UNIVERSITY OF SOUTHAMPTON

Faculty of Medicine, Health and Life Sciences

School of Psychology

Attentional and Interpretive Biases in Clinical Depression

by

Lynda Parnham-Ormandy

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Thesis abstract

This thesis is concerned with cognitive biases in depression, with particular focus on attentional and interpretive biases. It reviews cognitive theories of depression, such as those of Beck (1976) and Bower (1981), who predicted that depressed individuals will selectively attend to negative information and will show an enhanced tendency to impose negative interpretations on ambiguous information. In contrast, Williams, Watts, MacLeod, and Mathews (1997) argue that depression is more strongly associated with a bias for negative information in memory, and that depression is not associated with an attentional bias. The methodologies developed for assessing attentional and interpretive bias are described, and research into these biases in depression are reviewed. More recently, attentional bias has been considered in relation to the differing attentional processes of shift, hold and disengagement. It has been suggested that depression may be associated with difficulties in disengaging attention from negative information. Evidence of attentional and interpretive biases in depression is mixed, and further research is required, particularly using clinically depressed samples.

The empirical study examined attentional and interpretive biases in clinically depressed participants and non-depressed controls. The study used: (a) an attentional cueing task, (b) a homophone task, and (c) a morphed faces task. It was predicted that an attentional bias for negative information, and a negative interpretive bias for ambiguous information, would be found in clinically depressed participants. Neither of these predictions was supported. While the present study did not detect attentional and interpretive biases in depression, these biases may be found in future research using different methodologies.

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Attentional and interpretive biases in clinical depression

Lynda Parnham-Ormandy[1]

Running head: ARE THERE ATTENTIONAL AND INTERPRETIVE BIASES FOR NEGATIVE INFORMATION IN DEPRESSION?

Address for correspondence
Lynda Parnham-Ormandy, Doctoral programme in Clinical Psychology, School of Psychology, Building 44, University of Southampton, Highfield, Southampton,
SO17 1BJ, UK. (Telephone +44-02380-595321

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[1] School of Psychology, University of Southampton, Southampton, UK

Abstract

This review considers the key cognitive theories of depression and their predictions regarding biases in information processing in depression, with particular focus on attentional and interpretive biases for negative information. Beck (1976) and Bower (1981) proposed that cognitive biases favouring negative information operate throughout the cognitive system in depression, and that these biases might cause and maintain depressive episodes. Williams, Watts, MacLeod, and Mathews (1997) suggest that an attentional bias for negative information is not a feature of depression and that depression is more strongly associated with a negative memory bias. The research on attentional and interpretive bias in depression is reviewed. For each type of bias, the different paradigms used to investigate processing of emotional information are described, followed by an evaluation of research findings regarding the presence of these biases in depression.

Key words: depression, interpretation, attention, information processing

Depression

Depression is a mood disorder characterised by feelings such as sadness, guilt, hopelessness, anhedonia, and suicidal thoughts. There are often physiological symptoms, such as insomnia, decreased appetite and loss of libido. There is often impairment of social or occupational functioning. In milder episodes, such functioning may require markedly increased effort to maintain normal levels (American Psychiatry Association; [APA], 1994).

Prevalence

It is estimated that at any one time, 15-20% of adults experience depression. At least 12% experience depression severe enough to require treatment at some time in their lives. Depression is purported to be twice as common in women as in men, and is more prevalent in areas of lower socio-economic class (Davison & Neale, 1998). It is typically a recurrent disorder; 80% of individuals who have an episode of depression will relapse within a year (Coryell et al., 1994). It is estimated that the prevalence has increased over the last 50 years, and that the age of onset has decreased (Klerman, 1988).

Diagnosis

Depression is divided into two main categories in DSM-IV (APA, 1994): unipolar and bipolar. Bipolar depression refers to when the individual also experiences periods of mania or hypomania. This paper will be concerned with unipolar depression, and will henceforth be referring to unipolar depression when the term depression is used. For a diagnosis of depression to be made, the individual needs to meet five of the following criteria, including one or both of the first two, for the past two weeks:

- Sad or depressed mood for most of the day, nearly every day
- Loss of interest and pleasure in their usual activities
- Change in sleep pattern (either with early morning waking, inability to sleep or increased sleep)
- Shift in activity level (lethargy or restlessness)
- Change in appetite
- Loss of energy, fatigue
- Negative self-concept, self-reproach, self-blame, worthlessness or guilt
- Difficulty in concentrating (e.g. slowed thinking, indecisiveness)
- Recurrent thoughts of death or suicide

If the individual has been depressed for more than two years, they may meet criteria for dysthymic disorder.

Cognitive Approaches to Understanding Depression

Cognitive approaches to depression focus on the role of thoughts and biases in information processing as moderators of an individual's mood. As cognitive approaches will be central to this review, the key theories within the cognitive approach are covered separately.

Bower's Associative Network Theory of Emotion

Bower was primarily concerned with the relationship between mood and memory. He used the structure of memories as the basis for his theory, and proposed that memories are represented in a network of semantic concepts and schemata (Bower, 1981, 1987). Events are encoded in memory through a process of establishing new

associative connections between representations of incoming information and existing concepts. When a concept is activated by an event or by novel information, the associative linkages with representations or existing knowledge function to make sense of the event. This process leads to learning, in that encoding allows the memory to be processed and stored, such that it is available for access at a later point. Emotions are also represented within the memory network as 'emotion nodes', thus the spread of activation from an 'event node' may lead to an emotion node, so that the event is coded with the relevant emotion attached in memory. Each emotion node (e.g. fear, depression, joy) has a cluster of associated autonomic correlates, such as those elicited when the emotion node is activated.

Some emotion nodes are inhibitory towards other nodes, for example, when the depression node is activated; the joy node will be inhibited (Bower, 1981). Bower gives an example of this process: if a person is asked to think about "kindergarten days", this proposition may combine with activation from an emotion unit to bring the proposition into consciousness, by exceeding a set threshold at which point this will happen. Therefore, a sad person becomes conscious of thinking about kindergarten days and will recall a sad memory from those days. This constitutes reactivation of a sad memory and sends feedback to the sadness node, which maintains activation of the emotion (Bower, 1981). Furthermore, Bower proposes that once an emotion node is activated, it prompts recall of mood-congruent memories. Hence, when a person is sad, they will recall sad memories, which make them sadder. This process illustrates a vicious cycle of depression in Bower's theory.

Bower's theory has implications for several cognitive processes, including associative processes, interpretative processes and the attentional salience of mood-congruent material (Bower, 1981, 1987). With respect to associative processes, Bower

found that an individual's mood affected which free associations were made in response to neutral stimuli. For example, if a happy person was given *life* as the stimulus word, they associated words such as *love*, *freedom*, *open* and *joy*. In comparison, when an angry person was given *life* as a stimulus, they associated words such as *struggle, toil, fight* and *compete* (Bower, 1981). Bower also postulated that mood affects the way people elaborate on or draw inferences from events. In addition, he thought that mood state would affect an individual's predictions about the future. As an example, the ambiguous setting is given: "John came home late from an office party to find his wife waiting up for him." An angry reader may interpret the situation as negative, whereby John's wife is angry and they are likely to have a nasty interaction. However, a reader who feels happy and secure may infer that John's wife waited up for him because she was keen to see him, thus predicting a happy interchange (Bower, 1981).

These emotion-related biases are also likely to influence the interpretation of interpersonal interactions. Bower posits that social interactions, by their nature, are ambiguous, and as a result, an individual has to make sense of the interaction by reading the situation and intentions of the other party using available clues. Therefore, interpretive bias is likely to operate in a similar manner to that described above for predictive inferences.

The processes underlying these biases may be viewed as a type of top-down processing (e.g. Williams, Watts, MacLeod, & Mathews, 1997). This means that when information should be processed bottom-up, that is, the interpretation should be driven by the available information incoming via the senses, this does not inevitably happen. Instead, the emotion node and its associations prime the individual, so that the incoming information is interpreted to fit the emotion currently being experienced, rather than being interpreted in an unbiased fashion (Bower, 1981).

Another implication of this theory relates to the attentional salience of mood-congruent material. The model predicts that individuals will exhibit selective attention for material that is consistent with their mood state. Bower (1981) gives the example of watching a scene between a happy and a sad character. If all other factors are equal, the sad individual might be expected to spend more time concentrating on the sad character, and vice versa with the happy person. Related to this is the notion of 'perceptual pop-out'; a colourful description for the experience whereby an emotion should cause mood-congruent words to 'pop out' at the perceiver (Bower, 1981). Furthermore, individuals are purported to have a lower recognition threshold for emotion congruent material, such that if a tachistoscope is used to record the time an individual takes to respond to given words, those that are congruent with the mood of the individual will be processed and responded to more quickly than those that are mood incongruent.

The link with depression.

An individual's tendency to make negative predictions based on their mood state would account for the themes of pessimism and hopelessness often encountered in depression. Thus, when the individual is depressed, their depressed emotion node is activated, which is manifested in the autonomic and behavioural elements of depression, such as tearfulness, low motivation and anhedonia. This activation leads to the recall of sad memories. In addition, when the individual contemplates doing something to try to ameliorate their low mood, their negative predictions about the outcome may inhibit this tendency. In addition, the individual's tendency to interpret ambiguous information in a negative manner would continue to activate the depressed emotion node when it need not necessarily be activated, hence continuing the depressive episode in the vicious cycle manner described earlier.

Based on Bower's assertions, several assumptions may be made:

1. There exists an attentional bias in depression, whereby individuals selectively attend to mood congruent material;

2. There exists a negative interpretive bias in depression, whereby when an individual is faced with an ambiguous situation, they will tend to make a negative interpretation;

3. There exists a bias in memory, whereby memories recalled will be congruent with the current mood state.

It is assumed that these processes serve to maintain an individual's depressive mood.

Beck's Cognitive Theory of Depression

Beck (1967, 1976, 1987) proposed a model for understanding depression based on the notion of a faulty information processing system. At several points in the sequence of information processing, it was proposed that there are biases and distortions that serve to exacerbate and maintain the depressive state. The broad framework of information processing may be conceptualised as a continuum (Beck, 1987), encompassing: early stages of perception and attention → working memory → interpretation → recall → long-term memory.

Beck (1967, 1976, 1987) suggests that an individual's experience leads them to form schemata that help them organise their experiences of themselves, their future and the world. Schemata serve to organise perception and to govern and evaluate behaviour (Fennell, 1989). Schemata lead to the development of assumptions, which are used to predict the experiences that individuals may encounter, and which reflect the individual's enduring orientations, rules and behavioural inclinations (Beck, 1987).

Such templates for understanding are necessary and helpful for the individual's functioning. However, in some people, these assumptions become rigid, extreme, and 'dysfunctional' (Fennell, 1989).

Dysfunctional assumptions tend to lay dormant until activated following a critical incident; that is, an incident which is congruent with an individual's negative schemas and which supports the individual's negative predictions. Once dysfunctional assumptions have been activated, they give rise to negative automatic thoughts (NATs, Beck, 1976). NATs may take the form of thoughts, images or memories. They are automatic, in that they tend to appear at the forefront of a person's thinking, without being consciously summoned. It is hypothesised that NATs underpin the behavioural, emotional, cognitive, physical and motivational manifestations of depression (Fennell, 1989), by way of dominating the thinking of the individual, and leading to symptoms such as withdrawal, anhedonia, loss of sleep, poor concentration and anxiety.

Beck proposed that central to a depressive episode is a sense of loss: the notion that the individual is lacking an attribute that they consider essential for happiness. This may include: competence in attaining goals, attractiveness to others, closeness to family and friends, tangible possessions, and good health or status (Beck, 1976). Such self-appraisals reflect the way the person perceives their life situation. Beck posited that the experience of depression revolves around specific cognitive distortions. Beck conceptualised these as a negative cognitive triad, encompassing a negative view of themselves, the world around them and their future (Beck, 1976). In this way, Beck felt that depressed people are victims of their own illogical self-judgements (Davison & Neale, 1998).

Negative biases in cognition.

Beck (1976) proposed that depressed individuals have specific cognitive biases or distortions in their thinking which result in them manipulating information in their environment, such that it fits their schemas. Beck felt that such misinterpretations could be labelled as a 'deviant' web of incorrect meanings attached to situations. It is hypothesised that the information upon which these misinterpretations are made is often neutral or ambiguous in its actual meaning.

He divided these into aberrant thinking styles that include:

Personalization: whereby the individual attributes external events and others' behaviour as being inextricably linked to themselves. Beck terms this a form of "basic egocentric colouring" in that the individual has a frame of reference that enables them to view all events as pivoting around them (Beck, 1976). Personalization may be seen in the depressed individual's tendency to compare themselves with others, for example, assuming everyone else is happier than himself or herself, when they have no evidence to support this.

Dichotomous thinking: (Nueringer, 1961) whereby the thinking of depressed individuals is polarized, such that everything is good or bad, wonderful or horrible. Themes of 'never' and 'always' are common (Beck, 1976). It appears that depressed individuals are unable to tolerate ambiguity or neutrality. Such thinking may have a catastrophic nature, in that the worst-case scenario will be assumed. These global judgments may then lead to specific distortions or misinterpretations, including:

- Arbitrary influence: whereby the individual draws a conclusion in the absence of sufficient evidence;

- Selective abstraction: the process of drawing a conclusion based on one of many elements in a situation, with this usually being the element that supports the individual's dysfunctional assumption in that situation;
- Overgeneralization: the tendency to make conclusions based on one event, making the resulting view congruent with their negative predictions.

Underpinning these errors are often processes of: magnification of negative evidence, such that it eclipses all other evidence and reasoning; and the minimization of positive evidence that is incongruent with the individual's depressive schemata (Beck, 1976).

Beck (1987) felt that specific cognitive errors underpin the behavioural, affective and motivational symptoms of depression. For example, the thought that "Nothing will work out" will lead to loss of initiative and, "It's not worth the effort" promotes fatigability. This leads to a decreased participation in pleasurable activities, which allows more time for negative rumination. Thus, a self-fulfilling prophecy starts to emerge.

Hypotheses derived from Beck's theory.

Haaga, Dyke, and Ernst (1991) summarise the testable hypotheses generated by Beck's theory. One hypothesis concerns the information processing biases considered inherent in depression. They felt that this could be broken down into several stages, at which biases may be encountered in the depressed person's thinking:

- Biased attention deployment: a tendency to show more negative self-focused attention than non-depressed controls;
- Attentional bias for external negative information;

- Biased recognition memory: enhanced recognition of negative words, compared to positive ones;
- Biased recall, specifically an increased probability and speed of retrieving negative memories;
- Biased manipulation of information, such that strong negative conclusions are drawn, going beyond the information available;
- Distortions caused by overestimation of negative events and underestimation of positive events. (Haaga et al., 1991)

Summary

Beck's Schema Theory and Bower's Network Theory have a number of similar predictions regarding the negative cognitive biases in depression. That is, depressed individuals should show attentional, interpretive and memory biases for negative information. Moreover, their predictions apply to both anxiety and depression in a similar manner. They predict that cognitive processing is biased in emotional disorders, with depressed individuals having a bias for depression-related information whereas anxious individuals have a processing bias for anxiety-related (danger-relevant) information. These theoretical views differ from models that suggest that these different emotions have different patterns of cognitive bias, as discussed next.

The Integrative Model: Williams, Watts, MacLeod, and Mathews (1988, 1997)

Williams et al. (1988, 1997) propose that anxiety and depression are fundamentally different in the ways in which the information processing biases operate. Given the nature of the disorders, they posit that it is unlikely for them to have the same

types of underlying cognitive errors. For example, anxiety is characterised by fear and threat, resulting in increased attentional vigilance. It is also associated with escape and avoidance behaviour. In contrast, depression is characterised by themes of loss, sadness, and rumination. Depression is not particularly known for associated avoidance behaviour.

Williams et al. suggest that anxious people are more vigilant for threat and exhibit primarily biases in preattentive processes (i.e. in early processing, prior to awareness). In comparison, depressed individuals are more likely to have a bias in postattentive elaborative processes, thus facilitating the recall of negative memories (Williams et al., 1997).

Williams et al. (1988, 1997) draw on the distinctions in information processing to inform their model, such as the distinction between automatic and strategic processing (Schneider & Schriffrin, 1977). Automatic processing can occur without awareness, is rapid, is unconstrained by capacity and may occur in parallel, whereas strategic processing is capacity limited, relatively slow and usually serial in nature (Williams et al., 1997).

Two processes deemed central to the understanding of information processing biases are priming and elaboration. Priming involves automatic activation of multiple components involved in the representation of the stimulus. Priming strengthens the internal representation of the stimulus in memory and makes it easier and faster to access. In contrast, elaboration is a strategic process, and involves activation of the representation of the stimulus in relation to associated representations, to form new linkages and activate old ones. This means that when the stimulus is presented, the internal representation is easily retrievable due to increased paths of access, via the associations made (Williams et al., 1997).

Williams et al. (1997) propose a model of information processing bias in emotional disorders, which takes account of these differences. They suggest that depression is mainly associated with a bias in strategic elaborative processes favouring negative information (i.e. a negative recall bias). However, anxiety is mainly associated with a bias for threat in automatic processes, including priming and early aspects of attentional processes.

Summary

There are differing schools of thought on the biases in information processing in anxiety and depression, those of Beck (1976) and Bower (1981), and that of Williams et al. (1988, 1997). Beck and Bower's models predict attentional and interpretive biases in depression (as well as in anxiety). However, Williams et al. (1997) does not predict a depression-related attentional bias, and the prediction of an interpretive bias in depression is not entirely clear from this model. An implication of Williams et al. is that you would see an interpretive bias in depression if the task involved elaborative processes. All three models predict a negative memory bias in depression.

With the aim of evaluating these theories, research into information processing biases in anxiety and depression has focused on the three main types of bias: attentional bias, interpretive bias and memory bias. These have been researched with different types of emotional disorders, such as depression, post-traumatic stress disorder and anxiety disorders, including generalised anxiety disorder (GAD) and social phobia. The anxiety literature appears to have lead the field in terms of methodologies used and has generated the majority of research into attentional and interpretive biases. There has been less research into these biases in depression, and studies have often used methodologies from the anxiety literature. Therefore, relevant anxiety research will be

considered initially when describing the methodologies used to study attentional and interpretive biases, before research into depression is discussed.

This review will focus on attentional bias and interpretive bias in depression, because the theories considered above make differing predictions about these biases and the evidence for them is controversial and less clear-cut. In contrast, there has been a considerable amount of research that has demonstrated memory biases for negative information in depression, so the presence of this type of bias is widely accepted (e.g. reviews by Blaney, 1986; Williams et al., 1997). Thus, partly due to space limitations, research into memory biases will not be reviewed here, and the review will focus instead on the primary questions of whether there are attentional and interpretive biases in depression.

Attentional Bias: Concepts and Methods

Attentional bias occurs when there is a consistent tendency to allocate (or switch) attentional resources to certain types of stimuli, such as negative or threatening information (Williams et al., 1997). This bias is well documented in anxiety, whereby individuals are constantly vigilant for signs of threat, but it is suggested that this is much less the case in depression (Fox, Russo, Bowles, & Dutton, 2001).

