A COMPETITIVE TEST OF FOUR MODELS OF BIASED INFORMATION PROCESSING IN CLINICAL DEPRESSION

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ABSTRACT

This study tested four models of characteristically biased depressive cognition against each other. Using samples of clinically depressed and non-depressed participants (n = 25 in both groups), evidence was gathered of characteristic processing strategies used in the completion of two tasks. The first involved participants rating the 'believability' of contrived feedback regarding their performance on seven tests of 'intelligence'. The second required participants to remember this same feedback following a short interval. Attempts were made to describe aspects of the self-schemata used by participants in the completion of these tasks.

The findings from this study do not support proposals that there exist characteristic differences between depressive and non-depressive cognition in terms of biased information-processing. Firstly, the analysis of grouped data did not reveal differences between depressed and non-depressed participants in terms of the strategies used in the completion of the two tasks. Secondly, there were apparent differences between the strategies used by both groups for the two tasks. In rating the 'believability' of feedback, it appeared that both groups of participants utilised an 'unbiased' processing strategy. In attempting to recall feedback, it appeared that both groups operated a 'schematically-biased' processing strategy. The depressed sample held, on average, more 'negative' self-schemata in relation to the processing tasks, and were less confident of their self-knowledge in this regard.

This study also attempted to identify the strategy being used by each participant, in order to further investigate ideas that biased strategies might be 'characteristic' of either group. Conclusions from these analyses are tentative, but evidence was obtained of differences between participants in both groups, in terms of the strategies adopted. Finally, there were indications that conceptualisations of 'bias' contained in the literature might be inadequate and that certain participants utilised 'mixed' strategies.

These findings have implications for cognitive models of depression (e.g. Beck, 1967) and an understanding of the nature of 'schematic processing'. In addition, they help to clarify the purpose of cognitive therapy for depression.

DECLARATION

No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification in the University of Manchester, or in any other institution of learning.

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This thesis is dedicated to my parents, and my brother, and to Rebecca, with love.

Chapter One

INTRODUCTION

1. INTRODUCTION

1.1 Definition and features of depression.

The term 'depression' has been used to refer to either a symptom, a syndrome or any of a range of different nosologic disorders (Kendall et al, 1987). As a 'symptom' it might, for example, be used to indicate that someone is feeling sad. As a 'syndrome', it refers to a cluster of symptoms that tend to occur together (Williams, 1992), but which may be present in the context of any of a number of diagnosable disorders (e.g. schizophrenia). Finally, for depression to be a 'nosologic category', careful diagnostic procedures must be observed, whereby other potential diagnostic categories are excluded.

The syndrome of clinical depression incorporates a diverse range of symptoms, which can be divided into four broad categories (Williams, 1992). Firstly, there are seen to be 'emotional' changes (such as feelings of sadness). Secondly, there are 'cognitive' changes (for example, low self esteem, rumination or difficulties with concentration). Thirdly, 'behavioural' changes have been noted (such as agitation or retardation) and finally there are a number of associated 'somatic' symptoms (including disturbances of sleep, or loss of energy). While cognitive functioning is affected, depression does not seem to influence intellectual performance (Grannick, 1963; Friedman, 1964).

Distinctions have been drawn between different types of depression. For example, a distinction has been made between those who experience periods of euphoria between episodes of depression, and those experiencing 'normal' mood at such times. The former condition has been termed bipolar disorder, or 'manic depressive disorder', and is seen to be far less common than instances where there are no periods of euphoria (unipolar depression). This thesis concentrates on unipolar, non-psychotic depressive disorder.

Criteria have been drawn up which specify the symptoms which must be present in order for a person to be given a diagnosis of depression. Appendix 1 presents the criteria for Major Depressive Episode used in the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSMIV, American Psychiatric Association, 1994). The two main features of depression are a lowering of mood that is both severe and prolonged, and a loss of interest and pleasure in activities. For someone to receive a diagnosis of Major

Depressive Episode, at least one of these two main symptoms must have been present, in addition to four or more of the other symptoms listed, for a period of at least two weeks. The symptoms must cause significant distress or impairment in functioning (e.g. social, occupational or other). Other symptoms which commonly occur in association with 'depression' defined in this way (for example, 'avoidance' or 'ruminations') are excluded as they also occur in other diagnostic categories (Williams, 1992). In DSM IV, Major Depressive Disorder has been divided into sub-types involving either a single episode or recurrent episodes of Major Depressive Episode.

The criteria used to diagnose 'mild', 'moderate' or 'severe' depressive episode in the ICD - 10 Classification of Mental and Behavioural Disorders, Clinical Descriptions and Diagnostic Guidelines (ICD - 10, World Health Organisation, 1992) are similar to those used in DSM IV, and are listed in Appendix 2.

These definitions of 'depression' do not make any assumptions as to what the cause of the depression might be. However, attempts have been made to identify sub-clusters of symptoms within the syndrome, and these may be based on ideas about aetiology. For example, the literature contains references to ideas of there being 'reactive' (in response to a life event) and 'endogenous' (due to organic disturbance) forms of depression. Williams (1992) noted that while the distinction was made on the basis of many more criteria than simply whether a 'life event' was identified, research into the basis for, and treatment implications of, such a classification has led to complex and inconclusive findings.

1.2 Comorbidity with other Disorders

The extent to which depression co-occurs with other psychiatric conditions is difficult to determine, given the range of forms that the affective disorders can take, and the observation that the syndrome may occur in the context of what is seen as another primary disorder. Rehm and Mehta (1994) note that the practice of distinguishing 'primary' and 'secondary' diagnoses on the basis of attempting to determine which condition occurred first can lead to added confusion. In particular, they note difficulties in distinguishing between primary 'anxiety' and 'affective' disorders, due to the extent to which symptoms of both conditions occur together.

Mineka et al (1998) have recently reviewed the comorbidity of anxiety and unipolar depression. Throughout this century, some researchers have treated anxiety and depression as distinct diagnostic entities, while others have argued that together they represent a single underlying dimension or 'class' of mood disorder. DSM III limited the practice of making co-diagnoses, but research that ignored exclusion rules revealed extensive comorbidity. Research based on DSM III-R and DSM IV (APA, 1994), in which exclusion rules were largely eliminated, noted that anxiety and depression were among the most notable examples of overlapping disorders (Clark et al, 1995). As well as the disorders co-occurring, it is noted that key symptoms which define these theoretically distinct disorders often occur together. Regarding diagnostic comorbidity, Clark's (1989) meta-analysis showed that depressed patients had an overall rate of 57% for any anxiety disorder. The likelihood of a particular anxiety disorder co-occurring with depression mirrors the base-rate prevalence of the anxiety disorder (Kessler et al, 1994). Hence, social and simple phobias have the highest rates of co-occurrence in depressed individuals, whereas panic disorder has the lowest rate of co-occurrence.

DSMIV (APA, 1994) states that the following mental disorders frequently co-occur with Major Depressive Disorder: Substance-Related Disorders, Panic Disorder, Obsessive-Compulsive Disorder, Anorexia Nervosa, Bulimia Nervosa and Borderline Personality Disorder. The extent to which depression is co-morbid with other personality disorders is unknown, but Rehm and Mehta (1994) suggest that this might be high.

Depressive disorder is also found to commonly co-occur with a range of medical conditions. DSMIV (APA, 1994) suggests that up to 20-25% of individuals with certain general medical conditions (e.g. diabetes, carcinomas, stroke) will develop Major Depressive Disorder during the course of their general medical condition.

1.3 Epidemiology

Epidemiological studies indicate that 4 - 5% of the population at any one time experience clinical depression (Paykel, 1989). Approximately 1 in 10 people suffer an episode of depression in any one year (Amensohn and Lewinsohn, 1981), and approximately 1 in 5 people have been clinically depressed at some time in their lives (Kessler et al, 1994).

Depression is therefore not uncommon in the general population - after the anxiety disorders, affective disorders are the most prevalent psychiatric condition. It also appears that there are differences between men and women in terms of their vulnerability. Estimates of prevalence contained in DSMIV indicate that 10 - 25% of women, and 5 - 12% of men meet criteria for Major Depressive Disorder at some time in their lives. Point prevalence estimates are cited as 5 - 9% of women and 2 - 3% of men in a community sample.

The study by Amensohn and Lewinsohn (1981) helps to explain these observed differences between the sexes. Following a longitudinal, prospective study of 1000 people, these authors reported that the incidence of new cases was similar for men and women (7.1% of men, 6.9% of women), but that women were more likely to suffer repeated episodes of depression. In the course of the study, 21.8% of women who experienced depression became depressed again, compared to 12.9% of the men in the sample. No differences were observed in terms of the length of depressive episodes, or in the age at which the first episode of depression was experienced.

1.4 Course and Chronicity

The course that depression takes can vary greatly between individuals. In most cases, depression is time-limited and untreated episodes usually resolve within three to six months (Fennell, 1989). However, episodes of depression can vary in terms of their duration and the frequency with which they occur. Williams (1992) notes that 25% of episodes last less than one month, and a further 50% resolve within three months. DSMIV reports that in 20 - 30% of cases, there is 'incomplete remission' and sufferers are left with some depressive symptoms, but at a level that do not meet criteria for diagnosis. Keller et

al (1984) found that 21% of patients suffering an episode of major depression still had major symptoms of the disorder after two years of follow up. Keller and Shapiro (1981) note that a long duration of illness is a negative predictor of response to treatment.

Relapse following recovery is common. Eighty (80%) of depressed patients have more than one depressive episode (Clayton, 1983), and over 50% relapse within two years of recovery (Keller and Shapiro, 1981). DSMIV reports that the number of prior episodes strongly predicts the likelihood of developing a further depressive episode. 50 - 60% of those who have experienced a single episode will go on to experience a second episode, while 90% of those who have experienced three episodes will experience a fourth.

1.5 Measurement of Depression

Rabken and Klein (1987) note that four categories of measures relating to depression are available, for use where the patient is the principal informant. These are: structured diagnostic interviews, clinician rating scales, global illness ratings and self-rating scales.

Diagnostic interviews have been published, with the aim of improving the reliability of clinical assessment by standardising the inquiries made by raters as well as the response options for patients. Rabken and Klein (1987) note that a range of such measures are available, which differ in terms of, for example, the degree of structure, the extent of inference by the rater that is possible, and the amount of training required. Commonly-used schedules include the Present State Examination (PSE; Wing et al, 1974) and the Structured Clinical Interview for DSM III-R (SCID III-R; Spitzer et al, 1990), which has been designed specifically to generate DSM III-R diagnoses.

Scales have also been developed with the aim of assessing 'severity' within a diagnostic category. As such, they assume a unitary dimensionality that may be unfounded, but the potential advantage is that they may allow for the the description of patient samples and the measurement of change (perhaps through the use of 'cut-off' scores). Rating scales may either be administered by the clinician (e.g. the Hamilton Rating Scale for Depression, HRSD; Hamilton, 1960) or rely on the patient's self-report (e.g. the Beck Depression Inventory; Beck et al, 1961). Different measures place emphasis on different aspects of a

patient's presentation, and as a result may be more suitable for particular client groups. For example, the HRSD (Hamilton, 1960) is especially thorough with regard to somatic symptoms, and may therefore be more suitable for those suffering a severe and prolonged depression, in whom such symptoms are seen to be more pronounced (McLean, 1976).

'Global rating scales' are widely used in clinical trials, although it is far from clear what considerations the ratings given encompass (Rabken and Klein, 1987). A study by Chipman and Paykel (1974) indicated that ratings were influenced by more than symptom severity, and it may be that the value or desirability of observed changes are important. Examples of global rating scales include the Clinical Global Impressions (Guy, 1976) and the Global Assessment Scale (Waskow and Parloff, 1975).

In addition, there exist an enormous array of measures assessing specific cognitive, behavioural, psychosocial or other aspects of the patient's presentation. A consideration of the relative merits of these different approaches to the measurement of depression is beyond the scope of this thesis, but the reader is referred to texts by Hamilton and Shapiro (1990) and Marsella, Hirschfield and Katz (1987)

1.6 Aetiological factors in Depression

While the cause of depressive disorder is not known, a number of models have been developed, based on an understanding of factors associated with the development and maintenance of the disorder. The different models variously emphasise biological, environmental, behavioural and cognitive factors in the origins of depression, and are often intended as guides to potentially therapeutic interventions, by identifying elements of the patient's presentation that might usefully be addressed. In so doing, they make assumptions as to what the primary aetiological causes of depression might be, and which elements should seen as 'consequences' of being in a depressed state. However, a common view is that no single factor or model can satisfactorily explain the occurrence of depression - rather, the interaction of many of these elements results in the kinds of symptoms already described (Fennell, 1989). As this study relates primarily to cognitive factors implicated in depression, only brief mention will be made of alternative perspectives.

1.6.1 Biological theories of depression

The monoamine theory of depression proposes that depression is due to an absolute or relative decrease in monoamines, or of receptor sensitivity, at certain receptor sites in the brain (Silverstone and Turner, 1995). The theory was developed following largely unexpected observations of drug effects - namely, that imipramine had pronounced anti-depressant activity, and iproniazid (a drug used in the treatment of tuberculosis) had euphoriant properties. Imipramine was found to inhibit the neuronal re-uptake of noradrenaline and serotonin, while iproniazid inhibited monoamine oxidase, an enzyme responsible for metabolising all three neurotransmitter monoamines (noradrenaline, dopamine and serotonin). At about the same time, it was found that reserpine (a compound used in the treatment of hypertension) was found to cause depressive syndrome in some patients, and that it acted to deplete the brain of monoamines.

Unfortunately, the particular receptor sites and monoamines involved in different forms of depressive disroders are unknown. Silverstone and Turner (1995) conclude that affective disorders are unlikely to be a unitary condition and that several neurotransmitter systems, acting at different sites in the brain, are likely to be involved. So far, investigations have failed to provide a clear picture of what these relationships between the various neurotransmitters and the other symptoms of depression are.

While the administration of drugs which inhibit the uptake of monoamines from the synaptic cleft has been effective in the treatment of depression, a substantial proportion of patients experience only partial remission following pharmacological treatment. The monoamine hypothesis also fails to explain the time lag between the administration of anti-depressant medication and psychological effects - it seems likely that there are secondary effects in other, as yet unknown, systems in which the primary disturbances lie. Finally, the monoamine theory fails to explain the onset of the condition - it is not known if neurochemical changes precede or follow symptoms of depression or, if they do precede other symptoms, what process might have led to this happening.

1.6.2 Environmental factors and depression

Associations between depression and certain life events or social factors have been noted by a number of authors, with the claim that the factors identified are in some way causally linked to the development of the disorder. Brown and Harris (1978) studied working class women living in London and developed a model to explain the development of depression in their sample. They identified three circumstances which acted as 'vulnerability factors' to depression, and were seen as the main aetiological cause of depressive disorder. These factors were: 'caring for three or more young children'; 'death of their mother , or separation from her before the age of eleven'; and 'lack of someone in whom they could confide'. For some individuals, 'not working outside of the home' was also found to be a vulnerability factor.

Brown and Harris (1978) go on to discuss the impact of severe life events (termed 'provoking agents') such as problems with housing and finance, which are seen to influence the timing of the depression. Finally, 'symptom-formation factors' are those seen to influence the severity and form (whether 'psychotic' or 'neurotic') of the depressive disorder (for example, 'past loss' is seen to influence the severity of depression). The authors acknowledge that such observations do not answer questions about the way in which such life events come to cause the development of depression, and invoke various psychological factors (such as self esteem) not directly examined in the study.

Gelder et al (1991) noted that the four vulnerability factors identified by Brown and Harris (1978) have not received consistent support from subsequent research. In a rural community in the outer Hebrides, only one of the vulnerability factos (that of caring for three young children) proved to be significant (Brown and Prudo, 1981). A replication of the original study in Canada identified 'lack of a confidant' as a vulnerability factor, but found no support for the other three factors (Costello, 1982). These mixed findings may result in part from cultural differences between the populations studied, or individual differences in terms of personality or the development of coping strategies.

1.6.3 Behavioural models of depression

Williams (1992) identified a number of behavioural formulations of depression contained in the literature. Early behavioural models attributed depressive symptoms to 'inadequate or insufficient reinforcement' (Lazarus, 1968). More specifically, some authors suggested that it was a reduced frequency of social reinforcement that led to the observed behavioural changes in depression (e.g. Lewinsohn et al, 1970). Ferster (1966) suggested that depression led to people become less sensitive to stimuli in the environment 'announcing' the availability of positive reinforcement. Alternatively, a reduction in the level of reinforcible behaviour (for whatever reason) might lead to someone receiving less social reinforcement (Ferster, 1966).

The theory of 'aversive control' attributes reduced behavioural output to a fear that any behaviour will be punished. Several authors suggested that depression might result from intense and prolonged anxiety (Lazarus, 1968; Wolpe, 1972), while Gray (1990) refined the idea by suggesting that stimuli in the environment might simply signal the non-availability of any reward.

Costello (1972) put forward the idea that certain stimuli might lose their 'potency' as reinforcers, either as a result of changes in biochemical mechanisms or due to the disruption of a behavioural chain by the loss of a single reinforcer. This became known as the 'loss of reinforcer effectiveness' theory.

These early models were not expressed sufficiently precisely to generate testable experimental or clinical predictions (Williams, 1992). Where supporting evidence was available, it tended to be of a correlational nature, and did not allow for conclusions to be drawn about the direction of causality between different factors. Three further behavioural models were put forward that did lead to testable predictions.

Firstly, the observation that those suffering with depression appeared to exhibit 'social skills deficits' (Lewinsohn et al, 1970; Coyne, 1976), led to the suggestion that these deficits resulted in less rewarding interactions with others. Studies indicated that depressed individuals alienated those with whom they interacted, chiefly through mentioning personal problems with self-blaming and hopeless statements attached (Coyne, 1976; Hammen and

Peters, 1978). However, Williams (1992) noted that it may be inappropriate to consider the central difficulty - a negative and self-blameful way of talking to others - as a lack of 'social skills'.

'Self-control theory' (Rehm, 1977) emphasises problems that depressed people have in giving themselves sufficient rewards. It is based on the self-regulation model developed by Kanfer (1970) in which an individual's control over their own behaviour is seen to relate to three processes: self-monitoring, self-evaluation and self-reinforcement. Empirical evidence is available which demonstrates that depressed and non-depressed people do differentially reward and punish themselves as predicted by the theory (Lobitz and Post, 1979) and the theory has led to several successful treatment studies (e.g. Fuchs and Rehm, 1977).

The theory of 'learned helplessness' (Seligman, 1974, 1975) emphasised that organisms could learn about the contingencies between instrumental responses and the outcomes of these responses, and that they could weigh up the probability of a behaviour resulting in a specific outcome. The theory proposed that motivational, cognitive and emotional changes in depression follow a period of learning in which responding and reinforcement are perceived as independent. While the theory generated a good deal of research, Williams (1992) noted that many of the demonstrations of learned helplessness in humans did not require an explanation in terms of the non-contingency between outcome and action.

Behavioural models emphasise change in motivation and accompanying activity deficits in depression, and are able to account for some of the observed phenomena. However, they do not account for individual variation in responses to similar situations, nor for many of the cognitive changes observed in depression.

1.7 Cognitive Theories of Depression

Cognitive models of the affective disorders are essentially 'information-processing' theories. By this, it is meant that hypotheses regarding the origins of depressive symptoms make reference to a view of man as a 'complex information-processing system' (Mathews, 1997) and that attempts are made to understand the 'fundamental processing mechanisms which act upon, and are themselves acted upon, by the flow of information through the system' (Williams et al 1997).

The term 'information processing' refers to a range of mental tasks, including the attention to and perception of stimuli, the evaluation of the information contained and memory for such information at some later time (Haaga et al, 1991). Information-processing theories assume that there are intimate, reciprocal relationships between such cognition and emotion, and that theorising about affective disorders can be aided by an understanding of the conscious and unconscious cognitive processes observed in depression (Williams et al, 1997). While the focus is on cognition, non-cognitive elements of emotion are not excluded, nor regarded as being in any way 'secondary'.

Cognitive models of depression (e.g. Beck, 1967) therefore suggest that people who become depressed tend to think differently about themselves and the world around them. That is, the beliefs, attitudes and thought processes of certain people make them vulnerable to depression. Williams (1992) has termed the suggestion that cognition renders some people vulnerable to the onset or maintenance of depresssion 'the vulnerability theory', while the idea that cognition affects mood is called 'the precipitation theory'. Regardless of the role that cognition plays in the aetiology of depression, it is clear that it may nevertheless have a distinct influence on the maintenance of depressive symptoms.

While there is no single 'cognitive model of depression', the most influential ideas have been those contained in Beck's theory of emotional disorders (Beck, 1976). Before Beck's theory is described in more detail, however, brief mention will be made of some of the other important cognitive factors that have been discussed in the literature.

The attributional reformulation of the theory of Learned Helplessness (Seligman, 1981) proposed that depression occurred when people expected that a highly aversive state of

affairs was likely to occur, and that there was little they could do about it. The more certain and uncontrollable the negative event, the greater the motivational and cognitive deficits. The more important the uncontrollable events are to the person, the greater the effects on their mood and self esteem.

The theory also contained the proposal that depressed persons exhibit a characteristic 'maladaptive attributional style', whereby negative events tend to be attributed to 'internal', 'stable' and 'global' causes, while positive events are attributed to 'external', 'unstable' and 'specific' causes.

Early research tended to focus on this last factor - the maladaptive attributional style - and to overlook the other central claims made in the reformulated theory. Williams (1992) concluded that this research into attributional style led to ambiguous results. For example, Raps et al (1982) found that clinically depressed persons did demonstrate a maladaptive style, while schizophrenic patients (acting as psychiatric controls) did not. Hargreaves (1985), however, found no differences in terms of attributional style between depressed and control subjects, using the Attributional Style Questionnaire (Peterson et al, 1982). Moreover, there was no significant correlation between Seligman's measure of 'internality' and the Rotter Locus of Control Scale (Rotter, 1966).

Further refinements to the theory have been made in order to accommodate additional findings. A reformulation of the reformulation, termed the 'hopelessness theory of depression' (Alloy et al, 1988), emphasises misattribution about negative events in particular, and stresses that such events must actually occur if the diathesis-stress model (the idea that a negative, uncontrollable event is necessary) is to be adequately tested.

Questions have been raised as to whether the 'internality' dimension is consistently related to depression (Brewin, 1985). Weiner (1986) argued that it is necessary to include another attributional dimension, relating to the 'controllability' of events. In relation to this idea, Brown and Siegal (1988) demonstrated that it was only for negative events perceived as uncontrollable that there was a relationship between attributional style and depression. Williams (1992) pointed out that the reformulated helplessness model did state that events must be perceived as uncontrollable, and suggested that the question of whether controllability is thought of as an 'attribution' *per se* might be relatively unimportant.

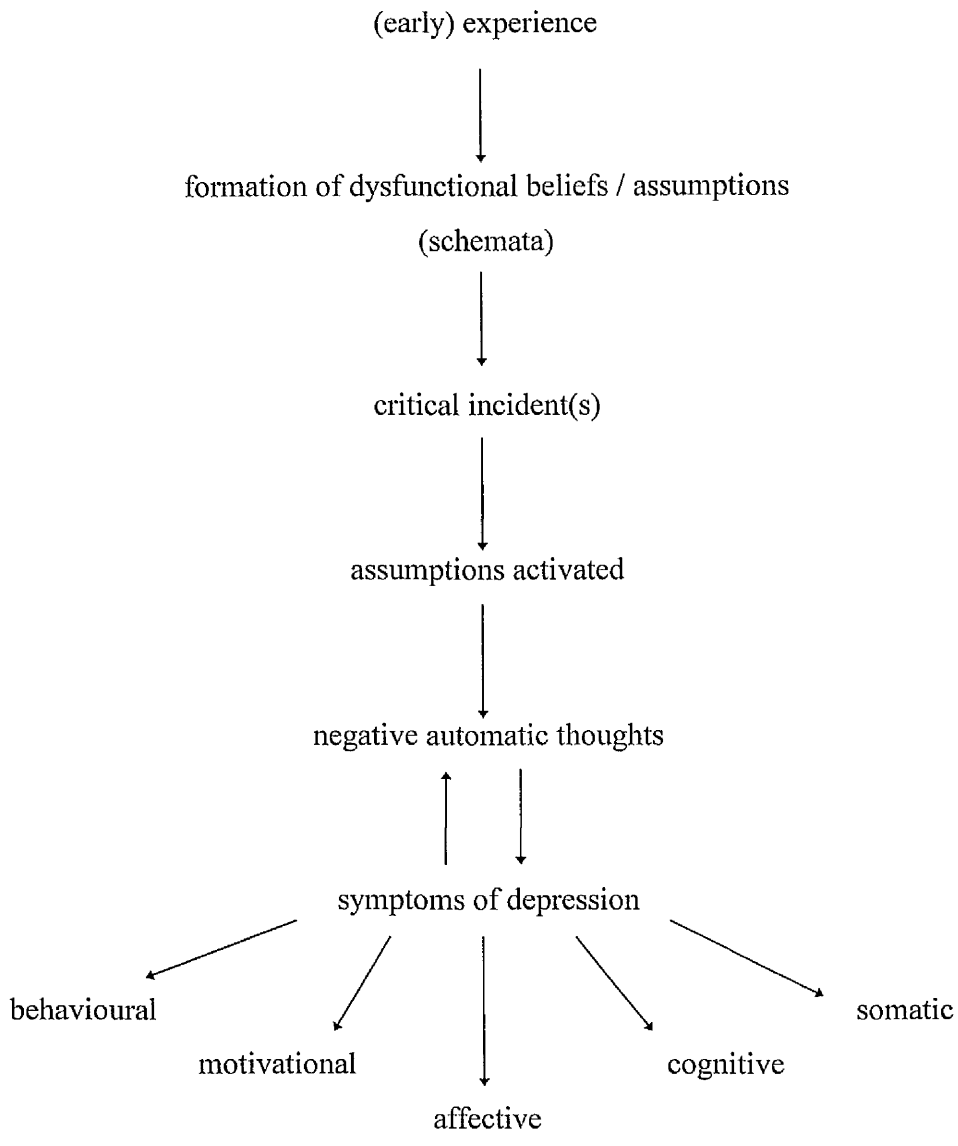
A number of studies have found that attributional style predicts later morbidity in terms of physical health problems (e.g. Peterson et al, 1988; Seligman et al, 1988 for review). Williams (1992) noted that physical health problems are often associated with depression, and that such longitudinal research designs have also demonstrated attributional style to be a stable feature of a person's cognitive functioning. He concludes that whatever the exact relationship between attributional style and depression turns out to be, an understanding of this factor may be helpful in the treatment of some patients.

