 18)0 I am not sleeping more than normal.  
1 I occasionally sleep more than usual.  
2 I frequently sleep at least 1 hour more than usual.  
3 I frequently sleep at least 2 hours more than usual.  
4 I frequently sleep at least 3 hours more than usual.

\*\*\* If you circled #1, 2, 3 or 4: Have you been sleeping extra for more or less than 2 weeks? more less

- 19)0 I do not feel anxious, nervous or tense.  
1 I occasionally feel a little anxious.  
2 I often feel anxious.  
3 I feel very anxious most of the time.  
4 I feel terrified and near panic.

\*\*\* If you circled #1, 2, 3 or 4: Have you been feeling anxious, nervous or tense for more or less than 2 weeks? more less

- 20)0 I do not feel discouraged about the future.  
1 I occasionally feel a little discouraged about the future.  
2 I often feel discouraged by the future.  
3 I feel very discouraged about the future most of the time.  
4 I feel that the future is hopeless and that things will never improve.

\*\*\* If you circled #1, 2, 3 or 4: Have you been feeling discouraged for more or less than 2 weeks? more less

- 21)0 I do not feel irritated or annoyed.  
1 I occasionally get a little more irritated than usual.  
2 I get irritated and annoyed by things that usually don't bother me.  
3 I feel irritated or annoyed almost all of the time.  
4 I feel so depressed that I don't get irritated at all by things that used to bother me.

\*\*\* If you circled #1, 2, 3 or 4: Have you been feeling more irritable than usual for more or less than 2 weeks? more less

- 22) 0 I am not worried about my physical health.  
1 I am occasionally concerned about bodily aches and pains.  
2 I am worried about my physical health.  
3 I am very worried about my physical health.  
4 I am so worried about my physical health that I cannot think about anything else.

\*\*\* If you circled #1, 2, 3 or 4: Have you been worried about your physical health for more or less than 2 weeks? more less

## INSTRUCTIONS

Below is a list of behaviours that may or may not be relevant for you. Based on your personal experiences, please indicate how frequently you experience these feelings and thoughts in social situations. A social situation is defined as a gathering of two or more people. For example: A meeting; a lecture; a party; bar or restaurant; conversing with one other person or group of people, etc. FEELING ANXIOUS IS A MEASURE OF HOW TENSE, NERVOUS OR UNCOMFORTABLE YOU ARE DURING SOCIAL ENCOUNTERS. Please use the scale listed below and circle the number which best reflects how frequently you experience these responses.

---

|       |            |            |           |          |          |        |  |
|-------|------------|------------|-----------|----------|----------|--------|--|
|       | Very       |            |           |          |          | Very   |  |
| Never | Infrequent | Infrequent | Sometimes | Frequent | Frequent | Always |  |
| 1     | 2          | 3          | 4         | 5        | 6        | 7      |  |

---

1) I feel anxious when entering social situations when there is a small group ..... 1 2 3 4 5 6 7

2) I feel anxious when entering social situations when there is a large group ..... 1 2 3 4 5 6 7

3) I feel anxious when I am in a social situation and become the centre of attention ..... 1 2 3 4 5 6 7

4) I feel anxious when I am in a social situation and I am expected to engage in some activity ..... 1 2 3 4 5 6 7

5) I feel anxious when making a speech in front of an audience ..... 1 2 3 4 5 6 7

6) I feel anxious when speaking in a small informal meeting ...  
..... 1 2 3 4 5 6 7

7) I feel so anxious about attending social gatherings that I avoid these situations ..... 1 2 3 4 5 6 7

8) I feel so anxious in social gatherings that I leave the social gathering ..... 1 2 3 4 5 6 7

9) I feel anxious when in a small gathering with:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

10) I feel anxious when in a large gathering with:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

11) I feel anxious when in a bar or restaurant with:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

12) I feel anxious and do not know what to do when in a new situation with:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

13) I feel anxious and do not know what to do when in a situation involving a confrontation with:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

14) I feel anxious and do not know what to do when in an embarrassing situation with:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

15) I feel anxious when discussing intimate feelings with:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

16) I feel anxious when stating an opinion to:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