Williams et al. (1997) make several assumptions in the conceptualisation of attentional bias, in that the attentional switch can occur in any sense modality; that the switch is perceived as being involuntary and that it is perceived as being contingent upon a change in the individual's internal or external environment (e.g. in their own body, or in the external vicinity). This implies that attentional bias is a unitary concept.

Williams et al. (1997) propose two broad ways of examining this attentional bias: (a) by studying how attending to salient information may facilitate performance, and (b) by assessing how the same mechanism may debilitate performance on another task. In facilitation of performance, the task requires participants to attend to negative information; they might be expected to perform better on this task if they have a negative attentional bias, compared to an individual who does not have this pre-existing bias. Conversely, if they are asked to perform a task that requires them to attend to other information in the presence of negative information, whereby they need to prevent themselves being distracted by the negative information, it is predicted that individuals who selectively attend to negative information will perform worse than those who do not.

Interference tasks may be used to assess the extent to which negative distractor words interfere with task performance. A commonly used task is the Emotional Stroop, where words are written in colours and individuals are asked to name the colour as

quickly as possible, and disregard the word meaning. Colour-naming latency is taken to reflect the extent to which the word has been processed. This approach has been used in a range of disorders, including anxiety disorders and depression (Williams, Mathews, & MacLeod, 1996). For example, Gotlib and McCann (1984) used the emotional Stroop task with mildly depressed students. They presented the participants with 50 neutral, 50 positive and 50 depressive words, of which they were asked to name the colour. They found that the participants with mild depression were significantly slower at naming the negative words than the positive or neutral words. Williams et al. (1996) conducted a review of the studies using the emotional Stroop task. They conclude that for patients who are emotionally disturbed, performance on colour naming is particularly disrupted when the words they have to colour-name are related to their specific psychopathology. They also considered whether the emotional Stroop was more sensitive to trait or state emotion. They conclude that individual differences in trait emotion are commonly associated with individual differences in Stroop interference, but that trait differences require some activation by state emotion to show the disruption. They also examined the extent to which the results may be due to artifactual issues, and conclude that findings are not attributable to interitem priming, repetition of items or conscious strategies (Williams et al., 1996) and therefore appear to reflect interference by salient emotional stimuli.

Visual probe tasks are examples of tasks that rely on effects of facilitation, (rather than interference with a simultaneous competing task) to reveal attentional biases. This methodology has been adapted from experimental cognitive psychology paradigms that have shown that the deployment of visuo-spatial attention can be assessed from manual response times (MacLeod, Mathews, & Tata, 1986; Mogg & Bradley, in press).

In a typical study of attentional bias in emotional disorders, pairs of words are presented one above the other (e.g. MacLeod et al., 1986). One word will be emotionally salient (e.g. a negative word) and one will be neutral. When the words disappear, a probe (e.g. a dot) will appear in one of the positions. If a person has an attentional bias for negative information, it is expected that they will be faster to respond when the probe appears in the same location as the negative word, as this is where their attention is focused (facilitation; Williams et al., 1997). Conversely, it is expected that they will be slower to respond when the probe appears in the opposite location, due to having been focused on the threat word (Fox et al., 2001; Fox, Russo, & Dutton, 2002).

Fox et al. (2001) argue that the information gained in visual probe methodology is still unclear, in that such results are often taken as a measure of attentional shift towards the negative stimuli. They argue that the stimulus pair is often presented within foveal or para-foveal vision (i.e. peripheral to the point of focus, but within the visual area), which means that it is possible to attend to both at the same time. It is unclear whether the negative information is drawing and holding attention or whether the person is having difficulty disengaging attention from the negative information (in order to redirect attention to the probe). This argument arises from the proposition that attentional bias is not a unitary concept, but a series of stages: attentional shift, attentional holding and attentional disengagement (Fox et al., 2001, Posner, Inhoff, & Friedrich, 1987).

Fox et al. (2001) studied the effect of attentional cueing as a way to understand further the process of attentional bias. In a typical cueing task, participants were asked to detect a target (e.g. a square) that appeared to the left or right of a central fixation point. On some trials, a cue (e.g. a flashing light) would appear. If this cue accurately

predicts the location of the target, then it is termed a *valid* cue. This condition is assumed to be sensitive to 'shift and hold' components of attention, as the probe appears in the same location as the cue. If the target appears in a different location to the cue, then the cue is *invalid.* This condition is sensitive to "disengagement," as attention has to disengage from the location of the cue and be redirected to the probe (Fox et al., 2001). It is generally found that valid cues lead to faster response times, and invalid cues lead to slower response times than an uncued condition would. This is known as a *cue validity effect* (Fox et al., 2001).

Some studies (e.g. Stolz, 1996) have led to the suggestion that attentional direction (the 'shift towards' component) is encapsulated, that is, it is not affected by higher cognitive variables, such as salience of words. However, the disengagement of attention is not thought to be encapsulated, that is, it is affected by higher order cognitive variables. Thus, emotion-related attentional biases may operate primarily in disengagement processes, rather than in attentional shifting, as suggested by Fox et al. (2001). To address this issue, Fox et al. (2001) conducted a series of experiments with anxious participants and non-anxious controls. They used positive, negative and neutral words and faces as cues. On each trial, a single cue appeared, and was followed by a neutral target. The results supported the attentional disengagement hypothesis, in that anxious participants took longer to detect a target on invalid trials when the cue stimulus was negative (i.e. when the probe was in the opposite location to the negative cue). They did not find support for the attentional drawing (shift towards) hypothesis, in that anxious participants were not faster on valid trials when the cue was negative (i.e. when the probe was in the same location as the negative cue). However, they gave a caveat, that the cue is likely to attract attention, irrespective of its emotional content, thus as reaction times are generally fast on valid trials, it might be hard to increase them,

and so the task may not be very sensitive to emotion-related attentional shifts. Fox et al. (2001) interpreted their results in terms of a difficulty in disengaging attention from negative cues in anxiety. However, they did not measure depression, so it is unclear whether this bias was specific to anxiety.

Evidence for Attentional Bias in Depression

One of the first studies to compare attentional biases in clinical anxiety and depression was a visual probe study by MacLeod et al. (1986). They used a sample of depressed participants in their study, as well as groups of patients with generalised anxiety and non-clinical controls. They found no evidence for an attentional bias for negative information in depression, whereas there was in anxiety.

Hill and Dutton (1989) used the visual probe methodology, following on from MacLeod et al., (1986). They felt that MacLeod et al. failed to find an attentional bias in depression because they had used a stimulus presentation time (500ms) that is too short for depressives to be able to process the material, due to cognitive slowing in depression. They increased the stimulus presentation time (to 750ms) and used words associated with threat to self-esteem and neutral words. They did not find an attentional bias for depression-relevant words in depressed participants, thus supporting the findings of MacLeod et al. (1986).

Gotlib, McLachlan, and Katz (1988) used a colour perception task (which is conceptually similar to the visual probe task) to explore attentional deployment in depression. They showed mildly depressed participants and non-depressed controls pairs of words, differing in emotional valence. The two words were presented together, and then simultaneously replaced by two coloured bars. Participants were asked which bar had appeared first. Whichever they identified was taken to indicate which word they

had been attending to. They found that non-depressed participants showed an attentional bias for positive words, whereas mildly depressed participants showed unbiased attention, suggesting an "even-handedness" in deployment of attention.

Mogg et al. (1991) also used the colour perception methodology in a series of experiments with anxious and depressed participants. They were unable to find an attentional bias for threatening information in anxious participants, and were unable to replicate the findings of Gotlib et al. (1988). They questioned the use of the colour perception task, suggesting that it may not be an appropriate methodology for studying attentional biases. For example, Mogg et al. noted that a substantial number of participants said that the task was "impossible" because the coloured bars seemed to appear simultaneously (which they did) and some participants expressed a reluctance to guess. They also argued that the colour perception task forces participants to make contrived decisions and it is unclear which specific cognitive mechanisms might mediate such guessing responses. Given the failure to replicate Gotlib et al.'s (1988) findings, Mogg et al. suggested that the colour perception task might not provide a reliable measure of the direction of attention to the word stimuli. Given the mixed findings in this area of research, it is important that the methodologies used are reliable and valid, such that findings can be used as a basis for further research. Failure to replicate findings therefore casts doubt on the reliability of this methodology and the criticisms made suggest that the colour perception task may not be a reliable method of studying attentional biases.

McCabe and Gotlib (1995) used clinically depressed females in their study and repeated the deployment of attention methodology as above, and found that depressed females did not show any bias for negative, positive or neutral words, supporting the notion of an even-handedness of attention deployment. Furthermore, the non-depressed

females avoided attending to the negative stimuli, which may suggest a protective bias against focusing on negative stimuli. On the basis of this, they suggest that Mogg et al. (1991) were "too hasty" in dismissing the deployment of attention task as unreliable, suggesting that stimulus exposure times may be a relevant factor in the discrepancy of findings. However, their arguments did not explain why the task seems to be insensitive to anxiety-related attentional biases. Nevertheless, these studies suggest that stimulus exposure times are particularly important in studies of depression, which links to Williams et al.'s hypotheses around the need for elaborative processing and a reliance on longer exposure times.

Therefore, the studies so far have failed to find consistent evidence supporting the existence of a negative attentional bias in depression, thus supporting Williams et al.'s theory, and arguing against Beck and Bower. Two further studies, using emotional Stroop tasks, also failed to find evidence of attentional biases for negative information in depression: Mogg, Bradley, Williams, & Mathews (1993) used subliminal and supraliminal presentation of words on a background patch of colour. Anxious, depressed and control participants were asked to give the colour of the background patch. Depressed participants did not show any bias for negative information. Furthermore, the depressed participants had high levels of anxiety, which might have been expected to cause an attentional bias for negative information, as the effect was found in the anxious group. They suggested that the presence of depression might have suppressed the preconscious bias for negative information (Bradley, Mogg, Millar, & White, 1995). Bradley et al. (1995) repeated the methodology with participants with a diagnosis of GAD, those with a combined diagnosis of GAD and depression, and controls. The findings replicated those of Mogg et al. (1993).

Mogg, Bradley, and Williams (1995) conducted a study of clinical anxiety and depression, with the aim of looking at attentional bias in both, pre-attentive processes, and in later aspects of attentional processing (i.e. using a longer stimulus duration which is more likely to be sensitive to strategic processing). They used the probe-detection methodology with depressed, anxious and control participants. They presented negative words (with depression and anxiety-relevant themes), neutral words and positive words. Half of the word pairs were presented supraliminally (1 second presentation) and half were presented subliminally (very brief presentation and masking). Participants were asked to decide whether the probe had appeared in the upper or lower half of the screen. They found that anxious participants showed an attentional bias towards the spatial location of the negative stimuli in subliminal and supraliminal presentation, compared with controls. This supports the previous findings of attentional bias in anxiety. They also found that depressed individuals showed an attentional bias for supraliminally presented negative information (whether for anxiety and depression relevant words). The depressed participants did not show any bias for subliminal negative words or for positive words in either presentation condition (Mogg et al., 1995). The findings of an attentional bias for negative stimuli in depressed participants were unexpected, as they had not been found in previous studies (Mogg et al., 1995).

Mathews, Ridgeway, and Williamson (1996) also used the visual probe methodology to assess the impact of threatening words on the attention deployment of clinically depressed individuals. They found that clinically depressed participants were more attentive to socially threatening words than anxious participants (consistent with the findings of Mogg et al., 1995). However, the depressed participants had equal or higher levels of trait anxiety than the anxious group, thus reducing reliability of the findings when applied to depression. The attentional bias in depression was apparent in

the longer exposure condition (500ms) only (Mathews et al., 1996) and not in a subliminal masked condition, which further suggests that this bias is not pre-attentive. Overall, this study provides some partial support for Beck's (1976) Schema and Bower's (1981) Network theories in supporting the existence of a negative attentional bias in depression.

Bradley, Mogg, and Lee (1997) conducted two studies using induced and naturally occurring depression. Using visual probe methodology, participants were shown two types of negative words: depression relevant and anxiety relevant. In addition, neutral and positive words were used as fillers. Words were presented for 14ms (masked), 500ms and 1000ms, to allow consideration of pre-attentive (pre-conscious) and elaborative processes. With the induced depression group, participants showed an increased vigilance for depression relevant words in the 500ms exposure condition and a similar near-significant trend in the 1000ms exposure condition. There was no evidence of a depression-congruent bias for stimuli in the 14ms masked exposure (Bradley et al., 1997). The procedure was then repeated with naturally occurring dysphoria. It was found that increased state anxiety of the depressed participants was associated with a greater bias to shift attention towards the location of negative words in the 14ms (masked) condition. Correlations indicated that severity of depression was associated with greater vigilance for negative stimuli presented for 1000ms. This suggests that anxiety, but not depression, is associated with pre-conscious biases. When depression and anxiety are co-morbid, this may result in pre-conscious attentional biases being detected because of the anxiety. It also provides support for the suggestion that attentional bias in depression is found at longer presentations of negative words, supporting the notion of a difficulty to disengage from negative stimuli. Thus, depression may not draw an individual's attention to negative information, but

once it is engaged, it is difficult to disengage. This is supported by the tendency of depressed individuals to ruminate over sad thoughts (Bradley et al., 1997).

Bradley et al. (1997) suggest that the future focus of research on attentional bias in depression should concern itself not with whether an attentional bias exists in depression, but which components of selective attention processes are implicated.

Mogg, Millar, and Bradley (2000) used visual probe methodology combined with eye movement tracking technology to explore this. They presented anxious, depressed and control participants with sad, happy or threatening faces, paired with a neutral expression of the same face, before a probe appeared in one location. They found that individuals with GAD shifted their initial gaze more frequently and quickly to the threatening faces, compared to the normal and depressed participants. This further supports the evidence for an initial orienting of attention towards threat in anxiety. Depressed participants did not show a bias in eye movement for sad faces, which may be taken as support for Williams et al.'s model (1997), which predicts that depression will not be associated with specific attentional biases in initial orienting. However, it is noted that the depressed group had equivalent levels of anxiety to the anxious group, suggesting that the presence of depression may inhibit the attentional orienting predicted by the anxiety.

Koster et al. (2004) looked specifically at attentional disengagement in depression, following on from work on anxiety by Fox et al. (2001). Using a cueing task methodology, they presented dysphoric participants and controls with negative, positive and neutral words. A single cue appeared on each trial, followed by a probe in the same location (valid) or different location (invalid). Their results suggested that the dysphoric participants had difficulty disengaging attention from negative words at a longer presentation time of 1500ms. In addition, they did not find an attentional holding effect

(i.e. there was no increase in response times for valid trials when the cue was negative). They suggest that these results may reflect a tendency in dysphorics to monitor negative information without being able to disengage from it. A significant problem in their findings is that that their dysphoric participants had a higher level of trait anxiety than the controls, suggesting that the trait anxiety may be moderating some of the attentional bias effects. The frequent co-morbidity of anxiety and depression makes this a difficult problem to overcome in this type of research, as it is estimated that 72% of individuals with depressive disorders have a current additional diagnosis of GAD (Brown, Campbell, Lehman, Grisham, & Mancill, 2001).

As noted in the literature on anxiety and attentional bias, there are inherent difficulties in determining attentional bias from manual response times when using visual probe methodology (e.g. Fox et al., 2001). This has particular relevance for depression, as it is known that depressives often exhibit slowed thinking and motor responding (DSM IV; APA, 1994). Furthermore, with emotional Stroop methodology, there may be interference caused by the stimuli triggering negative thoughts, which may compete for attentional resources, particularly for depressed participants (e.g. Mogg & Bradley, in press). In addition, the emotional Stroop and the visual-probe methodologies only provide information concerning a snapshot view of attentional bias, rather than information about the deployment of attention before or after measurement (Mogg & Bradley, in press; Eizenman et al., 2003).

Eizenman et al. (2003) have attempted to overcome these difficulties by using eye-tracking technology showing the exact pattern of point of gaze. They showed dysphoric and control participants' sets of four images, comprising categories of threat and anxiety, loss and sadness, interpersonal attachment and social contact, and neutral themes. They found that dysphoric participants fixated on the dysphoric-themed

pictures for longer, compared to threat, neutral or social contact pictures, and compared to controls. They found that dysphoric participants were able to disengage attention from the other pictures, but found it more difficult with the dysphoric-themed pictures. This suggests that depression influences later elaborative stages of processing, rather than early attentional processes (Eizenman et al., 2003). More generally, this provides support for the existence of attentional biases in depression, with a specific bias for depression-relevant information, rather than negative material in general.

Gotlib, Krasnoperova, Yue, and Joorman (2004) summarised the findings so far with regard to attentional bias in depression, in respect of the role of attentional bias in the causation or maintenance of depression. They put forward three hypotheses:

a. Depressed individuals exhibit selective attention for negatively valenced stimuli;
b. Depressed individuals have lost the positive attentional bias characterising non-depressed individuals;
c. Attentional biases do not exist in depression.

To further explore this, Gotlib et al. used samples of clinically depressed and anxious participants and normal controls, all of whom were female. They used the visual probe methodology with pairs of faces (neutral expression versus sad, angry or happy). The faces were presented for 1 second before the probe appeared. They found that individuals with a diagnosis of major depressive disorder selectively attended to sad faces. The non-psychiatric controls allocated their attention evenly between the sad and neutral faces. The individuals with a diagnosis of GAD did not show a bias for sad faces. The results from the depressed group contradict the findings of Mogg et al. (2000) who did not find an attentional bias for sad faces in depression. However, in this study, the depressed individuals did not have the high levels of GAD found in Mogg et

al.'s study, suggesting that if sad stimuli are presented for longer times (1 second) and the depression is not confounded by high levels of anxiety, an attentional bias for depression-relevant stimuli will be found in depressed individuals. This supports the existence of a *content specificity hypothesis* in depression (Gotlib et al., 2004; cf. Mathews et al., 1996).

Summary

With the emotional Stroop and visual probe studies, several have failed to find an attentional bias in depressed participants (e.g. MacLeod et al., 1986; Bradley et al., 1995). When bias has been found, it is under conditions of longer presentation times of negative information, which are more likely to allow elaborative processing (e.g. Mogg et al., 1995). Thus, it may be that unless the stimulus is negative and elaboratively processed, there will not be an attentional bias in depression.

Conclusion

The findings concerning attentional bias are mixed. With anxiety, the consensus seems to be that there is an attentional bias for information containing threat. It may be that this occurs in the attentional shift towards stimuli and in pre-conscious stages of processing.

In depression, it seems likely that there is an attentional bias for negative information, which occurs in the disengagement of attention, in that depressed individuals become 'stuck' on negative information and are unable to move their attentional resources away from the negative stimuli. This is seen most consistently when information presented is negative and presented for a long enough duration for elaborative processing to occur.

Interpretive Bias: Concepts and Methods

Interpretive bias in depression has attracted far less research interest than attentional bias or memory bias.

In the study of interpretive bias in emotional disorders, five key methodologies have been developed and used in the study of interpretive bias in anxiety and depression. These methodologies will be reviewed briefly, before the evidence base for interpretive biases in depression is discussed.

Firstly, rating tasks have been used, such that participants are given an ambiguous scenario, and are asked to rate the probability of negative events occurring, based on their interpretation of the scenario (e.g. Butler & Mathews, 1983). Participants may then be asked to generate possible explanations or rate possibilities and assess the associated risk.