Some authors have given special emphasis to other elements of cognition. For example, Ellis (1962) listed eleven 'irrational beliefs', the activation of which is thought to lead to the variety of emotional, behavioural and cognitive consequences seen in the emotional disorders. These beliefs are thought of as 'irrational' in the sense that they are rigid, inconsistent with reality, illogical and interfere with a person's well-being and attainment of goals. A therapy aimed at challenging such beliefs has been developed (see, for example, Dryden, 1995). Nolen-Hoeksema (1987) emphasised the importance of 'rumination' in depression, while Ingram and Smith (1984) discuss the role of self-focused attention. However, such ideas do not constitute complete theories regarding the development and maintenance of depression.

1.7.1 Beck's Cognitive Theory of Depression

Beck's cognitive theory of depression (Beck, 1967; Beck et al, 1979) identifies three main categories of cognitive construct: structures ('schemata'), processes ('cognitive errors') and products ('negative automatic thoughts'). In essence, the theory is that depressed persons possess stable and enduring 'negative' schemata, which (when 'activated' by negative events) bias the processing of information by the individual, giving rise to the aforementioned negative content of the persons' thinking. The model is presented diagrammatically in Fig. 1

Fig. 1 Diagrammatic representation of Beck's cognitive model of depression



1.7.1 a) Cognitive Products (Negative Automatic Thoughts)

The content of depressed persons' thinking is seen to be characterised by pervasive 'negative' themes relating to the self, world and future (the 'negative cognitive triad', Beck et al, 1979) involving, for example, hopelessness and pessimism (Clark et al, 1990; Beck et al 1987; Strack and Coyne, 1983). Such thoughts are seen as being qualitatively different (in terms of the themes they relate to) from those of non-depressed people, or those suffering from other emotional disorders (e.g. anxiety). This is known as the 'content specificity hypothesis' (Beck, 1976). In considerations of depressive cognition, the

importance of thinking about the 'self' is often stressed (Beck et al, 1979). People suffering with depression are seen as more likely to make negative self evaluations (seeing themselves as 'worthless'), to feel guilty and to discount their own achievements.

Such cognitions have been termed 'negative automatic thoughts' (NATs) as they are negatively-toned (i.e. associated with unpleasant emotions), and can come 'out of the blue' (i.e. are not necessarily prompted by events or the result of directed thinking). They are seen as having the effect of causing a downswing in mood, further negative thought and other symptoms of depression.

1.7.1 b) Cognitive Structures (Schemata)

In Beck's terminology, 'schemata' are stable, cognitive assemblies of structural elements, which are themselves organised into larger constellations. They are considered to represent the basic beliefs and attitudes which a person holds and act like unwritten rules which govern the interpretation of situations. Emotional disorders such as depression are thought to be associated with particular kinds of constellations of schemata, which are seen as 'dysfunctional' in that they are rigid, extreme and resistant to change (Fennell, 1989). Again, the 'content specificity hypothesis' is thought to be important - 'depression' is said to be characterised by schemata concerned with loss, and with negative aspects of self, world and future. Common examples of dysfunctional assumptions and beliefs include: 'If someone thinks badly of me, I cannot be happy' and 'I must do well at everything I undertake'.

Williams et al (1997) note that the term 'schema' has been used in a number of different ways, and that this has led to confusion and misunderstanding. In its most general usage, 'schema' refers to a 'stored body of knowledge' - a memory structure - which interacts with all aspects of information processing within its domain, by guiding attention, expectancies, interpretation and memory search.

These authors also note suggestions that a schema so defined should demonstrate certain properties i.e. fulfil certain additional criteria. Firstly, it should have a consistent internal structure, so that stimuli come to be structured in a stereotypical manner. Secondly, the knowledge contained in a schema should be generic in nature, relating to 'abstract

prototypical representations of environmental regularities'. Finally, it has been suggested that a 'schema' should be a 'modular package' of such generic information, such that activation of any one part will tend to produce activation of the whole (Mandler, 1984).

Williams et al (1997) note a number of ways in which schemas might influence information-processing, involving both 'bottom-up' and 'top-down' interactions. 'Bottom-up' (data-driven) interactions are those where the cognitive system attempts to identify the schema most able to accommodate incoming information; 'top-down' (conceptually-driven) processes involve a particular schema being used to guide processing (attention, memory and so on).

Within the literature on schemata, the term 'self-schema' has commonly been used to refer to the knowledge about oneself stored in long term memory. Williams et al (1997) review evidence relating to questions of whether there is a single 'self-schema' and conclude that self-information does not seem to be structured in the way consistent with the specific definition of 'schema'. Alternatively, they suggest that people have many possible self-schemata, some of which remain latent until activated by events, situations or mood states. This relates to ideas of multiple selves or 'self-guides' contained in the literature on 'self knowledge' (e.g. Markus and Nurius, 1986; Straumann, 1992). Alloy et al (1997) note that it is implicit in the content-specificity hypothesis that depressed people will have negative self-schemata in some, but not all, domains. However, it remains possible that people might have distinctive modes of organising their self-knowledge, so that particular patterns do recur over time.

1.7.1 c) Cognitive Processes

Beck hypothesised that depressed individuals demonstrate cognitive distortions, manifested as systematic biases or 'thinking errors', such as 'arbitrary inference' (e.g. someone concludes that a friend has fallen out with them because they did not smile at them), 'over-generalisation' (e.g. 'failing this exam means I will fail all the others') or 'selective abstraction' (e.g. noticing only the bad things in a report about oneself). In addition to these, several other categories (which are not mutually exclusive) have been distinguished (Williams, 1992).

'Thinking errors' thus relate to the way that a person processes information. As already noted, these processing mechanisms can relate to either attention, evaluation or memory (Haaga et al, 1991). By the term 'bias', it is meant that processing is systematically skewed so as to produce a discernible pattern in the content of a person's thoughts (Morris 1996). Mathews (1997) notes that a limited capacity processing system necessitates a degree of selection among a range of available information, and defines 'bias' as any systematic preference in the priorities used in making decisions as to what is to be processed, particularly when it relates to information which has emotional meaning. When processing gives rise to a discrepancy between the content of thought and some commonly accepted index of objective reality, the thought is additionally seen as being inaccurate and 'distorted'. It is important to note, however, that biased processing does not necessarily give rise to inaccurate, distorted thought content - on some occasions, the product of biased thought will be accurate. For example, a tendency to interpret the actions of others as hostile may generally lead to distortions, but on occasion will be accurate.

It is also important to note that it is not seen as 'abnormal' to bias or distort information to be consistent with pre-existing conceptual frameworks (Nisbett and Ross, 1980; Hollon and Kriss, 1984). Williams (1992) reviews some of the evidence for biased processing in non-clinical populations. Tversky and Kahneman (1974) described a series of 'heuristics' used by people when making judgements in conditions of uncertainty. For example, the 'availability heuristic' leads to judgements regarding the frequency or probability of an event being based on the ease with which relevant instances can be recalled. A so-called 'anchoring heuristic' reflects the finding that different starting points yield different estimates which are biased towards (or 'anchored by') the initial values. For example, if a roulette wheel is spun and the number observed by someone before they are asked to estimate something (e.g. the number of countries in the United Nations') their responses vary considerably depending on the number observed beforehand.

Williams (1992) noted that evidence of biases / heuristics in non-clinical populations can seem to have relevance to everyday clinical observations of cognitive 'distortions' in depression. However, the additional claim has been made that people who are depressed exhibit particular processing biases which are qualitatively different from those who do not suffer with depression (see, for example, Kovacs and Beck, 1978). The suggestion has been

that these 'depressive' information processing biases are both characteristic (trait-like) and pervasive (relating to many or all content domains).

1.7.2 Evidence for Beck's Cognitive Model of Depression.

Beck's cognitive model of depression has been extensively investigated and has received a good deal of support, in the form of evidence that is both correlational and experimental (Williams, 1992). Checklists and diaries have been used to demonstrate that depressed persons do have more negative automatic thoughts, logical errors can be identified in these thoughts, and studies of selective recall, for example, seem to support a schema theory (Gotlib, 1981). Mood induction studies provide some of the best evidence that depressive cognition may cause low mood (Goodwin and Williams, 1992).

However, it has often proved difficult to find evidence of dysfunctional attitudes in those thought to be vulnerable to depression (perhaps due to a history of depressive disorder), when they are not actually depressed (Williams et al, 1997). More generally, it has been difficult to demonstrate any form of 'dysfunctional thinking' once a person's depression has lifted (Miranda and Gross, 1997). Some findings run counter to these conclusions. For example, Alloy et al (1997) claim to demonstrate preferential processing of negative self-referent information in those considered 'vulnerable' to depression (based on evidence of dysfunctional attitudes or inferential styles). However, difficulty in demonstrating cognitive differences between such groups of people when they are not depressed is a serious challenge to claims that cognitive structures or processes render a person *vulnerable* to depression, and to claims that cognition has a significant causal role in the development of the disorder.

To reconcile these observations, Miranda and Persons (1988) have proposed the 'mood-state dependent hypothesis' i.e. that dysfunctional thoughts, attitudes and beliefs are inaccessible until activated by negative mood. Similarly, Teasdale (1988), in his Differential Activation Hypothesis, writes that 'depressed mood negatively biases a range of cognitive processes, including those involved in accessing representations of events and persons, the interpretation and evaluation of events and persons, and the generation of

expectations concerning the future outcome of events'. Beck (1967) has suggested that dysfunctional schema are present all the time but activated by precipitating life events.

1.7.3 Cognitive Therapy for Depression

A form of therapy aimed at alleviating the effects of depression has been developed, on the basis of Beck's cognitive model. Miranda and Gross (1997) describe cognitive therapy as 'an active, directive, educational approach to therapy, in which patients learn to identify and then modify dysfunctional thoughts, attitudes and beliefs'. Cognitive therapy is based on the premise that individuals can 'learn to recognise and modify their negative beliefs and maladaptive processing proclivities, thereby preventing or alleviating depression' (Hollon, Shelton and Davies, 1993). In the course of cognitive therapy, patients are introduced to the cognitive model, and the impact of different elements is examined. Patients are encouraged to look for evidence of biased processing, and to challenge 'dysfunctional' thinking (Williams, 1992; Mathews, 1997).

Cognitive therapy for depression can be effective. There is evidence that it is better than no treatment (Dobson 1989; Persons 1993) , at least as effective as other short-term psychological or pharmacological treatments (review, Persons 1993) and several meta-analytic reviews have shown cognitive therapy to be superior to other treatments, particularly in terms of preventing relapse (Hollon, Shelton and Loosen, 1991).

It is therefore important to understand the nature of depressive information-processing, because of the implications this holds for cognitive conceptualisations of depression and, more specifically, for clarifying the purpose of cognitive therapy. One important question - the focus of this study -relates to the issue of whether there are differences between those who are depressed and those who are not, in terms of characteristic information processing strategies. Is it correct that depressed persons 'think differently', and do they require interventions to correct 'dysfunctional thinking'? (Dykman et al, 1989).

1.8 Information processing biases in Depression

Hollon and Garber (1988) note that in Beck's model (with 'schema' seen as distinct from 'processing'), observed differences in the outcomes of processing (cognitive products) between depressed and non-depressed persons might arise due to differences in information processing strategies, or due to differences in schema content.

The literature on depressive cognition makes reference to three distinct forms of processing bias, on the basis of which four models comparing depressed and non-depressed persons have been proposed (Morris, 1996). The models relate to the form of processing bias *typically* exhibited in either group - as noted, the proposal is that there exist different 'characteristic' (trait-like) and 'pervasive' (relating to many domains of information) processing biases in either group.

The three forms of processing bias are termed 'positive bias', 'negative bias' and 'schema-congruent bias'. The first two biases are seen as 'valence-driven' i.e. relating to whether the information being processed ('stimulus' or 'product') is intrinsically 'positive' or 'negative'. In the third, the relationship between the information and the expectations of the person (in the form of 'schemata') is critical. A fourth alternative is that people might be unbiased (realistic or 'undistorted'). For processing to be truly unbiased it must not be influenced by either the 'valence' of the information or a person's prior expectations.

'Negative Bias' implies that processing is biased to produce 'negatively-toned' cognitive products. Thus, attention is given to negative information, new information is interpreted to give rise to negative appraisals, and memory for negative material is enhanced. Where processing relates to the 'self', such a bias is termed a 'self-derogating' bias.

'Positive Bias', by contrast, refers to a tendency to process information so as to produce 'positively-toned' cognitive products. Attention is given to positive information, new information is interpreted to give rise to positive appraisals, and memory for positive material is enhanced. Where processing relates to the 'self', such a bias is termed a 'self-enhancing' bias.

The term 'Schema-Congruent Bias' is used to mean that processing is biased so as to give rise to products that are consistent with prior expectations or beliefs. 'Schematic processing' (Neisser, 1976) implies that information is processed so as to be consistent with the content of a schema. Processing is not so much 'valence-driven' as 'consistency-driven'. The 'valence' of processing will depend on the relationship between the schema and the information being processed i.e. it may be positively or negatively biased, depending on this factor. Whether cognitive products resulting from such processing are objectively 'accurate' (or positively / negatively distorted) will depend on the accuracy of the schema held by the person processing the information.

Self-consistency theory (Shrauger, 1975) and self-verification theory (Swann, 1987, 1990) emphasise the tendency of people (regardless of their depression status) to select, interpret and recall information relating to the self to be congruent with their prior beliefs or schematic knowledge. Markus (1977) similarly suggests that processing of information about the self is biased so as to increase congruency between cognitive products and self-schema. Giesler et al (1996) suggest that depressed people seek 'self-verifying' (negative) information as it fosters intra-psychic and inter-personal coherence i.e. provides reassurance that their self-views are correct.

Having described the three forms of bias, it is important to clarify the claims made in each of the four models of depressive cognition. The first three models suggest that depression is associated with a particular kind of biased processing strategy that differs from those seen in people who are not depressed. The fourth model suggests that the processing strategy is the same in the two groups, but that differences may exist between the schemata underlying their processing of certain information.

1.8. 1 Model 1 - 'Depressive pessimism' - negative bias in depression, unbiased non-depressives

In this model, depression is seen to lead to a 'negative bias' in processing, while non-depressed persons are seen as more accurate, unbiased and data-driven.

Thus, Kovacs and Beck (1978) write 'the cognitions are frequently irrelevant and inappropriate to the reality and mirror a consistent negative bias against oneself'. They go on to state 'in the clinical depressions, the patient's perceptions, interpretations and evaluations are not consensually validated and the pervasive negative bias against oneself remains relatively immune to conventional corrective feedback'. Finally, they note 'recall is characteristically skewed in depression. Depressed individuals selectively recall material with negative content at the expense of neutral or positively toned material'

1.8.2 Model 2 - 'Depressive Realism' - unbiased depressives, positively biased non-depressives

This model has been termed the 'Depressive Realism' hypothesis (Alloy and Abramson, 1979) and in this view, depression is associated with an 'unbiased' style of thinking. Depressed people are seen as accurate and undistorted in their view of the world. The relatively negative content of depressed persons' thinking is thought to result either from these people experiencing 'negative realities' (Coyne, 1989; Krantz, 1985) or - more commonly - due to the fact that non-depressed persons typically exhibit positively biased processing.

1.8.3 Model 3 - Mixed model - negative bias in depression, positively biased non-depressives

This model is essentially a combination of ideas put forward in the first two models, and was developed to accommodate mixed findings (Evans and Hollon, 1988). While non-depressed persons are thought to exhibit a positive (self-enhancing) bias, depression is seen to be associated with negative (self-derogating) processing. Engel and DeRubeis (1993) suggested a refinement of this model, whereby dysphoric individuals were seen to be unbiased.

1.8.4 Model 4 - Self Schema Model

In contrast to suggestions of either depressed or non-depressed persons exhibiting characteristic valence-driven biases, this model proposes that both groups exhibit 'schema-congruent' processing biases (Dykman et al, 1989). It is proposed that differences in thought content arise from differences in the schemasunderlying processing.

This position grew out of observations of the parallels between the kinds of biases seen in depressed people and those exhibited by non-clinical populations (e.g. Nisbett and Ross, 1980). It was suggested that people generally select, interpret and recall information to be consistent with their prior beliefs or schematic knowledge (Markus and Wurf, 1987). Dykman et al (1989) suggested that processing biases in depressed persons might be similar, and that depressed persons are only negative relative to non-depressed persons when their schema are more negative.

In Beck's theory, all processing is thought of as 'schematic', in that schema are seen as the conceptual filters for the coding, screening and evaluation of stimuli. Dykman et al (1989), however, suggested that Beck is neither clear nor consistent in terms of how 'schematic processing' operates in depression. These authors note that the writings of Beck (e.g. Beck, 1976) suggest a characteristic negative bias, in line with the position outlined in Model 1. The Self Schema Model suggests that while the outcomes of processing are often different when someone is depressed, the processing strategy in operation is not different. Rather, the suggestion is that the same processing strategy - 'schematic processing' - operates regardless of depression status.

Dykman et al (1989) note that the first three models come from a view of Beck's theory as a 'characteristic processing' theory, while the fourth model views it more as a 'schema theory'. Alternatively, distinguishing between the models raises questions regarding the nature of schemata - a characteristic, pervasive negative bias might imply a 'global' negative self schema in depression. As already noted, such a view has been seen by some as overly simplistic (Williams et al, 1997). Finally, these models raise questions about the kind of strategy typically exhibited by depressed and non-depressed people.

1.9 Evidence Relating to Characteristic Processing Strategies in Depression

Studies have been conducted which examine cognition in both depressed and 'normal' participants, and which have utilised a range of information-processing tasks. Investigations of biases in depression have generally looked at the processing of information relating to the 'self', because of its proposed importance in the development of the disorder. Koenig et al (1995) suggest that processing of self-referent information is more highly biased than other-referent information in depressive cognition.

Mathews (1997) noted that studies investigating biases in depression have generally utilised two main classes of processing task - either examining judgements made in response to information (alternatively called 'evaluation' or 'interpretation of meaning' tasks), or the recall of information. Much of the information available in real-life situations is ambiguous, and it is noted that 'evaluation' tasks always involve ambiguous information of one form or another. Judgements made about ambiguous information are relevant to many aspects of clinical work (e.g. when hypochondriacal concerns are triggered by non-specific symptoms).

The literature on depressive cognition contains descriptions of a vast number of empirical investigations relevant to a discussion of characteristic processing biases. This thesis shall present only a small number of examples, in order to illustrate the key issues under consideration in this research.

1.9.1 Empirical studies in support of Depressive Pessimism

Evidence cited in support of there being a 'negative bias' in depressed persons includes findings from tests of autobiographical memory. When asked to recall past events, depressed patients recall more negative examples in a limited time than will non-depressed controls (Teasdale, 1983). Straumann (1992) found a similar result, in an examination of the recall of childhood memories cued by positive and negative words.

Because these findings might arise from depressed persons having experienced a greater number of negative events, researchers have also looked at memory for materials presented under experimental conditions. Bradley and Mathews (1988) investigated recall of self-referent adjectives in samples of depressed participants, recovered depressives and non-psychiatric controls. Respondents were presented with lists of 'positive' and 'negative' adjectives. For half of these words, participants were required to decide whether each word described them, while for the other half they had to judge if they described an 'unfamiliar' person who they had previously named. After a 20 second interference task, participants were allowed two minutes of free recall. The depressed sample remembered more negative self-referent words while controls recalled more positive than negative words in this condition. In the other person - referent condition, recovered depressives recalled fewer positive than negative adjectives, a pattern not shown by the other groups, suggesting that retrieval patterns in recovery are not completely normal.

This type of design - called the Self Referential Encoding Task (SRET) - has also been used by Ingram et al (1987) to demonstrate a negative bias in recall. Mathews (1997) suggested that the effect is stronger for words describing personality (citing Clark and Teasdale, 1985) and disappears when judging whether the words describe someone else (citing Bradley and Mathews, 1983). Sanz (1996) used the SRET to demonstrate that while sub-clinically depressed participants recalled equivalent numbers of positive and negative adjectives, they recalled fewer positive adjectives than socially anxious and non-depressed, non-anxious controls. Mathews (1997) concludes that there is stronger evidence for a memory bias in designs using explicit (rather than implicit) memory tasks.

Work on Mood Congruent Memory (reviewed by Blaney, 1986) has also been interpreted as providing evidence of support for a negative bias. For example, Teasdale and Fogarty (1979) manipulated the mood of non-depressed volunteers, using self-statements developed by Velten (1968). This mood induction procedure was shown to influence the recall of autobiographical memories - depressed mood resulted in slowed recall of positive material (but not speeded recall of negative material). Williams et al (1997) note that further studies have been conducted which look at the effects of mood induction on both the encoding and retrieval of memories for experimental materials.

Gotlib (1981) examined rates of self-reinforcement and self-punishment on a memory task by 16 depressed and 12 non-depressed psychiatric patients. Both these groups showed less self-reinforcement and greater self-punishment than a group of 19 non-psychiatric 'control' participants (hospital employees), but only the depressed group demonstrated a bias in recall of the extent to which they had given themselves rewards or punishment. This group recalled fewer rewards and a greater number of self-punishments.

Brewin (1993) reported that many studies indicate that situations are evaluated differently by depressed and non-depressed participants. For example, Alloy and Ahrens (1987) found that depressed subjects were more pessimistic about their likelihood of success on a task, on the basis of the same information. Pietromonaco and Markus (1985) demonstrated that depressed subjects estimated that negative events such as accidents were more likely to happen to them, and suggested that this indicated that different sorts of information were being retrieved from memory.

1.9.2 Empirical studies in support of Depressive Realism

Evidence for Depressive Realism (Model 2) is largely dependent on a single experimental design - the original 'judgement of contingency task' developed by Alloy and Abramson (1979), in which participants estimate the extent to which their pressing of a button controls the illumination of a bulb. Dobson and Pusch (1996) failed to replicate these findings in a sample of clinically depressed participants. In support of Depressive Realism, however, Alloy and Abramson (1988) have also looked at judgements made by depressed and non-depressed people regarding their own social skills.

Lewinsohn et al (1980) compared observer ratings of depressed and non-depressed patients' inter-personal behaviour with similar ratings made by the participants themselves. The sample consisted of 71 patients with unipolar non-psychotic depression, 59 psychiatric, non-depressed controls and 73 non-psychiatric, non-depressed controls. Following each of four 45 minute sessions, the discrepancy between the ratings was examined. At time 1, this discrepancy was significantly smaller for the 'depressed' group than for either of the control groups. Over time, the discrepancy for the depressed group

became greater, as they started to rate themselves more favourably and, it could be argued, less accurately. Discrepancy scores for the two control groups remained unchanged.

Regarding memory tasks, Nelson and Craighead (1977) presented participants with an ambiguous task, for which they were either rewarded or punished on 30% or 70% of the trials. Depressed participants were more accurate in recalling the negative feedback when delivered at low frequency.

That non-depressed people exhibit a self-enhancing bias has been demonstrated in several studies. For example, Alloy and Abramson (1979) noted this as part of their original study on 'depressive realism', Brown (1986) noted a self-enhancement bias in social judgements and Weinstein and Klein (1996) review evidence for 'unrealistic optimism' regarding the estimated likelihood of future positive and negative events. In the study by Nelson and Craighead (1977), non-depressed participants underestimated the amount of negative feedback (a positive distortion).

1.9.3 Empirical evidence in support of Model 3

As noted, Model 3 is essentially a combination of elements from the first two models, and as such evidence in support of this position largely comes from a review of the literature and the drawing of conclusions as to the kinds of biases *typically* displayed by the two groups.

1.9.4 Empirical evidence in support of schematic processing

In order to allow for an adequate understanding of schematic processing of self-referent information, it will first be necessary to briefly consider the literature relating to self-schemata and the nature of the 'self-concept'.

1.9.4 a) The Self Concept

Schema relating to the processing of self-referent information can be thought of as forming part of a person's self-concept. The literature relating to ideas about the self-concept is vast. Markus and Wurf (1987) review some of the major advances in theories of self-concept and emphasise the dynamic, active and multi-faceted nature of current conceptualisations. In particular, these authors stress the importance of ideas about the 'structure' of the self-concept.

There are thought to be multiple 'selves' that can be identified, using a range of measures. In order to describe a particular 'schema' within the self concept, Markus (1977) suggests that information from a number of sources needs to be combined. It is only when a self-description derives from a 'well-articulated generalisation about the self' that it can be expected to 'converge and form a consistent pattern with the individual's other judgements, decisions and actions'. Describing different types of self-representations, Markus and Wurf (1987) draw distinctions between 'core' and 'peripheral' self-views; past, present and future self-views; positive and negative self-views; and views of how a person actually sees him / herself, as opposed to how they would like to be, feel they ought to be or are afraid to be.

This last idea has been developed by Higgins and colleagues in work relating to Self-Discrepancy Theory (SDT; e.g. Higgins, 1987). SDT proposes that there are three important domains of 'self': the actual self (or self-concept) and the 'ideal' and 'ought' selves (which are seen as 'self-guides'). In addition, there are two 'standpoints' on the self - a person's own view, and that which they imagine some 'significant other' holds about them. These exist in each of the three domains.