17) I feel anxious when talking business with:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

18) I feel anxious when approaching and/or initiating a conversation with:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

19) I feel anxious when having to interact for longer than a few minutes with:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

20) I feel anxious when drinking (any type of beverage) and/or eating in front of:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

21) I feel anxious when writing or typing in front of:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

22) I feel anxious when speaking in front of:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

23) I feel anxious when being criticized or rejected by:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

24) I attempt to avoid social situations where there are:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

25) I leave social situations where there are:

|                         |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|
| strangers .....         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| authority figures ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| opposite sex .....      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| people in general ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

26) BEFORE ENTERING a social situation I think about all the things that can go wrong. These types of thoughts I experience are:

Will I be dressed properly? ..... 1 2 3 4 5 6 7

I will probably make a mistake and look foolish .....  
..... 1 2 3 4 5 6 7

What will I do if no one speaks to me?  
..... 1 2 3 4 5 6 7

If there is a lag in the conversation what can I talk about?  
..... 1 2 3 4 5 6 7

People will notice how anxious I am .. 1 2 3 4 5 6 7

27) I feel anxious before entering a social situation .....  
..... 1 2 3 4 5 6 7

28) My voice leaves me or changes when I am talking in a social situation ..... 1 2 3 4 5 6 7

29) I am not likely to speak to people until they speak to me  
..... 1 2 3 4 5 6 7

30) I experience troublesome thoughts when I am in a social setting.  
For example:

I wish I could leave and avoid the whole situation .....  
..... 1 2 3 4 5 6 7

If I mess up again I will really lose my confidence .....  
..... 1 2 3 4 5 6 7

What kind of impression am I making? . 1 2 3 4 5 6 7

What ever I say it will probably sound stupid .....  
..... 1 2 3 4 5 6 7

31) I experience the following prior to entering a social situation:

sweating ..... 1 2 3 4 5 6 7  
frequent urge to urinate ..... 1 2 3 4 5 6 7  
heart palpitations ..... 1 2 3 4 5 6 7

32) I experience the following in social situations:

|                                |   |   |   |   |   |   |   |
|--------------------------------|---|---|---|---|---|---|---|
| sweating .....                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| blushing .....                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| shaking .....                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| frequent urge to urinate ..... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| heart palpitations .....       | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

33) I feel anxious when home alone .... 1 2 3 4 5 6 7

34) I feel anxious when I am in a strange place .....  
..... 1 2 3 4 5 6 7

35) I feel anxious when I am on any form of public transport (i.e., bus, train, airplane) ..... 1 2 3 4 5 6 7

36) I feel anxious when crossing streets ..... 1 2 3 4 5 6 7

37) I feel anxious when I am in crowded public places (i.e., stores, church, movies, restaurants, etc.) ... 1 2 3 4 5 6 7

38) Being in large open spaces makes me feel anxious .....  
..... 1 2 3 4 5 6 7

39) I feel anxious when I am in enclosed places (i.e., elevators, tunnels, etc.) ..... 1 2 3 4 5 6 7

40) Being in high places makes me feel anxious .....  
..... 1 2 3 4 5 6 7

41) I feel anxious when waiting in a long line .....  
..... 1 2 3 4 5 6 7

42) There are times when I feel like I have to hold on to things because I am afraid I will fall ..... 1 2 3 4 5 6 7

43) When I leave home and go to various public places, I go with a family member or friend ..... 1 2 3 4 5 6 7

44) I feel anxious when riding in a car .... 1 2 3 4 5 6 7

45) There are certain places I do not go to because I may feel trapped ..... 1 2 3 4 5 6 7