Secondly, homophone tasks have been used (e.g. Eysenck, MacLeod, and Mathews, 1987). Homophones are words that have one pronunciation, but two spellings that infer different meanings: e.g. one negative and one neutral (e.g. die/dye, guilt/gilt). The homophone words are presented in auditory form and participants are asked to write them down or use them in a sentence (e.g. Richards, Reynolds, & French, 1993). Their spelling or use of the words is taken as an indication of the interpretation made. If an individual has a negative interpretive bias, it is expected that they will make a higher number of threat interpretations.

However, Lawson and MacLeod (1999) discuss the methodological flaws upon which the claims of interpretive bias are made in studies using rating and homophone tasks. In particular, most tasks rely on individuals giving their interpretation to the researcher. This has an inherent problem of being unable to determine whether

interpretive bias is being measured or whether the results are due to response bias (i.e. the tendency to emit a negative response).

A third method of studying interpretive bias is the use of signal detection methods. Signal detection analysis allows for the patterns of responding to be analysed, such that it can be determined if an individual's responses reflect negative interpretive biases or patterns of negative responding. Thus, it is possible to distinguish sensitivity from response bias. For example, Eysenck, Mogg, May, Richards, and Mathews (1991) presented ambiguous sentences to clinically anxious, recovered anxious and control participants. Each sentence could be interpreted in a threatening or non-threatening way. Participants were later asked to identify each sentence from a choice of four, reflecting a threatening and non-threatening interpretation of the ambiguous sentence and two distractor sentences. Their results were consistent with an anxiety-related interpretive bias.

The fourth area is the use of priming methodologies, as discussed in the attentional bias literature. These also have strengths in overcoming the problem of response bias. For example, MacLeod and Cohen (1993) used the RSVP (Rapid Serial Visual Presentation) paradigm, whereby participants are presented with sentences, one at a time, by their self-paced pressing of a button, and are then asked questions about the sentences. Participants are measured covertly on the time taken to press the button, which reflects their reading time of the sentences (which include ambiguous and non-ambiguous information). This avoids response and experimenter bias effects. The time taken to press the button is inferred to be a measure of comprehension latency (MacLeod & Cohen, 1993).

The fifth methodology incorporates the use of measures of autonomic correlates associated with cognitive biases. For example, eye-blink magnitude has been used to

measure negative interpretative bias (e.g. Lawson, MacLeod, & Hammond, 2002). Similarly, Mathews, Richards, and Eysenck (1989) modified the homophone task to include a measure of skin conductance to try to assess psychophysiological responses to ambiguous emotional stimuli.

Evidence of interpretive bias in depression

Using the rating methodology, Butler and Mathews (1983) gave anxious and depressed patients and control participants ambiguous scenarios to consider (e.g. you wake with a start in the night, thinking you heard a noise, but all is quiet). They were asked what they thought might have woken them up, and were then given three possible explanations to arrange in order of likeliness (e.g. was it a burglar or a cat?). They found that anxious and depressed participants made more threatening interpretations than controls, suggesting that a negative interpretive bias may be common to both types of mood disorder in a similar manner. It is noted that the depressed group had equivalent levels of anxiety to the anxious group, suggesting that the anxiety could have caused the negative interpretive bias. However, their findings suggested that depressed participants assessed all negative events as being more likely to occur (compared with controls), consistent with the global nature of the negative cognitive triad proposed by Beck.

Lawson and MacLeod (1999) argue that the use of priming methodology has confirmed the existence of a negative interpretive bias in anxiety. However, they noted that such methodology has been "conspicuously absent" from depression research. Therefore, it was uncertain whether depressed individuals have a negative interpretive bias or merely a negative response bias. Lawson and MacLeod (1999) applied the priming methodology to participants with depression. They did not find evidence of an interpretive bias in depressed participants and suggested that they found evidence for

the reverse of depression-linked interpretive bias, in that participants with high BDI scores had a *reduced* tendency to activate negative meanings of ambiguous prime stimuli (Lawson & MacLeod, 1999). This supports the assertion that depression and anxiety have different patterns of information processing, thus supporting Williams et al. (1997). Lawson and MacLeod suggest that depression may be associated with a negative response bias, rather than a negative interpretive bias. A significant methodological limitation with this study is the use of undergraduate psychology students as the depressed population.

Bradbury (2001) used the RSVP paradigm (MacLeod & Cohen, 1993) with a clinically depressed sample of patients. The results did not give any evidence of a negative interpretive bias in depression, thus agreeing with the findings of Lawson and MacLeod (1999). However, all participants also completed the homophone task (Mathews, Richards, & Eysenck, 1989), the results of which supported the notion of a negative interpretive bias in depression. However, Bradbury notes that the findings may be due to response bias rather than interpretive bias, as discussed by MacLeod and Cohen (1993). Of the two methodologies for studying interpretive bias in depression, i.e. the RSVP task and homophone task, the former may be considered to have more credibility due to its lack of response bias effects. Therefore, these results may be consistent with the notion that a negative interpretive bias does not exist in depression.

Lawson, MacLeod, and Hammond (2002) sought a method of investigation that would not rely on manual response time and would not be subject to effects of response bias and demand characteristics. They employed a method to investigate interpretive bias in depression drawing on the literature that has investigated emotional modulation of the eye-blink reflex. When participants make a negative interpretation of a stimulus, they exhibit a relatively larger blink reflex magnitude, compared to when they make a

neutral interpretation (Lawson et al., 2002). The task was conducted using groups of individuals with high and low BDI scores. Participants were played a list of words that sounded similar, but differed in emotional valence (e.g. *dress* and *stress*). They were asked to write down what they heard and their blink magnitude was measured as they heard the words. They found that both groups displayed augmented blink magnitudes when negative interpretations of ambiguous stimuli were made. Furthermore, the high BDI group displayed disproportionately larger blink magnitudes than the low BDI group. The authors conclude that this provides support for the proposition that "an elevated tendency to impose negative interpretations on ambiguous information is associated with increased levels of emotional symptomatology specific to depression" (Lawson et al., 2002).

They suggest that this is the first study to show support for the existence of a negative interpretive bias in depression that is not confounded by problems of self-report, response bias or reaction time measures, thus providing strong support for the theories of Beck (1976) and Bower (1981). However, the authors note that this was not conducted on a clinical population, which limits the generalisability of the results to clinically depressed individuals. In addition, they did not investigate positive interpretations of ambiguous material. Thus, another future research question is whether depressives may be less likely to make positive interpretations of ambiguous stimuli.

Summary and Conclusions

Evidence is mixed on the topic of interpretive bias in depression. Several studies that have found a negative interpretive bias have been criticised for their methodology, and studies with improved methodology have found mixed results.

Future research needs to continue to use methodologies that do not have experimenter bias or response bias effects. In addition, more research with clinically depressed participants is required.

Cognitive Biases in Depression: Conclusions and Future Research

With regard to the theories of Beck and Bower, and Williams et al., the research findings of attentional and interpretive biases are mixed. That is, there is some evidence for a negative attentional bias in depression (supporting Beck and Bower), but this bias does not seem to occur in all aspects of attentional processing (e.g. it may occur mainly in maintained attention, Gotlib et al., 2004). Overall, the biases are far more specific than suggested by Beck and Bower, and as such are more reflective of the specificity of Williams et al.'s model.

As a general point, more research needs to be conducted with clinically depressed samples, as results based on studies using students, or with mood-induction procedures have limited generalisability. With regard to attention, the current conclusion is that an attentional bias may be found in depression when stimuli are negative, content-specific, (i.e. depression-relevant), and presented for long enough to allow elaborative processing to occur. This conclusion is largely an amalgamation of research across different studies.

With regard to interpretive bias, the current conclusion is uncertain. Future research needs to take account of the findings from research on attentional biases, in terms of the specificity required in the stimuli to bring about an interpretive bias for negative information. Again, future research needs to employ methodologies that are unaffected by experimenter demand and response bias. Furthermore, there is very little

research conducted into interpretive bias in clinical depression, with most studies using student samples.

Clinical Implications

The use of cognitive behavioural therapy for the treatment of depression has a comprehensive evidence base and is increasingly the treatment method of choice (e.g. Padesky & Greenberger, 1995). However, the approach assumes the existence of negative cognitive biases, such as attentional and interpretive biases, as an inherent factor in depression, in terms of causation and maintenance of the depressive episode. Therefore, the existence of such biases needs to be clarified using objective scientific methods. A better theoretical understanding of cognitive biases in depressed individuals may help in the development of more effective treatments in the longer term, which are derived directly from cognitive theories of depression.

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Running head: *Cognitive bias in clinical depression*

Cognitive bias in clinical depression

Lynda Parnham-Ormandy*

School of Psychology, University of Southampton

(Prepared for submission to British Journal of Clinical Psychology – see Appendix B for instructions to authors)

* Requests for reprints should be addressed to Lynda Parnham-Ormandy, Doctoral programme in Clinical Psychology, School of Psychology, Building 44, University of Southampton, Highfield, Southampton, SO17 1BJ, UK. E-mail: ljp201@soton.ac.uk

Abstract

Objectives: Cognitive models of depression (Beck 1976, Bower 1981) predict that attentional and interpretive bias will be evident in clinically depressed participants. Previous research investigating these biases has yielded mixed findings.

Design: Clinically depressed (n = 20) and control (n = 23) participants took part in the study, which used a cross-sectional design, in which the groups were compared on their performance on three cognitive tasks.

Method: Participants completed three tasks: (a) an attentional cueing task based on Fox, Russo, Bowles and Dutton (2001) in which negative, positive and neutral words were used as cues. Participants had to respond to a target after each cue, appearing in the same or opposite location; (b) a homophone task assessing interpretive bias (Eysenck, MacLeod, & Mathews, 1987), in which participants heard words with one pronunciation but two meanings (negative and neutral) and wrote down the word; (c) a morphed faces task assessing interpretive bias, in which participants were presented with ambiguous faces (containing a mixture of two emotional expressions, e.g. sad and happy) and had to classify the emotion of the face. Participants also completed questionnaire measures of anxiety and depression and a diagnostic interview.

Results: The results did not find any significant group differences in performance on any of the cognitive tasks.

Conclusion: While this study did not find evidence of attentional and interpretive biases in depression, these biases may be detected in future research using different methodologies.

Introduction

A controversy in cognitive theories of depression concerns the role and nature of information processing biases. Beck's Schema Theory (1976) and Bower's Network Theory (1981) propose that there are information processing biases, including perception, attention and memory biases, which serve to cause and maintain the depressive episode. These two models predict that depressed individuals will exhibit an attentional bias for negative information. It is suggested that attention will be drawn to negative information in the environment, as a consequence of the information being congruent with their mood state. The negative information then makes the individual feel more depressed and this process continues in a vicious cycle. Furthermore, when depressed individuals are presented with ambiguous information, such that there are several ways to interpret the information, it is predicted that depressed individuals will impose a negative interpretation on to the information, a tendency described as having a negative interpretive bias. Williams, Watts, MacLeod, and Mathews (1988, 1997) have disagreed with this view, and suggest that depression is more strongly associated with memory bias (due to enhanced elaborative processing of negative information), and is not necessarily associated with an attentional bias. The prediction from the latter model regarding interpretive bias in depression is not well specified.

Given that cognitive models of depression, such as Beck's (1967) and Bower's (1981) theories, predict the presence of attentional and interpretive biases in clinical anxiety and depression, these biases have been investigated using a variety of experimental tasks and paradigms. Many of these tasks have been used in research with anxiety disorders, and have been adapted for use with depression. The following section will briefly describe some of the tasks that have been used to

assess attentional and interpretive biases in emotional disorders and will identify some unresolved issues, which the present study aimed to address. One major aim of the present study was to test the prediction, which was derived from Beck's (1967) model, that depressed individuals would have greater difficulty in disengaging attention from negative information, compared with controls. This was investigated using a modified cueing task, which was selected because previous research by Fox, Russo, Bowles, and Dutton (2001) indicates that it is particularly sensitive to biases in disengaging attention from emotional information. With respect to interpretive biases, the present study used two tasks: a homophone task and an ambiguous faces task. The homophone task is an established methodology for assessing interpretive biases in anxiety, as discussed later; whereas the ambiguous faces task is a relatively novel paradigm which uses signal detection methodology to assess interpretative bias separately from response bias. The present study used two different tasks in order to provide converging evidence of interpretive biases in depression, irrespective of the type of methodology used. Before describing these tasks in detail, previous research into attentional and interpretive biases in depression will briefly be reviewed.

With regard to previous research into attentional biases in depression, this has often used the emotional Stroop task or the visual probe task. A typical emotional Stroop task consists of presenting words to participants, which may be emotionally salient or neutral. The words are presented in coloured writing, and participants are asked to name the colour and disregard the meaning of the word. The time taken to name the colour is taken as an indication of to what extent the word has been processed. From the models of Beck (1976) and Bower (1981), it is predicted that negative words would interfere with colour-naming ability. Research findings have

been mixed, with some studies finding evidence to support this (e.g. Gotlib & McCann, 1984), and other studies failing to find any evidence of interference (e.g. Mogg, Bradley, Williams, & Mathews, 1993; Bradley, Mogg, Millar, & White, 1995). A typical version of the visual probe task involves presenting pairs of words one above the other. One word is emotionally salient (e.g. negative) and the other is neutral. When the words disappear, one word is replaced by a target (e.g. a dot) appearing in one of the locations previously occupied by the words. Participants are required to respond to the target probe (e.g. by classifying it or identifying its location). The use of this methodology to investigate attentional bias in depression has yielded mixed results. Some studies have found evidence to support the notion of a negative attentional bias in depression (e.g. Mogg, Bradley, & Williams, 1995; Mathews, Ridgeway, & Williamson, 1996). Other studies have found evidence of an even-handedness of attention deployment in depression (e.g. Hill & Dutton, 1986; MacLeod, Mathews, & Tata, 1986), suggesting that there is no attentional bias in depression. Furthermore, some studies have suggested that there is an attentional bias for positive information in non-depressed individuals, which is lacking in depressed individuals (e.g. Gotlib, McLachlan, & Katz, 1988; Mogg et al., 1991). A recent review of attentional bias in depression suggested that attentional biases are more likely to be found in depression when stimuli are presented for relatively long durations (one second or more), which allows greater elaborative processing (Mogg & Bradley, in press). Elaborative processing is strategic and involves new material being processed such that associations are made with existing information. During this, new linkages are made and old linkages are reactivated. This makes this information faster and easier to access due to the availability of pathways to it. This may be viewed as a type of top-down processing, such that when new information is

perceived, and it should be processed bottom-up (i.e. via the information coming in through the senses) it is instead processed using the existing templates (Williams et al., 1997).

Recent work into attentional bias has distinguished between different aspects of attentional processes, such as shift, hold and disengagement (e.g. Fox, Russo, Bowles, & Dutton, 2001; Fox, Russo, & Dutton, 2002). It has been suggested that the disengagement aspect of attention (i.e. the ability to refocus the attention away from current material and towards new information) is not an encapsulated process (e.g. Stolz, 1996). That is to say that it may be affected by higher order cognitive variables. Therefore, emotion-related attentional biases may operate primarily in processes of disengagement, rather than the shifting of attention towards salient stimuli (e.g. Fox et al., 2001). This means that if individuals with depression engage their attention onto information that is negative and hence, relevant to their concerns, they may find it difficult to 'unhook' their attention from the negative information in order to direct it elsewhere. Research into the disengagement component of attention has involved the use of cueing tasks (e.g. Posner, Inhoff, & Friedrich, 1990; Fox et al., 2001). This has been necessary because the visual probe task, as described earlier, does not distinguish between these different components of attention. In a typical cueing task, a cue (which may be negative, positive or neutral) is presented on one side of a central cross. When the cue disappears, a target appears in one of the two locations. If the location of the cue is the same as the location of the target, the cue is *valid.* If the location of the cue is opposite to the target, the cue is *invalid.* The time taken to respond to the target reflects where attention was directed immediately before the target appeared. If participants shift and hold their attention on the cue, they should be faster to respond to targets that replace the cue (i.e. valid trials). If

participants have difficulty in disengaging attention from the cue, they should be slower to respond to targets that appear in the opposite location (i.e. invalid cues). If, as suggested earlier, there is enhanced elaboration of negative information in depression, then depressed individuals may show a difficulty in disengaging attention from negative information. Variations of the methodology for the cueing task are: (a) the type of cue used: in previous studies, cues used have been words (Fox et al., 2001), and schematic faces (Fox et al., 2001, Fox et al., 2002); and (b) the type of target and response required. In the Fox et al. (2001) study, the target appeared to the left or right of a central fixation cross, and participants had to identify where it had appeared. A potential problem of this is that responding may reflect a motor or localization bias, such that participants may attend to one area of the screen and respond using a present/absent response (Fox et al., 2002). In further studies, participants had to classify the target (e.g. categorise the target, by indicating whether it was a square or a circle) (Fox et al. 2002). Fox et al. posit that the introduction of a categorisation task is important, as any cue validity effects could then not be attributed to response preparation effects.

In the current study, the cueing task was used with clinically depressed participants and non-depressed controls to investigate attentional biases for negative information. The cues consisted of words, which were negative (depression-relevant), positive or neutral. It is suggested that words may be salient for depressed individuals due to the nature of depressive rumination often being in the form of words (e.g. negative automatic thoughts, Beck, 1976). The words were displayed for two stimulus durations: (a) 200ms, which has been found to be sensitive to anxiety-related biases in disengaging attention from negative cues, and (b) 1000ms, which has been shown to be sensitive to depression-related biases using the visual probe

task (e.g. Mogg et al., 1995). Following on from Fox et al. (2002) the target was an arrow, of which participants were required to classify the direction.

As regards interpretive bias in depression, there has been far less research. Of the studies conducted so far, some have found evidence of a negative interpretive bias in depression (e.g. Butler & Mathews, 1983; Lawson, MacLeod, & Hammond, 2002) whereas others have found no evidence of such a bias (e.g. Lawson & MacLeod, 1999). Moreover, few studies have used clinical samples, and have tended to use student samples, which cannot be assumed to be representative of clinically depressed individuals. Thus, the present study used two different paradigms to investigate interpretive bias in clinical depression: a homophone task and an ambiguous faces task.

The homophone task has been used in studies of interpretive bias in anxiety and has been found to be a sensitive measure of interpretive bias (e.g. Eysenck, MacLeod, & Mathews, 1987; Mathews, Richards, & Eysenck, 1989). A homophone is a word with one pronunciation, but two spellings inferring two different meanings, one negative and one neutral (e.g. die/dye). Participants are asked to write down the word that they hear, and their chosen spelling is taken to reflect the interpretation made. The homophone task was used in the current study as it seems to be a robust index of interpretive bias, and allows comparison with previous studies.