A person's self-view can be assessed using the Selves Questionnaire (Higgins et al, 1985) which is a free response measure in which respondents list up to ten traits or attitudes in each domain and from each standpoint. It has been shown that different forms of discrepancy between these different views on the self are associated with different forms of negative affectivity. Specifically, 'actual-ideal' discrepancies are seen to be associated with depression, while 'actual-ought' discrepancies are associated with anxiety or self-disgust

(Higgins, 1987). Discrepancies identified by this method are seen as relatively stable constructs, with fairly high persistence over periods of two to three months.

SDT (Higgins, 1987) also emphasises the importance of considering the 'availability' and 'accessibility' of a person's discrepancies. 'Availability' is assumed to depend on the extent to which self-views in two domains diverge, while the 'accessibility' of discrepancies is similar to that of any stored construct, and depends on similar factors e.g. how recently it has been activated, how frequently it is activated and whether it is applicable to current events. 'Priming' manipulations are seen as increasing the accessibility of discrepancies, and this may be appropriate for increasing the accessibility of schemata more generally.

Many approaches have been taken to identifying people's self-views, and the Selves Questionnaire is just one of them. Dykman et al (1989) used a 50 item Self-Description Questionnaire. Markus (1977) noted that the endorsement of items on rating scales may reflect underlying schemata, but made the additional point that responses can be affected by other factors, such as the 'favouribility' or 'desirability' of a particular item.

In order to determine whether an information-processing strategy can be considered to be 'schematic', it is necessary to describe specific features of the schema relating to the processing task. Poorly defined 'global' self-views are unhelpful, because they give rise to a situation whereby seeking 'congruency' with the schema equates with a valence-driven bias. Ideally, descriptions should be of specific, narrowly-defined schema relating to the processing task in question. Kuiper and Rogers (1979) suggested that schema-congruent information will be processed more efficiently, and on occasion this approach has been used to identify schemata. Markus and Wurf (1987) noted that such 'implicit' measures of schema are limited in the extent to which additional aspects of the schema can be identified (for example, how important or 'central' the schema is to a person's self-view).

1.9.4 b) Empirical evidence in support of schematic processing

Evidence relating to schematic processing (Model 4) is provided in a study by Dykman et al (1989) which examined the encoding and recall of ambiguous and unambiguous feedback by 'depressed' (college students with a BDI score equal to or greater than 13) and non-depressed participants. Firstly, the investigators determined which areas of self-schemata discriminated between the two groups (using a 'Self-Description Questionnaire'). The area of self-schema seen as discriminating related to the extent to which they saw themselves as 'successful', while the area of self-schema seen as non-discriminating related to the extent to which they saw themselves as 'polite'.

Both groups of participants performed multiple trials of a dot-counting task which was presented as requiring abilities that either did or did not discriminate between the two groups. Following each trial, participants were given either ambiguous or unambiguous feedback regarding the extent to which their performance indicated that they were either 'successful' or 'polite'. Ambiguous feedback consisted of a pair of scores, and participants were asked which of the pair was their 'true' score. Unambiguous feedback consisted of a single score, following which response latencies to press a button corresponding to their score were recorded. Finally, there was a recall task, in which participants were asked to state the number of trials for which they had received each of the five unambiguous feedback classes. The study examined whether there was a tendency towards either a positive or negative bias in either group regardless of whether schema discriminated between the groups. It also looked for the influence of using 'ambiguous' or 'unambiguous' information.

The findings indicated that depressed participants were only 'negatively biased' relative to the control group in the condition where their schemas were more negative. Both groups exhibited positive, negative and unbiased processing, depending on the relative feedback cue-to-schema match i.e. it appeared that both depressed and non-depressed participants utilised schematic processing in their encoding of ambiguous feedback. Response latencies for both ambiguous and unambiguous information also supported schematic processing. Recall of unambiguous feedback was unbiased in both groups.

Derry and Kuiper (1981) used an incidental recall paradigm (the SRET) to show the biasing effects of a 'negative self schema' on the processing of self-referent information in a sample of clinically depressed participants. Depressed and non-depressed participants were asked to rate a list of depressive and non-depressive adjectives on two measures. The first was a semantic judgement task: 'does this word mean the same as a given word?' The second task was to make a self referent judgement: 'does this word describe you?' After these tasks, participants were given a surprise recall task and asked to remember as many of the self-referent adjectives as possible.

The findings were that depressed subjects recalled more 'depressive' self-referent adjectives than 'non-depressive' self referent adjectives, and the conclusion was drawn that adjectives consistent with the self schema were recalled more accurately than those inconsistent with the self schema. Self referent judgements only improved recall in depressed subjects for 'schema congruent' (i.e. depressed-content) words. These conclusions, however, raise questions as to what is considered a 'self schema', as the findings themselves are similar to those cited in support of a 'negative bias' in depression (Model 1) i.e. they imply a global, negative self schema. The literature as a whole contains references to 'schemata' defined with greater or lesser degrees of precision - for example, Ingram et al (1994) differentiate between 'state' and 'trait' schemata.

Morris (1996) demonstrated that both dysphoric and non-dysphoric subjects exhibited schematic processing in the recall of their performance on a series of tests. The design of this study is described in more detail later in this thesis. The studies by Morris (1996) Dykman et al (1989) constitute competitive tests of schematic processing against models of characteristic valence-driven biases.

1.10 Conclusions Regarding the Empirical Evidence Relating to Characteristic Processing Biases.

A review of the empirical evidence relating to processing biases in depression highlights both 'methodological' and 'theoretical' considerations. These shall be considered separately.

1.10.1 Methodological Considerations in Investigations of Processing Biases.

The majority of studies have not used participants who are clinically depressed, but instead describe findings which relate to analog samples of one form or another (Ackerman and DeRubeis, 1991). Participants described as 'depressed' are often people who might best be described as 'dysphoric' (following recommendations made by Kendall et al, 1987) or others in whom a temporary depressed mood has been induced. Haaga and Solomon (1993) review the 'continuity issue' in depression research and discuss different ways of proceeding, depending on whether the variables under consideration are expected to relate to a range of symptoms or symptom severity, or more specifically to Major Depression as defined by diagnostic criteria. They note that Beck (1971) suggests sub-clinical affect states are not comparable, smaller versions of clinical disorders with regard to cognitive features because they are associated with accurate perceptions of events, whereas disorders display a mismatch between cognition and reality. It is concluded that tests of theory derived from considerations of clinical depression should use clinically depressed subjects.

In many of the designs, the distinction between 'distortion' and 'bias' is not made clear - usually, the two are assumed to be synonymous. This issue relates to the question of what is an appropriate criterion, against which to judge whether processing is biased or distorted. Williams (1992), for example, expressed doubt that comparisons of depressed persons' ratings of their own social skills against ratings made by an observer (a methodology used in, for example, Lewinsohn et al, 1980) could be taken as evidence of biased processing or otherwise. The difficulty arises as there is no group of raters who might be seen as free from bias.

In judging whether processing is positively or negatively biased, conclusions might be based on a comparison of findings from a depressed group with any of a number of 'baseline' measures, depending on the design of the study and the processing task involved. Potentially, investigations of bias might look for differences between 'depressed' and 'normal' persons, or for differences in the processing of 'positive' and 'negative' material, or they might examine performance relative to 'chance' or some objectively 'undistorted' criterion.

Regarding 'schematic' processing, it is apparent that very few studies have attempted to closely specify the nature of the schema relating to the processing task under examination. Where such endeavours have been made, it is worth considering whether the steps taken to identify the schema have been sufficiently rigorous. As noted, some authors refer to a global 'negative self schema' (e.g. Derry and Kuiper, 1981). Dykman et al (1989) identified 'discriminatory' and 'non-discriminatory' schema using a 50 item Self-Description Questionnaire, on which respondents rate the extent to which each dimension described them, and the extent to which the dimension was important to their self-view. Both ratings were made on a 9-point Likert scale, and both had to be greater than 5 for a dimension to be considered as indicating the presence of a 'well-articulated structure in memory'. It is noted that 'intelligence' was seen to be one of the dimensions which discriminated between depressed and non-depressed respondents in their study.

The extent to which study protocols appear to have 'face validity' (Nevo, 1985) to those participating in the study may well be an important factor. For example, Dykman et al (1989) told subjects that accuracy on a dot-counting task was closely related to the extent to which they were either 'successful' or 'polite'. A manipulation check to examine whether this cover story was believed consisted of looking for correlations between ratings of how well they expected to perform, and their original self rating for the dimension under consideration.

1.10.2 Theoretical considerations regarding investigations of processing biases

The literature relating to processing biases in depression is undeniably confused and contradictory. Empirical findings have been interpreted in terms of three forms of bias, and four models of how processing differs between those who are depressed and those who are not. Some studies have produced findings that do not fit any of the models of 'characteristic' processing biases. For example, it has been shown that depressed people can on occasion demonstrate self-serving processing biases (Swann, 1990; Morris, 1996).

Attempting to gather empirical evidence which would allow for one model to be favoured over the others is difficult. While many investigations of processing biases in depression have been conducted, it is unfortunate that in many of the designs which have been used, evidence of 'bias' consists of demonstrations that depressed persons' cognitive products

are more negative than those of non-depressed people. This is unsatisfactory as alternative models may make the same prediction (Dykman et al, 1989; Morris, 1996). Many of the studies investigating biases in depression have been interpreted in terms of the first model i.e. in terms of whether there exists a characteristic 'negative' bias. More generally, it appears that the vast majority of studies relate to one or other of the models suggesting valence-driven biases - few studies have examined the schema relating to the processing tasks involved (Williams, 1992).

One conclusion might be that both depressed and non-depressed people can on occasion exhibit each of the kinds of biases that have been proposed. The models might then be thought of as describing the 'dominant' strategy used by each of the two groups, around which there exists a degree of variation (in terms of individuals, the strategies used or the kinds of tasks for which strategies are used). Attempts might then be made to determine which form of bias each group typically demonstrates, across a range of processing tasks, in order to distinguish between the four models. Alloy and Abramson (1988) attempt to do this, and conclude that the weight of literature suggests that depressed people are less biased than those who are not depressed. Williams (1992) concludes that the weight of evidence from clinical observation argues against the view that depressed people tend to be more accurate in their cognition ('depressive realism'), while acknowledging that in certain experimental situations this might be the case.

Alternatively, attempts might be made to determine the particular circumstances which will predict the kind of processing bias that will be exhibited. Without entering into the question of whether there is any 'dominant' form of processing bias in either depressed or non-depressed people, attempts have been made to describe features of either the processing task or the relevant schema, which influence the kind of bias observed. For example, differences have been noticed between 'memory' and 'judgement' tasks (Morris, 1996). Other authors have concluded that 'ambiguous' information appears to be processed differently (Dykman et al, 1989; Craighead et al, 1979). It also appears to be important to consider whether the task relates to automatic or effortful / controlled processing (Ingram et al, 1994), with a suggestion that depression influences 'controlled' processes to a greater degree (Williams et al, 1997; Sanz, 1996). Williams (1992) notes that for certain tasks, it may be necessary to consider whether the information (e.g. rewards or punishments) was generated by the experimenter, or by the person participating in the study.

With regard to important features of the schema, Morris (1996) suggested that self-enhancing biases might prevail over schematic processing when the relevant self-schema is not confidently held. The question of whether information is processed differently depending on the degree to which it is 'emotionally engaging' seems to involve aspects of both the task and the schema. Pacini et al (1998) suggest that depressive processing in more engaging situations is more likely to be biased, and that 'depressive realism' only occurs under 'trivial' conditions.

It is not possible to present a full account of all of the factors that have been discussed in the literature, but it is clear that for each new study it will be necessary to specify such conditions very closely, if findings are to be related to those arising from other investigations, and for 'patterns' to emerge.

A third interpretation of the empirical evidence has been made, and is contained in the paper by Dykman et al (1989). This suggests that ideas of characteristic valence-driven processing biases might be misleading, and result from an inexact conceptualisation of the nature of schematic processing. In these terms, the suggestion of valence-driven processing biases either ignores the influence of schema, or implies a 'global' self-schema that is either 'positive' or 'negative'. Put another way, a 'negative bias' to processing has been inferred following comparisons of depressed and non-depressed participants responses to tasks, without any examination of whether the schema used in the task differ between the two groups. There is perceived to be a need for studies which examine more closely the schema relating to the processing task under examination.

Dykman et al (1989) note that schematic processing does not preclude there being *tendencies* to bias or distort information in a certain way (and that these might relate to the valence-driven models described earlier), but that these tendencies might be due to differences in terms of schemata, or any of a range of factors rarely considered in empirical studies (for example, motivation). These authors also note that such tendencies could only be assessed by reviewing a range of studies looking at different processing tasks. Kuiper and Higgins (1985) similarly conclude that positively or negatively biased and unbiased outcomes are not 'characteristic' of either depressed or non-depressed persons. Rather, that

there is one processing strategy ('schematic processing') which leads to either biased or unbiased outcomes, depending on conditions under which processing takes place.

There is therefore a need for studies which will help to distinguish between these contradictory positions. Recently, Morris (1996) described findings from a competitive test of the four models of depressive processing biases. In his design, participants estimated how well they would perform on a series of tests of 'verbal aptitude', by providing a single 'performance expectation score' seen to relate to all of the tests. Participants then completed five verbal aptitude tests, following which they were presented with five contrived feedback scores and told that these related to their performance on each of the tests. However, the scores were contrived so as to deviate in a pre-determined fashion from their expectation. Specifically, the five scores were: their expected score, and scores 8 and 17 percentile points above and below their expected score. Participants were then asked to rate how well they believed each test performed as a measure of verbal aptitude. Morris (1996) postulated that each of the three proposed biases predicted a different pattern in these 'validity ratings' across the five conditions (the five levels of feedback, above and below the expected scores). After completing two distractor tasks, subjects were asked to recall their feedback scores, and a 'memory distortion score' calculated by comparing their responses to their actual feedback scores. Again, the three forms of bias predict different patterns of response in terms of their memory distortion scores across the five conditions. The findings obtained from this study indicated that both dysphoric and non-dysphoric participants used a self-enhancing strategy (positive bias) to rate the validity of the tests, and a schematic strategy to recall their scores.

The participants in the Morris (1996) study were college students (23 dysphoric, 76 non-dysphoric), assigned to either group on the basis of two administrations of the Beck Depression Inventory (Beck et al, 1979). To be considered 'dysphoric', participants scored above 9 on both administrations, and to be considered 'non-dysphoric', participants scored below 5 on both administrations.

Morris (1996) discusses the implications of his findings, and attempts to identify the particular circumstances leading to a self-enhancing strategy in dysphorics. As has already been noted, it was apparent that expectations for performance were not confidently held,

and Morris (1996) cites evidence that in this circumstance a self-enhancing strategy predominates over schematic processing (Pelham, 1991; Swann et al, 1992).

Without entering into a full consideration of Morris' (1996) study, it is nevertheless clear that the approach taken offers a useful way of testing between contradictory claims made in the literature. This study therefore proposed to develop the design used by Morris (1996) in order to provide a competitive test of the four models using clinically depressed participants.

1.11 Summary

The literature on depressive cognition makes reference to three distinct forms of processing bias, and four models describing the form of processing strategy typically exhibited by depressed and non-depressed people. Empirical investigations of biased processing have resulted in a confusing array of contradictory findings - no clear picture of 'characteristic forms' of valence-driven processing strategies has emerged, for either group. This may reflect the influence of a wide range of factors thought to be important in determining the strategy that is utilised. Alternatively, ideas of 'characteristic' valence-driven processing strategies may be misguided, and have resulted from an inadequate examination of the schema relating to the various processing tasks that have been investigated. This reading of the literature suggests that competitive tests of the four models which have been put forward are necessary. Morris (1996) has described a methodology that allows for this to be done, and describes findings from a sample of dysphoric students.

1.12 Logic and aims of the present study.

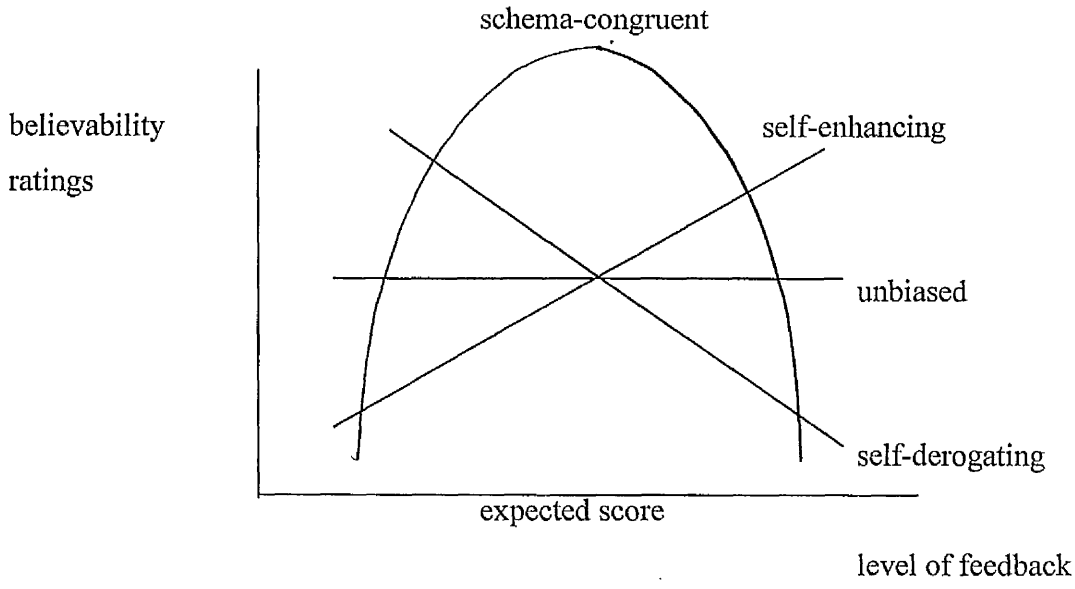
This study attempts to provide a competitive test of the four models of information processing strategies in depression, through a comparison of responses made by clinically depressed and non-depressed participants in the course of completing two information processing tasks. The first task required participants to make judgements about the believability of ambiguous information regarding their performance on a series of tests. The second task required participants to recall this same information following a brief distractor task.

Patterns in the responses given by participants allow for conclusions regarding the form of processing strategy being exhibited by the two groups of subjects. A detailed description of the procedures followed is presented in section 2.3; it is, however, necessary to briefly outline these procedures in order to explain the logic of the study. Participants were first asked to estimate their likely level of performance on seven upcoming tests of 'intelligence'. Once the seven tests were completed, participants were presented with contrived feedback scores, which they were told 'may or may not reflect your true performance' i.e. it was unclear to participants in the study whether the scores were their real scores, or had been made up by the researcher. The scores were in fact contrived so as to be at seven, set gradations above and below the level at which they expected to perform.

The 'judgement' task involved participants estimating the likelihood that each of the seven scores reflected their true performance (termed a 'believability rating'). The 'recall' task involved participants being asked to recollect all seven of their scores. A 'memory distortion score' was calculated by subtracting their actual feedback score from their recalled score. The form of any 'characteristic' processing strategy being exhibited by participants in either group would be revealed by an examination of the relationship between the 'level' of the feedback and 'believability' and 'memory distortion' scores.

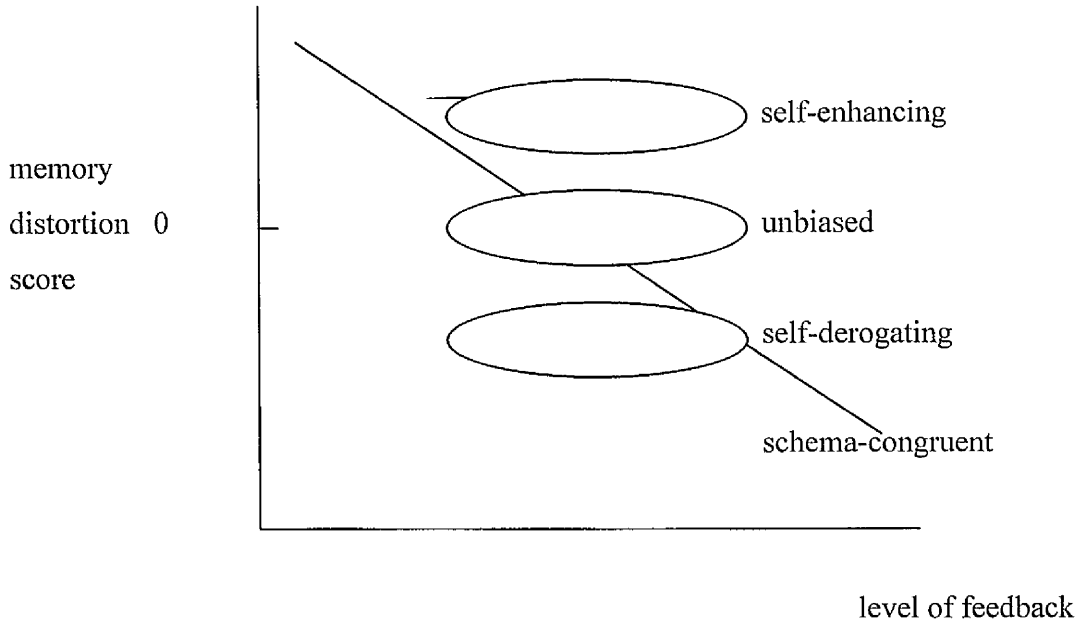
It was postulated that a negative (self-derogating) bias would result in a negative linear relationship between believability ratings and feedback level i.e. a tendency to rate more positive (more favourable) feedback as less believable. By contrast, a positive (self-enhancing) bias would result in a positive linear relationship between believability ratings and feedback level i.e. a tendency to rate more positive (more favourable) feedback as *more* believable. It was further postulated that schematic processing would be associated with a relationship between believability ratings and feedback level that took the form of an 'inverted U' i.e. that feedback scores which deviated from the expected score would be rated as less believable. Finally, an 'unbiased' processing strategy would result in equivalent believability ratings for all levels of feedback. These hypothesised patterns of response are illustrated in Fig. 2.

Fig. 2 Diagrammatic representation of the patterns of relationship between believability ratings and levels of feedback predicted by the four models.



Similarly, it was postulated that each processing strategy would result in a distinctive pattern in memory distortion scores. A self-derogating bias would result in an negative distortion (a significant negative discrepancy from zero) at each level of feedback and for a total (summed) distortion score. By contrast, a self-enhancing bias would result in a positive distortion (a significant positive discrepancy from zero) at each level of feedback and for a total (summed) distortion score. Schematic processing was expected to result in memories being distorted to conform with prior expectations, with the direction and magnitude of the distortion being a function of the discrepancy between the expected and feedback scores (cf. Morris, 1996). This would result in a negative linear relationship between memory distortion scores and feedback level, such that there is 'adding to' scores below the expected score, and 'subtracting from' those which exceeded the expected score. However, it was proposed that schematic processing should result in no overall distortion from zero. Finally, an 'unbiased' processing strategy would give rise to distortion scores that did not differ significantly from zero at each level of feedback or for a total (summed) distortion score. These relationships are expressed diagrammatically in Fig. 3.

Fig. 3 Diagrammatic representation of the patterns of relationship between memory distortion scores and levels of feedback predicted by the four models.



In this way, it was postulated that it would be possible to determine the form of processing strategy demonstrated by depressed and non-depressed participants.

In addition to comparisons of depressed and non-depressed participants, and a comparison of strategies used in two separate processing tasks, the responses of individual participants could be analysed to examine for variability in terms of processing strategy within each of the participant groups.

1.13 Hypotheses

The study is a competitive test of four models and therefore constitutes what Platt (1964) has termed 'multiple hypothesis testing'. The advantage of such an approach is that one hypothesis may be corroborated, while simultaneously falsifying another, and (in the terms used by Platt, 1964) this allows for 'stronger inferences' to be drawn. In tests of a single model or hypothesis, by comparison, findings which confirm the prediction of the hypothesis do not 'prove' the model (a logical error termed 'affirming the consequent'; Cliff, 1983) and additionally do not examine whether an alternative model may also explain the findings (perhaps more adequately).

Each of the four models generates predictions about the form of the relationships that will be observed between the level of feedback and both 'believability ratings' and 'memory distortion scores', in depressed and non-depressed subjects. These predictions are summarised in Table 1.

Table 1 Predicted form of processing strategy utilised by depressed and non-depressed participants, on the basis of the four models of depressive cognition.

model	Processing Strategy, Depressed Participants	Processing Strategy. Non-Depressed Participants
Model 1	self-derogating	unbiased
Model 2	unbiased	self-enhancing
Model 3	self-derogating	self-enhancing
Model 4	schematic	schematic

Chapter Two

METHODOLOGY

2. METHODOLOGY

2.1 Participants

2.1.1 Depressed sample

The depressed sample consisted of 25 participants, who were recruited from hospital outpatient and primary care settings. To be considered for the study, participants had to have been assessed and diagnosed as depressed, either by their General Practitioner, consultant psychiatrist or clinical psychologist. Participants additionally had to be either receiving or awaiting treatment for their condition, and to meet DSMIV criteria for a primary diagnosis of Major Depressive Disorder (M.D.D.) at the time of their involvement. Diagnostic status was determined by administration of selected items from the Structured Clinical Interview for DSM III-R (Spitzer et al, 1990), which were sufficient to allow for DSM IV diagnosis of M.D.D. Participation in the study was voluntary.

Potential participants were excluded if they had a previous or current history of psychosis, bipolar disorder or any manic episode, or were known to have any organic brain disorder, substance abuse problem or to have been recently bereaved. In addition, potential participants were excluded if they were not fluent in, or unable to read, English.

In addition to assessment using the SCID, participants were assessed for the level of their depression using the Beck Depression Inventory (B.D..I., Beck et al, 1961). Kendall et al (1987) suggest that scores of 20 or greater on the B.D.I. should be considered 'moderate depression', although for those who meet criteria on a structured clinical interview, the label 'depressed' (referring to the syndrome) may be used for those scoring above 16 on the B.D.I. Two of the 25 participants meeting diagnostic criteria for Major Depressive Disorder using the SCID scored below this level. The range of BDI scores in the depressed sample was between 14 and 41, with a mean score of 25.1

The depressed sample was composed of 9 males and 16 females. The age range of these participants was 22 years to 72 years, with a mean age of 36.1 years. 22 of the 25 participants were taking anti-depressant medication at the time of their involvement.