## Appendix B

## List of Stimuli for Attention Task

Depressed Neutral

|            |            |             |             |
|------------|------------|-------------|-------------|
| DEPRESSED  | ONLOOKERS  | SAD         | BAR         |
| DEJECTED   | THERMALS   | UNHAPPY     | PACKAGE     |
| GLUM       | AURA       | DOWN        | OVER        |
| GLOOMY     | EIGHTS     | GRIM        | DUSK        |
| CHEERLESS  | GLASSWARE  | HOPELESS    | PAVEMENT    |
| DESOLATE   | SQUATTED   | BLEAK       | MUCUS       |
| MISERABLE  | REACTIONS  | TEARFUL     | MALLARD     |
| SORROWFUL  | BEGINNERS  | DISMAL      | PATIOS      |
| MELANCHOLY | PENINSULAS | PESSIMISTIC | SEARCHLIGHT |
| WORTHLESS  | COSMETICS  | DRAINED     | FITTINGS    |
| HELPLESS   | OPERATORS  | USELESS     | FLOATED     |
| DOWNCAST   | CHEAPEST   | PITIFUL     | HUSKIES     |

Anxious Neutral

|             |             |            |            |
|-------------|-------------|------------|------------|
| RIDICULED   | PERFECTED   | HUMILIATED | MINIATURES |
| EMBARRASSED | DISTINCTION | SHAME      | GATES      |
| TENSE       | DIGIT       | NERVOUS    | CHARGED    |
| ANXIOUS     | NEEDLES     | WORRIED    | TIGHTLY    |
| DISTRESSED  | FINGERNAIL  | FEARFUL    | LEANING    |
| JUMPY       | MUSED       | JITTERY    | HURLERS    |
| UPTIGHT     | CESSION     | MORTIFIED  | HORSEHIDE  |
| ASHAMED     | EASIEST     | DESPISED   | HEADWORD   |
| SCORNE      | NODULES     | SHAMEFUL   | MITIGATE   |
| PANICKY     | FIELDED     | SCARED     | ACTUAL     |
| AFRAID      | BOUGHT      | FRIGHTENED | ACTIVITIES |
| TERRIFIED   | COASTLINE   | PETRIFIED  | MOUSTACHE  |

Neutral Neutral

|             |             |             |             |
|-------------|-------------|-------------|-------------|
| AVERAGE     | SCHOOLS     | MILD        | CHINS       |
| NORMAL      | TABLES      | FRIENDLY    | BASEBALL    |
| STUDIOUS    | NOMINALS    | QUIET       | TEETH       |
| HONORABLE   | ANTITOXIN   | GENTLE      | DIFFER      |
| EVEN        | SUCH        | SENSIBLE    | FOUNTAIN    |
| MEDIUM      | MOUTHS      | FAIR        | ONTO        |
| ALERT       | ALGAE       | RESPECTABLE | ANTIBIOTICS |
| PREDICTABLE | ANNIVERSARY | OBSERVANT   | CHARTERED   |
| CAUTIOUS    | PATENTED    | YOUNG       | POINT       |
| TYPICAL     | PLASTIC     | STABLE      | BUCKET      |
| KIND        | FOUR        | MODERN      | TAKING      |
| LITERARY    | BROTHERS    | CONSISTENT  | BIOLOGICAL  |

## Appendix C

## List of Stimuli for Self-Referent Task

| <u>Depressed</u> | <u>Socially Anxious</u> | <u>Neutral</u> |
|------------------|-------------------------|----------------|
| DEPRESSED        | RIDICULED               | AVERAGE        |
| SAD              | EMBARRASSED             | NORMAL         |
| DEJECTED         | TENSE                   | STUDIOUS       |
| UNHAPPY          | ANXIOUS                 | HONORABLE      |
| GLUM             | DISTRESSED              | EVEN           |
| DOWN             | JUMPY                   | MEDIUM         |
| GLOOMY           | UPTIGHT                 | ALERT          |
| GRIM             | ASHAMED                 | PREDICTABLE    |
| CHEERLESS        | SCORNED                 | CAUTIOUS       |
| HOPELESS         | PANICKY                 | TYPICAL        |
| DESOLATE         | AFRAID                  | KIND           |
| BLEAK            | TERRIFIED               | LITERARY       |
| MISERABLE        | HUMILIATED              | MILD           |
| TEARFUL          | SHAME                   | FRIENDLY       |
| SORROWFUL        | NERVOUS                 | QUIET          |
| DISMAL           | WORRIED                 | GENTLE         |
| MELANCHOLY       | FEARFUL                 | SENSIBLE       |
| PESSIMISTIC      | JITTERY                 | FAIR           |
| WORTHLESS        | MORTIFIED               | RESPECTABLE    |
| DRAINED          | DESPISED                | OBSERVANT      |
| HELPLESS         | SHAMEFUL                | YOUNG          |
| USELESS          | SCARED                  | STABLE         |
| DOWNCAST         | FRIGHTENED              | MODERN         |
| PITIFUL          | PETRIFIED               | CONSISTENT     |