Some previous interpretive bias studies have been criticised for their reliance on asking participants to report the interpretations they impose on ambiguous situations. For example, participants are given the ambiguous scenario: you wake with a start in the night, thinking you heard a noise, but all is quiet. What do you suppose woke you up? (Butler & Mathews, 1983). This has the inherent problem of being unable to distinguish whether a negative answer reflects a negative interpretive

bias or a negative response bias; i.e. the participant may consider several responses but report a negative one, possibly because of experimenter demand effects, whereby they feel that a negative answer is expected of them. Research in interpretive biases has attempted to overcome this problem by using covert measurements, such as response latency (e.g. MacLeod & Cohen, 1993, with the use of priming methodologies in anxiety research); or by measuring autonomic correlates of cognitive biases (e.g. Mathews et al, 1989; Lawson et al., 2002), or signal detection approaches (e.g. Eysenck, Mogg, May, Richards, & Mathews, 1991). Morphed faces have been used in research into interpretive bias in social anxiety, whereby participants are presented with ambiguous faces comprising blends of two emotional expressions (e.g. a dominant angry face blended with a 'weak' happy face) in the same picture. Participants are asked to classify the emotion of the face (e.g. Richards, et al., 2002). The current study used a modified version of this task, which allowed the results to be analysed using signal detection analysis, such that it can be established whether effects are due to the ability to discriminate between emotional expressions (i.e. interpretive bias) or to response bias. In the current study, the morphed faces paradigm will be applied to depression, with the use of sad, happy and angry faces.

The main hypotheses for the current study are as follows:

For the attentional cueing task, it is predicted that:

- Depressed individuals will show difficulty in disengaging attention from the location of negative words. That is, when the cue word is negative (depression-related), and the cue is invalid, the depressed participants will

be slower to respond to the target on invalid trials, relative to valid trials, in comparison with normal controls.

In the homophone task assessing interpretive bias for ambiguous words, it is predicted that:

- Depressed participants will make more negative interpretations of homophones than non-depressed participants will.

In the morphed faces task assessing interpretive bias for ambiguous faces, it is predicted that:

- Depressed individuals will show a bias in enhanced discrimination of sad faces, relative to angry or happy faces, compared with controls.
- Depressed individuals may also show a response bias favouring the selection of sad faces than angry or happy faces, compared with controls.

Method

Design

The attentional cueing task had one between-subject variable of Group (depressed versus non-depressed). There were three within-subject variables: Word type (depression-relevant, neutral, positive), Cue Validity (valid versus invalid) and the Stimulus Onset Asynchrony (SOA), i.e. the interval between onset of cue and onset of target (200ms versus 1000ms). The dependent variable was response time to classify a probe target. The homophone task had one between-subject variable: Group (depressed versus non-depressed). The dependent variable was the percentage of negative interpretations of homophones. The morphed faces task had one between-subject variable of Group (depressed versus non-depressed). The main within-subject variable was Continuum (happy-sad, sad-angry, happy-angry), which refers to which two emotions were blended together in each face. The dependent variables were non-parametric signal detection measures of discrimination (A) and response bias (B).

Ethical approval

Ethical approval was obtained from a Local Research Ethics Committee, three separate NHS Trust Research and Development Governance organisations and University of Southampton Ethics Committee (see Appendix C for letters of approval).

Participants

Recruitment of depressed participants was either done directly, by approaching group members of "Coping with Depression" groups (see Appendix D

for standardised script), run by the Primary Care Psychology Service, or from assistant psychologists, counsellors and counselling psychologists. A letter was sent to psychologists, asking them to refer patients whom they felt might be interested in participating in the research (see Appendix E). They were requested to return a referral form (see Appendix F), which included the patient's details and a confirmation that the clinician had discussed the referral with them. Once this had been received, an information letter was sent to the individual, which detailed the purpose of the study and what they would be required to do if they chose to participate (see Appendix G). They were then asked to return a slip confirming that they would like to participate in the research (see Appendix H). On receipt of this, the person was contacted to arrange an appointment time for the testing session to take place.

Control participants were recruited from staff at a local general hospital. This setting was chosen as it was anticipated to contain a representative cross-section of age, and educational level, with a possible bias towards female staffing, which was to be matched with the expected bias towards females in the depressed sample. Recruitment was by way of flyers, which were circulated to staff-only areas of the hospital, and by e-mail to all staff (see Appendix I). Staff were asked to fill out a slip and return it if they were interested in the research. They were then sent an information sheet (see Appendix J). They were asked to return an opt-in slip if they wished to participate (see Appendix K). When this had been received, they were contacted to arrange an appointment for the testing session.

There were two groups of participants, as follows:

1. *Depressed Group* ($n = 20$). All individuals met the two inclusion criteria, which were (a) a primary diagnosis of Major Depressive

Disorder or Dysthymia as determined by the DSM-IV (American Psychiatry Association; [APA], 1994) based interview (adapted from the Anxiety Disorders Interview Schedule, ADIS-R, Brown, Dinardo, & Barlow, 1994) (see Appendix L), and (b) a score of 14 or over on the Beck Depression Inventory II (BDI-II: Beck, 1996). The group comprised 11 females and 9 males, of which 16 individuals were recruited from Primary Care settings (i.e. non-psychiatric patients) and a further four who responded to recruitment information intended for the control sample, but who met criteria for inclusion in the depressed group.

2. *Non-depressed control group* ($n = 23$) had no known history of depression, and a current BDI score of 13 or below (indicating no or minimal depression; Beck, 1996). The group comprised 21 females and 2 males.

A further six people participated in the research, all of whom met criteria for a diagnosis of Major Depressive Disorder or Dysthymia, but their BDI-II score was less than 14. Therefore, these data are excluded from analysis. All participants were aged between 18 and 60.

Materials and apparatus

Attentional cueing task

A laptop computer was used to present the task to participants (Sony Notebook, Model PCG-F305) using an Inquisit programme (Inquisit version 1.33 software). The words were taken from Mogg et al. (1993) (see Appendix M). There were three word lists (negative, positive and neutral) each consisting of 40 words. In

Mogg et al.'s study, the negative words were selected as depression-relevant if three judges rated them as three or more out of five for relevance to depression and less than three for relevance to anxiety. The words types were matched for word length and frequency using Carroll, Davies, and Richman's (1971) norms. The words were also matched on ratings of emotionality by three judges (Mogg et al., 1993). Participants made their responses using a 2-button response box. The buttons were labelled with a left or right arrow (← or →).

Homophone task

A list of words taken from Matthews et al. (1989) (see Appendix N) was played to participants through the computer audio system. The list comprised 4 practice words, 14 homophone words (e.g. die/dye) and 14 neutral filler words. The homophone and filler words were presented in a fixed random order. A response sheet was given for participants to write down their answers (practice list and main list, see Appendix O).

Morphed Faces Task

Faces were taken from the MacArthur Foundation Research Network on Early Experience and Brain Development (2002). Eight models were used, comprising four males and four females. For each model, there was a happy, sad and angry facial expression. These prototypes were used to create the three continua: happy-sad, sad-angry and angry-happy; with each continuum consisting of 16 blended faces. For each continuum, two prototypes (e.g. happy and sad) were blended to create morphed (computer-manipulated) images in which one emotion was dominant and the other was weak. Therefore, each image contained 60% of one

emotion and 40% of another. Therefore, for the happy-sad continuum, there were eight faces that were 60% happy and 40% sad, and eight faces that were 40% happy and 60% sad. The preparation of each continuum used Gryphon Morph v2.5 software (Gryphon Software Corporation, 1994) and was similar to the methods of delineation and interpolation used in studies investigating categorical perception of emotional expression (e.g. Young et al., 1997). The resulting colour images were presented to participants on a laptop computer (Sony Notebook, Model PCG-F305). Participants made their responses using a 2-button response box.

For the cueing and morphed faces tasks, the computer was positioned such that the stimuli were presented at eye-level, one metre from the participant. The overhead light was switched off during the computer-based tasks to aid concentration and increase the visibility of the stimuli on the screen.

Procedure

A standardised verbal script was used for all participants, containing the structure of the session, an introduction to the tasks, informed consent, and the debriefing statement (see Appendix P, versions c and p). All participants were asked for informed consent (see Appendix Q) and then Section A of the personal information sheet was then completed, detailing their name, age, occupation and number of years in full-time education (see Appendix R: Section A).

Homophone task

Standardised instructions were read out by the researcher (see Appendix P). Participants were told that they would hear a series of words, and were asked to write down each word once on the response sheet. They then heard 4 practice words first,

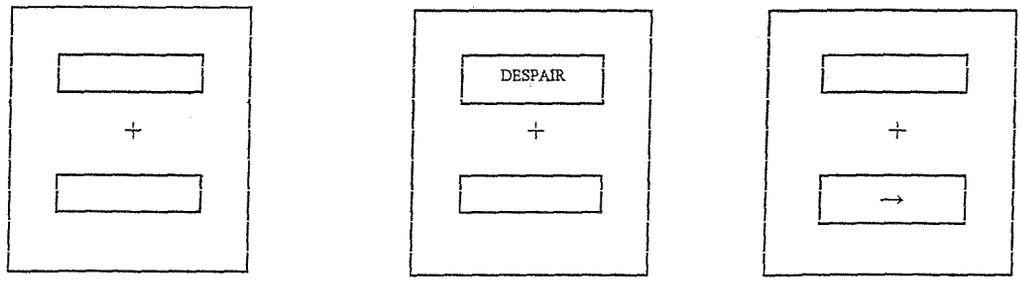
followed by the main list, which comprised 28 words. Each word was heard once and there was a five second delay between the presentation of each word.

Attentional Cueing task

The task was similar to that used by Fox et al. (2001, experiment 1). Each trial began with two boxes appearing one above, and one below, a central fixation cross, which was presented for 1000ms. A cue word (negative, positive or neutral) appeared in one of the boxes for 200ms or 1000ms, depending on the SOA condition, and was then replaced by an arrow pointing left or right. Participants were asked to indicate the direction of the arrow by pressing one of the two corresponding response buttons, as quickly and accurately as possible. There was then an inter-trial interval of 1000ms before the next cue appeared. Standardised instructions were presented on screen (see Appendix S). All stimuli were presented using white lettering in capitals or arrows (font Ariel 14) with a grey border on a black background. The boxes were 15mm x 90mm, words 5mm high. A typical trial is depicted in Figure 1.

Figure 1

Typical trial from task



Fixation display 1000ms Presentation 200ms/1000ms Until response (or 9 secs)
Note: Not to scale

There were 12 practice trials and then 192 experimental trials. Each trial was presented in a new random order for each participant.

Morphed faces task

Standardised instructions were given on the screen (see Appendix T). The stimuli appeared against a black background, with lettering in white. Each trial presented a colour photograph (110mm x 140mm) of a morphed face on the screen. The two response options were written at the bottom left (e.g. "sad") and the bottom right of the screen (e.g. "happy"). There were three blocks of trials in which participants were required to decide whether each face was (a) happy or sad, (b) happy or angry, or (c) sad or angry. The blocks were given in randomised order and each block contained 2 practice trials and 48 experimental trials, during which each of the 16 faces was presented three times in a randomised order. Participants had to press the corresponding (left or right) button on the response box to classify each face. If there was no response, after 15 seconds, the trial timed out and a new face appeared.

The questionnaires were then completed by all participants in the following order: Profile Of Mood States - short form (to measure state anxiety and depression) (POMS, McNair, Lorr, & Doppleman, 1989), Beck Depression Inventory-II (BDI-II, Beck, 1996), Beck Anxiety Inventory (BAI, Beck & Steer, 1993) and Profile Of Mood States - short form (to measure trait anxiety and depression). Next, depressed individuals were asked for details of their current episode of depression, previous episodes and any treatment received (see Appendix R: section B). Non-depressed controls were asked if they had experienced any episodes of emotional upset (pertaining to depression and anxiety) that had required them to seek treatment in the

past. This was completed after the tasks, to avoid biasing their responses. All participants were then administered the DSM-IV diagnostic interview. Finally, the debriefing statement was read out to participants (see Appendix P). This explained the purpose of the study, and clarified that there was no deception used. It also confirmed the anonymity of their results. In addition, following recommendation by the ethics committees, depressed individuals were asked for their permission for their GP to be informed of their participation in the study, by way of a standardised letter (see Appendix U). If consent was given, GP details were requested and recorded on the information form. At this point, controls were paid a £5.00 fee.

Results

Group Characteristics

Group characteristics are summarised in Table 1. The depressed group scored significantly higher on all questionnaire measures, compared to controls (BDI-II, BAI, POMS state depression, POMS trait depression, POMS trait anxiety and POMS state anxiety). The groups were matched for educational level, but not for gender ratio, X^2 (1) = 10.26, $p < .01$, as there were more women than men in the control group. In the depressed group, eight participants also met criteria for dysthymic disorder. In addition, 17 participants also met criteria for one or more diagnoses of an anxiety disorder (14 participants met criteria for a diagnosis of GAD, 11 experienced panic attacks, five had social phobia, six had agoraphobia, four had post-traumatic stress disorder, and five had claustrophobia). The mean number of anxiety diagnoses per participant in the depressed group was 2.5 (range 0-5). Duration of the current episode of depression ranged from four months to five years.

As regards treatment in the depressed group, 12 participants were taking prescribed anti-depressant medication, two were receiving cognitive therapy, eight were receiving counselling, and 10 were attending group interventions (didactic sessions with a cognitive behavioural focus on depression and stress management).

Table 1
Group Characteristics

	Group			
	Depressed	Non-depressed		
Measure	Mean (*SD*)	Mean (*SD*)	*t*	*df*
n	20	23		
Age	43.90 (9.70)	40.87 (10.85)	0.96	42
Gender ratio, m/f	9/11	2/21		
BDI	31.40 (11.26)	3.83 (2.61)	10.71**	42
BAI	22.70 (14.28)	4.22 (4.21)	5.58**	42
POMS State depression	6.90 (5.87)	0.83 (1.80)	4.45**	42
POMS State anxiety	5.85 (4.86)	1.39 (1.67)	3.91**	42
POMS Trait depression	9.85 (6.13)	1.04 (1.43)	6.28**	42
POMS Trait anxiety	6.95 (5.45)	1.65 (1.91)	4.13**	42
Duration of current episode of depression (months)	22.07 (19.54) (range: 4-60)			
Number of previous episodes of depression	4.86 (6.67) (range: 0-20)			

Note: * $p < .01$. ** $p < .001$.

Attentional Cueing Task

Using the same criteria as Fox, Russo, Bowles, & Dutton (2001), the response time (RT) data were excluded from trials with errors. Also, RTs less than 100ms or more than 2000ms were excluded, and then response latencies that were more than 2.5 SDs above each participant's mean RT were excluded as outliers. Mean RT data for each SOA condition are included in Figures 2 and 3.

Figure 2
Mean Response Times for each Word Type for both Groups at SOA of 200ms

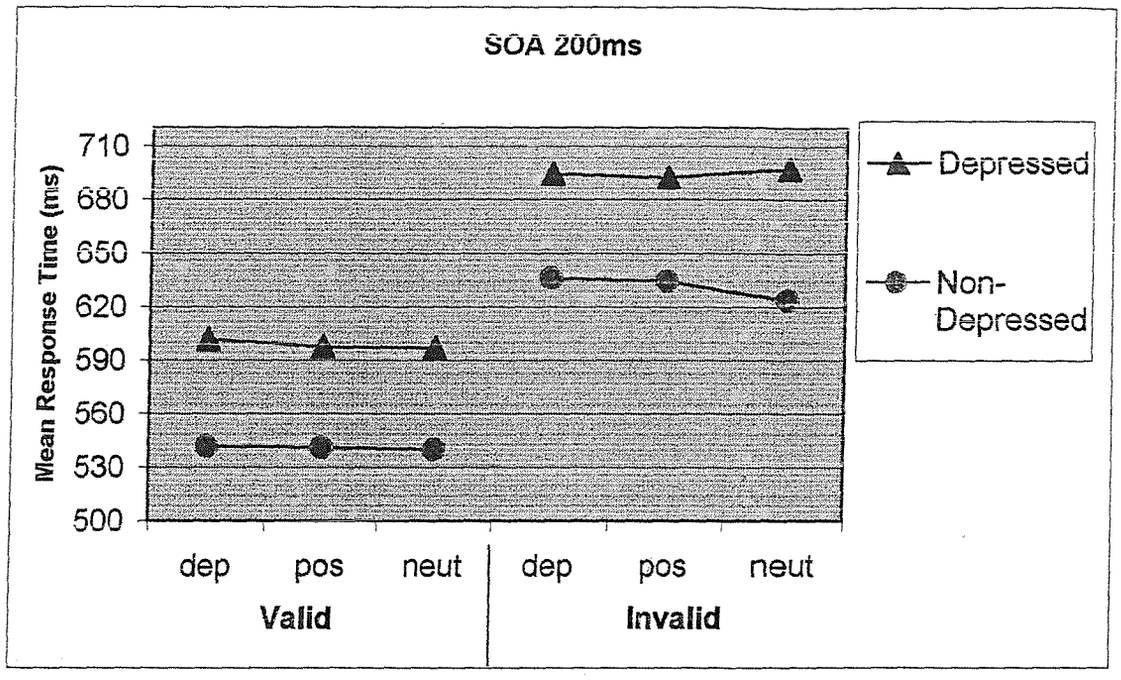
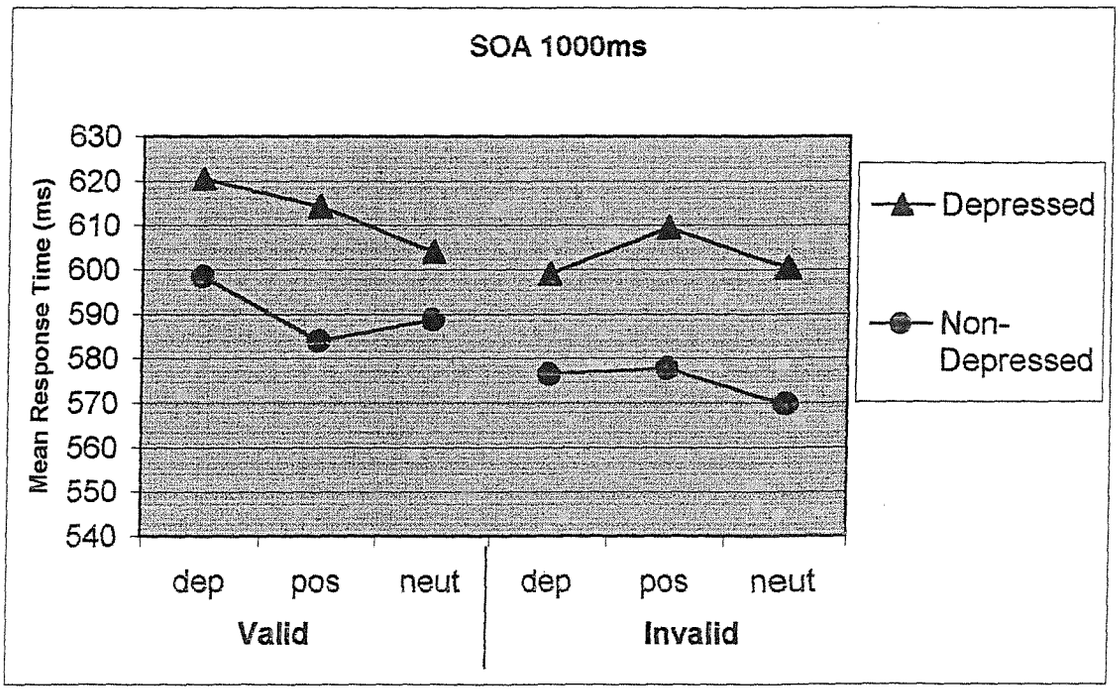