2.1.2 Non-depressed Sample

The non-depressed sample consisted of 25 participants contacted through information about the study made available on posters displayed at various locations around a large general hospital. Participation in the study was voluntary.

Potential participants were excluded if they currently met diagnostic criteria for any form of mental disorder, or had previously met criteria for psychosis, bipolar disorder or any manic episode, or were known to have any organic brain disorder, substance abuse problem or to have been recently bereaved. Three of the 25 participants had previously had a single episode of depression meeting DSMIV criteria for Major Depressive Episode - in all cases the episode had resolved a year or more before testing. None of the sample were taking any form of psychoactive medication at the time of testing.

The non-depressed sample was composed of 9 males and 16 females. The age range of these participants was 19 years to 67 years, with a mean age of 41.4 years. The range of BDI scores in the non-depressed sample was between 0 and 11, with a mean score of 4.4.

2.2 Measures and Rating Scales

2.2.1 The Beck Depression Inventory (B.D.I.; Beck et al, 1961)

The BDI was developed to provide a quantitative method for assessing the severity of depression, and consists of 21 items relating to symptoms and attitudes characteristic of a depressed population. Each item is composed of four graded self-evaluative statements, ranked in order of severity. The patient chooses the statement that comes closest to describing their state during "the past week, including today". Each item contributes a score of either 0, 1, 2 or 3. The total BDI score is the sum of these individual scores, and will therefore be in the range 0 - 63. It was initially intended for use as an interviewer administered measure, but is now more widely used as a self-rating scale. A copy of the B.D.I. is presented in Appendix 3.

Williams (1992) notes that the split-half reliability of the BDI has been shown to be around 0.9, and that its test-retest reliability is approximately 0.75. Beck et al (1961) reported that the BDI correlated well with clinician's ratings of severity of depression. It has also been found to correlate with other scales measuring depression, such as the Hamilton Rating Scale for Depression ($r = 0.75$; Schwab et al, 1967).

Kendall et al (1987) review the use and properties of the BDI, concluding that while it offers a useful measure of syndrome depression, it is not suitable as a nosological screening device. The relatively high test-retest reliability is largely due to the stability of 'non-depressed' respondents' scores - those who score above some defined cut-off criterion at initial testing commonly change classification, regardless of whether retesting is conducted within hours (Hatzenbuehler, Parpal and Matthews, 1983), days (Zimmerman, 1986) or 1 to 4 weeks (Deardorff and Funabiki, 1985; Hammen, 1980). Because scores can vary greatly in a short time period, Kendall and colleagues recommend that the BDI should be administered at the time of any experimental testing, and that ideally two scores should be available, at different points in time.

These authors also conclude that while the BDI is a relatively sensitive measure, it is only moderately specific to depression as a nosologic category. Significant proportions of respondents scoring highly on the BDI do not have diagnosable disorders and of those who do, many do not have a primary affective disorder (Oliver and Simmons, 1984; Hammen, 1980). It is recommended that the BDI is used in conjunction with other forms of assessment (for example, structured diagnostic interviews), and that measures of other affective states are administered.

With these considerations in mind, Kendall et al (1987) suggest the following guidelines regarding cut-off scores for the BDI, based on a review of large sample psychometric studies: a score of 0 - 9 constitutes 'normal' levels of symptomatology; 10 - 20 corresponds to 'mild depression'; 20 - 30 to 'moderate depression' and 30 or more to 'severe depression'

Regarding the use of the B.D.I. in the assessment of syndromal depression, Table 2 summarises the conclusions of Kendall et al (1987).

Table 2 Conclusions of Kendall et al (1987) regarding the use of the BDI in the assessment of depression.

syndromal assessment (BDI score)		Label
0-9		non-depressed
10-15		dysphoric
16- above, and nosologic assessment		
	meets no criteria	dysphoric
	meets criteria for affective disorders and nothing else	depressed
	meets criteria for affective disorder and other predominant disorder	other disorder with secondary depression

2.2.2 The Beck Anxiety Inventory (B.A.I.; Beck et al, 1988)

The BAI consists of 21 anxiety symptoms, which respondents rate according to the extent to which they have been bothered by each symptom "during the past week, including today". Responses are scored on a 0 - 3 scale, giving a score range of 0 to 63. The primary purpose of developing the BAI was to provide a more reliable self-report instrument for discriminating anxiety from depression (Beck et al, 1988). Creamer and colleagues (Creamer, Foran and Bell, 1995) note that the time frame suggests that the BAI was conceptualised more as a measure of 'state', rather than 'trait' anxiety. A copy of the BAI is presented in Appendix 4.

The developmental study using psychiatric patients (Beck et al, 1988) reported a high level of internal consistency (Cronbach's alpha = 0.92) and a test-retest correlation of 0.75. Factor analysis revealed two factors: 'somatic symptoms' and 'subjective anxiety and panic symptoms'. Using a non-clinical sample, Creamer and colleagues again demonstrated a high level of internal consistency, while low test-retest correlations suggested that the scale

was functioning as a state measure (Creamer et al, 1995). The two-factor structure was found at administration during a time hypothesised as being 'highly stressful', but not at a time of 'low stress'. These authors also demonstrated that the BAI was superior to the STAI (Spielberger et al, 1970), in terms of differentiating anxiety from depression.

Beck and Steer (1990) recommend that scores of 0 - 9 points be interpreted as normal anxiety; 10 - 18 as mild - moderate; 19 - 29 as moderate - severe; and 30 - 63 as severe anxiety.

2.2.3 Structured Clinical Interview for DSM III-R (Spitzer et al, 1990)

The SCID III-R is a semi-structured interview designed to enable a clinically trained interviewer to assess the nature and severity of psychiatric symptoms and to diagnose these disorders. Psychiatric disorders covered include anxiety disorders, affective disorders, psychotic, eating and personality disorders. The items from the SCID III-R used in this study are presented in Appendix 5.

2.2.4 The Selves Questionnaire (Higgins et al, 1985)

The Selves Questionnaire was developed to measure the quality of respondents' 'self discrepancies', a concept important in Self Discrepancy Theory (Higgins, 1987). It is a free response measure in which individuals list up to ten words to describe the attributes they believe they actually possess, ideally would like to possess, and feel they ought to possess. The first list is therefore seen to provide a description of a person's 'self concept', while the second and third of these measures are seen as relating to significant 'self guides'.

The questionnaire can be adapted to include ratings (on a 4 or 10 point rating scale) of the extent to which they actually, ideally or ought to possess each attribute. In addition, 'self-concept' or 'self-guide' attributes may be listed from the perspective of significant others; for example, to examine the attributes a respondent believes a parent thinks they actually possess. However, the version of the Selves Questionnaire used in this study did not include either of these additional measures. A copy of the measure used in the study is presented in Appendix 6.

Discrepancy scores can be calculated by comparing the attributes an individual lists to describe his actual self with those used in the self guides. Using this approach, it has been found that actual : ideal discrepancy scores correlated with self-reported depressive mood, whereas actual : ought discrepancy scores correlated with self-reported anxiety (Higgins et al, 1985; Straumann and Higgins, 1988). Similar findings emerged from a study using clinically depressed and anxious participants (Straumann, 1989).

In this study, the Selves Questionnaire was used simply to indicate whether participants recorded 'intelligence' (or some closely related concept) in either their descriptions of themselves, or as part of their self-guides. As such, it provided an additional indication of whether the processing tasks completed by participants related to a well-articulated schema, or indeed whether participants evidenced a self-discrepancy with respect to the concept of 'intelligence'.

2.2.5 Seven Tests of Intelligence

Seven tests from the Wechsler Adult Intelligence Scales - Revised (Wechsler, 1981) provided the basis for the 'intelligence tests' completed by participants. In some cases, the tests administered were 'shortened' versions of the published tests - not all items were used. The WAIS-R tests used were (in the order in which they were administered): Picture Completion, Digit Span, Block Design, Object Assembly, Comprehension, Digit Symbol, Similarities. A description of the final forms of these tests used in this study is contained in Appendix 7.

2.2.6 'Estimation of own intelligence' measure

Participants were asked to estimate how well they would expect to perform on an accurate measure of intelligence, and to express their answer as a percentile score, relative to the adult population of the United Kingdom. Examples were given to introduce the concept of a percentile score, and the researcher was available to provide any further explanation if it was needed. The item as it appeared to participants is presented in Appendix 8. This item was included to allow for description of the schema relating to processing tasks in this study, and to serve as an 'reference point' in determining which processing strategy was being used by participants (see sections 2.3 and 2.4).

2.2.7 Confidence in Accuracy of Estimate of Own Intelligence

Participants were asked to indicate the degree of confidence they had in the accuracy of their estimation of their own intelligence, using an 8 point Likert-type scale ranging from 1 ('not at all confident') to 8 ('completely certain'). The item as it appeared to participants is presented in Appendix 8.

2.2.8 Importance of Own Intelligence

Participants were asked to indicate the degree to which intelligence was important to their self-view, using an 8 point Likert-type scale ranging from 1 ('not at all important') to 8 ('extremely important'). The item as it appeared to participants is presented in Appendix 8.

2.2.9 'Ideal Intelligence' measure

Participants were asked to indicate how intelligent they would ideally like to be, in relation to the rest of the adult population of the United Kingdom, and to express their answer as a percentile score. The item as it appeared to participants is presented in Appendix 8.

2.2.10 Validity of Intelligence Tests

Participants rated the suitability of each test 'as a measure of intelligence', using a 10 cm. visual analogue scale, oriented vertically (following the recommendation of Gift, 1989). The end-points of the scales were labelled 'unsuitable' and 'very suitable'. These measures allowed for checks that the seven tests were seen by participants as reasonably and equivalently valid as measures of intelligence.

2.2.11 Ratings of the Believability of Contrived Feedback

Participants rated the likelihood that each of seven feedback scores was their true score, using a 10 cm. visual analogue scale, oriented vertically (following the recommendation of Gift, 1989). The end-points of the scales were labelled '0% (certainly false)' and '100% (certainly true)'. These measures allowed for conclusions to be drawn regarding the form of

processing strategy being used by participants in the study, in evaluating feedback regarding their own performance (see sections 2.3 and 2.4).

2.2.12 Recall of Contrived Feedback

Participants were asked to recall their feedback score for each of the seven intelligence tests. Responses were made verbally and recorded by the researcher. This measures allowed for conclusions to be drawn regarding the kind of processing strategy being used by participants in the study, in recalling feedback regarding their own performance (see sections 2.3 and 2.4).

2.3 Procedure

Depressed participants were initially contacted by a clinician involved in their care. A number of clinicians were involved in identifying people who potentially met the inclusion criteria, and introducing them to the study. These clinicians included General Practitioners, clinical psychologists, and a consultant psychiatrist. Those identified as being suitable for inclusion were either contacted face-to-face, or through a standard letter (reproduced in Appendix 9). They were given an information sheet about the study (reproduced in Appendix 10) and asked to indicate their willingness to be approached by the researcher by signing a consent form to this effect. The information sheet explained that the study looked at the way depression affected how people think. People were told that they would be asked to fill out questionnaires, and to complete some psychological tests on which they would be given feedback. It was stressed that the feedback might or might not be true, and that they would be asked to estimate the extent to which feedback reflected their true performance. No mention was made of the nature of these tests, nor of the fact that they would be asked to recall their feedback scores. Information was provided about the nature of confidentiality as it applied to the study, and they were informed that they could withdraw at any time. The researcher then made contact with those who had given consent for him to do so, and arranged a time at which to meet in order to administer the measures. Participants were either visited in their home or seen in the Psychology Department of a large general hospital.

At the start of the session, information about the nature of the study was repeated and participants asked to indicate their agreement to take part in the study by signing a consent form (reproduced in Appendix 11). Participants then completed a written questionnaire asking for demographic information (reproduced in Appendix 12), the Beck Depression Inventory, the Beck Anxiety Inventory and the Selves Questionnaire. Items from the SCID were then used in order to determine the participant's diagnostic status with respect to a range of mental disorders.

Following this, participants were told that the study involved the administration of seven 'widely-used and well-established intelligence tests'. They were told that they would be asked to rate the suitability of the tests, that there would be a break while the tests were scored and that they would then be shown a score for each test that 'may or may not be true'. They were told that they would be asked to estimate how likely it was that the feedback score was their true score. It was anticipated that this account would activate participants' schemata in relation to their own intelligence. Participants then completed the measures relating to the estimate of their own intelligence, their confidence in this estimate, the importance of intelligence to their self-view and their ideal intelligence.

Each of the seven intelligence sub-tests were then administered in a standardised order. Each sub-test was immediately followed by completion of the rating scale relating to its suitability as a measure of intelligence. There followed a short break (of approximately 5 - 7 minutes) in which time the researcher led the participant to believe that he was scoring the seven tests. In reality, this time was used to calculate the individualised contrived feedback scores for the next stage of the study. The contrived feedback deviated in a pre-determined fashion from each participant's performance expectation. Specifically, the seven feedback scores were at the level at which the participant expected to perform, and 7, 14 and 21 percentile points above and below this score. These feedback scores therefore related to seven 'feedback conditions' which were either 'slightly', 'moderately', or 'greatly' above and below expected performance, or at the expected level of performance.

These feedback scores were then presented to participants. For each participant, feedback conditions were randomly assigned to the set of tests in order to ensure that tests and feedback conditions were not confounded. Feedback scores were presented for each of the seven tests in the same standardised order in which the tests had been administered.

Participants completed ratings of the believability of each feedback score immediately following its presentation (in contrast to Morris, 1996 who presented all five feedback scores simultaneously on a form).

Participants then completed a distractor task, presented as a 'test of imagination'. In this task, participants were shown two pictures. For each of these pictures, they were asked to make up a 'dramatic and vivid' story about what might be happening in the picture, and to write this story down in a test booklet. Completion of this task typically took between 4 and 6 minutes.

This was followed by a surprise recall task, in which participants were asked to recall the feedback scores they had received for each of the seven 'tests of intelligence'. Responses were made verbally and recorded by the researcher.

Participants were then informed that the study was at an end, and invited to ask questions or make comments on what had taken place, before being fully de-briefed about the study. In the de-briefing, it was emphasised that all the feedback scores had been contrived and that they bore no relationship to the person's actual performance or intelligence. Participants were also informed that many of the tests had been administered incorrectly, thus preventing the researcher from forming any conclusions about their intelligence. The whole procedure typically took in the order of one-and-a-half hours to complete.

Comments made at this stage indicated that only two participants (both in the non-depressed group) had suspected that all the scores had been made up, and even they had been uncertain of this while making their responses. No-one discerned that there was any pattern to the feedback, and so all participants appeared to accept that each individual score might or might not be their true score.

Identical measures were administered to depressed and non-depressed participants, and identical procedures followed. However, completion of the study often took considerably less time with non-depressed participants, chiefly due to less time being spent on diagnostic assessment through the use of the SCID II-R. Because non-depressed volunteers were responding to the brief information about the study presented on posters, care was

taken to ensure that they read the information sheet, and therefore received the same information prior to their involvement.

The study therefore examined the processing strategies used by depressed and non-depressed persons in the completion of two information processing tasks. These related to i) judgements about the believability of individualised contrived feedback which deviated in a pre-determined fashion around the level at which each participant expected to perform, and ii) memory for this feedback following a brief distractor task. Additional measures allowed for a decription of the schema relating to these information processing tasks.

2.4 Data Analyses

The data were analysed using the statistics package for social sciences (SPSS for Windows). The normality of distributions of continuous variables was assessed by a comparison of the mean and median scores, and measures of skewness and kurtosis.

Using data collected through the procedures outlined above, three further variables were calculated. Firstly, seven 'memory distortion scores' were calculated for each participant. These comprised a ('recalled feedback score' - 'actual feedback score') for each of the seven feedback conditions. Following this, a single 'S score' was calculated for each participant. This was the sum of all the memory distortion scores, across the seven conditions. Finally, a 'discrepancy score' was calculated for each participant, which equated to their ('ideal intelligence' - 'estimated intelligence'). Responses made to the Selves Questionnaire were coded simply as the presence or absence of the concept of 'intelligence' in any of the three domains. Analysis of the data then proceeded in four stages.

Stage 1. A comparison was made of depressed and non-depressed participants in terms of self-ratings of mood, and measures relating to their self-concept in terms of 'intelligence', using t-tests for normally distributed data and Mann Whitney U tests for non-normally distributed data.

Stage 2. Validity ratings made by depressed and non-depressed participants for each of the seven tests of intelligence were analysed using a 2 (depression status) x 7 (intelligence test) repeated measures MANOVA. As the validity of the seven tests might conceivably influence the believability of the contrived feedback, it was necessary to conduct this analysis in order to investigate whether validity ratings would need to be entered as a covariate in subsequent analyses. Differences between mean validity ratings for the seven tests by the two groups were investigated using Scheffe post hoc tests.

Stage 3. Judgements regarding the believability of feedback were analysed for evidence of biased processing strategies, using two different approaches.

a) Idiographic Analysis

As it could not be assumed that participants in either group all utilised the same processing strategy (the four models described are conceptualised as summarising 'characteristic' processing strategies, although it may be that this reflects a 'dominant' strategy which conceals a degree of individual variation), data were initially analysed by examining the responses of every participant individually. In this approach, a number of sources of information were combined. Firstly, believability ratings across the seven feedback conditions (-21, -14, -7, 0, +7, +14, +21 percentile points) were plotted for each participant and examined by eye, to determine whether any of the three patterns of relationship predicted on the basis of models of bias were observed. This visual examination of the data would also reveal if there appeared to be evidence of unbiased processing, or some other pattern to the relationship that was not predicted by the models. Attempts were then made to fit a curve through the seven data points, using a curve estimation procedure (a form of regression analysis in which the proportion of variance described by different equations can be estimated). The statistical significance of the variance explained by linear and quadratic equations was assessed, using the criteria described below. Linear and quadratic equations were used as these related to the forms of relationship predicted by the three processing biases.

For the variance explained by either equation to be considered significant:

i) the Adjusted R square value had to be greater than 0.4
ii) the significance of F had to be less than 0.05

The slope of any linear relationship (Beta) had to be greater than + / - 0.4, to be considered a significant positive / negative relationship

It was important to examine each individual set of data points visually, to confirm or disconfirm conclusions made on the basis of statistical evidence. For example, if statistical evidence were to support a conclusion of a schematic processing bias (significant variance explained by the quadratic equation), a visual examination was necessary to ensure that the pattern of relationship was indeed an 'inverted U'.

Through the combination of these methods, an attempt was made to determine the nature of the relationship between believability and feedback condition, for each participant. A judgement was made as to whether there appeared to be evidence of a positive linear relationship (self enhancing), a negative linear relationship (self-derogating), an 'inverted-U' (schema congruent), whether the participant appeared unbiased, or whether the participant's responses could not be classified as fitting any of these patterns of relationship. It was anticipated that responses might be difficult to classify for a number of reasons, including the suggestion that there might be 'mixed' strategies in operation. For example, participants might be utilising a strategy that was both 'schematic' and positively or negatively biased i.e. evaluating information to be congruent with performance at something other than their expected level.

b) Group - based Analysis

Alternatively, it was possible that within each of the study groups, participants were all using the same processing strategy (the idea contained within models of 'characteristic' processing strategies). With this assumption, the nature of this strategy could then be elucidated using a 2 (depression status) x 7 (feedback level) repeated measures MANOVA on the believability ratings provided by each participant, in conjunction with Scheffe post hoc tests. Validity ratings could be entered as a covariate if appropriate.

Curve estimations for linear and quadratic equations were also performed on mean believability ratings for each of the seven feedback conditions, for depressed and non-depressed participants.

Stage 4. Again, two approaches were taken to analysis of memory distortion scores, in an attempt to elucidate the processing strategy used in the recall of feedback scores.

a) Idiographic Analysis

As it could not be assumed that participants in either group all utilised the same processing strategy with respect to the recall task, this data was initially analysed by examining the responses of every participant individually.

It had been postulated that a positive bias would result in memory distortion scores for each of the seven feedback conditions that all tended to be positively distorted (significantly above zero) resulting in a positive S score. Similarly, a negative bias would result in a negative S score and an unbiased processing strategy in an S score close to zero. A schema-congruent bias, by contrast, would result in an overall S score close to zero, but with a varying pattern of memory distortion scores across the seven feedback conditions (specifically, a negative linear relationship).

It was therefore appropriate to look for evidence of a significant negative, linear relationship in the responses of each individual participant. This was attempted, using a combination of approaches. Statistical evidence of a significant linear relationship was gathered using a curve estimation procedure (a form of regression analysis in which the proportion of variance described by different equations can be described). For the variance explained by a linear equation to be considered significant:

i) the Adjusted R square value had to be greater than 0.4
ii) the significance of F had to be less than 0.05

The slope of any linear relationship (Beta) had to be greater than + / - 0.4, to be considered a significant positive / negative relationship.

The criterion used to indicate whether recall was positively or negatively distorted was that for this conclusion to be drawn, the participant's S score had to be above +35 or below -35 (respectively) - equivalent to the recalled scores for each of the seven tests being distorted by at least five percentile points in the same 'direction' (distorted positively or negatively). To be considered 'unbiased', a participant's S score had to lie between - 5 and + 5 i.e. for the sum of all seven memory distortion scores to deviate from zero by less than 5 percentile points. In addition, there had to be evidence of a significant linear relationship.

In combination with a visual examination of plots of individual participants' responses, these observations were used to reach conclusions regarding the likely processing strategy exhibited by each participant. It was anticipated that responses might be difficult to classify for a number of reasons, including the suggestion that there might be 'mixed' strategies in operation - for example, a negative linear relationship within scores that were either positively or negatively distorted relative to zero).

b) Group-based Analysis

The assumption that participants in either the depressed or non-depressed samples all used the same processing strategy allowed for an analysis of grouped data. First, the S scores of depressed and non-depressed participants were subjected to t tests in order to determine whether they differed significantly from zero (evidence of a positive or negative bias).

The processing strategies used in the recall of ambiguous feedback were further investigated using a 2 (depression status) x 7 (feedback level) repeated measures MANOVA on the memory distortion scores provided by each participant. Again, differences between conditions and / or groups were investigated using Scheffe post hoc tests, and validity ratings could be entered as a covariate if appropriate.

Curve estimations for linear and quadratic equations were also performed on mean memory distortion scores for each of the seven feedback conditions, for depressed and non-depressed participants.

To investigate the possibility that participants were responding randomly in terms of their recall of feedback scores, a 2 (depression status) x 7 (feedback level) repeated measures

ANOVA was performed on recalled scores provided by each participant, in conjunction with Scheffe post hoc tests. In addition, correlation coefficients were calculated for recalled scores and feedback scores, at each level of feedback.

Chapter Three

RESULTS

3. RESULTS

Tests of normality indicated that the memory distortion scores for the feedback conditions '-21' and '+21' percentile points were not normally distributed. An examination of these distortion scores indicated that a large proportion of participants had provided a distortion score of 'zero' - it appeared that for some participants, recall at either 'extreme' of the feedback conditions was extremely accurate. These data were nevertheless included in subsequent analyses of variance, as this method is sufficiently robust to departures from normality. It was also found that discrepancy scores were not normally distributed. All other data were normally distributed, and therefore parametric tests were appropriate in all cases, apart from those tests to be conducted on categorical / ordinal data (responses to Likert-type scales).

3.1 Participant characteristics

Regarding participant characteristics, it was observed that both groups were composed of 9 men and 16 women. The mean (and standard deviation) of ages (in years) in the two groups were: depressed 36.0 (12.8); non-depressed 41.4 (15.8). This difference was not significant ($t\,[48] = 1.33$, $p = 0.190$).

3.2 Measures relating to mood and self-concept in terms of 'intelligence'

The responses of depressed and non-depressed participants to i) measures of mood and ii) measures relating to their self-concept in terms of intelligence were compared, using t tests for normally distributed data and Mann Whitney U tests for non-normally distributed data. The results of these comparisons are summarised in Tables 3 and 4.

Table 3. Measures of mood, estimated intelligence and ideal intelligence for depressed and non-depressed participants, giving means (s.d.) and the significance of the difference between the groups.

	Mean (s.d.)			
	Depressed (n=25)	Non-depressed (n=25)	t (48)	p
1 B.D.I.*	25.1 (7.7)	4.4 (3.3)	12.38	0.000
2 B.A.I.**	19.6 (9.5)	6.8 (4.1)	6.19	0.000
3 Estimated intelligence	52.2 (16.8)	67.3 (12.5)	-3.61	0.001
4 Ideal Intelligence	71.0 (19.1)	78.1 (12.3)	-1.56	0.126

[*BDI = Beck Depression Inventory, **BAI = Beck Anxiety Inventory]

Table 4. Measures of discrepancy scores, confidence ratings and importance ratings, for depressed and non-depressed participants, giving medians (range) and the significance of the difference between the groups.

	Median (range)			
	Depressed (n=25)	Non-depressed (n=25)	Mann Whitney U	p
5 Discrepancy score	20 (-20, 60)	10 (-25, 40)	254	0.246
6 Confidence rating	4 (1, 8)	5 (1, 7)	192	0.018
7 Importance rating	6 (1, 8)	6 (3, 8)	280	0.518

Depressed and non-depressed participants differed in terms of BDI and BAI scores. Unsurprisingly, the depressed sample provided significantly higher scores on both these measures. Of the depressed participants, 7 scored in the range for 'mild' depression; 10 in the range for 'moderate' depression; and 8 in the range for 'severe' depression (following Kendall et al, 1987). The participant in the non-depressed sample who scored 11 on the BDI might be thought of as experiencing mild depression or 'dysphoria', but was retained in the sample as responses to the SCID III-R did not indicate significant low mood. All other participants in this sample scored within the range 0 - 9, indicating 'normal' levels of depressive symptomatology.