## Appendix D

## Questionnaire Information

Thank you for agreeing to participate in our research project. We are investigating the prevalence rates of depression and social anxiety in the university population. Your responses on this questionnaire are strictly confidential and only the principle investigator will have access to the data. Later, the data will be transferred onto a computer and, during this process, your name will be replaced with a coded number. Thus, anonymity will be maintained. Furthermore, questionnaires will be locked in a secure place until coded and then destroyed.

We ask you to complete this questionnaire as truthfully as possible. You will receive 1 credit hour for filling out this questionnaire.

Some additional investigations of depression and social anxiety will be conducted within the next few weeks. If you are willing to participate in future laboratory studies please leave your name and telephone number in the appropriate space provided on the next page. Additional credit hours will be provided for future participation.

Thank you for your cooperation.

Sincerely,

Derrick K. Larsen, B. A. &

Lorna Sandler, Ph.D.

Appendix E

Questionnaire Information on Future Participation

If you are willing to participate in future investigations please fill in your name and telephone number below. Providing your name and telephone number DOES NOT commit you to taking part in future studies but DOES indicate a willingness to participate.

NAME: \_\_\_\_\_ (please print)

TELEPHONE NUMBER: \_\_\_\_\_

## Appendix F

## Attention Task Instructions

Thank you for agreeing to participate in this study. In this part of the study, a list of word pairs will be presented to you on the computer monitor. One word will appear above the other in the centre of the screen. Please read the top word out loud as soon as it appears. The word pairs will then disappear from the screen and sometimes, a probe (.) will appear in the space of one of the two words. When you see this probe respond immediately by pressing the space bar on the computer key board. This segment of the experiment will last approximately 10 minutes. Once you have completed this part of the experiment, you will be given instructions for the second part of the experiment. Do you have any questions?

## Appendix G

## List of Practice Stimuli

Practice Pairs

|          |           |          |          |
|----------|-----------|----------|----------|
| ONE      | SIX       | TWENTY   | EIGHT    |
| THREE    | NINE      | FIVE     | TWO      |
| FOUR     | SEVEN     | TEN      | TWELVE   |
| ELEVEN   | FIFTEEN   | THIRTEEN | EIGHTEEN |
| FOURTEEN | SEVENTEEN |          |          |

## Appendix H

## Self-Referent Encoding Task Instructions

For the next part of the experiment I would like you to place your left index finger on the yellow dot and your right finger on the red dot on the key board in front of you and once again, pay close attention to the computer screen. A "ready" prompt will appear in the middle of the screen and upon its termination an adjective will appear in the space previously occupied by the "ready" prompt. At this point, you are to respond as quickly as possible by pressing either yellow "Y" key, indicating YES the adjective was self-descriptive, or the red "N" key, indicating NO the adjective was not self-descriptive. Following this, you will be asked to rate how well this word described you, on a five point scale (1=not at all and 5=extremely). After answering the question, you will be prompted to replace your fingers on the dots and another trial will begin. Once you have completed this part of the experiment, you will be given instructions for the third part of the experiment. Do you have any questions?

Appendix I

Subtraction Task Instructions

Now, what I would like you to do is count backwards, out loud, from 1000 by three's (e.g., 1000, 997, 994 etc.) until the computer gives you new instructions. When you are ready press any key and start counting. The computer will beep when your time is up. Do you have any questions?

Appendix J

Incidental Recall Task Instructions

At this point, I would like you to try and recall as many words as you can that were presented in the self-referent task and write them down on the piece of paper provided to you. You have approximately three minutes to complete this task. Again, press any key and start writing until the computer signals you to stop. Are there any questions?