Figure 3
Mean Response Times for each Word Type for both Groups at SOA of 1000ms



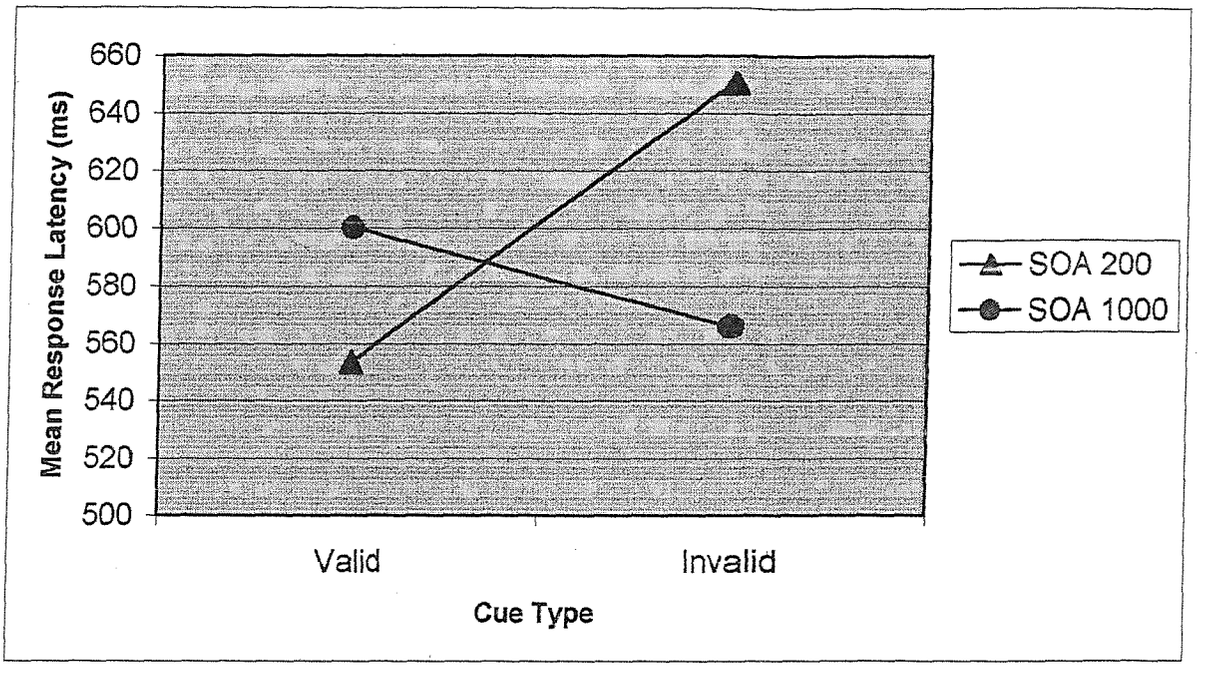
The RT data were subjected to a 2 (Group: depressed and non-depressed) x 3 (Word type: negative, positive, neutral) x 2 (SOA: 200ms and 1000ms) x 2 (Validity: valid

and invalid) ANOVA (see Figures 2 and 3 for mean RTs in each condition). There was a non-significant trend of Group, $F(1,41) = 3.56, p = .07$, as the depressed group were slower in responding across all conditions (as shown in Figures 2 and 3). There was a significant main effect of SOA, $F(1,41) = 5.2, p = .03$, as the 1000ms SOA condition yielded faster responses than the 200ms SOA condition (means: 601ms [$SD = 97$] and 614 [$SD = 110$] respectively). There was also a significant main effect of Validity, $F(1,41) = 70.19, p < .01$, as the valid trials yielded faster responses than the invalid trials (means: 587ms [$SD = 105$] and 628ms [$SD = 102$] respectively). There was a highly significant interaction between Validity and SOA, $F(1,41) = 90.9, p < .01$. Post-hoc comparisons revealed that when SOA was 200ms, the validly cued condition was significantly faster than the invalidly cued condition, $t(42) = 17.83, p < .01$. When the SOA was 1000ms, there was no significant difference between valid and invalid trials, $t(42) = 1.23, p = .23$ (see Figure 4). There were no other significant effects (all F values < 2.24).[1,2]

[1] As the cue validity effect was present at an SOA of 200ms only, the RT data were analysed separately, from each SOA. In the SOA 200ms condition, there was only a main effect of Validity on RT, $F(2,40) = 312.3, p < .01$. There were no other significant effects (all F values < 3.4). In the SOA 1000ms condition, there were no significant effects found (all F values < 3.54).

[2] The data were also analysed using alternative exclusion criteria such that the participants in the depressed group who had been recruited in response to the information intended for the control sample were removed from the depressed group. This analysis did not reveal any further results of interest.

Figure 4
Plot of Interaction between Validity and SOA (RTs averaged across Groups and Word Types)



Homophone Task

The neutral (filler) words were disregarded in the analysis of results, leaving data from 14 homophone words for each participant. Following on from Mathews et al. (1987), the number of spellings corresponding to the negative interpretations of each homophone was calculated for each participant, and converted into a percentage of all homophones that were spelt correctly. The spellings that did not correspond to either meaning were eliminated so that the negative spellings score was a percentage of the total of correctly spelled homophones. The depressed group ($n = 20$) had a mean negative interpretation score of 72% (*SD* 12). The control group ($n = 23$) had a mean negative interpretation score of 70% (*SD* 12). An independent *t*-test showed that these means were not significantly different, $t\ (41) = 0.69$, $p = .49$. The mean number of negative interpretations was 50% or above for both groups, indicating that

the negative interpretation was dominant in all cases. A one-sample *t*-test showed that this difference was significant for all participants, $t(42) = 11.2, p < .01$.

Correlations were calculated between the percentage of negative spellings on the homophone task and the questionnaire measures of depression and anxiety (see Table 2). There were no significant results for the whole sample. However, there was a significant positive correlation in the depressed group between BDI and homophone scores, $r = .47, p = .04$; and between state depression and homophone scores, $r = .45, p = .05$. There were no other significant correlations (see Table 2).

Table 2
Correlations of Homophone Scores and Measures

	r values		
Measure	Whole sample ($n = 43$)	Depressed Group ($n = 20$)	Non-depressed Group ($n = 23$)
BDI	.23	.47*	-.26
BAI	.26	.33	.16
POMS state anxiety	.22	.20	.27
POMS state depression	.29	.45*	-.06
POMS trait anxiety	.25	.30	.17
POMS trait depression	.22	.33	-.07

Note * Correlation is significant at the .05 level (2-tailed)

Morphed Faces Task

The data from each continuum were subjected to a signal detection analysis. A hit (H) denotes an accurate classification of the dominant emotion (e.g. a "sad" classification of a face that was 60% sad and 40% happy) and a false alarm (FA)

denotes the classification of the weak emotion (e.g. a "sad" classification of a face that was 40% sad and 60% happy). Following from Donaldson (1996), using the distribution-free non-parametric model, the discrimination index A' was computed using the formulae:

(i) For $H >= FA$: $A = 0.5 + [(H - FA)(1 + H - FA)]/[4H(1 - FA)]$

(ii) For $FA > H$: $A = 0.5 - [(FA - H)(1 + FA - H)]/[4FA(1-H)]$.

The bias index B''_D was calculated using the formula:

$$B''_D = [(1 - H)(1 - FA) - (H)(FA)]/[(1 - H)(1 - FA) + (H)(FA)].$$

The discrimination scores range between 0 and 1. When H = FA (i.e. performance is at chance), A' = 0.5. A score above 0.5 indicates above chance discrimination between faces. Response bias measures the ranges between −1 and +1, with positive values reflecting conservative performance and negative values indicating liberal response bias (Donaldson, 1996). A zero value indicates a neutral bias.

The means for the sad classifications are shown in Table 3, which were obtained from the two continua that used sad emotional blends, i.e. sad-happy and sad-angry.

Table 3

Scores from morphed faces task for classification of sad faces

	Group	
	Depressed	Non-depressed
Continuum	Mean (*SD*)	Mean (*SD*)
	Hit (60% sad)	
Sad-happy	.83 (.10)	.75 (.13)
Sad-angry	.68 (.18)	.62 (.18)
	False alarm (40% sad)	
Sad-happy	.25 (.15)	.24 (.12)
Sad-angry	.29 (.17)	.24 (.14)
	Discrimination (A)	
Sad-happy	.87 (.07)	.84 (.06)
Sad-angry	.80 (.05)	.78 (.09)
	Response bias (B)	
Sad-happy	-.20 (.50)	.00 (.49)
Sad-angry	.04 (.59)	.26 (.50)

A Group (2: depressed and non-depressed) by Continuum (2: sad-happy and sad-angry) ANOVA was performed on the discrimination (A) scores for sad faces. There was no main effect of Group, $F(1,41) = 1.65$, $p = .21$, and no interaction between Group and Continuum, $F(1,41) = .15$, $p = .70$. However, there was a main effect of Continuum, $F(1,41) = 24.31$, $p = < .01$. From the means, it can be seen that

the sad-happy faces are more easily discriminated than the sad-angry faces, across groups (mean A scores: sad-happy = .85, sad-angry = .79).

A Group by Continua ANOVA was performed on the response bias scores (B) for sad faces. There was a non-significant trend for a main effect in Group, $F(1,41) = 3.29$, $p = .08$, as the depressed group tended to make more sad classifications than the control group (mean B score for non-depressed group = .13, for depressed group = -.08). There was a significant main effect of Continuum, $F(1,41) = 4.90$, $p = .03$. From the means, it can be seen that more sad classifications were made for the sad-happy continuum than the sad-angry continuum (mean B score for sad-angry = .15, for sad-happy = -.10). There was no interaction between Continuum and Group, $F(1,41) = .01$, $p = .92$.

The means for the happy classifications are shown in Table 4, which were obtained from the two continua including happy face blends: happy-sad and happy-angry[3].

[3] It should be noted that data from the happy-sad continuum are included in the analyses of both sad classifications and happy classifications. This means that the results of the two analyses are not independent of each other. However, this approach was preferred to a separate analysis of the happy-angry faces, as this would not have indicated whether there was an effect of Continuum on happy classifications.

Table 4
Scores from morphed faces task for classification of happy faces

	Group	
	Depressed	Non-depressed
Continuum	Mean (*SD*)	Mean (*SD*)
	Hit (60% happy)	
Happy-sad	.75 (.15)	.76 (.12)
Happy-angry	.65 (.22)	.74 (.17)
	False alarm (40% sad)	
Happy-sad	.17 (.10)	.25 (.13)
Happy-angry	.17 (.15)	.21 (.15)
	Discrimination (A)	
Happy-sad	.87 (.07)	.84 (.06)
Happy-angry	.84 (.08)	.85 (.07)
	Response bias (B)	
Happy-sad	-.20 (.50)	-.00 (.49)
Happy-angry	.34 (.63)	.07 (.61)

A Group by Continuum ANOVA was performed on the discrimination of (A) scores for happy faces. There were no significant effects, $F(1,41) < 1.91$ *ns*.

A Group by Continuum ANOVA was performed on the response bias (B) scores for happy faces. There was a non-significant trend for a main effect of Group, $F(1,41) = 3.18$, $p = .08$, as the non-depressed group tended to make more happy classifications than the depressed group (Mean for non-depressed group = .04, for depressed group = .27). There were no other significant effects, $F(1,41) < 3.18$ *ns*.

Discussion

None of the experimental hypotheses was supported. That is, there was no evidence of an attentional bias for negative words in depressed individuals, compared with controls. There was also no evidence of an interpretive bias, as the depressed group did not significantly differ from the control group, either in their performance on the homophone task or the morphed faces task. More detailed aspects of the results will now be considered for each task in turn.

Attentional Cueing Task

There was no significant interaction effect of word type and group on response times. Therefore, the results do not support the hypothesis that negative cues had a selective effect on the attentional processes of the depressed participants, and as such, do not lend support to the prediction of a negative attentional bias in depression. This finding is consistent with several previous studies that also failed to find an attentional bias in depression. For example, MacLeod et al. (1986) found that their depressed group did not show an attentional bias for negative material. This was also found by Gotlib et al. (1988), Hill and Dutton (1989), and McCabe and Gotlib (1995). Several studies using emotional Stroop tasks, have found no evidence of selective interference from negative words on the responding of depressed participants (e.g. Mogg et al., 1993; Bradley et al., 1995). Mogg, Millar, & Bradley (2000) used eye-tracking methodology in addition to the visual probe task and did not find an attentional bias for negative faces in their depressed participants.

However, other studies have found evidence of an attentional bias for negative material in depressed individuals (e.g. Mathews et al., 1996; Mogg et al., 1995). Therefore, the current results add to a literature that has very mixed findings. On one

hand, the present results seem consistent with the theory of Williams et al. (1997) who suggested that depression is not associated with a negative attentional bias. This prediction is in contrast to those from the theories of Beck (1976) and Bower (1981), which predict attentional biases in depression.

On the other hand, in interpreting the present results, it is important to consider whether there are methodological factors that might explain the non-significant findings. For example, one important question is whether the task was a sensitive measure of attentional cueing effects. Thus, it is helpful to note that the results showed basic cueing effects (irrespective of word type and group), in the 200ms exposure condition, as RTs in valid trials were faster than those on invalid trials (this was also found by Fox et al., 2001). This suggests that this condition was sensitive to attentional effects. However, although there was a basic cueing effect at 200ms SOA, the stimulus presentation duration may have been too short to allow elaborative processing of negative information in depressed participants, which may explain why no attentional bias was found in this condition (e.g. Williams et al., 1997). In the 1000ms SOA condition, there was no evidence that the RTs were affected by the validity of the cues. This might explain why the predicted attentional bias was not found, as this condition seems to be insensitive to basic attentional effects of shift/hold versus disengagement.

Of note, the use of response times as the dependent variable has been criticised by some authors. For example, Lawson et al. (2002) discuss the use of response latency with regard to the study of interpretive bias in depression. Lawson et al. (2002) consider the use of response times an unsuitable method of examining cognitive bias in depression due to the slowing of reaction times to execute voluntary responses in depression, and the increased variability of response latencies (Lawson

et al., 2002). It was found that there was a non-significant trend for the depressed group to be slower to classify the direction of the arrows across all conditions. This trend is consistent with other research findings (e.g. Byrne, 1975). This is discussed by Williams et al. (1997) who suggest it could be due to motor slowing and/or cognitive slowing in individuals with depression. Payne and Hewlett (1960) (as cited in Williams et al., 1997) suggest that cognitive slowing may be caused by depressive rumination, by way of the rumination 'using up' processing resources that would otherwise be allocated to the task. Alternatively, it is suggested that the slowing may be due to lowered arousal or lowered motivation levels in depression (Williams et al., 1997). The presence of such slowing effects may complicate the assessment of attentional biases in depression when using tasks that rely on response time data.

Homophone Task

There was no significant difference between the depressed and non-depressed groups in the interpretations of the homophone words. In addition, the mean number of negative interpretations for both groups was above 50%, which has been found in previous studies (e.g. Mathews et al., 1989). This might be partly explained by a word frequency effect that mediated responding (e.g. Mathews et al., 1989). Furthermore, in the present study, the control group were staff in a general hospital, which may have increased their frequency of use of the some of the homophone words (for example, die, foul, pain, weak, skull and flu), particularly as many controls were nursing staff or medical secretaries, who would naturally have greater exposure to these words in their working environment. This may have led to an increased number of negative spellings in the control group, which may have obscured any depression-related group difference. Therefore, in further studies, it

would be beneficial to have a control group who would not have such a possible bias (e.g. non-hospital staff). In addition, some of the homophones had a neutral meaning that would appear to be used infrequently in the general population (e.g. lyre, scull, gilt and teas).

Furthermore, it has been questioned whether the specificity of material is important in eliciting an interpretive bias. The homophone task contains generally negatively themed homophones, and may not be sensitive to the specific concerns of depressed individuals (e.g. Gotlib, Krasnoperova, Yue, & Joorman, 2004). In further studies, it would be beneficial to modify the homophone task to include a greater number of depression-relevant themes, (e.g. poor/pour, whine/wine). However, it is of interest to note that the depressed group's homophone data was positively correlated with their depression scores, suggesting that the homophone task was sensitive to depression levels in depressed participants.

With the homophone task, there is an inherent problem of response bias, such that participants may have considered both alternative meanings of a homophone, but chose to report the negative meaning. Furthermore, this may be affected by experimenter bias, such that they felt that they were aware of the purpose of the experiment and tried to respond accordingly, by either deliberately giving a "depressed" answer, or trying to avoid giving a depressed or negative answer (e.g. MacLeod & Cohen, 1993). In further study, the inclusion of a measure of social desirability may be beneficial (e.g. Mogg et al., 1994). In addition, it may be the case that participants interpreted the homophones in one way, but (mis)spelt it the other way. In further research, it would be interesting to use a methodology described by Richards, Reynolds, and French (1993) whereby participants are asked to use the homophone in a sentence, to avoid being reliant on their spelling. This would also

decrease the error rate caused by responses consisting of spellings that did not match either interpretation, because it would be possible to score the meaning from the sentence. In discussing the limitations of the homophone paradigm, Eysenck et al. (1991) note that a constraint of the task is that participants may access both meanings of a homophone, but they can only write down one. This has the implication that participants have to make a conscious choice about which interpretation to write down, thus, their response may be more reflective of a response bias than an interpretive bias. In relation to this, comments from participants in the present study suggested that most of them were aware of two meanings of some of the words, but they reported that they wrote down the first interpretation that came to mind. Interestingly, this did not seem to be the experience of Mathews et al. (1989), who report that their participants hardly ever had awareness of both meanings of the homophones. As a general point, Eysenck et al. (1991) also note that in everyday life, words are usually encountered in a context, which will have an effect on the interpretation made. Therefore, the design of the homophone task, in which words are presented in isolation, decreases the ecological validity of the task. In their study, Eysenck et al. (1991) presented sentences with ambiguous meanings (e.g. after applying for a job that you really want, you receive a letter that contains the answer you had expected). The ambiguity in this type of sentence is more representative of the ambiguity that may be encountered in everyday life, where individuals are required to make an interpretation of events. Furthermore, this may be more representative of the negative cognitive style of a depressed individual, as predicted by Beck (1976).

Williams et al. (1997) propose that ambiguous material will only elicit a negative interpretive bias if the material is processed elaboratively. The homophone

task is assumed to involve automatic processing. This may account for the lack of difference between groups, as if the depressed group had elaboratively processed the homophones, they may have made a greater number of negative interpretations.

There are no published studies using the homophone task with depressed individuals with which to compare these results. However, Bradbury (2001-unpublished manuscript) used the homophone task in a study with clinically depressed individuals, and found a significant difference between the depressed and non-depressed group's negative interpretation score. The depressed group in Bradbury's study had a higher mean negative interpretation score, indicating that they made more negative interpretations of the homophones than the participants in the present study (81% compared to 72%). Furthermore, Bradbury's control group made fewer negative interpretations than in the present study (63% compared to 70%). The difference in findings between the studies does not appear to be due to the level of depression in the two studies. Bradbury's depressed sample had similar mean BDI scores to the participants in the present study (33 compared to 31). State depression was not measured in Bradbury's study. Therefore, there appear to be no obvious reasons for the difference in findings between these two studies, particularly with regard to the scores of the depressed groups. Further research may help to clarify this discrepancy. Of interest, Bradbury also used the RSVP paradigm (MacLeod & Cohen, 1993), the results of which did not find any evidence of a negative interpretive bias in depression. The RSVP paradigm is not affected by many of the criticisms of the homophone task (such as response bias), and thus may be considered to be a more accurate measure of interpretive bias.