The overlap between depression and anxiety is an issue that is discussed more fully in sections 1.2 and 4.3.1, but it is here noted that a significant proportion of the depressed sample also appeared to be experiencing significant anxiety. 10 members of the depressed sample scored in the range for 'mild - moderate' anxiety; 9 in the 'moderate - severe' range; and 4 in the 'severe anxiety' range (after Beck and Steer, 1990).

Non-depressed participants made estimations of their expected performance on tests of intelligence that were significantly higher than those made by depressed participants. No information is available which allows for conclusions as to whether these estimations are accurate, in either group. Nevertheless, it appeared that the schema regarding 'own intelligence' differed on average between the two groups in this regard, and that non-depressed persons were significantly more 'positive' about their likely performance.

Both depressed and non-depressed persons were only moderately confident in the accuracy of the estimates they made. 16 of the depressed sample, and 17 of the non-depressed sample, rated their confidence as 5 or greater (on an 8 point scale). It was observed that the non-depressed participants were significantly more confident in their estimations of intelligence than depressed persons. These findings are discussed more fully in chapter 4.

No differences were observed between the two groups in terms of their 'ideal' levels of performance on 'an accurate test of intelligence'. Perhaps surprisingly, the 'ideal intelligence' in both groups was at a somewhat 'modest' level, in the region of 75%. Resulting 'discrepancy scores' (seen as relating to ideas of actual : ideal discrepancies, discussed earlier) did not differ significantly between the two groups. Both groups rated

'intelligence' as being something that was important to their self-view, with median ratings of 6 (on an 8-point scale) and differences between groups that were non-significant. 19 of the depressed sample, and 24 of the non-depressed sample, gave an 'importance' rating of 5 or greater.

Responses to the Selves Questionnaires are summarised in Table 5. This table describes the numbers of participants in both groups who mentioned 'intelligence' in each of the three domains, and the number mentioning 'intelligence' in any domain.

Table 5 Summary of responses made to the Selves Questionnaire by depressed and non-depressed participants.

	self-actual	self-ought	self-ideal	in any domain
depressed (n=25)	2	2	4	5
non-depressed (n=25)	4	0	3	4

Only a small proportion of participants in either group mentioned 'intelligence' in any of the three domains examined by the Selves Questionnaire. Due to the small numbers of participants mentioning 'intelligence', no further analyses of these responses were performed.

3.3 Validity ratings for each of the seven tests of intelligence.

The mean ratings given by depressed and non-depressed participants regarding the validity of each of the seven tests as 'measures of intelligence' are presented in Table 6.

Table 6 Means (and standard deviations) of validity ratings for each of the seven 'tests of intelligence'.

(test)	Depressed (n = 25)	Non-depressed (n = 25)	Whole group (n = 50)
Picture completion	5.65 (2.34)	5.63 (2.15)	5.64 (2.23)
Digit Span	6.31 (2.76)	4.88 (2.49)	5.60 (2.70)
Block Design	6.58 (2.54)	7.28 (1.90)	6.93 (2.25)
Object Assembly	5.48 (2.94)	6.36 (2.27)	5.92 (2.64)
Comprehension	6.62 (2.24)	6.34 (2.62)	6.48 (2.42)
Digit Symbol	5.98 (2.75)	5.82 (2.20)	5.90 (2.46)
Similarities	6.26 (2.57)	6.46 (2.30)	6.36 (2.41)

It appeared that each of the seven tests was seen as having moderate face validity by the respondents in this study. Potential differences between the ratings given for the seven tests, and between the two groups of participants, were investigated using a 2 (depression status) x 7 (intelligence test) repeated measures MANOVA.

This MANOVA revealed significant differences between the validity ratings given to the seven tests by the combined groups, $F(6, 288) = 3.37$, $p < 0.005$. The groups did not differ in their overall validity rating, $F(1, 48) = 0.002$, $p = 0.969$. The interaction term, $F(6, 288) = 2.02$, $p = 0.063$, indicated that there was a statistical trend towards differential validity ratings in the depressed as opposed to the non-depressed group. Because of these findings, it would be necessary to enter the validity rating for each test as a covariate in later analyses (as described below).

Scheffe post hoc tests were used compare the validity ratings for each of the seven tests, for grouped data (combining responses of depressed and non-depressed participants). The variance table of the MANOVA revealed that the Scheffe Least Significant Difference = 1.066. Significant differences were therefore observed between the validity ratings of 'block design' and 'picture completion', and 'block design' and 'digit span'. In other words, 'block design' was seen as more suitable as a measure of intelligence than either of the tests which preceded it in the order in which they were administered.

3.4 Processing strategies used in judging the believability of feedback scores

Judgements regarding the believability of the feedback in the seven conditions were analysed in two ways. Firstly, responses were examined for evidence of individual differences in terms of processing strategies used, and secondly evidence was sought of group tendencies towards the use of a 'characteristic' processing strategy.

3.4.1 Analysis of individual responses

As has been described in section 2.4, a combination of statistical evidence and a visual examination of plots of believability ratings across the seven conditions was used to reach a conclusion for each participant regarding the processing strategy apparently in operation. Specifically, attempts were made to determine whether the responses given by each participant indicated a biased processing strategy (positive, negative or schematic), were unbiased, or could not be classified.

The data relating to these conclusions are presented below (Tables 7 and 8). Table 9 summarises the conclusions that it was possible to reach using these methods.

Table 7 - Idiographic analysis of believability ratings for depressed participants

(findings meeting stated significance criteria appear in bold; findings suggestive of a trend towards significance appear in italics)

subject number	Quadratic Adj R sq	Quadratic Sig F	Linear, Adj R sq	Linear, Sig F	Beta	Visual examination	Conclusion
1	**0.58**	*0.08*	-0.18	0.82	-0.11	?s	x
2	**0.59**	*0.07*	0.03	0.32	0.44	x	x
3	0.20	0.28	*0.35*	*0.09*	**0.67**	?p	x
4	-0.09	0.54	-0.15	0.68	0.19	x	x
5	0.27	0.23	0.32	0.10	**0.66**	?p	x
6	0.31	0.75	-0.15	0.67	0.19	x	x
7	**0.72**	**0.03**	0.18	0.19	**-0.56**	x	x
8	0.29	0.21	-0.19	0.91	-0.05	x	x
9	**0.54**	*0.09*	*0.36*	*0.08*	**-0.68**	?n	x
10	0.05	0.49	0.02	0.33	-0.43	x	x
11	**0.46**	0.12	-0.09	0.52	0.29	?p	x
12	**0.83**	**0.01**	**0.84**	**0.00**	**0.93**	p	p
13	**0.59**	*0.07*	-0.14	0.64	-0.21	s	x
14	**0.46**	0.95	-0.17	0.74	0.15	x	x
15	0.21	0.46	0.00	0.36	-0.41	?u	x
16	*0.39*	0.86	-0.15	0.65	0.21	x	x
17	0.14	0.32	0.31	0.11	**-0.65**	x	x
18	-0.21	0.65	0.16	0.71	0.17	?s	x
19	**0.59**	*0.07*	**0.62**	**0.02**	**-0.82**	n	n
20	-0.07	0.51	-0.19	0.87	-0.07	x	x
21	0.30	0.21	0.19	0.17	**-0.58**	x	x
22	**0.91**	**0.00**	**0.47**	*0.05*	**-0.75**	?n	n
23	*-0.37*	0.84	-0.11	0.55	-0.27	x	x
24	**0.66**	*0.05*	**0.73**	**0.01**	**-0.88**	?n	n
25	-0.11	0.54	-0.16	0.71	-0.17	x	x

s - schema congruent
n - negative
p - positive
u - unbiased
x - unclassifiable
? - possible conclusion

Idiographic plots of believability ratings are contained in Appendix 13

Table 8 - Idiographic analysis of believability ratings for non-depressed participants

(findings meeting stated significance criteria appear in bold; findings suggestive of a trend towards significance appear in italics)

subject number	Quadratic Adj R sq	Quadratic Sig F	Linear, Adj R sq	Linear Sig F	Beta	Visual examination	Conclusion
26	-0.31	0.76	-0.06	0.46	0.33	x	x
27	0.27	0.23	0.31	0.10	**-0.66**	n	x
28	-0.35	0.82	-0.14	0.63	0.22	?p	x
29	**-0.49**	0.98	-0.19	0.88	-0.20	x	x
30	-0.35	0.81	-0.15	0.66	0.20	x	x
31	**0.56**	*0.08*	*0.39*	*0.08*	**0.70**	?u	x
32	0.00	0.44	-0.18	0.81	0.11	?u	x
33	-0.30	0.75	-0.04	0.43	-0.36	x	x
34	**0.87**	**0.00**	**0.45**	*0.06*	**0.73**	?p	p
35	-0.04	0.48	0.08	0.26	0.48	x	x
36	**0.52**	0.10	0.23	0.15	**-0.60**	x	x
37	0.07	0.51	0.12	0.24	**0.51**	x	x
38	-0.35	0.81	-0.10	0.54	-0.27	x	x
39	0.24	0.25	*0.35*	*0.09*	**-0.68**	?n	x
40	**-0.44**	0.95	-0.17	0.75	0.14	x	x
41	**0.50**	0.11	-0.19	0.94	0.03	?s	x
42	**0.68**	**0.04**	-0.18	0.80	0.11	?s	s
43	0.14	0.33	-0.19	0.88	-0.06	x	x
44	0.15	0.31	-0.07	0.48	-0.32	x	x
45	0.23	0.26	0.26	0.13	**-0.62**	?n	x
46	**0.56**	*0.08*	0.31	0.11	**0.65**	x	x
47	-0.21	0.65	0.00	0.36	-0.41	x	x
48	0.31	0.21	0.24	0.15	**0.60**	x	x
49	**0.73**	**0.03**	0.22	0.16	**0.59**	?p/s	s
50	0.16	0.31	0.30	0.11	**-0.65**	x	x

s - schema congruent
n - negative
p - positive
u - unbiased
x - unclassifiable
? - possible conclusion

Idiographic plots of believability ratings are contained in Appendix 13

Table 9 Summary of conclusions regarding the processing strategies used in judging the believability of feedback, following idiographic analysis of participants' responses.

(processing strategy)	Depressed	Non-depressed
self enhancing	1	1
self derogating	3	0
unbiased	0	0
schema-congruent	0	2
unclassifiable	21	22

It appeared that examples of different forms of processing strategy could be found in both depressed and non-depressed participants. To illustrate this, some examples of individual responses are presented below.

Fig.4 - example of apparent self-enhancing bias:

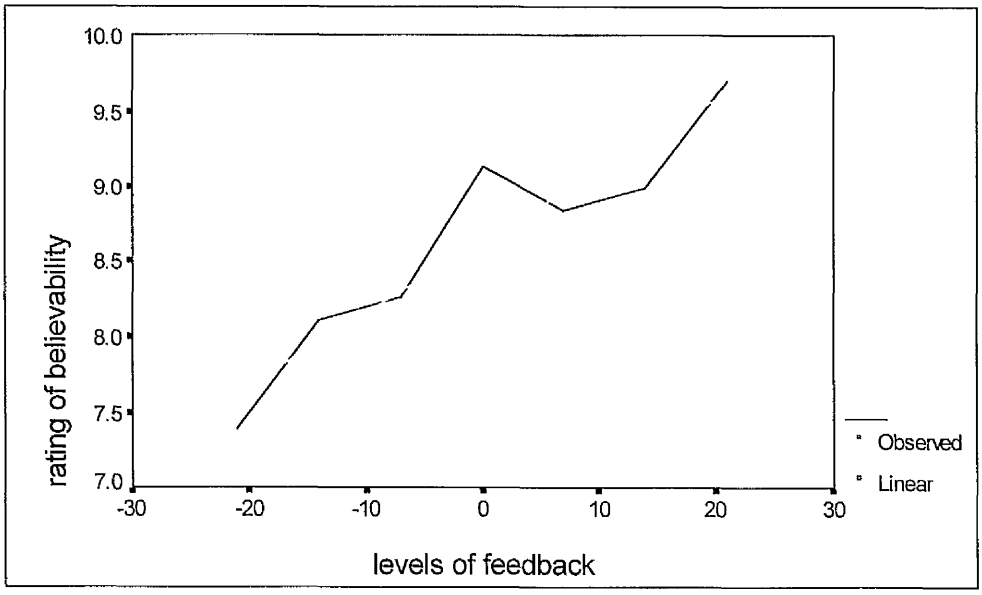


Fig 5 - example of apparent self-derogating bias:

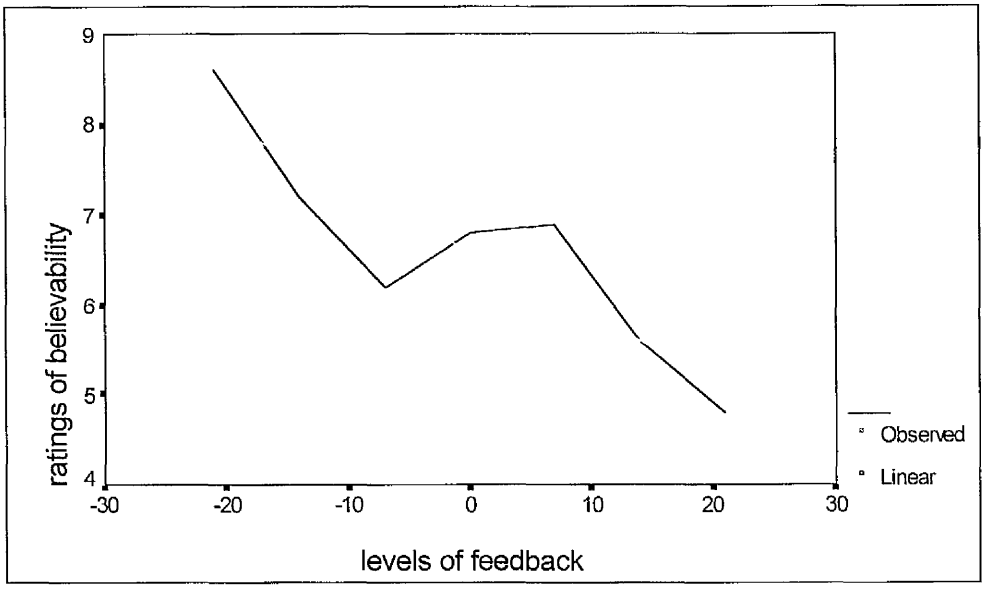


Fig 6 - example of apparent schema-congruent bias:

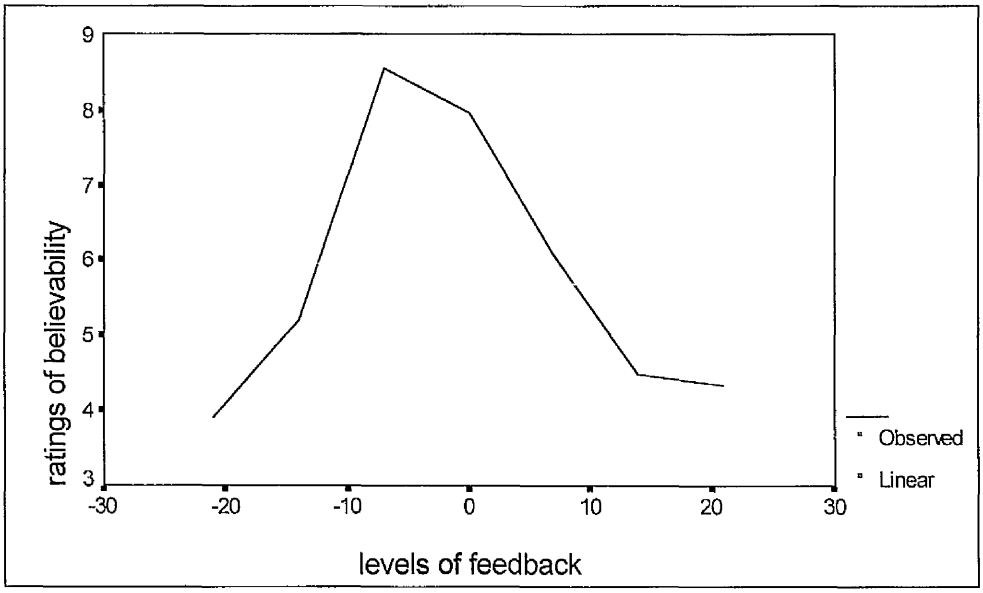
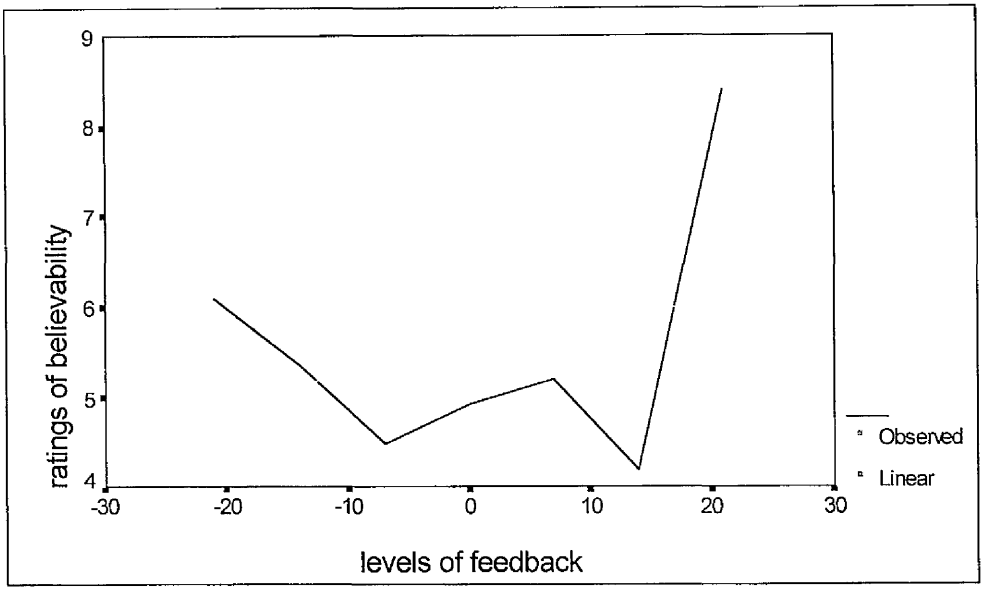


Fig 7 - example of unclassifiable response



For the vast majority of participants, it was not possible to arrive at a firm conclusion regarding the processing strategy in operation using these methods. Reasons for this are discussed in chapter 4.

3.4.2 Analysis of grouped data

The alternative approach taken to the analysis of believability ratings was to combine the individual responses of members of either group (assuming 'homogeneity' of responses within the group), and to look for evidence of a 'characteristic' processing strategy being exhibited by either depressed or non-depressed participants. Table 10 contains means (and standard deviations) of believability ratings across the seven feedback conditions, for both depressed and non-depressed participants. Figs. 8 and 9 presents these means and associated 95% confidence intervals, for depressed and non-depressed participants respectively.

Table 10 Means (and standard deviations) of believability ratings across the seven feedback conditions, for both depressed and non-depressed participants.

(feedback condition)	Depressed	Non-depressed
-21points	5.4 (2.8)	5.1 (3.2)
-14 points	6.7 (2.3)	5.6 (3.1)
-7 points	5.8 (2.5)	5.8 (2.8)
0 points (+/-)	6.2 (2.0)	6.5 (2.4)
+7 points	5.7 (2.5)	5.8 (2.3)
+14 points	4.5 (2.4)	5.5 (2.8)
+21 points	5.6 (2.9)	5.6 (2.8)

Fig. 8 Means and associated 95% confidence intervals for believability ratings across the seven feedback conditions, for depressed participants.

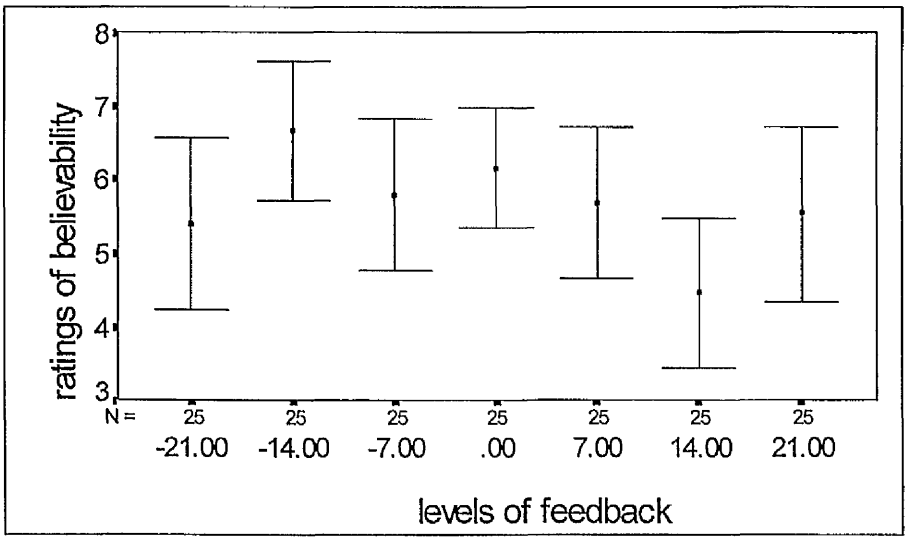
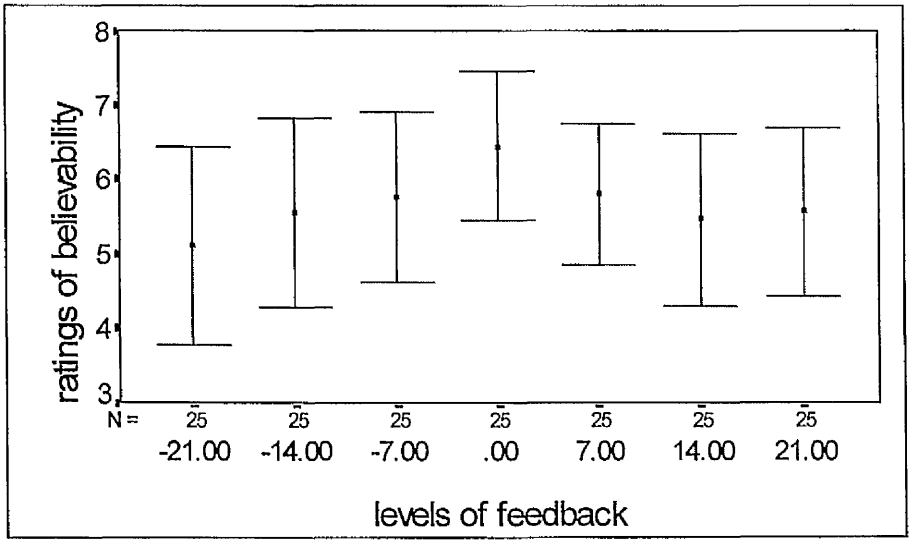


Fig. 9 Means and associated 95% confidence intervals for believability ratings across the seven feedback conditions, for non-depressed participants.



Differences between the believability ratings for the seven tests, and between the two groups of participants, were investigated using a 2 (depression status) x 7 (feedback condition) repeated measures MANOVA. As it had been noted that differences existed between the validity ratings ascribed to the seven tests used, the validity rating for the test used at each feedback condition for each participant was entered into the analysis as a covariate.

This MANOVA revealed no significant differences between the believability ratings for the seven tests by the combined groups, $F(6, 288) = 1.68$, $p = 0.126$. The groups did not differ in their overall validity rating, $F(1, 48) = 0.00$, $p = 0.989$. The interaction term, $F(6, 288) = [illegible]$ $p = 0.570$ was also non-significant.

It therefore appeared that for both groups, judgements about the believability of feedback were not related to the valence of the feedback in any of the ways predicted by conceptualisations of 'biased' processing.

Curve estimation procedures performed on the group mean believability scores for each of the seven feedback conditions, for depressed participants, indicated that a linear equation did not account for a significant amount of the variance (Adjusted R square = 0.033, Significance of F = 0.323); the quadratic equation was also non-significant (Adjusted R square = -0.091, Significance of F = 0.529), as was the cubic equation (Adjusted R square = 0.289, Significance of F = 0.318).

Similar curve estimation procedures performed on the group mean believability scores for non-depressed participants, indicated that a linear equation again did not account for a significant amount of the variance (Adjusted R square = -0.133, Significance of F = 0.610); the quadratic equation was also non-significant (Adjusted R square = 0.465, Significance of F = 0.127), as was the cubic equation (Adjusted R square = 0.398, Significance of F = 0.254).

3.5 Processing strategies used in the recall of feedback scores

Regarding the form of processing strategy used by depressed and non-depressed participants in the recall of their feedback scores, attempts were again made to examine individual participants' responses, as well as analyses performed on grouped data in an attempt to identify a characteristic processing strategy.

3.5.1 Analysis of individual responses

As has been described in section 2.4, the combination of a visual examination of responses across the seven conditions and statistical evidence was used to reach a conclusion for each participant regarding the processing strategy apparently in operation. Specifically, attempts were made to determine whether the responses given by each participant indicated a biased processing strategy (positive, negative or schematic), were unbiased, or could not be classified (perhaps due to indications of there being a 'mixed' strategy).

The raw data relating to this approach is presented on the following pages (Tables 11 and 12). Table13 summarises the conclusions that it was possible to reach using these methods.