Morphed Faces Task

There was no evidence of a bias in the discrimination of sad faces in depressed participants. This finding seems to be consistent with that of Lawson & MacLeod (1999) who failed to find a negative interpretive bias in depression. They suggested that when methodologies are employed which are not confounded by response bias; there is no negative interpretive bias to be found in depression.

The depressed group had a non-significant trend for a greater response bias favouring sad classifications and against happy classifications, compared to controls. Several possible underlying mechanisms contribute to this trend, for example, (a) depressed participants may be more likely to favour making 'sad' responses, or (b) non-depressed participants may be exhibiting a stimulus-independent response bias, such that they do not consider each face in turn, but consistently report that faces are happy.

As regards the use of the morphed faces task, this is the first study to use this paradigm to study interpretive bias in depression. Emotional faces have also previously been used in research into attentional bias in depression and this research has shown evidence of selective attention to sad faces in depressed patients (Gotlib et al., 2004). Gotlib et al. (2004) discuss contemporary research from experimental cognitive psychology, which suggests that perception and processing of words is governed by a different executive system than that used in the processing of pictures and objects. It is suggested that pictures may be more salient as they access the system where affective material is stored. This may mean that the faces may be more likely to elicit biases in processing. In addition, the use of faces has links to the difficulties of social interactions often experienced by individuals with depression. Related to this, Bower (1981) discusses the ambiguity of social interactions and the

reliance on cues from others, often derived from facial expression. It may be argued that tasks using faces have good ecological validity, as sad faces are a naturalistic source of depression-relevant information. However, some authors have suggested that self-referential material may be more effective in eliciting cognitive biases in depression (e.g. Mogg & Bradley, in press). The importance of self-referential processing has also been discussed in relation to memory (Bradley & Mathews, 1983) and attention (Segal, Gemar, Truchon, Guirguis, & Horowitz, 1995). Thus, it would seem helpful for future studies of interpretive bias to consider whether the stimuli can be presented in a way that encourages self-referential processing (i.e. in relation to the self), as this might be more likely to reveal a depression-related bias.

General Discussion

A significant strength of this study is that it was conducted on a clinical population. Much of the research to date into depression-related attentional and interpretive biases has been based on findings with mildly depressed students, which may not be representative of clinically depressed patients. However, clinical studies may have their difficulties, for example, as discussed by Mogg and Bradley (in press), many studies of clinically depressed participants have an inherent problem of high levels of anxiety, co-morbid with depressed mood. It is estimated that 72% of individuals with depressive disorders have a current additional diagnosis of GAD (Brown, Campbell, Lehman, Grisham, & Mancill, 2001). Therefore, it is difficult to obtain "pure" cases of depression, thus, interpretation of results must bear in mind that although depression was the primary problem reported by all participants in the depressed group, many of the depressed participants also had higher state and trait anxiety scores than the control group. Moreover, the majority of the depressed group

also met criteria for a diagnosis of GAD, which may have confounded results. As only six participants in the depressed group did not meet diagnosis for GAD, there were too few participants to analyse the effects of secondary diagnoses.

As a general issue, it would have been preferable for the groups to have been matched for gender. It was anticipated that the depressed group would have a higher number of females than males, as depression is purported to be twice as common in women as in men (Davison & Neale, 1998). Therefore, the general hospital was chosen for the control sample as it was expected that there would be a higher percentage of female than male staff.

Furthermore, as regards the depressed sample, many depressed participants self-referred to the study, after being approached in "coping with depression" groups. It may be that those depressed individuals who are able to attend groups and feel well enough and motivated enough to take part in a study may not be typical of other individuals with depression, who are not at a level where they can do this, because of their low levels of motivation and energy. Thus, the cognitive styles of the depressed group in this study may not have been reflective of individuals with depression more generally, or compared to those with more severe depression.

None of the tasks in the present study provided significant findings of cognitive biases in depression. This raises the question of whether the study has sufficient power to reveal the predicted biases. However, the groups were considered to have sufficient numbers of participants to detect these biases, as previous clinical studies in which cognitive biases in depression have been found have had similar or fewer participants in the depressed and control groups (e.g. Gotlib et al., 2004; Mathews et al., 1996; Mogg et al., 1995).

In summary, the present results did not provide support for Schema Theory (Beck, 1976) or Network Theory (Bower, 1981), both of which predict that there are biases for negative information in attention and interpretive processes in depression. While the range of tasks used in this study did not detect these predicted biases, which may be due to methodological reasons noted earlier, it may well be that future research with other tasks may reveal them.

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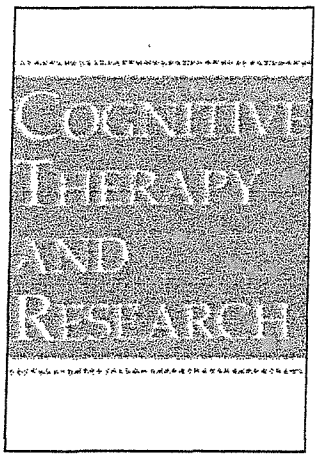

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10. In general, Cognitive Therapy and Research follows the recommendations of the *Publication Manual of the American Psychological Association (5th Ed., 2001),* and it is suggested that contributors refer to this publication.
11. Authors are encouraged to condense reports as much as possible and to be ready to provide more extensive details upon request. To assist in the standardization of assessment and treatment replications, authors of clinical outcome studies are required to submit a copy of their treatment manual and specific scoring procedures with the manuscripts. Topical relevance, methodological accuracy, and clarity of reporting (for both procedures and outcome) are of critical importance in experimental studies. Particular attention should be given to such considerations as the maximization of internal and external

validity, the optimal use of multimethod assessment, and a comprehensive reporting of results. Authors will be responsible for providing readers with copies of raw data, treatment and scoring manuals, and relevant experimental materials upon request (with incurred expenses accruing to the requestor). Case studies and brief reports should communicate important and heuristic observations, such as replication attempts, innovative techniques, and successful examples of how scientific research can be effectively integrated with clinical responsibilities. For brief reports, authors should set the character-space limit at 60 characters per line and should not exceed 380 lines of text (exclusive of the title page, abstract, and footnotes). References should not exceed 25 citations, and there should be no more than 2 tables or figures.

12. Authors requesting blind review should submit the manuscript in a form appropriate to this process (see the APA *Publication Manual*). Every effort will be made to expedite feedback to the author and to effect rapid publication of accepted manuscripts.
13. **The journal makes no page charges.** Reprints are available to authors, and order forms are sent with proofs.

British Journal of Clinical Psychology

The British Journal of Clinical Psychology publishes original contributions to scientific knowledge in clinical psychology. This includes descriptive comparisons, as well as studies of the assessment, aetiology and treatment of people with a wide range of psychological problems in all age groups and settings. The level of analysis of studies ranges from biological influences on individual behaviour through to studies of psychological interventions and treatments on individuals, dyads, families and groups, to investigations of the relationships between explicitly social and psychological levels of analysis.

The following types of paper are invited:

- Papers reporting original empirical investigations;
- Theoretical papers, provided that these are sufficiently related to the empirical data;
- Review articles which need not be exhaustive but which should give an interpretation of the state of the research in a given field and, where appropriate, identify its clinical implications;
- Brief reports and comments.

1. Circulation

The circulation of the Journal is worldwide. Papers are invited and encouraged from authors throughout the world.

2. Length

Papers should normally be no more than 5,000 words, although the Editor retains discretion to publish papers beyond this length.

3. Reviewing

The journal operates a policy of anonymous peer review. Papers will normally be scrutinised and commented on by at least two independent expert referees (in addition to the Editor) although the Editor may process a paper at his or her discretion. The referees will not be aware of the identity of the author. All information about authorship including personal acknowledgements and institutional affiliations should be confined to the title page (and the text should be free of such clues as identifiable self-citations e.g. 'In our earlier work...').

4. Online submission process

1) All manuscripts must be submitted online at http://bjcp.edmgr.com/.

First-time users: click the REGISTER button from the menu and enter in your details as instructed. On successful registration, an

email will be sent informing you of your user name and password. Please keep this email for future reference and proceed to LOGIN. (You do not need to re-register if your status changes e.g. author, reviewer or editor).
Registered users: click the LOGIN button from the menu and enter your user name and password for immediate access. Click 'Author Login'.

2) Follow the step-by-step instructions to submit your manuscript.

3) The submission must include the following as separate files:

- Title page consisting of manuscript title, authors' full names and affiliations, name and address for corresponding author.
- Abstract
- Full manuscript omitting authors' names and affiliations. Figures and tables can be attached separately if necessary.

4) If you require further help in submitting your manuscript, please consult 'Tutorial for Authors' (PDF, 130Kb).

Authors can log on at any time to check the status of the manuscript.

5. Manuscript requirements

- Contributions must be typed in double spacing with wide margins. All sheets must be numbered.
- Tables should be typed in double spacing, each on a separate page with a self-explanatory title. Tables should be comprehensible without reference to the text. They should be placed at the end of the manuscript with their approximate locations indicated in the text.
- Figures can be included at the end of the document or attached as separate files, carefully labelled in initial capital/lower case lettering with symbols in a form consistent with text use. Unnecessary background patterns, lines and shading should be avoided. Captions should be listed on a separate page. The resolution of digital images must be at least 300 dpi.
- For articles containing original scientific research, a structured abstract of up to 250 words should be included with the headings: Objectives, Design, Methods, results, Conclusions. Review articles should use these headings: Purpose, Methods, Results, Conclusions.
- For reference citations, please use APA style. Particular care should be taken to ensure that references are accurate and complete. Give all journal titles in full.
- SI units must be used for all measurements, rounded off to practical values if appropriate, with the Imperial equivalent in parentheses.

- In normal circumstances, effect size should be incorporated.
- Authors are requested to avoid the use of sexist language.
- Authors are responsible for acquiring written permission to publish lengthy quotations, illustrations etc for which they do not own copyright.

For Guidelines on editorial style, please consult the *APA Publication Manual* published by the American Psychological Association, Washington DC, USA (http://www.apastyle.org/).

6. Brief reports and comments

These allow publication of research studies and theoretical, critical or review comments with an essential contribution to make. They should be limited to 2000 words, including references. The abstract should not exceed 120 words and should be structured under these headings: Objective, Method, Results, Conclusions. There should be no more than one table or figure, which should only be included if it conveys information more efficiently than the text. Title, author and name and address are not included in the word limit.

7. Publication ethics

Code of Conduct
Principles of Publishing

8. Supplementary data

Supplementary data too extensive for publication may be deposited with the British Library Document Supply Centre. Such material includes numerical data, computer programs, fuller details of case studies and experimental techniques. The material should be submitted to the Editor together with the article, for simultaneous refereeing.

9. Post acceptance

PDF page proofs are sent to authors via email for correction of print but not for rewriting or the introduction of new material. Authors will be provided with a PDF file of their article prior to publication for easy and cost-effective dissemination to colleagues.

10. Copyright

To protect authors and journals against unauthorised reproduction of articles, The British Psychological Society requires copyright to be assigned to itself as publisher, on the express condition that authors may use their own material at any time without permission. On acceptance of a paper submitted to a journal, authors will be requested to sign an appropriate assignment of copyright form.

11. Checklist of requirements

- Abstract (100-200 words)
- Title page (include title, authors' names, affiliations, full contact details)
- Full article text (double-spaced with numbered pages and anonymised)
- References (APA style). Authors are responsible for bibliographic

accuracy and must check every reference in the manuscript and proofread again in the page proofs.

- Tables, figures, captions placed at the end of the article or attached as separate files.

University of Southampton

Department of Psychology

University of Southampton
Highfield
Southampton
SO17 1BJ
United Kingdom

Telephone +44 (0)23 8059 5000
Fax +44 (0)23 8059 4597
Email

12th August 2003

To Whom It May Concern

Dear Sirs

Re. Lynda Parnham

I am writing to confirm the approval of Lynda Parnham's application to the ethical committee for her study titled 'A study of mood, thinking and judgement'. Approval was given on the 20th June 2003.

Yours sincerely

KLucas

Mrs Kathryn Lucas
Ethical Committee Secretary

Swindon Local Research Ethics Committee (LREC)
Kennet and North Wiltshire Primary Care Trust
Southgate House
Pans Lane
Devizes
Wiltshire
SN10 5EQ

Direct Line: 01380 733767
Fax: 01380 733779

GF kp SW 33/2003

11 December 2003

Miss Lynda Parnham
Trainee Clinical Psychologist

Dear Miss Parnham

SW 33/2003
A study of mood, thinking and judgement: Does a negative interpretative bias exist in depression?

At its meeting on 9 December 2003 Swindon Research Ethics Committee received your letter dated 30 October 2003 regarding amendments which was approved.

Any changes or extensions to the protocol, or additional investigators, should be notified to the Committee for approval. Adverse events should also be reported to the Committee. May we remind you of the Data Protection Act 1998, and the need to conduct the trial in accordance with the Good Clinical Practice guidelines.

The Committee is required to audit progress of research and to produce a yearly report to the Avon Gloucestershire and Wiltshire Strategic Health Authority and Department of Health. You are therefore required to provide a brief yearly report and a short final report.

The Swindon Research Ethics Committee is fully compliant with the International Conference on Harmonisation/Good Clinical Practice (ICH) Guidelines for the Conduct of Trials Involving the Participation of Human Subjects and undertakes to adhere to the relevant clauses of the guidelines for clinical practice adopted by the European Union in January 1997.

Yours sincerely

Kirsten Peck

pp **Godfrey Fowler (Mr)**
Chairman
Swindon Local Research Ethics Committee

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Miss Lynda Parnham
Trainee Clinical Psychologist

Research and Development
Avon & Wiltshire Mental Health Partnership NHS Trust
Centre for Research, UWE
Glenside Campus, Blackberry Hill
Bristol S16 1DD

Tel:0117 344 8839
Fax:0117 344 8848
Email: tony.soteriou@uwe.ac.uk

06 August 2003

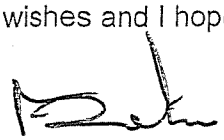
Dear Lynda

Re: A Study of Mood:Thinking and Judgement
Start date: 1st August 2003 End Date: 31st August 2004
Date R&D project form received at R&D office: 31st July 2003

Thank you for the updated R&D form for the above project – this has been reviewed by the R&D Office and I am very pleased to be able to confirm that your project has been **APPROVED TO PROCEED**. It was considered that for this particular R&D project, approval could be given without the need for additional review of scientific quality by the R&D committee, as the project is part of a DClinPsych with formal supervisors Professor Mogg and Bradley, at the University of Southampton. Approval is subject to your supervisor having reviewed and approved formally your protocol.

- **Trust approval is given subject to the appropriate NHS research ethics committee approval** Please forward confirmation of full LREC approval to the R&D Office as soon as possible.
- **It is unclear from your protocol where clients are being recruited from, the GP surgeries or from AWP. This needs to be clarified. If it is the GP's then appropriate R&D approval will be needed.**
- Consideration needs to be given to ensuring patient confidentiality and to ensuring that informed consent for the participants' involvement in the research is initially made by the direct clinical team. This will also need you not to see any patient identifiable information or records prior to full consent being given. Your protocol currently indicates that you, the researcher, will contact clients following referral from the GP. This may not be appropriate.
- You have indicated that outcome measures are not applicable to this study, which I do not think is the appropriate.
- If there are any changes to the study protocol then please ensure that a revised protocol is immediately forwarded to the AWP R&D office with the amendments highlighted, together with confirmation that the amendments have been favourably reviewed by the appropriate research ethics committee.
- If the end date changes from that shown above then please inform me. Trust approval will cease on this end date, please contact me to discuss and request any extension.
- Please ensure that both you and your supervisor are aware of the Department of Health's Research Governance Framework (available from the Internet: http://www.doh.gov.uk/research), Trust Intranet and the R&D Office).

Best wishes and I hope the research proceeds well.



Dr Tony Soteriou,
Associate Research and Development Director

Swindon and Marlborough NHS
NHS Trust

RESEARCH & DEVELOPMENT
Commonhead Offices
Great Western Hospital
Marlborough Road
Swindon SN3 6BB

4 November 2003

Miss L Parnham

Dear Lynda

APPROVAL OF RESEARCH PROJECT: 2003HR0001
A study of mood, thinking and judgement

Thank you for returning the completed R&D project form. As you have successfully obtained Trust approval and LREC approval you may proceed with your research project/trial.

In accordance with the Research Governance Framework all researchers must be aware of their obligation to comply with the Data Protection Act and the Health & Safety Act. You are also required to inform the Data Protection Officer of your intended project prior to the start of research.

After 6/12 months into your trial (depending on the duration of research) you will be asked to complete a short form in order to report progress and any changes to your project. Please also note that the R&D department will conduct a random audit of 10% of all research trials/projects being conducted within the Trust each year and your research may be included.

Please notify the R&D department when your research as been completed and of any resulting publications.

Finally good luck with your research and please contact the R&D department again if you have any further queries. If you have not already received one, a Researcher's Information Pack is available from the R&D department; this pack is full of useful advice on how to conduct a research project.

Thank you for your co-operation.

Yours sincerely

Wendy Griffiths
R &D Manager

Swindon NHS
Primary Care Trust

Direct Line: 01793 708706
Fax:: 01793 708701
Email: jane.leaman@swindon-pct.nhs.uk

Public Health Directorate
North Swindon District Centre
Thamesdown Drive
Swindon
Wiltshire
SN25 4AN

Ms Lynda Parnham,

19.12.03.

Dear Ms Parnham,

Re: A Study of Mood, Thinking and Judgement. Protocol No: MWP/S/001/03/04
Thank you for submitting your proposal to the Swindon PCT for research management and governance evaluation. The proposal to recruit and enter patients from Swindon primary care practices (Protocol Number MWP/S/001/03/04) as detailed in the application form and protocol supplied by you was approved. This approval is subject to the research being conducted in accordance with GCP Standards based on adherence to the project protocol and the study meeting all the requirements of the DoH Research Governance Framework (RGF). The responsibilities of the principal investigator and local lead researcher, under the RGF are attached for your information and action where appropriate. Approval was for a local start date of 1st December 2003.and a local end date of 31st December 2004.

The PCT (and the Research Ethics Committee), require notice of any amendments and serious adverse events. In addition the PCT require regular, succinct reports on progress, specifically including details of local recruitment, similar to that currently required by RECs. This approval applies to the project for the duration as defined in the protocol and application form. A final report should be provided to the PCT within 12 months of project completion.

The Department of Health require that the PCT and the PCT RM&G (based in Southampton), maintain a database of project details, which includes commercial trials. However, no trial details will be passed to third parties, without prior agreement with yourselves. We note that you hold a contract with Taunton & Somerset Trust, which enables you to work within Avon & Wilts Psychiatric Health Trust, which in turn routinely provides psychology services in the Swindon PCT area and, that you will be conducting the practical part of the research under the supervision of Dr Howells of AWP. We note that University of Southampton is providing indemnity insurance in addition to the responsibility that the NHS holds in this sphere. Finally, the PCT would like to wish the project success.

Yours

Jane Leaman
Director of Public Health, Swindon PCT
Cc: WREN, University of Southampton.

Verbal script for recruitment from Coping with Depression group

My name is Lynda Parnham and I am a Trainee Clinical Psychologist from University of Southampton. I am conducting research into the effect of mood on thinking and judgment.

I am hoping to recruit people to take part in this research.

If you would be interested in participating, it would involve meeting with me at the Victoria Hospital for about 1-½ hours at an arranged time.

During that time, I would be asking you to fill out some questionnaires, and do some simple tasks, such as looking and faces and words on a screen and making a rating about them, and listening to some words on a tape and writing them down.

If you think you would be interested in participating, I will give you an information sheet that will tell you more about it, and an opt-in slip, which you can return to me if you would like to take part.

I will be available during the break and at the end of this evening's class if you would like any further information.

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Department of Clinical Psychology
Victoria Hospital
Okus Road
Swindon
SN1 4HZ

Tel:01793 437538

January 2004

Dear

My name is Lynda Parnham and I am a Trainee Clinical Psychologist, currently based at the Victoria Hospital in Swindon. I am conducting a study, under the supervision of Dr. Liz Howells, (Consultant Clinical Psychologist), into the effect of mood on thinking and judgement.

I would like to recruit patients with a current diagnosis of clinical depression, who would be willing to participate in this research.

If you would be willing to assist me with this, I would be asking you to provide me with names and contact details of patients who fit these criteria and would be happy to be invited to participate in the research.

Each patient would be sent an information letter asking him or her to attend a session with myself, which will last approximately 1½ hours. During this time, they would be asked to complete some questionnaires about their mood, and then undertake some tasks involving spelling, judgement and comprehension.

If you were able to assist in the recruitment of participants, I would be grateful if you could fill out the following sheet for any patients that you would like to refer.

Such a referral would not constitute a referral to the psychology service for assessment or treatment. For any patients where this is required, please continue to use the existing referral system.

If you require any further information, please contact me at the above address.

Yours sincerely,

Lynda Parnham
Clinical Psychologist in Training

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Department of Clinical Psychology
Victoria Hospital
Okus Road
Swindon
SN1 4HZ

Tel:01793 437538

Referral to Study on Mood, Thinking and Judgement

Patient Details

Name: Date of Birth:

Address:

Telephone Number:

Please add any information that you feel is relevant:

Has this referral been discussed with the patient?

YES / NO (please circle)
If no, please justify:

Referrer details

Name:

Practice/Base:

Signature:..... Date:.....

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Department of Clinical Psychology
Victoria Hospital
Okus Road
Swindon
SN1 4HZ
Tel:01793 437538

January 2004

Information Sheet (P)

A Study of Mood, Thinking and Judgement

You have been invited to take part in a research study. Before you decide whether you want to take part, this sheet will give you some information about why this study is being done and what it will involve. You may wish to discuss it with your clinician, or with the researcher, or with anyone else. You may take time to decide whether or not you wish to take part.

What is the purpose of the study?
This study aims to develop an understanding of the relationship between mood, thinking and judgement.

Why have I been chosen?
_ _ _ _ _ _has written to me to say that you have low, sad or depressed moods all or some of the time. He or she should have talked to you and asked your permission before writing to me. There will be another 23 people with similar problems to you who will be taking part in the study.

Who is organising the study?
The study is being carried out by Lynda Parnham, who is a Trainee Clinical Psychologist in Swindon. She is doing this study as part of a Doctorate in Clinical Psychology with University of Southampton. The study will take 18 months to complete overall.

What will happen to me if I take part?
The study will involve meeting with me for about 1½ hours to complete some questionnaires and talk about your current situation. At that point, you will be asked if you are willing to carry out some simple tasks including listening to some words on a tape and looking at some pictures of faces, and words on a screen. You will be under no obligation to do so and can withdraw from the study at any time without this having any effect on your current treatment
Your results will later be compared with other people who do not suffer with long-standing sad moods or depression, to see if there are any differences in how people think when they are depressed.

Are there any disadvantages or risks in taking part in this study?
Sometimes, people can find it upsetting to talk about how they feel. If this happens, Lynda will ask you what would be useful to help you to feel better, and talk to you about this. Lynda has experience of talking to people who sometimes get upset, and there is no need to worry if this happens.
Sometimes people find experiment sessions a bit stressful. If you were to find this, we would stop and have a break, or try something else, or we can stop the assessment, and this will not affect any treatment you receive in the future.

What are the possible benefits of taking part in this study?
People often find it very helpful to talk to someone about how they feel, especially when the person is very interested. Often people find that by taking part in studies, they feel very pleased or proud afterwards, knowing that they have played an important part in finding out more about a psychological problem.

In the long run, we hope that the information gained will be able to increase our understanding of how people think when they are depressed. We might be able to improve the way we treat depression.

If, after you have participated, you think that you might like to see a psychologist to talk about how you feel, you will need to talk to your GP, who may be able to refer you to a psychologist or counsellor. You will not be able to automatically see Lynda for psychology sessions after you have taken part in the study.

Will my GP be paid for including me in the study?
No health care professionals will be paid as a result of your involvement in the study.

Confidentiality
All information collected during the course of the study will be kept strictly confidential and will be used only for this study. Identifying information (e.g. your name) will be deleted to ensure anonymity. Identity numbers will be used instead so that you cannot be recognised by the answers you give. If you are happy for your GP to know that you have chosen to participate in the study, then a letter would be sent to the GP to them, however, they would not be given your results.

Ethical Approval
This study has been approved by the Swindon Local Research Ethics Committee.

What will happen to the results of the study?
The results of the study will be written up by the researcher as part of a training course in clinical psychology. If you would like a summary of the results, then please feel free to contact me at the end of the study (September 2004) and I will be happy to provide a summary.

If you decide to take part, please fill in the sheet attached and return it to me at the above address. A meeting will be arranged when I have received this. In the meantime, if you have any questions about the study, please contact myself: Lynda Parnham, Trainee Clinical Psychologist at the Victoria Hospital, as above.

Thank you for taking the time to read this, and I hope to hear from you soon.

Lynda Parnham
Clinical Psychologist in Training

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Department of Clinical Psychology
Victoria Hospital
Okus Road
Swindon
SN1 4HZ
Tel: 01793 437538

January 2004

Information Sheet (P)

A Study of Mood, Thinking and Judgement

You have been invited to take part in a research study. Before you decide whether you want to take part, this sheet will give you some information about why this study is being done and what it will involve. You may wish to discuss it with your clinician, or with the researcher, or with anyone else. You may take time to decide whether or not you wish to take part.

What is the purpose of the study?
This study aims to develop an understanding of the relationship between mood, thinking and judgement.

Why have I been chosen?
You have requested further information after hearing about the study during a course run by the Swindon Psychology Service. There will be another 23 people with similar problems to you who will be taking part in the study.

Who is organising the study?
The study is being carried out by Lynda Parnham, who is a Trainee Clinical Psychologist in Swindon. She is doing this study as part of a Doctorate in Clinical Psychology with University of Southampton. The study will take 18 months to complete overall.

What will happen to me if I take part?
The study will involve meeting with Lynda for about 1½ hours to complete some questionnaires and talk about your current situation. At that point, you will be asked if you are willing to carry out some simple tasks including listening to some words on a tape and looking at some pictures of faces, and words on a screen. You will be under no obligation to do so and can withdraw from the study at any time without this having any effect on your current treatment
Your results will later be compared with other people who do not suffer with long-standing sad moods or depression, to see if there are any differences in how people think when they are depressed.

Are there any disadvantages or risks in taking part in this study?
Sometimes, people can find it upsetting to talk about how they feel. If this happens, Lynda will ask you what would be useful to help you to feel better, and talk to you about this. Lynda has experience of talking to people who sometimes get upset, and there is no need to worry if this happens.
Sometimes people find experiment sessions a bit stressful. If you were to find this, we would stop and have a break, or try something else, or we can stop the assessment, and this will not affect any treatment you receive in the future.

What are the possible benefits of taking part in this study?
People often find it very helpful to talk to someone about how they feel, especially when the person is very interested. Often people find that by taking part in studies, they feel very pleased or proud afterwards, knowing that they have played an important part in finding out more about a psychological problem.

In the long run, we hope that the information gained will be able to increase our understanding of how people think when they are depressed. We might be able to improve the way we treat depression.

If, after you have participated, you think that you might like to see a psychologist to talk about how you feel, you will need to talk to your GP, who may be able to refer you to a psychologist or counsellor. You will not be able to automatically see Lynda for psychology sessions after you have taken part in the study.

Will my GP be paid for including me in the study?
No health care professionals will be paid as a result of your involvement in the study.

Confidentiality
All information collected during the course of the study will be kept strictly confidential and will be used only for this study. Identifying information (e.g. your name) will be deleted to ensure anonymity. Identity numbers will be used instead so that you cannot be recognised by the answers you give. If you are happy for your GP to know that you have chosen to participate in the study, then a letter would be sent to the GP to them; however, they would not be given your results.

Ethical Approval
This study has been approved by the Swindon Local Research Ethics Committee.

What will happen to the results of the study?
The results of the study will be written up by the researcher as part of a training course in clinical psychology. If you would like a summary of the results, then please feel free to contact me at the end of the study (September 2004) and I will be happy to provide a summary.

If you decide to take part, please fill in the sheet attached and return it to me at the above address. A meeting will be arranged when I have received this. In the meantime, if you have any questions about the study, please contact myself: Lynda Parnham, Trainee Clinical Psychologist at the Victoria Hospital, as above.

Thank you for taking the time to read this, and I hope to hear from you soon.

Lynda Parnham
Clinical Psychologist in Training

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Department of Clinical Psychology
Victoria Hospital
Okus Road
Swindon
SN1 4HZ

Tel:01793 437538

A Study of Mood, Thinking and Judgement (P)

I would like to participate in the study and have received the information sheet. I would like to be contacted to arrange a meeting to participate in the study.

Name:

Address:

Telephone Number:

I would prefer to be contacted by TELEPHONE / LETTER (please circle).

Please return this slip to **Lynda Parnham** at the above address.

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Department of Clinical Psychology
Victoria Hospital
Okus Road
Swindon
SN1 4HZ
Tel:01793 437538

A Study looking at Mood, Thinking and Judgement

My name is Lynda Parnham, and I am a Trainee Clinical Psychologist. I am conducting a study into mood, thinking and judgement. I need participants to fill in some questionnaires about their mood, and then complete some simple tasks including listening to some words on a tape and looking at pictures of faces, and words on a screen. You will be asked to make some simple ratings.

Your participation and results will be confidential and will not be made available to your employer.

A payment of £5 will be offered to each participant completing the study.

For more information, please fill in the slip below and return it to me at the above address.

I look forward to hearing from you.

A Study looking at Mood, Thinking and Judgement

I am interested in participating in the above study and would like some more information.

I am happy for this information to be sent to the address that I have given.

Name:

Address:

Signature:..... Date:.....

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Department of Clinical Psychology
Victoria Hospital
Okus Road
Swindon
SN1 4HZ

Tel:01793 437538

January 2004

Information Sheet (C)

A Study of Mood, Thinking and Judgement

You have been invited to take part in a research study. Before you decide whether you want to take part, this sheet will give you some information about why this study is being done and what it will involve. You may wish to discuss it with your clinician, or with the researcher, or with anyone else. You may take time to decide whether or not you wish to take part.

What is the purpose of the study?
This study aims to develop an understanding of the relationship between mood, thinking and judgement.

Why have I been chosen?
You returned the slip to obtain further information after seeing the flyers at your workplace You are being asked to participate as a "control participant" or a healthy volunteer, meaning that you do not suffer with depression.
This means that your results would be compared against those of people who suffer with depression There will be another 23 people who will be taking part in the study as control participants.

Who is organising the study?
The study is being carried out by Lynda Parnham, who is a Trainee Clinical Psychologist in Swindon. She is doing this study as part of a Doctorate in Clinical Psychology with University of Southampton. The study will take 18 months to complete overall.

What will happen to me if I take part?
The study will involve meeting with me for about 1½ hours to complete some questionnaires and talk about your current situation. At that point, you will be asked if you are willing to carry out some simple tasks including listening to some words on a tape and looking at some pictures of faces, and words on a screen. You will be under no obligation to do so and can withdraw from the study at any time.

Your results will later be compared with other people who do not suffer with long-standing sad moods or depression, to see if there are any differences in how people think when they are depressed.

Are there any disadvantages or risks in taking part in this study?
Sometimes, people can find it upsetting to talk about how they feel. If this happens, Lynda will ask you what would be useful to help you to feel better, and talk to you about this. Lynda has experience of talking to people who sometimes get upset, and there is no need to worry if this happens.
Sometimes people find experiment sessions a bit stressful. If you were to find this, we would stop and have a break, or try something else, or we can stop the assessment, and this will not affect any treatment you receive in the future.

What are the possible benefits of taking part in this study?
Often people find that by taking part in studies, they feel very pleased or proud afterwards, knowing that they have played an important part in finding out more about a psychological problem.

In the long run, we hope that the information gained will be able to increase our understanding of how people think when they are depressed. We might be able to improve the way we treat depression.

If, after you have participated, you think that you might like to see a psychologist to talk about how you feel, you will need to talk to your GP, who may be able to refer you to a psychologist or counsellor. You will not be able to automatically see Lynda for psychology sessions after you have taken part in the study.

Will my employer be paid for including me in the study?
No employer or health care professional will be paid as a result of your involvement in the study.

Confidentiality
Your employer will not be informed that you are participating in this study. All information collected during the course of the study will be kept strictly confidential and will be used only for this study. Identifying information (e.g. your name) will be deleted to ensure anonymity. Identity numbers will be used instead so that you cannot be recognised by the answers you give.

Ethical Approval
This study has been approved by the Swindon Local Research Ethics Committee.

What will happen to the results of the study?
The results of the study will be written up by the researcher as part of a training course in clinical psychology. If you would like a summary of the results, then please feel free to contact me at the end of the study (September 2004) and I will be happy to provide a summary.

If you decide to take part, please fill in the sheet attached and return it to me at the above address. A meeting will be arranged when I have received this. In the meantime, if you have any questions about the study, please contact myself: Lynda Parnham, Trainee Clinical Psychologist at the Victoria Hospital, as above.

Thank you for taking the time to read this, and I hope to hear from you soon.

Lynda Parnham
Clinical Psychologist in Training

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Department of Clinical Psychology
Victoria Hospital
Okus Road
Swindon
SN1 4HZ

Tel:01793 437538

A Study of Mood, Thinking and Judgement (C)

I would like to participate in the study and have received the information sheet. I would like to be contacted to arrange a meeting to participate in the study.

Name:

Address:

Telephone Number:

I would prefer to be contacted by TELEPHONE / LETTER (please circle).

Please return this slip to **Lynda Parnham** at the above address.

1. MAJOR DEPRESSION

1a. Currently, have you been feeling depressed, sad, empty, or have you lost interest or pleasure in almost all of your usual activities? YES NO

1b. Currently, have other people commented to you that you appear down or tearful, or that you seem less interested in your usual activities? YES NO

1c. Have you ever experienced a period of two weeks or more when you felt depressed, sad, empty or lost interest or pleasure in your usual activities? YES NO

*** If YES to either 1a, 1b or 1c, or uncertain, continue enquiry.
If NO to all, skip to DYSTHYMIC DISORDER ***

1d. Now there's a list of questions about how you have felt nearly every day for the past two weeks. So for all of them it is: nearly every day in the past two weeks:

- has your sleep been disturbed/changed YES NO
- have you been much more active or so slowed down you could hardly move YES NO
- have you felt tired/lacking in energy YES NO
- have you felt worthless or guilty (not just about being ill) YES NO
- have you had difficulty thinking, concentrating or making decisions YES NO
- have you had thoughts about death or hurting yourself YES NO
- has your weight or appetite been different in the last two weeks from how it is normally YES NO

2. DYSTHYMIC DISORDER

2a. Over the past two years, have you frequently had days when you felt down, blue or depressed for most of the day? YES NO

2b. Over the past two years, have other people commented to you that you often appear down, blue or depressed? YES NO

*** If NO to 2a or 2b, go to 2c ***

2c. Have you ever experienced a period when you felt down, blue or depressed more days than not for two years or more? YES NO

If YES, when was the most recent time this occurred?

*** If YES to either 1a, 1b or 1c, continue enquiry.
If NO to all, skip to MANIA ***

CURRENT EPISODE

Now, I want to ask you a series of questions about this current period of time when you felt down or depressed.

2d. What percentage of days over the past two years have you experienced a depressed mood for most of the day? %

2e. Over the past two years, have you had periods of two months or more when your mood was normal? YES NO

2f. Now there's a list of questions about your experiences during the past two years. Have you:

- had poor appetite or overeating YES NO
- had trouble sleeping, or sleeping too much YES NO
- felt tired all the time YES NO
- been down on yourself, feeling like a failure YES NO
- had poor concentration or difficulty making decisions YES NO
- feeling pessimistic about the future YES NO

3. MANIA

3a. Have you ever experienced a period of several days or more when you felt unusually or excessively high or irritable? This is very different from being in a good mood or feeling the effects of a substance. YES NO

If YES:

What I mean is a period when you felt persistent or abnormally high or irritable, perhaps along with such things as a decreased need for sleep, racing thoughts, distractibility, and an unusual increase in the number of activities you were involved in? YES NO

If YES:

When was the most recent time this incurred?

How long did this period last?

4. PANIC DISORDER

4a. Have you had times when you have felt a sudden tense anxiety, fear or discomfort (a panic attack)? YES NO

4b. Do these feelings ever 'come out of the blue' for no apparent reason? YES NO

4c. When in the situation, does the anxiety come on immediately? YES NO

4d. How long does it take for the anxiety to reach its peak level?

4e. How long does the fear usually last at this peak level?

4f. During a panic attack, do you experience:

racing heart or palpitations	YES NO
sweating	YES NO
trembling or shaking	YES NO
shortness of breath	YES NO
feeling of choking	YES NO
chest pain or discomfort	YES NO
feeling hot or cold	YES NO
dizziness	YES NO
numbness or tingling sensations	YES NO
fear of dying	YES NO
feeling detached from yourself	YES NO
fear of going crazy	YES NO

5. AGORAPHOBIA

5a. Do you feel panicky about being in places or situations, or avoid them? YES NO

5b. Have you ever felt panicky in any situations or avoided them because of panic? YES NO

5c. Are you worried about entering situations in case you become dizzy or vomit, etc? YES NO

6. PHOBIA

6a. Do you have a persistent, excessive fear of a specific object or situation? YES NO

6b. If YES, what?