Table 11 - Idiographic analysis of memory distortion scores for depressed participants

(findings meeting stated significance criteria appear in bold; findings suggestive of a trend towards significance appear in italics)

Subject number	S score	linear model, Adjusted R sq	linear model, sig F	Beta	Visual examination	Conclusions
1	*31*	**0.52**	**0.04**	**-0.77**	s	s
2	-10	-0.14	0.21	**-0.53**	x	x
3	**-78**	-0.19	0.94	-0.03	x	n
4	-12	**0.43**	*0.06*	**-0.72**	?s	x
5	27	0.17	0.19	**-0.55**	x	x
6	**4**	0.21	0.16	**-0.58**	x	x
7	**44**	*0.37*	*0.08*	**-0.69**	s	p
8	-27	0.00	0.36	**-0.41**	x	x
9	12	*-0.38*	*0.08*	**-0.69**	x	x
10	*33*	**0.53**	**0.03**	**-0.78**	s	s
11	*-31*	**0.75**	**0.00**	**-0.89**	s	s
12	**-57**	*0.38*	*0.08*	**-0.69**	s	n
13	**54**	**0.46**	*0.05*	**-0.74**	x	p
14	**-75**	0.21	0.16	**-0.58**	x	n
15	*-30*	-0.13	0.61	-0.23	x	x
16	**60**	-0.18	0.79	-0.12	x	p
17	**43**	-0.01	0.38	-0.39	x	p
18	**44**	**0.46**	*0.05*	**-0.74**	s	x
19	11	0.12	0.22	**-0.52**	x	x
20	-10	0.09	0.26	**-0.49**	x	x
21	**85**	**0.81**	**0.00**	**-0.91**	s	p
22	9	**0.47**	*0.05*	**-0.75**	s	s
23	6	*0.37*	*0.08*	**-0.69**	s	x
24	*30*	0.10	0.25	**-0.50**	x	x
25	-27	-0.11	0.55	-0.27	x	x

s - schema congruent
n - negative
p - positive
u - unbiased
x - unclassifiable
? - possible conclusion

Idiographic plots of memory distortion scores are contained in Appendix 14

Table 12 - Idiographic analysis of memory distortion scores for non-depressed participants

(findings meeting stated criteria appear in bold; findings suggestive of a trend towards significance appear in italics)

Subject number	S score	linear model, Adjusted R sq	linear model, sig F	Beta	Visual examination	Conclusions
26	**0**	0.00	0.37	**-0.40**	x	x
27	**0**	0.26	0.13	**-0.62**	?s	x
28	-6	0.15	0.21	**-0.53**	x	x
29	-10	0.06	0.28	**-0.47**	x	x
30	19	0.18	0.18	**-0.57**	x	x
31	-13	-0.16	0.69	-0.18	x	x
32	7	-0.15	0.69	-0.18	x	s
33	-9	**0.69**	**0.01**	**-0.86**	s	s
34	-21	-0.17	0.73	-0.15	x	x
35	-19	-0.19	0.92	-0.04	u	x
36	**-72**	**0.73**	**0.00**	**-0.88**	s	x
37	-24	-0.18	0.80	-0.11	x	x
38	**3**	0.00	0.36	**-0.41**	x	x
39	*30*	**0.43**	*0.06*	**-0.72**	?s	s
40	-9	**0.84**	**0.00**	**-0.93**	s	s
41	**-4**	-0.16	0.71	-0.17	x	x
42	**-2**	-0.10	0.55	-0.27	x	x
43	*30*	0.05	0.29	**-0.46**	?p	x
44	23	-0.15	0.66	-0.20	x	x
45	**3**	-0.11	0.57	-0.25	x	x
46	**50**	-0.17	0.76	-0.14	x	p
47	*31*	**0.47**	*0.05*	**-0.74**	?s	s
48	*30*	*0.37*	*0.08*	**-0.69**	x	x
49	**-42**	-0.09	0.52	-0.29	x	n
50	13	**0.59**	**0.02**	**-0.81**	s	s

s - schema congruent
n - negative
p - positive
u - unbiased
x - unclassifiable
? - possible conclusion

Idiographic plots of memory distortion scores are contained in Appendix 14

Table 13 Summary of conclusions regarding the processing strategies used in the recall of feedback, following idiographic analysis of participants' responses.

(processing strategy)	Depressed	Non-depressed
self enhancing	5	1
self derogating	3	1
unbiased	0	0
schema-congruent	4	6
unclassifiable	13	17

It was difficult to reach firm conclusions regarding apparent processing strategies for a significant proportion of both groups. Reasons for this are discussed in chapter 4. However, there was evidence of heterogeneity within both groups in terms of strategies being adopted. There appeared to be a tendency in both groups for memory distortion scores to follow a negative, linear relationship but that this was rarely significant, by the criteria adopted in this analysis. In some cases, there were apparent 'mixed strategies' in operation, making participants unclassifiable.

3.5.2 Analysis of grouped data

The alternative approach taken to the analysis of memory distortion scores was to combine the individual responses of members of either group (assuming 'homogeneity' of responses within the group), and to look for evidence of a 'characteristic' processing strategy being exhibited by either depressed or non-depressed participants.

In order to determine whether memory distortion scores were positively or negatively distorted in either group, separate one-sample t tests were performed on the S scores provided by depressed and non-depressed participants. Results are presented in Table 14.

Table 14 Results of one-sample t tests performed on the S scores provided by depressed and non-depressed participants.

(participants)	mean S score (s.d.)	t	df	p
Depressed (n = 25)	2.0 (41.86)	0.24	48	0.813
Non-depressed (n = 25)	0.32 (25.90)	0.06	48	0.951

It appeared that for both groups, S scores did not differ significantly from zero i.e. they did not appear to be positively or negatively distorted in terms of their recall of feedback. In order to determine whether either group appeared to be unbiased, or to be utilising a schema-congruent processing strategy, it was therefore necessary to determine the nature of the relationship between memory distortion scores and the seven levels of feedback.

Table 15 contains means (and standard deviations) of memory distortion scores across the seven feedback conditions, for both depressed and non-depressed participants. Figs. 10 and 11 presents these means and associated 95% confidence intervals, for depressed and non-depressed participants respectively.

Table 15 Means (and standard deviations) of memory distortion scores across the seven feedback conditions, for both depressed and non-depressed participants

(feedback condition)	Depressed	Non-depressed
-21points	16.92 (19.82)	8.92 (11.14)
-14 points	11.88 (15.57)	3.56 (8.71)
-7 points	3.16 (14.21)	2.80 (12.49)
0 points (+/-)	2.24 (14.05)	3.48 (9.00)
+7 points	-8.40 (13.68)	-3.52 (9.56)
+14 points	-13. 40 (14.41)	-9.32 (12.76)
+21 points	-10.40 (14.87)	-5.60 (11.90)

Fig. 10 Means and associated 95% confidence intervals for memory distortion scores across the seven feedback conditions, for depressed participants.

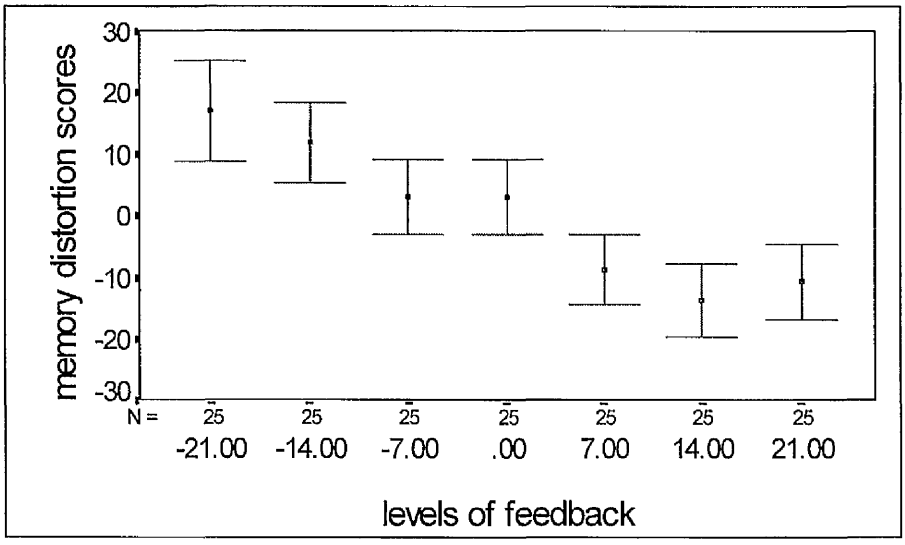
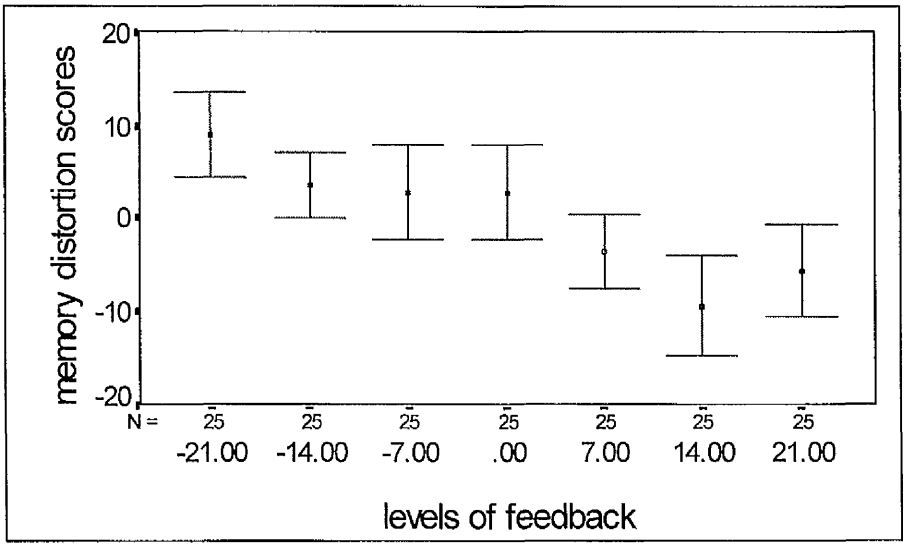


Fig. 11 Means and associated 95% confidence intervals for memory distortion scores across the seven feedback conditions, for non-depressed participants.



Differences between the believability ratings for the seven tests, and between the two groups of participants, were investigated using a 2 (depression status) x 7 (feedback condition) repeated measures MANOVA. As it had been noted that differences existed between the validity ratings ascribed to the seven tests used, the validity rating for the test used at each feedback condition for each participant was entered into the analysis as a covariate.

This MANOVA revealed a significant difference between the distortion scores for the seven tests by the combined groups, F (6, 288) = [illegible], $p < 0.005$. The groups did not differ in their overall validity rating, F (1, 48) = 0.03 , p = 0.864. The interaction term, F (6, 288) = 2.26, p = 0.038, was significant.

It was therefore apparent that significant differences existed between the memory distortion scores for the seven tests and that this pattern of differences was not the same in depressed and non-depressed participants. To investigate within-group differences, Scheffe post hoc tests were used. The variance table of the MANOVA revealed that the Scheffe Least Significant Difference = 7.55. In the depressed sample, there were significant differences between the mean memory distortion scores at a number of levels. These are indicated in Fig. 12.

Fig. 12 Differences between mean distortion scores for each of the seven feedback levels, for depressed participants. Significant differences are highlighted in bold.

level of feedback	-21	-14	-7	0	+7	+14	+21
+21	**27.3**						
+14	**30.3**	**25.3**					
+7	**25.3**	**20.3**	**11.6**				
0	**14.7**	**9.6**	0.9	xxx			
-7	**13.8**	**8.7**	xxx	0.9	**11.6**		
-14	5.0	xxx	**8.7**	**9.6**	**20.3**	**25.3**	
-21	xxx	5.0	**13.8**	**14.7**	**25.3**	**30.3**	**27.3**

level of feedback

In the non-depressed sample, there were also significant differences between the mean memory distortion scores at a number of levels. These are indicated in Fig. 13.

Fig. 13 Differences between mean distortion scores for each of the seven feedback levels, for non-depressed participants. Significant differences are highlighted in bold.

level of feedback	+21	**14.5**						
	+14	**18.2**	**12.9**					
	+7	**12.4**	7.1	6.3				
	0	5.4	0.1	0.9	xxx			
	-7	6.1	0.8	xxx	0.9	6.3		
	-14	5.4	xxx	0.8	0.1	7.1	**12.9**	
	-21	xxx	5.4	6.1	5.4	**12.4**	**18.2**	**14.5**
		-21	-14	-7	0	+7	+14	+21 level of feedback

Curve estimation procedures performed on the group mean memory distortion scores for each of the seven feedback conditions, for depressed participants, indicated that a linear equation accounted for a significant amount of the variance (Adjusted R square = 0.912, Significance of F = 0.0005); the quadratic equation was also significant (Adjusted R square = -0.925, Significance of F = 0.0025), as was the cubic equation (Adjusted R square = 0.938, Significance of F = 0.009). The Beta value for the linear relationship was -0.963.

Similar curve estimation procedures performed on the group mean memory distortion scores for non-depressed participants, indicated that a linear equation again accounted for a significant amount of the variance (Adjusted R square = 0.811, Significance of F = 0.003); the quadratic equation was also significant (Adjusted R square = -0.765, Significance of F = 0.025), as was the cubic equation (Adjusted R square = 0.717, Significance of F = 0.086). The Beta value for the linear relationship was -0.918.

These observations seemed to support the view that depressed participants utilised a schematic processing strategy in recall of their feedback scores. The findings for non-depressed participants, however, are not so clear. While they also evidenced a tendency to distort low scores in a positive (self-enhancing) direction and positive scores in a negative (self-derogating) direction, the effect was not so marked. These observations are discussed more fully in chapter 4.

To investigate the possibility that participants were responding randomly in terms of their recall of feedback scores, a 2 (depression status) x 7 (feedback level) repeated measures ANOVA was performed on recalled scores provided by each participant, in conjunction with Scheffe post hoc tests. In addition, correlation coefficients were calculated for recalled scores and feedback scores, at each level of feedback. Table 16 contains the means of recalled scores at each of the seven levels of feedback, for both depressed and non-depressed participants.

Table 16 Means (and standard deviations) of recalled scores at each of the seven levels of feedback, for both depressed and non-depressed participants

(level of feedback)	depressed	non-depressed	whole group
-21	48.1 (22.4)	55.2 (14.6)	51.7 (19.0)
-14	50.1 (22.6)	56.9 (15.1)	53.5 (19.4)
-7	48.4 (21.8)	63.1 (15.6)	55.7 (20.2)
0	54.4 (20.4)	70.8 (15.4)	62.6 (19.7)
7	50.1 (21.3)	70.8 (17.5)	60.8 (21.8)
14	52.8 (18.7)	72.0 (17.4)	62.4 (20.3)
21	62.8 (24.1)	82.7 (20.2)	72.7 (24.2)

The MANOVA revealed a significant difference between recalled scores at the seven levels of feedback, $F(6, 43) = 10.1$, $p < 0.005$. The interaction term was non-significant, $F(6, 43) = 1.8$, $p = 0.126$. The variance table of the MANOVA revealed that the Scheffe Least Significant Difference = 5.339

Table 17 contains the results of Pearson's r correlations between recalled scores and feedback scores, at each of the seven levels of feedback, for all participants (depressed and non-depressed). As the feedback scores were systematically related to each other, correlations between recalled scores and feedback scores at each level of recalled score are identical across all levels of feedback score.

Table 17. Pearson's r correlation coefficients for recalled scores and feedback scores, at each of the seven levels of feedback.

	actual feedback scores, at levels:						
	-21	-14	-7	0	7	14	21
recall at 21	**********	**********	**********	**********	**********	**********	.844
recall at 14	**********	**********	**********	**********	**********	.745	******
recall at 7	**********	**********	**********	**********	.841	**********	**********
recall at 0	**********	**********	**********	.806	**********	**********	**********
recall at - 7	**********	**********	.757	**********	**********	**********	**********
recall at - 14	**********	*****	.752	**********	**********	**********	**********
recall at - 21	.581	**********	**********	**********	**********	**********	**********

(* In all cases, $p < 0.000$)

Chapter Four

DISCUSSION

4. DISCUSSION

4.1 Aims of the study

This study competitively tested four models of 'characteristically' biased processing strategies in depressed and non-depressed persons. Participants were asked to complete two different processing tasks - one involving judgement / evaluation, the other a test of memory. For both of these tasks, data was analysed in two ways - idiographically (to investigate the idea that strategies are truly characteristic of depressed or non-depressed groups, in the sense that they are adopted by all members of the group) and as grouped data (in an attempt to identify the form of any characteristic strategy).

In this section, the findings from the study shall be discussed, with a view to drawing conclusions regarding the extent to which each of the four models of 'characteristic' processing biases are supported. Methodological issues that may have impacted upon the findings will be considered and, finally, attention will turn towards the clinical implications of the findings and directions for future research.

4.2 Summary of Results

4.2.1 Processing strategies used in judging the believability of feedback scores

In this processing task, participants were required to evaluate new information about themselves. The processing was effortful and (as in all judgement / evaluation tasks) related to information that was ambiguous. This ambiguity was explicitly drawn to the attention of participants by stating that the stimuli (feedback scores) might or might not be correct. Inferences regarding the form of processing strategy adopted do not follow from comparisons between groups (e.g. of 'bias' relative to a 'normative' comparison group), but from observed patterns within a set of cognitive products, and conceptualisations of how different biases might alter this pattern.

4.2.1 a) Idiographic analyses

Attempts were made to analyse the responses of individual participants, as it was noted that there might exist variability within either of the two groups of participants. However, such analyses produced few findings that met the adopted criteria of statistical significance. The main difficulty appeared to be that there were too few data points on which to demonstrate any pattern to the participant's responses, given the other sources of variance which were potentially contributing to the ratings of believability (discussed below). In addition, it appeared that for some participants processing related to a view of 'own intelligence' that was not confidently held (discussed below).

4.2.1 b) Group-based analyses

For both depressed and non-depressed participants, it was found that believability ratings were unrelated to the level of the feedback. Both groups tended to view feedback scores at all levels as only moderately believable (with mean ratings of 5 - 6 on a 10 cm. visual analogue scale).

These findings are inconsistent with any of the predictions made on the basis of models of biased depressive processing. It appeared that both depressed and non-depressed participants were operating an 'unbiased' processing strategy - believability ratings were not influenced by whether the feedback was more or less favourable, or the extent to which it deviated from participants' expectations. The observation that depressed participants appeared to be unbiased is consistent with the prediction arising from Model 2 (Depressive Realism). The findings of this study, however, are not consistent with the view that non-depressed people are characteristically self-enhancing.

These results are in contrast to those of Morris (1996), who used a similar design to demonstrate a self-enhancing bias in ratings of test 'validity' by both dysphoric and non-dysphoric participants. The findings are also inconsistent with the results of Dykman et al (1989), who found that both 'depressed' and non-depressed participants utilised a schematic processing strategy in judging which of two feedback scores was their own.

4.2.2 Processing strategies used in the recall of feedback scores.

The recall task used in this study constituted a test of implicit memory for self-referent material that had been presented as being of uncertain accuracy. Evidence of 'bias' depended upon a systematic distortion in recall of this information.

4.2.2 a) Idiographic analyses

Idiographic analyses of memory distortion scores indicated a degree of variability in the responses of individual members of both groups, as well as apparent use of 'mixed strategies'. The non-significant trend towards a negative, linear relationship for several sets of responses may reflect difficulties performing this form of analysis with a small number of data points for each participant (discussed below). These observations are important when considering the propositions contained in the four models i.e. that there exist 'characteristic' forms of processing strategies in the two groups. Again, it should be noted with regard to the analysis of individual sets of data, that not all participants seemed to have a view of 'own intelligence' that was confidently held.

4.2.2 b) Group-based analyses

The analysis of grouped data produced findings which corresponded to the pattern of response predicted by Model 4 (Schematic Processing). Model 4 proposes that both groups demonstrate a schema-congruent bias, and distort information to be consistent with their prior expectations. Put another way, the model predicts that information will be both positively and negatively distorted, depending on the match between the information being processed and the schema held by the participant involved. This was the observed pattern of response and in this respect, the study has replicated the findings of Morris (1996), with clinically depressed participants.

That there is no characteristic positive or negative bias in either group is indicated by the results of t tests performed on S scores. It was proposed that 'unbiased' processing would lead to an absence of distortion i.e. accurate recall, at every level of feedback. The observation of a significant negative, linear relationship (following visual examination and

curve estimation on mean memory distortion scores), in combination with S scores that do not differ significantly from zero, appears to indicate processing that is purely schematic, in both groups.

4.2.3 Description of the self - schemata relating to 'own intelligence'

In this section, information made available about the self-schemata used in the judgement and recall tasks in this study will be discussed. Is it appropriate to use the estimates of intelligence as a reliable indicator of a 'well-articulated generalisation about the self' (Markus, 1977), on the basis of which to infer the operation of particular processing strategies?

4.2.3 a) Positivity or negativity of schemata

Non-depressed participants were significantly more 'positive' regarding their own intellectual ability, in that they expected to perform at a higher level, relative to the rest of the adult population. This finding was in contrast to that of Morris (1996), who observed that dysphoric and non-dysphoric participants held equivalent expectations regarding a test of verbal aptitude. Other studies comparing expectations of performance in the two groups have supported Morris' finding, including Morris and Kanfer (1995) and Rehm (1988). Dykman et al (1989), however, noted as part of their first study that 'intelligence' was a domain in their 'Self Description Questionnaire' which discriminated between 'depressed' and non-depressed respondents.

Participants in the two groups provided a wide range of 'estimated intelligence' scores, which in some instances appeared to be, objectively, somewhat 'modest'. However, it is not possible to draw any conclusions as to whether the estimates made by either group are accurate or not. Demographic data relating to age, ethnicity and employment was collected, and while attempts have been made to estimate I.Q. scores on the basis of such information (for example, Wilson et al, 1978) these approaches are not sufficiently accurate to justify such an analysis with the amount of information available. All that can be concluded in this instance is that depressed participants as a group evidenced a more 'negative' schema in

relation to the processing tasks studied, relative to a non-depressed group. It is not known if either group were distorted in their estimations, relative to the best indicators of 'objective reality' (real tests of intelligence). As such, these observations might be evidence of distorted cognitive products, but do not specifically demonstrate any particular form of biased processing. It was noted in section 1.1 that depression does not seem to influence performance on untimed measures of intelligence.

4.2.3 b) Confidence in estimates of own intelligence

Non-depressed participants were also significantly more confident in the accuracy of their estimates of intellectual ability. Overall, however, it was observed that participants in both groups appeared to be only moderately confident, with approximately two thirds of each sample scoring 5 or greater on an 8 point scale. Morris (1996) found that participants in his study were also only moderately confident in their estimates of expected performance - with mean ratings of around 6 on 11 point scale.

This finding may indicate that the views these participants have of themselves in this respect do not relate to a clearly-held self-view or schema. Alternatively, they may suggest the influence of 'social desirability' upon responses to either 'estimated intelligence' or confidence ratings. A desire not to appear 'arrogant', for example, might have influenced the responses made by some participants. While it is to be hoped that the nature of the situation in which these assessments were made (i.e. that respondents were participating in a study, and encouraged to be accurate) would minimise motivational biases, such influences are likely to occur when investigating the processing of material that is central or important to a person's self view. This is obviously important when, as in this study, the estimates of likely performance are taken to be an accurate indicator of the form of the schema held by participants in the study.

4.2.3 c) Importance of 'own intelligence'

That 'own intelligence' is an important part of most people's self-view was borne out by the observation in this study that both groups gave high ratings for the item assessing this aspect of their self-concept. It seems likely that such responses might be less subject to

motivated response biases than the two ratings already discussed. Moreover, other studies have supported the view that 'intelligence' is an important aspect of the self concept - for example, Dykman et al (1989) found it to be given a mean importance rating of approximately 8, on a 9-point scale, by both depressed and non-depressed participants. These authors used a criterion that ratings of importance had to be 5 or greater on a 9-point scale to be considered a 'well articulated structure in memory' (following Markus, 1977). The clear majority of both groups in the present study provided ratings that exceeded this criterion.

Another line of evidence relating to the importance or 'centrality' of intelligence to respondents' self-views, however, is contained in the responses made to the Selves Questionnaires. As noted, very few people cited 'intelligence' in this free response measure, which attempts to assess the content of a person's self-concept and self-guides. While a significant proportion of both groups mentioned related concepts (e.g. 'successful'; 'cultured'), it seemed that in this 'unprompted' measure, intelligence (or a lack of it) was rarely identified as sufficiently important to mention. This observation might suggest that 'own intelligence' was not a 'central' feature of the self-concept of the majority of participants in this study. However, the low numbers of participants who made mention of 'intelligence' might have been a consequence of the particular form of Selves Questionnaire used in this study. The questionnaire asked about respondents' 'personal qualities', and it may be that different wording would have resulted in a greater proportion listing intelligence in one of the three domains.

4.2.3 d) Discrepancies within the self-concept, with regard to 'own intelligence'

It was not possible to identify from the Selves Questionnaires many respondents who evidenced a discrepancy between their self-concept and self-guides in terms of 'intelligence'. However, this study did include another measure of discrepancy, in the form of the 'discrepancy score' (a respondent's 'ideal intelligence' - 'actual intelligence'). This score therefore related to the concept of an actual-ideal discrepancy, shown to be important in depression (Higgins, 1987).

In this study, it was seen that the two groups provided a wide range of discrepancy scores. For most respondents, however, these scores were of the order of 10 to 20 percentile points i.e. most participants saw themselves as being somewhat less intelligent than they would like to be. The difference between the two groups in terms of discrepancy scores was not significant. This may have followed from moderate 'ideal intelligence' scores (with mean 'ideal' scores of around the 75th percentile in both groups), although these scores are perhaps highly susceptible to the influence of 'social desirability'.

4.2.3 e) Conclusions regarding the self-schemata relating to 'own intelligence'

Having made these observations, is it possible to conclude whether it was appropriate to use the estimates of intelligence as a reliable indicator of a 'well-articulated generalisation about the self'? It seems that at an individual level, there may well be participants in both groups for whom the estimate is not based on a self-view which is confidently held. While 'own intelligence' did appear to be important to most participants' self-views, they may not have had a clear view regarding their intelligence in relation to others, or their responses may have been influenced by a degree of social desirability in their responding.

Looking at the mean responses of the two groups, however, it appears that participants demonstrated moderate confidence in the estimates, and rated 'own intelligence' as very important to their self-view. While it may be important to consider whether there exists a discrepancy within the self-views of participants undertaking processing tasks, this did not distinguish between the groups in this study. The main differences between the two groups of participants were that those who were depressed held a more negative self-view, and were less confident in the accuracy of their estimates of likely performance.

4.3 Methodological considerations in the interpretation of findings

4.3.1 Participants in the study

In contrast to the majority of studies that have looked at processing biases in depression, detailed information was available about the levels of depressive symptomatology experienced by participants. This allowed for participants to be clearly classified as belonging to either of the two diagnostic groups. While recommendations regarding the interpretation of BDI scores have to be borne in mind, the information made available through the use of the SCID III-R allowed for conclusions to be drawn regarding those who scored below recommended cut-off scores.

Assessment using the SCID III-R was necessary to distinguish between different nosologic categories in which high levels of depressive symptomatology might be expected e.g. between those with a primary depressive disorder, and those who might be experiencing primary or significant anxiety disorders, eating disorders or some other form of mental health problem. It was unusual to include such an assessment of the non-clinical, comparison group, who in other studies are often assumed to be experiencing no significant difficulties of any kind. For these reasons, a high degree of confidence can be placed in the allocation of volunteers to the participant groups.

The majority of the depressed sample scored in the moderate - severe range of the BDI. Assessment using the SCID III-R ensured that participants were experiencing significant levels of distress, or impaired functioning in some area of their life. However, it was clearly unlikely that people experiencing very severe depression would volunteer for the study and keep to an appointment. In summary, it seems that the sample might best be described as experiencing 'moderate' levels of depression. 24 of the 25 'non-depressed' participants scored in the 'normal' range of the BDI, while one member might be considered 'dysphoric' by the criteria suggested by Kendall et al (1987).

Many of the depressed participants in this study experienced significant levels of anxiety symptoms. As noted in section 1.2, it is not unusual for depression and anxiety to co-occur. However, use of the SCID III-R ensured that the primary diagnosis for these participants

was one of a Major Depressive Disorder, so that findings can be related to depression theory and observations of similar sample groups contained in the literature. It appears that the depressed sample in this study was a 'naturalistic' clinical sample, in that symptomatology was of a form commonly observed in everyday clinical populations. This increases the generalisability of findings and conclusions (Berkowitz and Donnerstein, 1982).

4.3.2 Methodological considerations relating to descriptions of the self-schemata.

As noted in section 1.9.4 a), the 'availability' of a discrepancy is thought to depend on the extent to which the self-concept and self-guide diverge, while its 'accessibility' depends on how recently and frequently the discrepancy has been activated, as well as the 'applicability' between its meaning and the information being processed. In the design used in this study, the Selves Questionnaire was administered before any mention had been made of the nature of the seven tests. However, responses to 'actual' and 'ideal' intelligence measures were made after the nature of the forthcoming tests had been described and (it might be assumed) any schema relating to 'own intelligence' activated. In attempting to interpret measures relating to the self concept, it is to be noted that the procedures followed may have influenced the accessibility of self-views other than discrepancies, and be relevant to understanding apparent differences between responses to the 'importance' item and the three separate domains of the Selves Questionnaire.

4.3.3 Face validity of the 'intelligence' tests used in this study.

It has been suggested that the particular form of processing strategy adopted might depend on the extent to which the information being processed is seen as 'meaningful' or 'emotionally engaging' to the person involved (Pacini et al, 1998). For the feedback scores to be meaningful in this study (even though they were presented 'ambiguously'), it was important that the tests themselves were seen as having at least moderate face validity as measures of intelligence. The mean validity ratings for each of the tests indicated that both depressed and non-depressed participants saw the seven tests as being moderately

'suitable', but that these ratings were not equivalent for all tests. As this might potentially have introduced an additional source of variance into observed believability ratings and memory distortion, it was necessary to enter validity ratings as a covariate into analyses of these variables.

In the study conducted by Morris (1996), ratings of validity were made following the presentation of (contrived) information about performance, and were the variables analysed in order to determine the processing strategy being used. While therefore different in important ways to the validity ratings made in this study, it is interesting to note that mean validity ratings were in the range 4.5 - 6.5 (on a 9-point scale) i.e. the tests in that study were also seen as having moderate face validity. Dykman et al (1989) used a design in which a dot-counting task was presented either as a measure of 'politeness' or 'success'. The extent to which participants accepted this 'cover story' was investigated with a 5-point scale asking how important it was for them to perform well on the task. Mean ratings were again moderate (around 2.8) and did not differ between the two experimental groups.

4.3.4 The idiographic analyses used in this study

To aid the idiographic analyses, it would have been helpful to have had more data points available for each participant, on which to conduct curve estimation procedures. Different tests that would have allowed this (for example, by being briefer) might be considered for future research. However, it is noted that this study included 7 data points for each participant, whereas Morris (1996) contained only five. This study also included a wider range of feedback scores.

For a test to have reasonable face validity to those participating - necessary if it is to yield feedback that will be found 'meaningful' or 'emotionally engaging' - it is likely to require a significant amount of time to administer. This will limit the number of data points that can be collected per subject. It seems that a balance must be struck, if it is considered important to examine the processing of 'meaningful' information, given the potential for differences between the processing of this and 'trivial' information.

4.3.5 Methodological considerations in the interpretation of believability ratings

The findings of this study indicated that both depressed and non-depressed participants were operating an 'unbiased' processing strategy. However, this finding might simply reflect the influence of unsystematic error variance.

Among the sources of unsystematic error is likely to be variance introduced by using seven distinctly different tests of intelligence. As a consequence, participants were likely to have had different perceptions of their level of performance for each of the seven tests, depending on the ease or difficulty of completing each of the tests. In other words, the original estimation of intelligence (phrased as 'performance on an accurate test of intelligence') may not have been appropriate for, or equally applicable to, each of the seven sub-tests. This may have subsequently influenced the degree to which different levels of feedback were perceived as 'believable'. While Beck et al (1979) suggest that depressive schemata are so paramount in their influence that they render the person oblivious to situational information and potentially corrective feedback (the 'autonomous cognitive model'), Dykman et al (1991) demonstrate that depressive cognition can be influenced by situational factors.

Differences between the tests do not necessarily constitute a flaw in the design, given the additional demands created by the testing situation (e.g. the requirements for plausibility of differing feedback scores, for tests that could be distinguished in memory, and the need to maintain participants' attention and motivation). The presentation of feedback scores immediately after each test would reduce demands on memory. However, it is desirable for empirical findings to be sufficiently 'robust' (demonstrable in the presence of 'natural variability') that they are also 'generalisable' (after Berkowitz and Donnerstein, 1982). If the valence of the feedback did not systematically influence ratings of believability when tests were different from each other (as in this study), would it be correct to consider valence to be an important influence on the way such information is interpreted?

The presentation of feedback scores individually in this study, with judgements of believability made immediately after each score was seen, is different to the procedure

followed by Morris (1996). In that study, all five scores were presented simultaneously in written form and it may be that this difference in procedure influenced the results obtained.

Perhaps the most important factor, however, was the presentation of feedback scores as only potentially being true, which may have resulted in the scores being less meaningful or 'emotionally engaging' to participants. By contrast, Morris (1996) presented feedback scores as accurate, and asked for ratings of 'test validity'. It is clear that 'own intelligence' is something that most participants rated as important. Following advice from the ethics committee overseeing this research, however, the decision was taken to present feedback as only potentially being true (as opposed to following the methodology used by Morris, 1996 in this respect). This feature of the design might have led to the observed finding that all levels of feedback were judged to have on average been only moderately believable (and hence the conclusion of an 'unbiased' processing strategy).

This matter again relates to the generalisability of the research findings. The interpretation of ambiguous feedback is clearly important in everyday clinical presentations of depression, and should be investigated, although the question remains whether drawing attention to ambiguity was important in determining the form of these results. Generally, it is desirable that research should identify interesting aspects of behaviour that are demonstrable in testing situations that are largely 'naturalistic', and it might be considered that the ecological validity of the present findings are reduced by this aspect of the study design.

4.3.6 Methodological considerations in the interpretation of memory distortion scores

Regarding the responses to the memory task, it must be considered whether the observed pattern of response (in both this study and that of Morris, 1996) might simply be an artefact arising from the design of the study and the particular measures involved. In this design, it is the pattern of memory distortion scores (i.e. recalled score - actual score) across the seven levels of feedback that is used to infer schematic processing. The observed pattern of response might have arisen in three different ways, and it is important to consider whether they are all consistent with conceptualisations of what is meant by 'schematic processing'.

Schematic processing in this recall task is taken to mean that a person will systematically distort their memory for their actual scores to the value of their expected score, for all seven tests. The 'distortion scores' would in this instance follow the proposed (and observed) pattern of relationship with feedback level.

However, if participants were to simply guess randomly what their score was for each of the tests, within a recollected range of approximate values (for example, the range of their feedback scores), a negative linear relationship would result, as the difference between recalled and actual scores (i.e. memory distortion scores) would on average be greater when actual scores were either low or high (i.e. at either 'extreme' of the seven feedback levels). Moreover, it is inherent in this design that the 'average' of the seven feedback scores is the same as the expected score, for each participant. Hence, guessing within the range of the seven scores will produce mean 'recalled' scores for the group that are the same as the mean 'estimated intelligence' score. In other words, a lack of a relationship between recalled scores and feedback scores would also lead to a negative linear relationship between memory distortion scores and levels of feedback.

It does not appear that recalled scores are the result of purely 'random responding'. For both groups of participants, recalled scores were positively correlated with feedback scores at all seven levels of feedback (Table 17), and there were significant differences between the means of recalled scores at the seven levels of feedback. Equally, it is clear that neither group of participants were accurate (unbiased) in the recall of their feedback scores. There was clearly a systematic distortion of scores towards a particular value which corresponded to the mean of the 'estimated intelligence' scores (in that low scores were 'added to' and high scores were 'subtracted from'). The question arising is: how does this systematic distortion came about? The three alternatives are:

i) the systematic distortion of scores towards the expected level of performance (schematic processing)
ii) the systematic distortion of scores towards the mean of the feedback scores (a form of anchoring heuristic provided by the experimental procedures)
iii) an element of random responding (e.g. guessing within a range, or mis-remembering which score related to which test).

If the results had been obtained following an element of 'random responding', it would be hard to conclude that processing was genuinely 'schematic', even though in this design the effect would be, on average, to distort recalled scores to be consistent with expectations. The finding might better be viewed as an unfortunate 'artefact' of the study design. Again, the presentation of feedback scores as only potentially being true may have resulted in the scores being less meaningful to participants, and remembered less accurately. It has also been noted that depression can affect memory and concentration - the recall task in this study came at the end of an extended period of assessment and it may be that depressed participants were more likely to respond randomly and hence distort recalled scores for this reason.

Similar arguments apply to the distortion of scores towards the mean of the given feedback - while an anchoring heuristic of this kind would lead to the same pattern of results as distortion of scores towards the expected level of performance, it would be a different effect from processing that was genuinely 'schematic'. Both 'means of feedback' and 'estimated intelligence' constitute forms of 'anchoring heuristic', but in one case this would have been 'provided' for participants by the procedures followed in the study.

Unfortunately, it is not possible to determine which of the three processes has led to the results obtained in this study, and as such the present findings do not constitute an entirely satisfactory demonstration of schematic processing. Nevertheless, it is seen that all three processes are functionally equivalent in this design - they all result in recalled scores being distorted towards expected levels of performance. If the design of this study is taken as being ecologically valid, these observations suggest different ways in which processing might equate to a schema-congruent bias and serve to maintain the self concept.

Despite difficulties in the interpretation of this particular finding, it was appropriate to have conducted this investigation and analysis. Processing strategies in memory tasks have been an important area of research, providing much of the evidence for valence-driven biases. Findings consistent with the predictions of positive or negative bias would have been relatively straightforward to interpret, and it is noteworthy that this study has found no evidence for such valence-driven biases. However, the inclusion of a prediction based upon ideas of schematic processing has led to difficulties. Previous studies that have claimed to

demonstrate 'schematic' memory biases have typically involved conceptualisations of a 'global' negative self-schema, and hence equate to ideas of 'negative bias'. The design of experiments that would provide a satisfactory test of genuinely 'schematic' memory biases would be a useful goal for future research.

4.4 Theoretical considerations in the interpretation of findings

4.4.1 Theoretical considerations in the interpretation of believability ratings

In section 4.2.1 b), it was noted that both depressed and non-depressed participants utilised an apparently unbiased processing strategy in the evaluation of believability ratings. As discussed in section 4.3.5, certain features of the design might have introduced a degree of unsystematic error variance, which might in turn have concealed evidence of a biased processing strategy. However, if the finding is accepted, how can it be explained?

The lack of a self-enhancing strategy in the non-depressed sample may be a consequence of some particular feature of the judgement task involved. As noted, the information being processed in this study might well have been considered more 'important' or 'meaningful' than the degree of control over the illumination of a bulb (the task used by Alloy and Abramson, 1979). Dykman et al (1989) suggested that highly evaluative feedback is more deeply encoded, in order to explain why a task involving such information seemed less conducive to biased recall. It may be that this same factor inhibited a characteristic non-depressive self-enhancing bias in this study.

Pacini et al (1998), however, have alternatively suggested that depressive processing in more 'emotionally engaging' situations is more likely to be biased, and demonstrated that sub-clinically depressed participants made more 'optimal' decisions than a non-depressed control group under 'trivial' conditions. By contrast, processing by the two groups converged under more consequential conditions (i.e. the processing of both groups altered to become more similar). To explain these findings, Pacini et al (1998) invoke a dual-mode processing explanation, based on cognitive-experiential self-theory (Epstein, 1991) involving parallel processing systems ('rational' and 'experiential'). It may be that in this

study feedback scores are considered relatively 'trivial', as a consequence of being presented as 'maybe your true score, maybe not'. As a final note, however, it is important to recognise that Pacini et al (1998) did not examine processing of information about the self – rather, decisions about probabilities were being taken in order to win large or small amounts of money.

With regard to features of the self-view related to the processing task under consideration, Morris (1996) suggested that self-enhancing biases (such as he observed in both dysphoric and non-dysphoric participants) might prevail when the self-view relating to the processing task is not confidently held. Confidence ratings in this study and Morris (1996) seem to be comparable, while the findings in terms of characteristic processing strategies are clearly different. Moreover, in this study it was clear that depressed and non-depressed participants differed in terms of 'confidence' in their estimates, but not in terms of the strategies they used.

Pelham (1993) suggested that depressed people used a self-enhancing strategy when processing relates to their 'best self view' (most favourable characteristic). Pelham (1991) indicates that for college students 'own intelligence' does correspond to their 'best self view'. Participants in the study by Morris (1996) were college students, while in this study participants were drawn from all walks of life.

The picture is further complicated by observations regarding the impact of presenting participants with information that is 'ambiguous' or not. Clearly, 'judgement' tasks necessarily imply a degree of ambiguity, but the form and degree of ambiguity can also differ between studies. Regarding 'ambiguous' information, Dykman et al (1989) suggested that this appeared to be less susceptible to 'negative' biases in depression, while noting that in their study schematic processing was supported for both ambiguous and unambiguous information.

It may be that there is an interaction between different aspects of the processing tasks involved in studies producing these different findings - whether information relates to the self, or not; whether the task is one of judgement or recall; whether the information is ambiguous ; and whether it is considered to be 'emotionally engaging' by participants.

Such considerations make it clear that the range of findings described in the literature may result from any of a number of features of the processing tasks involved. This makes it very difficult to compare observations between studies. When it is additionally considered that studies differ in terms of the criteria by which processing is considered to be 'biased' (i.e. relative to which 'baseline' measure), and that the vast majority of studies make no attempt to identify whether processing might better be considered 'schematic', the detection of factors influencing patterns of responding is complicated further.

Alternatively, the failure to find a 'characteristic' form of biased processing strategy might be the result of individual variability within the groups in terms of the strategies utilised. While the idiographic analyses were unable to identify any strategy for the majority of participants, there was some evidence of a degree of heterogeneity in this respect. If this were the case, an analysis of grouped data would reveal no clear relationship between believability and feedback level. Heterogeneity within a group might relate to the confidence with which the relevant self-view is held.

Moreover, individual responses might not relate closely to the patterns of response predicted by the four models due to the utilisation of 'mixed strategies'. For example, a participant might potentially exhibit processing that is simultaneously 'schematic' and 'positively biased' i.e. feedback is rated as increasingly believable, up to a point that does not correspond to expected performance, but is instead at some point above this (perhaps 'ideal intelligence'). In such a case, the range of feedback scores used in this study might not be appropriate for the detection of such mixed strategies for individual participants.

4.4.2 Theoretical considerations in the interpretation of memory distortion scores

The methodological considerations discussed in section 4.3.6 obviously have implications for the interpretation of findings presented in this study and by Morris (1996), in which it was claimed that these results represented the first demonstration of a schematic bias in recall.

Morris (1996) suggested that recall tasks are 'constrained' by reality, whereas individuals are 'free' to self-enhance or self-derogate when making subjective interpretations of ambiguous information - however, he does not acknowledge the inherent difficulty of designs where the 'form' of a schema is confounded with the mean of the feedback scores being processed. Given the tentative nature of any conclusions which can be drawn, it would be inappropriate to suggest further explanations of why an apparent schematic bias has been found in this study.

As has already been noted, descriptions of a 'negative memory bias' in depression are commonplace in the literature, but very few studies have previously examined whether recall of self-referent material might better be considered 'schematic'. Of those which have, Dykman et al (1989) and Dykman et al (1991) found no evidence of a schematic or characteristic valence-driven processing bias in a recall task completed by 'depressed' and non-depressed participants (although the 'depressed' group did evidence a negative bias in one condition).

4.5 Conclusions

The central aim of this study was to investigate whether any of four models of 'characteristic' processing strategies could be supported, in a design which allowed for them to be tested against each other. In answer to this question, it appears that the present findings do not support any of the models. No evidence of a 'characteristic' valence-driven processing strategy was found for either group, in either task. As such, the first three models are not supported. Tentative evidence is available for schematic processing in completion of the memory task, but not in the evaluation task, in which processing was

seen to be 'unbiased'. This indicates the use of different processing strategies for different processing tasks. Moreover, the analysis of grouped data did not reveal any differences between depressed and non-depressed participants in terms of the strategies used in the completion of the two tasks. This counts against ideas that depressed individuals are characterised by 'aberrant' or 'dysfunctional' processing. While no differences between the groups were observed in terms of processing strategies, there were differences in terms of the self-schemata relating to the processing task.

It may, however, be erroneous to conclude that processing in the evaluation task is 'unbiased'. While there is no significant relationship between believability ratings and feedback levels, this may be due to the influence of additional, uncontrolled factors introducing a degree of unsystematic error variance, which may in turn be concealing a characteristic biased processing strategy. A visual examination of the plotted means for the non-depressed group is suggestive of 'schematic' processing, although ANOVA revealed no evidence of significant differences between mean ratings for the seven tests or the two groups. Curve estimation procedures performed on mean believability ratings did not indicate a significant linear relationship, which might be expected if processing was genuinely unbiased (while noting that a 'perfect' linear relationship of equivalent mean ratings across all seven feedback levels would not meet criteria for significance using the statistical procedures used here).

Alternatively, the findings might follow from individual members of either group using a range of biased processing strategies. While the procedures followed in this study do not allow the identification of these strategies, it may be incorrect to interpret these findings as evidence of a characteristic 'unbiased' strategy.

Findings from the analysis of grouped data relating to the recall task were consistent with Model 4 (schematic processing). However, idiographic analyses indicated the use of heterogeneity in terms of strategies used, in both groups, and some evidence of the use of 'mixed strategies'. In addition, it was observed that the design of the study confounded schematic processing with other possible explanations.

With these misgivings noted, however, it can nevertheless be concluded that models of single 'characteristic' processing biases appear to be inadequate. While no individual study can answer questions of which form of bias is typically exhibited by either group, these findings have indicated that in a comparison of clinically depressed and non-depressed participants, there was apparent variability between processing tasks and within groups, but not between groups.

4.6 Clinical Implications

Depression is a common clinical problem, and can cause chronic, wide-ranging difficulties for those who are affected. For these reasons, research into factors involved in the development and maintenance of depression is valuable. Within cognitive models of depression, there have been suggestions that the negative content of depressed individual's thoughts is either a consequence of dysfunctional information processing, or dysfunctional schema underlying processing (Hollon and Garber, 1988; Dykman et al, 1989). Four models have been proposed that suggest depressed and non-depressed persons are characterised by particular forms of biased processing strategies.

Therapeutic approaches have been developed which identify both biased processing and schemata as targets for possible interventions. For example, Burns (1990) refers to 'cognitive distortions', listing ten thinking errors that can lead to distorted conclusions and maintain, among other things, low self-esteem. Patients are encouraged to identify such distortions, and to correct them by reviewing more objective evidence. By contrast, Young (1990) outlines a view of 'schema-focused therapy' in which attempts are made to identify the particular dysfunctional beliefs about the self that underpin biased processing. Cognitive therapists commonly address both aspects of cognition, although there may be differences of emphasis in the explanations they offer to patients.

A clarification of the nature of schematic processing (in the terms of Beck's model; Beck et al, 1979) is aimed at helping to clarify the purpose of cognitive therapy (see section 1.7.3). Is it correct that depressed people 'think differently' and require interventions to correct their thinking, or should the emphasis be put on the schemata underlying cognition?

Related to this are questions about the form that important self-schemata take. Are they global, negative 'pan-schemas' (Dykman et al, 1989), giving rise to characteristically 'negative' information processing, or do they have more specific domains of reference?

This study suggests that descriptions of depressive information processing as 'dysfunctional' or 'distorted' might be incorrect, in several important respects. For both of the processing tasks examined in this study, there was no evidence that depressed participants utilised an 'aberrant' information-processing strategy. Moreover, it appeared that processing strategies are not 'characteristic', in that different strategies might be used for different processing tasks. Finally, there was evidence of heterogeneity in terms of processing strategy within the two participant groups. These observations caution against the presumptions of the 'single strategy' models described in section 1.8. In clinical work, it is important to acknowledge the intricacy of depressive cognition, and to be aware that within different 'domains' there may be different sources of bias. Care must be taken not to assume the existence of negative bias when undertaking a clinical interview, or to view negative self-statements as part of a characteristic 'depressive negativity'. The potential for 'schematic' processing must also be understood, with the possibility that what is reported might be positively or negatively distorted, or undistorted. It is also possible that processing might be subject to two forms of bias simultaneously.

If the results of the group-based analyses are accepted in line with the initial hypotheses, it can be concluded that both groups of participants found all levels of feedback equally believable, but distorted their memories so as to be consistent with their expectations. These observations indicate that within depressive cognition, recall of information (e.g. evidence for beliefs) is more likely to be biased than evaluation of new information, and will result in distortions so that memories are congruent with expectations. Therapeutic interventions which address this aspect of cognition are more likely to be effective than efforts to 'correct' the evaluation of information. 'Schematic' processing biases in recall of information have implications for 'educational' approaches to psychotherapy, and behavioural experiments aimed at challenging beliefs, such as 'surveying friends' (Burns, 1990).

The findings also emphasise the importance of identifying the 'content' of specific self-schemata in understanding the output of processing. In this study, for example, there were differences between the self-views that depressed and non-depressed participants held in relation to their own intelligence, and these may have influenced the memories they would have retained regarding their performance on the seven tests, had it not been for additional information presented in the de-briefing.

Regarding the self-concept, a review of the literature makes it clear that there are potentially many self-views. Investigations such as the present study add to an understanding of the form of the self-view that it will be useful to address in therapy. By distinguishing 'global' self-views (with an attendant 'negative bias' to processing) from self-schema with a more limited domain of reference, it is possible to identify which seem to be more influential in depressive cognition. This study found no evidence for a negative bias in depression, and so indicates that it may be more helpful to specific aspects of a patient's self-concept.

Research into clinical presentations should ideally lead to conclusions that are applicable to work with the individual patient, and group designs can conceal an important degree of individual variability (Brown, 1998). This study has emphasised the potential for individual variation in terms of processing strategies, and highlighted the importance of attempting to describe the form of the self-schema underlying the processing of self-referential information.

4.7 Suggestions for further research

While a single study cannot lead to conclusions regarding the form of processing strategy typically exhibited by depressed or non-depressed individuals, each contributes to an impression of tendencies for either of these groups to behave in a certain way. Research can then be aimed at understanding the factors which influence the strategy adopted. In these attempts, it will be important to consider more recent conceptualisations of 'schematic' biases, and how these can be distinguished from other forms of bias.

The suggestion that 'schematic processing' might explain apparent differences between depressed and non-depressed persons has directed attention towards finding designs that would distinguish schema-congruent biases from valence-driven biases. From this view, it is seen that very few studies constitute adequate demonstrations of processing biases *per se*, but instead indicate demonstrations of differing cognitive products between depressed and non-depressed persons, that might have arisen following the utilisation of an identical processing strategy.

The design used in this study potentially allows for the demonstration of schema-congruent processing biases. In terms of the logic by which biased processing is inferred in this study, it is worth noting that the design is unusual in that a pattern of products is used, as opposed to comparisons of cognitive products between groups, or comparisons of cognitive products with indicators of 'objective reality' (for examples, actual stimulus materials). Notwithstanding difficulties in interpretation of the observed pattern in memory distortion scores, this approach potentially allows for the distinction between distortion and bias to be clarified in future studies, if some of the recommendations that follow were to be observed.

The interpretation of findings from the 'recall' task is complicated by the confounding of schematic processing with other possible influences. To clarify the interpretation of a negative linear relationship between memory distortion scores and feedback level, a different design could be used in which feedback scores were varied around some value other than the expected level of performance. For example, they could take the values of set gradations below the expected performance only. In this way, it would be possible to distinguish between distortion of scores towards the mean of the feedback (due to an anchoring heuristic, or random responding) and genuine schematic processing.