6c. Do you avoid being near the object or situation? YES NO

6d. If exposed to the object or situation would you experience intense anxiety? YES NO

6e. Does the fear or avoidance interfere with your daily functioning? YES NO

7. CLAUSTROPHOBIA

7a. Are you afraid of small, enclosed spaces? YES NO

7b. Do you experience intense anxiety every time you are in a small, enclosed space? YES NO

8. SOCIAL PHOBIA

8a. In social situations where you might be observed or evaluated by others, or when you are meeting new people, do you feel very fearful, anxious, or nervous? YES NO

8b. Are you currently overly concerned that you might do/say something that might embarrass or humiliate yourself in front of others? YES NO

8c. Do you avoid social or performance situations, or endure them with intense anxiety? YES NO

8d. Does the distress interfere with normal functioning? YES NO

9. OCD

9a. Are you bothered by thoughts, images or impulses that keep recurring to you that seem inappropriate or nonsensical, but you can't stop them coming into your mind? YES NO

If YES, specify:

9b. Do you feel driven to repeat some behaviour or to repeat something in your mind over and over again to try and feel more comfortable? YES NO

If YES, specify:

10. PTSD

10a. Have you personally experienced or witnessed a traumatic or life-threatening event? YES NO

10b. If YES:

Did you feel intensely helpless or horrified in that situation?	YES NO
Do you have nightmares or flashbacks of that event?	YES NO
Do you avoid situations that remind you of the event?	YES NO
Do you have persistent symptoms of increased arousal?	YES NO

11. GAD

11a. Over the last six months, have you been continually worried or anxious about a number of events of activities in your daily life? YES NO

11b. Do you find it hard to control worry? YES NO

11c. Do you have any of the following six symptoms which have been present more days than not in the past six months:

Restlessness/feeling on edge	YES NO
Easily fatigued	YES NO
Irritability	YES NO
Muscle tension	YES NO
Sleep disturbance	YES NO
Concentration problems	YES NO

11d. Does your anxiety interfere with your daily functioning? YES NO

12. NON ORGANIC PSYCHOSIS/CONVERSION SYMPTOMS

12a. Have you ever experienced a loss or change in your physical functioning such as paralysis, seizure or severe pain? YES NO

*** If YES, specify details of time and periods ***

12b. Has there ever been a period of time when you had strange or unusual experiences, such as:

Hearing or seeing things that other people didn't notice YES NO
Hearing voices or conversations when no one was around YES NO
Visions that no one else saw YES NO
Had the feeling that something odd was going on around you, that people were doing things to test or hurt you YES NO

Depression-relevant	Positive	Neutral
BLAME	ADORABLE	ABSORBS
BLEAK	ADVENTUROUS	ADAPTATION
DEFEATED	BELOVED	APPLIED
DEJECTED	BLISS	BEARINGS
DEPRESSED	CELEBRATION	BROCHURE
DESOLATE	CHARMING	CELERY
DESPAIR	COMFORT	CONSEQUENCE
DESPERATE	COURAGEOUS	CONVEY
DESPONDENT	COURTEOUS	DECADE
DISCOURAGED	DELIGHT	DENSITY
DISMAL	DEVOTED	DIVERT
DOWNCAST	ECSTATIC	DOWNWIND
DRAINED	ELATED	ENLARGE
DREAD	EMBRACE	EVIDENTLY
FAIL	ENCHANTING	EXCHANGE
FORLORN	ENTERTAINING	FARMYARD
FORSAKEN	EXOTIC	FEDERAL
GLOOM	FROLIC	FORMALITY
GRIEF	GENTLE	GEOMETRY
GUILT	GIFTED	HYPHEN
HELPLESS	GOODWILL	INTEND
HOPELESS	HARMONY	JUNCTION
LISTLESS	HEAVENLY	MIXTURE
LONELY	HELPFUL	MOLECULE
MELANCHOLY	HUMOROUS	NOTION
MISERY	INSPIRED	OCCUPATION
MOURNFUL	JOLLY	ORBITAL
PATHETIC	JUBILANT	PERIODICAL
PESSIMISTIC	KISSING	PORTION
PITIFUL	MERRY	PREFIX
POWERLESS	MIRACLE	PRODUCER
SADNESS	PARADISE	RADAR
SORROW	PRAISE	RANGING
SUICIDE	REJOICING	REPORTING
TEARFUL	ROMANTIC	RESEMBLE
TIRED	SANCTUARY	REVISE
TORMENTED	SUPERB	SENDING
UNSUCCESSFUL	THRILLED	SKYLINE
WORTHLESS	TRIUMPH	THERMAL
WRETCHED	VIBRANT	WATERFOWL

Words for the homophone spelling task

(Filler and homophone words)

1. Mint
2. Petal
3. Die/dye
4. Rabbit
5. Slay/sleigh
6. Foul/fowl
7. Melon
8. Rake
9. Moan/mown
10. Groan/grown
11. Stag
12. Spade
13. Liar/lyre
14. Play
15. Bore/Boar
16. Pain/pane
17. Weak/week
18. Trade
19. Mobile
20. Willow
21. Skull/scull
22. Tease/teas
23. Poodle
24. Bury/Berry
25. Month
26. Deed
27. Guilt/gilt
28. Flu/flew

Practice List

Please write down the words as you hear them on the tape.

1	
2	
3	
4	

Main List

Please write down the words as you hear them on the tape.

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
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14	
15	
16	
17	
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19	
20	
21	
22	
23	
24	
25	
26	
27	
28	

Script for assessment (controls)

- Close blinds, set up room (laptop, 2 chairs, water, plastic cups)
- Get correct pack ready (control).
- Ensure computer is on and working, check response box and speakers. Put laptop up on box file
- Check volume is not muted on laptop
- Bring into room and seat at desk, one metre from screen.
- Welcome participant and read verbal script

Verbal Script for Research Participants (C)

I am Lynda Parnham, a Clinical Psychologist in Training. I am asking for your participation in a study looking at mood and how if affects what people think about things. This will involve doing some tasks with me, and will last about an hour and a half. You will be asked to complete 3 tasks. One involves listening to some words on a tape and writing them down. The second involves looking at some words on a screen and responding by pressing a button. The third task involves looking at some faces and rating how emotional the facial expression appears to be. I will also be asking some questions about yourself, and how you have been feeling lately, and asking you to fill out some questionnaires.

All your personal information will be kept completely confidential, and can only be seen by me. Your name will not be included in the results. Nothing will be given to your employer.

If you are happy to take part, I need you to sign a consent form. It just says that you are happy to take part and that you understand that it is part of a research project.

Your participation is entirely voluntary, which means that you can stop at any time, and you can leave anytime you want to

Do you have any questions?

- Ask participant to sign consent form

Personal information form

I just need to get a few details from you before we start...

- Fill out form " Section A personal details" DOB

Experimental Section

Whilst we are doing these tasks, it is best if we don't talk, but we can talk after.

The first task I would like you to do involves listening to some words. We will do some practice words first. Your job is just to write down what you hear on the sheet in front of you. Please print the words, and don't worry about your spelling. Please just write down each word once. Ready?

- Give pen and response sheet
- Turn speakers on.
- Click on experiment 1 on laptop
- Play practice list (will start automatically)
- Pause laptop (press icon)
- Check understanding
- Turn over sheet
- Play main list
- On completion, file response sheet

- Switch off speakers
- Mute PC by double-clicking on icon and checking box

Was that ok? Are you happy to do the next task?

Attentional Cueing Task

- Laptop forward
- Lights off
- Run experiment 2 on laptop (click on icon)
- When instructions appear, give verbal instruction
- Leave cursor in top corner

This is the second task. It is a test about attention and concentration. For this one, you will see arrows and words appearing on the screen. You need to put one finger on this button, and one finger on this button (like this - demonstrate). Your job is this: when the arrow points left (show), then press the left arrow. If the arrow points right (show), then you press the right button. That's all you have to do. The words and arrows appear in different places – up the top and down the bottom– just do what the arrows say – press left for left and right for right. There are practice goes. This section lasts about 8 minutes.

Morphed Faces Task

- Click on experiment 3 icon – get instructions up on screen

This is the third task. For this one, you will see some faces appearing on the screen. Under the face, there will be two words that are names of feelings that people have. Your job is to decide how you think the person is feeling, and press the button that is on the same side as the feeling you think they have. When you decide, the face will disappear. You don't have to rush – it is more important that you are happy with your choice. But don't think about it for too long – just go for what you think is right. This task takes about 10 minutes.

Well done. That is all the computer stuff done.

- Move laptop away, to allow room for writing

Questionnaires

Ok – Now I need you to fill out some questionnaires.

State POMS

This sheet has words on it that describe feelings that people have. Can you read each word carefully, and then circle the number that matches how you feel right now, this minute.

BDI

For this one, each section has a list of 4 sentences. Your job is to circle the number that shows how you have felt over the last week.

Go through first one together

BAI

On this one, there are words describing how you might have feel. Can you say how much you felt like each one over the last week? You can get some of the symptoms for

other reasons, like being unwell or from hormones (women only). Please make sure they are due to anxiety and if you are unsure, please ask.
Go through first one together

Trait POMS
This one is like the one you did before, so I want you to do the same again, but this time, answer it for how you tend to generally feel, most of the time.

Ok, thanks for doing those.
- Collect up questionnaires

Diagnostic interview
Are you ready to carry on?
First, I need to ask you a few things about when you have been upset in the past
- Fill out section B

Now we need to go through some questions about how you feel about different things. Just to remind you – this is completely confidential. None of this information will be available to anyone else. All yes – no answers unless I ask for more detail.

- Administer diagnostic interview

De-briefing statement
The main aim of the research was to explore how people who feel depressed tend to interpret vague or unclear information, compared to people who do not feel depressed. It is expected that when depressed people are presented with unclear information, they will tend to make a negative interpretation.
The information you give will help us to have a better understanding of how people think and feel while they are depressed, which may help us, in the long run, to provide better treatment in the future.
Once again, the results of this study will not include your name at all and I haven't deceived or tricked you in any way.
You can have a copy of this summary if you like.

Payment of controls
Now you are finished – I need to give you your £5. This receipt says that I have paid you, so the university knows where the money has gone! It won't be used for anything else. Could you please sign to say that you have received the money.

- Hand over £5 note

Thank you for participating in this research, I am very grateful for your help.
You are free to go now, unless you have any further questions.

Script for assessment (patients)

- Close blinds, set up room (laptop, 2 chairs, water, plastic cups)
- Get correct pack ready (patient).
- Ensure computer is on and working, check response box and speakers. Put laptop up on box file
- Check volume is not muted on laptop
- Switch CD player off (close function – right click, last option)
- Bring into room and seat at desk, one metre from screen.
- Welcome participant and read verbal script

Verbal Script for Research Participants (P)

I am Lynda Parnham, a Clinical Psychologist in Training. I am asking for your participation in a study looking at mood and how if affects what people think about things. This will involve doing some tasks with me, and will last about an hour and a half. You will be asked to complete 3 tasks. One involves listening to some words on a tape and writing them down. The second involves looking at some words on a screen and responding by pressing a button. The third task involves looking at some faces and rating how emotional the facial expression appears to be. I will also be asking some questions about yourself, and how you have been feeling lately, and asking you to fill out some questionnaires.

All your personal information will be kept confidential, and can only be seen by me. Your name will not be included in the results.

If you are happy to take part, I need you to sign a consent form. It just says that you are happy to take part and that you understand that it is part of a research project.

Your participation is entirely voluntary, which means that you can stop at any time, and you can leave anytime you want to. If you decide you don't want to finish the session, this won't affect any treatment you have now or in the future in any way.

Do you have any questions?

- Ask participant to sign consent form

Personal information form

I just need to get a few details from you before we start...

- Fill out form

Experimental Section

Whilst we are doing these tasks, it is best if we don't talk, but we can talk after.

The first task I would like you to do involves listening to some words. We will do some practice words first. Your job is just to write down what you hear on the sheet in front of you. Please print the words, and don't worry about your spelling. Please write down each word once. Ready?

- Give pen and response sheet
- Turn speakers on.
- Click on experiment 1 on laptop
- Play practice list (will start automatically)
- Pause laptop (press icon)
- Check understanding
- Turn over sheet
- Play main list

- On completion, file response sheet
- Switch off speakers
- Mute PC by double-clicking on icon and checking boxes

Was that ok? Are you happy to do the next task?

Attentional Cueing Task
Run experiment 2 on laptop (click on icon)
When instructions appear, give verbal instruction

This is the second task. It is a test about attention and concentration. For this one, you will see arrows and words appearing on the screen. You need to put one finger on this button, and one finger on this button (like this - demonstrate). Your job is this: when the arrow points left (show), then press the left arrow. If the arrow points right (show), then you press the right button. That's all you have to do. The words and arrows appear in different places – up the top and down the bottom– just do what the arrows say – press left for left and right for right. There are practice goes again. This section lasts about 8 minutes.

Morphed Faces Task

- Click on experiment 3 icon – get instructions up on screen

This is the third task. For this one, you will see some faces appearing on the screen. Under the face, there will be two words that are names of feelings that people have. Your job is to decide how you think the person is feeling, and press the button that is on the same side as the feeling you think they have. When you decide, the face will disappear. You don't have to rush – it is more important that you are happy with your choice. But don't think about it for too long – just go for what you think is right. This task takes about 10 minutes.

Well done. That is all the computer stuff done.

- Move laptop away, to allow room for writing

Questionnaires
Ok – Now I need you to fill out some questionnaires.

State POMS
This sheet has words on it that describe feelings that people have. Can you read each word carefully, and then circle the number that matches how you feel right now, this minute.

BDI
For this one, each section has a list of 4 sentences. Your job is to circle the number that shows how you have felt over the last week.
Go through first one together

BAI
*On this one, there are words describing how you might have feel. Can you say how much you felt like each one over the last week? You can get some of the symptoms for other reasons, like being unwell or from hormones (*women only*). Please make sure they are due to anxiety and if you are unsure, please ask.*
Go through first one together

Trait POMS

This one is like the one you did before, so I want you to do the same again, but this time, answer it for how you tend to generally feel, most of the time.

Ok, thanks for doing those.

- Collect up questionnaires

Diagnostic interview

Are you ready to carry on?

First, I need to ask you a few things about your depression.

- Fill out section B

Now we need to go through some questions about how you feel about different things.

- Administer diagnostic interview

De-briefing statement

The main aim of the research was to explore how people who feel depressed tend to interpret vague or unclear information, compared to people who do not feel depressed. It is expected that when depressed people are presented with unclear information, they will tend to make a negative interpretation.

The information you give will help us to have a better understanding of how people think and feel while they are depressed, which may help us, in the long run, to provide better treatment in the future.

Once again, the results of this study will not include your name at all and I haven't deceived or tricked you in any way.

You can have a copy of this summary if you like.

GP informing

As part of research, we usually ask participants for their permission to advise their GP that they have taken part in a study.

We do this, in case that participating in this study has raised any issues that you would like to discuss further. It also means that your GP knows that you have done this study. It wouldn't have any negative effect on your treatment or the care that you receive and it wouldn't be used for any other purposes.

If you are happy about this, I would send this letter to your GP

- Show letter

Would it be alright for me to send this to your GP?

- If yes – *can you give me your GP details* (name of GP, surgery)
- Insert GP details on Section A: Personal information

Thank you for participating in this research, I am very grateful for your help.

You are free to go now, if you are ready.

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Department of Clinical Psychology
Victoria Hospital
Okus Road
Swindon
SN1 4HZ

Tel:01793 437538

Consent Form (C)

Title of study: A study of mood, thinking and judgement.

Name of researcher: Lynda Parnham, Trainee Clinical Psychologist

Please initial box:

1. I confirm that I have read and understood the Information Sheet, for the above study and I have the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason. I understand that my participation and any results will not be disclosed to my employer. ☐

3. I agree to take part in the above study ☐

.....	... .	.....
Name of participant	Date	Signature
.....	... .	.....
Researcher	Date	Signature

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Department of Clinical
Psychology
Victoria Hospital
Okus Road
Swindon
SN1 4HZ

Tel:01793 437538

Consent Form (P)

Title of study: A study of mood, thinking and judgement.

Name of researcher: Lynda Parnham, Trainee Clinical Psychologist

Please initial box:

1. I confirm that I have read and understood the Information Sheet, for the above study and I have the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason and without affecting my medical care. ☐

3. I agree to take part in the above study ☐

.....	.....	.....
Name of participant	Date	Signature
.....	.....	.....
Researcher	Date	Signature

Information about Participants

(Controls)

Section A: Personal Details

Name ..... Number .....

Date .....

Age .....

Occupation .....

Number of years in full time education .....

Do you wear spectacles for reading? Yes / No

If yes, do you have them with you? Yes / No

Do you have any reading difficulties? Yes / No

If yes: Please give details

Section B: Past Information

All information obtained from this form will be treated with absolute confidentiality.

1. In the past when you have been emotionally upset, has it been so severe that you have:

a. Discussed it with a friend? Yes / No

b. Visited your GP? Yes / No

c. Seen a Psychiatrist? Yes / No

d. Received any treatment? Yes / No

If yes: what type of treatment did you receive? Medication
Counselling
Cognitive Therapy
Other

2. If you have ever received any treatment such as medication or professional counselling for an emotional difficulty:

a. Was the problem predominantly feelings of tension and anxiety, or feelings of depression and hopelessness? Anxiety / Depression

b. Is this still a current problem for you? Yes / No

Information about participants

(Patients)

Section A: Personal Details

Name ..... Number .....

Date .....

Age .....

Occupation .....

Number of years in full time education .....

Do you wear spectacles for reading? Yes / No

If yes, do you have them with you? Yes / No

Do you have any reading difficulties? Yes / No

If yes: Please give details

Section B: Details of depression

1. For how long have you currently been depressed?

2. Are you currently receiving treatment for your depression? Yes / No

If yes: Are you receiving any of the following types of treatment and, if so, for how long?

a. Medication.....
b. Cognitive Therapy.....
c. Other.....

Who is treating you?.....

3. Have you had any other episodes of depression in the past? Yes / No

If yes: How many? .....

Generally, how long did they last?.....

4. Have you had any treatment for depression in the past? Yes / No

If yes: What sort of treatment did you receive?

a. Medication.
b. Cognitive Therapy
c. Other

For how long did you receive this treatment?.....

Screen 1

During the next task, you will be presented with some words. Each word will either appear at the top or the bottom of the screen.

Immediately after the word, an arrow pointing left or right will be presented in either the same location or in the opposite location.

Press the appropriate button as fast and as accurately as you can.

Screen 1.

During this task, you will be presented with a variety of different faces.

Your task is to classify the faces using the two buttons in front of you.

Throughout the task, make sure you read the instructions carefully, respond as accurately as possible, and don't rush your response.

Screen 2.

As soon as the face appears on the screen, classify the face by pressing one of the buttons in front of you.

Remember to respond as accurately as possible and don't rush your response.

The first two faces are for practice. After a pause, the main task will begin.

Avon and Wiltshire NHS
Mental Health Partnership NHS Trust

Department of Clinical Psychology
Victoria Hospital
Okus Road
Swindon
SN1 4HZ

Tel:01793 437538

Date:

Dear Dr.

Re: **DOB:**

Address:

I am writing to advise you that the above named patient has participated in a study of mood, thinking and judgement, following referral to Lynda Parnham.

They have given consent for me to write and advise you of this.

Individual results will not be made available. However, if you have any questions about the study generally, please contact me at the above address.

I would like to advise you that this person has been referred to Lynda Parnham for the purposes of this research only. If a psychologist or counsellor is already seeing the person, this will not affect their treatment. If they are not seeing a psychologist already, then participating in the research will not constitute a referral for assessment for therapeutic input. Therefore, if you feel this person needs to be seen by a psychologist for assessment, the existing referral system should be used.

Yours sincerely,

Lynda Parnham
Clinical Psychologist in Training