A review of the literature suggests that the processing strategy adopted by an individual may be determined by their depression status, the nature of the processing task, the nature of their schema in relation to the processing task, and features of the way that findings are analysed and interpreted. These conclusions have typically been drawn following investigations which have attempted to explain findings following the analysis of grouped data. This study has additionally emphasised the importance of examining responses for evidence of variability within samples of depressed or non-depressed individuals.

The analysis of individual participants' responses following processing tasks allows for a different kind of investigation into 'characteristic' biases. While many studies have looked at whether groups of depressed and non-depressed people use the same processing strategies as each other, or whether these strategies are used in a range of processing tasks, it is unusual to look for differences between participants within either of these groups. As already noted, the assumption that there exists a characteristic form of processing leads to the analysis of grouped data, which prevents examination of variation within the group. Brown (1998) discusses the advantages of idiographic analyses.

This study has not supported single strategy models of processing, and future studies should be directed towards identifying the dominant form(s) of processing strategy in depression, and the most important influences on the kind of strategy adopted. This study has suggested that research might investigate whether processing is biased so as to increase congruency with self-views in other domains, or to examine other influences of discrepancies between self-concept and self-guides held by the individual. Regarding this particular design, it is suggested that an idiographic analysis would be assisted by the creation of more data points; that using tests which were 'similar' to each other and varying feedback around a set of seven individual estimates of performance (one for each test) would reduce unsystematic error variance; and that presenting feedback as 'true' would make it more meaningful.

This study did not incorporate inclusion criteria regarding the form of the self-schema thought to relate to the processing tasks involved. As a consequence, it was possible to include a level of description of the schema, but the participant groups were not defined with respect to these factors. Future studies investigating processing biases (and in particular schematic processing) might benefit from having inclusion criteria relating to when a participant is said to have an 'adequate' schema. These would relate to concepts of 'importance', positivity or negativity of the schema, confidence in the self-view, and other features described in section 1.9.4 a).

Discrepancies within the self-schema might potentially influence the form of any biased processing, although no published investigations are known of by the author. It is

interesting to speculate whether schematic processing might be biased towards congruency with a self-view in a domain other than the 'actual' self-view i.e. towards consistency with an 'ideal' or 'ought' self-view. This thesis has only attempted to describe these aspects of the participants' self-views, rather than to specifically investigate their influence on forms of processing strategy. Clearly, estimates made of performance on intelligence tests in this study related to participants' 'actual' self-view. However, these questions suggest possible avenues for future research.

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APPENDICES

Appendix 1

DSM IV Diagnostic Criteria For Major Depressive Episode

A. Five or more of the following symptoms have been present during the same two-week period and represent a change from previous functioning: at least one of the symptoms is other 1) depressed mood or 2) loss of interest or pleasure.

Note: Do not include symptoms that are clearly due to a general medical condition, or mood-incongruent delusions or hallucinations.

1. depressed mood most of the day, nearly every day, as indicated by either subjective report(e.g. feels sad or empty) or observations made by other (e.g. appears tearful). Note: in children and adolescents: can be irritable mood.

2. markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by either subjective account or observation made by others).

3. significant weight loss when not dieting or weight gain (e.g. a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day. Note: in children, consider failure to make expected weight gains.

4. insomnia or hypersomnia nearly every day.

5. psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings or restlessness or being slowed down).

6. fatigue or loss of energy nearly every day

7. feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick)

8. diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).

9. recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without specific plan, or a suicide attempt or a specific plan for committing suicide.

B. The symptoms do not meet criteria for a Mixed Episode

C. The symptoms cause clinically significant distress or impairment in social, occupational or other important area of functioning.

D. The symptoms are not due to the direct physiological effects of a substance (e.g. a drug of abuse, a medication) or a general medical condition (e.g. hypothyroidism).

E. The symptoms are not better accounted for by Bereavement, i.e. after loss of a loved one, the symptoms persist for longer than two months or are characterised by marked functional impairment, morbid pre-occupation with worthlessness, suicidal ideation, psychotic symptoms or psychomotor retardation.

Appendix 2

ICD-10 Diagnostic Critera

Depressive Episode

In typical depressive episodes of all three varieties described below (mild, moderate and severe), the individual usually suffers from depressed mood, loss of interest or enjoyment, and reduced energy leading to increased fatiguability and diminished activity. Marked tiredness after only slight effort is common. Other symptoms are:

a) reduced concentration and attention
b) reduced self esteem and confidence
c) ideas of guilt and unworthiness (even in a mild type of episode)
d) bleak and pessimistic views of the future
e) ideas or acts of self harm or suicide
f) disturbed sleep
g) diminished appetite

The lowered mood varies little from day to day, and is often unresponsive to circumstances, yet may show a characteristic diurnal variation as the day goes on. For depressive episodes of a ll three grades of severity, a duration of at least two weeks is usually required for diagnosis, but shorter periods may be reasonable if symptoms are unusually severe or of rapid onset.

Mild Depressive Episode

Depressed mood, loss of interest and enjoyment, and increased fatiguability are usually regarded as the most typical symptoms of depression, and at least two of these plus at least two of the other symptoms should usually be present for a definite diagnosis. None of the symptoms should be present to an intense degree. Minimum duration of the whole episode is about two weeks.

An individual with mild depressive episode is usually distressed by the symptoms and has some difficulty in continuing with ordinary work and social activities, but will probably not cease to function completely.

Moderate Depressive Episode

At least two of the three most typical symptoms noted for mild depression should be present, plus at least three (and preferably four) of the other symptoms. Several symptoms are likely to be present to a marked degree, but this is not essential if a particularly wide variety of symptoms is present overall. Minimum duration of the whole episode is about two weeks.

An individual with moderately severe depressive episode will usually have considerable difficulty in continuing with social, work or domestic activities.

Severe Depressive Episode

In a severe depressive episode, the sufferer usually shows considerable distress or agitation, unless retardation is a marked feature. Loss of self-esteem or feelings of uselessness or guilt are likely to be prominent and suicide is a distinct danger in particularly severe cases. It is presumed here that the somatic syndrome will almost always be present in a severe depressive episode.

All three of the typical symptoms noted for mild and moderate depression should be present, plus at least four other symptoms, some of which should be of severe intensity. However, if important symptoms such as agitation or retardation are marked, the patient may be unwilling or unable to describe many symptoms in detail. An overall grading of severe episode may still be justified in such cases. The depressive episode should usually last at least two weeks, but if the symptoms are particularly sever and of rapid onset, it may be justified to make this diagnosis after less than two weeks.

During a severe depressive episode it is very unlikely that the sufferer will be able to continue with social, work or domestic activities, except to a very limited extent.

The Beck Depression Inventory

Beck Inventory

Name: _____ Date: _____

On this questionnaire are groups of statements. Please read each group of statements carefully. Then pick out the one statement in each group which best describes the way you have been feeling the past week, including today! Circle the number beside the statement you picked. If several statements in the group seem to apply equally well, circle each one. **Be sure to read all the statements in each group before making your choice.**

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

2. 0 I am not particularly discouraged about the future.
   1 I feel discouraged about the future.
   2 I feel I have nothing to look forward to.
   3 I feel that the future is hopeless, and that things cannot improve.

3. 0 I do not feel like a failure.
   1 I feel I have failed more than the average person.
   2 As I look back on my life, all I can see is a lot of failures
   3 I feel I am a complete failure as a person.

4. 0 I get as much satisfaction out of things as I used to.
   1 I don't enjoy things the way I use to.
   2 I don't get real satisfaction out of things anymore.
   3 I am dissatisfied or bored with everything.

5. 0 I don't feel particularly guilty.
   1 I feel guilty a good part of the time.
   2 I feel quite guilty most of the time.
   3 I feel guilty all of the time.

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

7. 0 I don't feel disappointed in myself.
   1 I am disappointed in myself.
   2 I am disgusted with myself.
   3 I hate myself.

8. 0 I don't feel I am any worse than anyone else.
   1 I am critical of myself for my weaknesses or mistakes.
   2 I blame myself all the time for my faults.
   3 I blame myself for everything bad that happens.

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

10. 0 I don't cry any more than usual.
    1 I cry more now than I used to.
    2 I cry all the time now
    3 I used to be able to cry, but now I can't cry even though I want to.

11. 0 I am no more irritated now than I ever am
    1 I get annoyed or irritated more easily than I used to.
    2 I feel irritated all the time now.
    3 I don't get irritated at all by the things that used to irritate me.

12. 0 I have not lost interest in other people.
    1 I am less interested in other people than I used to be.
    2 I have lost most of my interest in other people.
    3 I have lost all of my interest in other people.

13. 0 I make decisions about as well as I ever could.
    1 I put off making decisions more than I used to.
    2 I have greater difficulty in making decisions than before.
    3 I can't make decisions at all anymore.

14. 0 I don't feel I look any worse than I used to.
    1 I am worried that I am looking old or unattractive.
    2 I feel that there are permanent changes in my appearance that make me look unattractive.
    3 I believe that I look ugly.

15. 0 I can work about as well as before.
    1 It takes an extra effort to get started at doing something.
    2 I have to push myself very hard to do anything.
    3 I can't do any work at all.

16. 0 I can sleep as well as usual.
    1 I don't sleep as well as I used to.
    2 I wake up 1 - 2 hours earlier than usual and find it hard to get back to sleep.
    3 I wake up several hours earlier than I used to and cannot get back to sleep.

17. 0 I don't get more tired than usual.
    1 I get tired more easily than I used to.
    2 I get tired from doing almost anything.
    3 I am too tired to do anything.

18. 0 My appetite is no worse than usual.
    1 My appetite is not as good as it used to be.
    2 My appetite is much worse now.
    3 I have no appetite at all anymore.

19. 0 I haven't lost much weight, if any, lately.
    1 I have lost more than 5 pounds.
    2 I have lost more than 10 pounds.
    3 I have lost more than 15 pounds.

    I am purposely trying to lose weight by eating less.
    ☐ Yes ☐ No

20. 0 I am no more worried about my health than usual.
    1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
    2 I am very worried about physical problems and it's hard to think about much else.
    3 I am so worried about my physical problems that I cannot think about anything else.

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

Appendix 4

The Beck Anxiety Inventory

Instructions: Below is a list of common symptoms of anxiety. Please read each item in the list carefully. Indicate how often you experienced each symptom during the past week, including today by circling the corresponding number in the column next to each symptom.

	Never	Occasionally	Frequently	Almost a11 the time
1. Numbness or tingling.	0	1	2	3
2. Feeling hot.	0	1	2	3
3 . Wobbliness in legs'.	0	1	2	3
4. Unable to relax.	0	1	2	3
5. Fear of the worst happening.	0	1	2	3
6. Dizzy or light-headed.	0	1	2	3
7. Heart Pounding or racing.	0	1	2	3
8 . Unsteady.	0	1	2	3
9. Terrified.	0	1	2	3
10. Nervous.	0	1	2	3
11. Feelings of choking	0	1	2	3
12. Hands trembling.	0	1	2	3
13. Shaky.	0	1	2	3
14. Fear of losing control.	0	1	2	3
15. Difficulty breathing.	0	1	2	3
16. Fear of dying.	0	1	2	3
17. Scared.	0	1	2	3
18. Indigestion or discomfort in abdomen.	0	1	2	3
19. Faint.	0	1	2	3
20. Face flushed.	0	1	2	3
21. Sweating (not due to heat).	0	1	2	3

Appendix 5

Items from the SCID III-R used in this study

1. I am going to ask you some questions about your mood.

In the past month, has there been a period of time when you felt depressed / down for most of the day, nearly every day? Y / N

How long did it last? (at least two weeks)

During that time, did you notice:

lacking interest / pleasure in activities
weight loss / gain
trouble sleeping
restlessness / slowing
lack of energy
worthlessness ('How did you feel about yourself?')
guilt ('Did you feel guilty about things you had done?')
have difficulty thinking, concentrating or making decisions
have thoughts of death, or of hurting yourself

(5 of list including either depressed mood or lack of interest/pleasure)

2. Have you ever been depressed or down for most of the day before? Y / N

How long for?

Have you had more than one time like that?

*** Have you ever been diagnosed as suffering from depression? Y / N
*** Over how long a period have you suffered with depression? Y / N

3. Has there ever been a period of time when you were feeling so good or hyper that other people thought you were not your normal self, or you were so hyper that you got into trouble? Y / N

If 'No' , what about a time when you were very irritable?

How long did that last?

During this time:

how did you feel about yourself? (more self confident, any special powers or abilities)

need less sleep than usual?

more talkative than usual?

were thoughts racing through your head?

did you have trouble concentrating?

how did you spend your time?
(i.e. was there an increase in goal-directed activity, or psychomotor agitation?)

(N.B. need three of list; four if just 'irritable')

Did anyone say you were 'manic'? Y / N

Was it more than just 'feeling good'? Y / N

Were you taking any street drugs or medicines before this began? Y / N

4. I am now going to ask you about unusual experiences people sometimes have.

Has it ever seemed that people were talking about you, or taking special notice of you?

What abot receiving special messages from the TV, radio or newspapers?

Did you ever feel that you were especially important in some way?

Have you ever felt that parts of your body had changed or stopped working? Have you ever felt that someone or something outside yourself was controlling your thoughts or actions against your will?

Did you ever hear things that other people cannot hear? (e.g. people talking)

Have you ever had visions, or seen things that other people cannot see?

What about strange sensations in your body, or on your skin?

When did these start?

(Note also loosening of associations, incoherence, disorganised behaviour etc)

5. Have you ever had a panic attack, when you suddenly felt frightened , anxious or uncomfortable?

Y / N

Have you ever had > 4 in one month? Y / N

or one month of persistent fear of having another? Y / N

During the attack, did you notice feeling:

short of breath
dizzy / faint
heart racing
trembling
sweating
choking
nausea
derealisation
tingling
flushes
chest pains
afraid of dying
afraid of going crazy / losing control

Have you ever avoided places or situations, for fear that you might have an attack?

6. Is there anything that you were ever afraid to do, or felt uncomfortable doing in front of other people? (speaking, eating, writing)

Y / N

How much did this interfere with your life?

7. Are there any other things that you have been especially afraid of, like flying, heights, animals or seeing blood?

Y / N

How much did this interfere with your life?

8. Have you ever been bothered by thoughts which make no sense but keep coming back even if you have tried not to have them? Y / N

Is there anything that you have felt you have had to do over and over again? Y / N

9. Do you worry a lot about terrible things that might happen to you? Y / N

How long has this gone on for? (> 6 months)

When you are nervous or anxious, how do you feel physically? (physical symptoms)

What sorts of things do you worry about?

10. How much have you been drinking in the past month?

Have you ever drunk so much that it caused you problems?

Y / N

What problems?

Have you been taking any street drugs in the past month? (> 10 times in one month)

11. Have you had any serious illnesses or physical problems in the past year? Y / N

12. Has anyone close to you died in the past year? Y / N

13. What medication are you currently taking?

The Selves Questionnaire

PERSONAL QUALITIES QUESTIONNAIRE.

1. HOW YOU ARE NOW

In the spaces below, please write down ten words which *you* would use to describe yourself as you *actually are*. It might be hard to think of so many, but you can include things you do not like about yourself as well as those you do like (e.g. honest, selfish, caring etc.)

(list up to ten 'attributes' - qualities or characteristics)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

2. HOW YOU WOULD LIKE TO BE

In the spaces below, please write down ten words which describe the kind of person that *you* would *ideally like to be*. Some of these qualities might be the same as those you have written in other questions.

(list up to ten 'attributes' - qualities or characteristics)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

3. HOW YOU FEEL YOU SHOULD OR OUGHT TO BE

In the spaces below, please write down ten words which describe the kind of person that *you* feel you *should or ought to be*. Some of these qualities might be the same as those you have written in other questions.

(list up to ten 'attributes' - qualities or characteristics)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

The forms of the seven WAIS - R sub-tests used in this study

Picture Completion - 'even' items only.

Digit Span - one trial of each item, forwards and backwards.

Block Design - items 2, 3, 5, 6, 7.

Object Assembly - 'mannequin', 'hand' and 'elephant' sub-tests.

Comprehension - items 2, 3, 5, 6, 8, 10, 12, 13, 14, 15, 16.

Digit Symbol - one minute allowed.

Similarities - all items.

Measures relating to self-schema

Appendix 8

Measure of 'estimated intelligence'

In the space below, please estimate as accurately as possible, how well you think you would perform on an accurate test of intelligence, in relation to the rest of the adult population of the United Kingdom.

Express your answer as the proportion of the population that you believe would score lower on the test than you would. For example, if you think you are in the middle, put '50%'; if you think you would perform better than 80% of the population, put '80%'.

On a test of intelligence, I think I would perform better than ..... % of the population.

Measure of confidence in accuracy of estimated intelligence

How confident are you in the accuracy of this estimate? (circle the appropriate number)

1	2	3	4	5	6	7	8
not at all confident							completely certain

Measure of the importance of 'own intelligence'

How important is your own intelligence to you? (circle the appropriate number)

1	2	3	4	5	6	7	8
not at all important							extremely important

Measure of 'ideal own intelligence'

Using the same rating system as in question 1), indicate how intelligent you would ideally like to be, in relation to the rest of the adult population of the United Kingdom.

I would ideally like to perform better than ..... % of the population

Appendix 9

letter to potential participants

Department of Clinical Psychology
xxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxx
xxxxxxxxxx

Date:

Dear

I am writing to tell you about a study being conducted within the Department of Clinical Psychology, and to ask whether you might be interested in taking part. The study examines the way that depression influences the way that people think. As depression seems to be one of the reasons you visited your doctor, it has been suggested that you might be a suitable person for the researchers to approach. I enclose an information sheet which tells you more about what is involved. Those conducting the research study will not at any stage be involved in your treatment. The researcher is able to meet with you at your home, or arrangements can be made to meet at some other location.

Your involvement in the study is entirely voluntary, and you should not feel pressured in any way to take part. The treatment that is offered to you, by this or any other department, will not be affected by your decision.

However, if you would like to take part in the study, it would be extremely helpful if you could fill out the slip at the bottom of this page. You can either return it to the address at the top of the letter (c/o Remy McCubbin) or bring it with you next time you attend an appointment. You will then be contacted by Remy McCubbin (the researcher conducting the study).

Yours sincerely

I would like to be involved in the research study looking at people's thinking in depression, and have no objection to being approached by the researchers involved.

My name is .....

I can be contacted at the following address .....

.....

.....

I can be contacted on the following telephone number .....

Appendix 10

AN INVESTIGATION OF THE WAY PEOPLE THINK WHEN THEY ARE DEPRESSED

- INFORMATION SHEET FOR PARTICIPANTS

Researchers Involved in the Study:

Remy McCubbin, Trainee Clinical Psychologist

Contact Address:

Department of Clinical Psychology,
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Please read the following information carefully.

We are currently conducting a study looking at the way that people think when they are depressed. Findings from the study will help us to understand the causes of depression and to provide more effective help for those who are depressed. In order to do this, we need to contact some people who are currently suffering with depression, and others who are not. We would like you to consider whether you would be interested in taking part in this study, and have prepared this information sheet to tell you more about what is involved.

If you agree to take part, you will be asked to fill out some brief questionnaires, and then to complete some psychological tests on which you will be given feedback. *The feedback you are given may or may not reflect your true performance on the tests*. Your task will be to estimate the extent to which the feedback reflects your true performance. We expect that this will take no more than one hour, in the middle of which there will be a break for five or ten minutes. It is not expected that those involved will experience any significant or lasting discomfort or distress. The procedures involved have been approved by the Manchester Health Commission's Research Ethics Committee (Central).

The information you provide will be treated as confidential, by which we mean that personal details will be known only to the researchers named at the top of the page. All information gathered in the study is to be kept in a locked file within a clinical department in the hospital. Findings from the study that are to be made known to others (in the form of reports, publications, etc) will contain only anonymous information, which cannot be used to identify individuals.

If you agree to take part, you will be asked to sign a form, to show that you have given your consent. You are, however, under no obligation to take part in the study, and have the right to withdraw at any time - even if you have signed this form. You may also withdraw permission for the information you provide to be used in the study. The treatment offered to you in the future will not be affected by whether you do or do not take part in this study. There is no financial reward for those participating in the study.

If there are things which you do not understand, or if you would like more information, please contact Remy McCubbin (tel.xxxxx).

consent form for participants

Appendix 11

Department of Clinical Psychology,
School of Psychiatry and Behavioural Sciences, University of Manchester

CONSENT FORM

1. Please read this form very carefully

2. If there is anything you do not understand about the information sheet, or you wish to ask any questions, please speak to Remy McCubbin

3. Please check that all of the information on this sheet is correct. If it is, and you understand the explanation and agree with all the statements, then sign the form below.

YES I have been given a written explanation of the study by Remy McCubbin. It includes details of any potential risks, my rights as a participant, and what is to be done to me. I have been given the opportunity to ask questions.

YES I have had enough time to think about the study, and decide without pressure that I want to take part.

YES I understand that the decision is up to me and that I can change my mind without it affecting how I am treated in the future.

YES I have been assured that all information collected in the study will be held in confidence, and if the results are presented, my personal details will be removed.

YES I therefore agree that I will take part in the study.

Signed: .....

Date: .....

Address: .....

Appendix 12

PARTICIPANT DEMOGRAPHIC INFORMATION QUESTIONNAIRE

Name:

Sex: **Male / Female (delete as appropriate)**

Date of Birth:

Name and address of GP:

To which ethnic group do you belong? (tick appropriate category)

White (Caucasian)

Afro-Caribbean

Asian

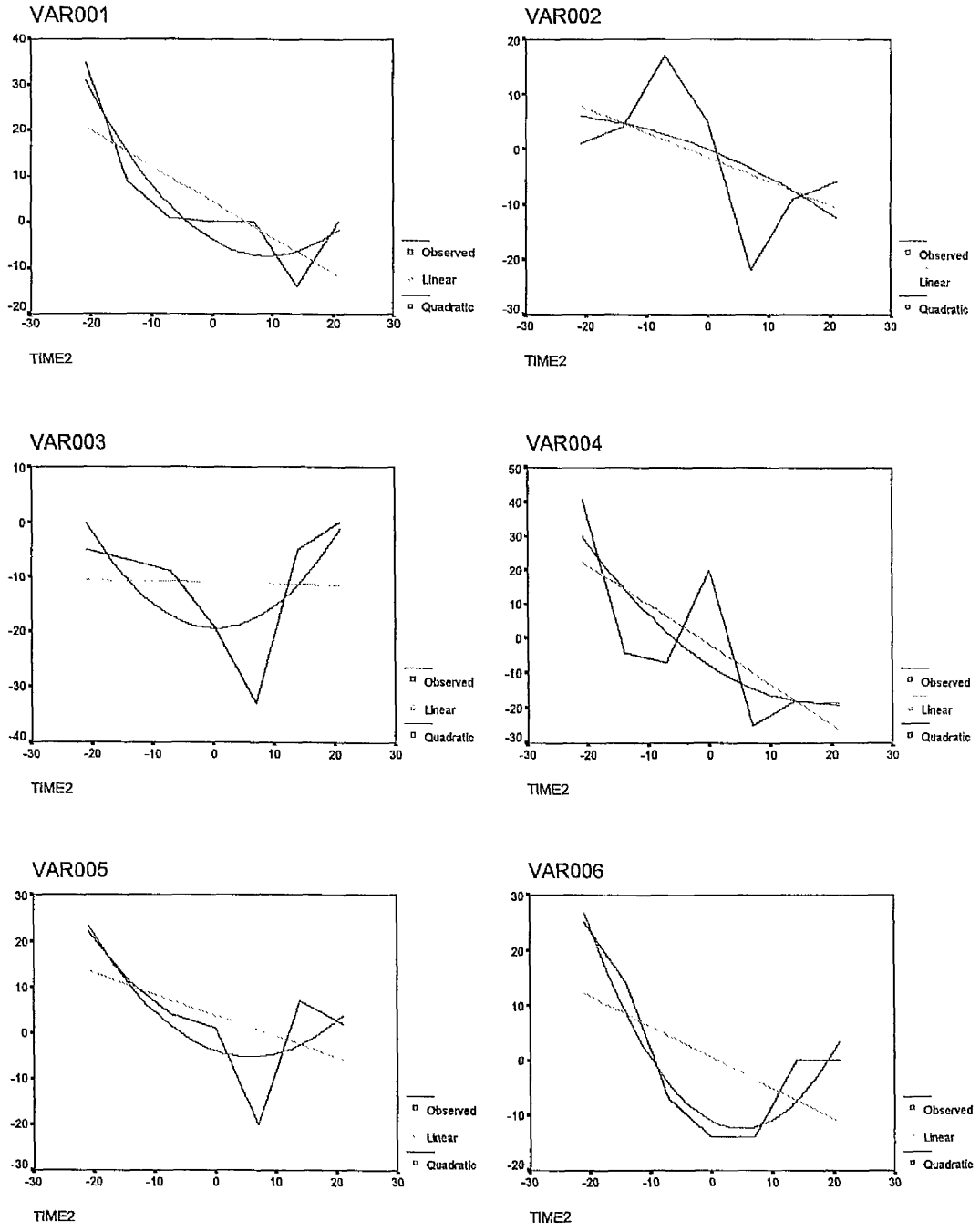
African

Other (please specify)

Currently employed / unemployed (delete as appropriate)

What kind of work do you normally do?

Idiographic plots of believability scores



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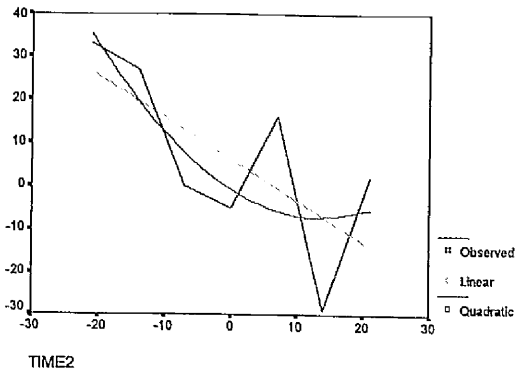

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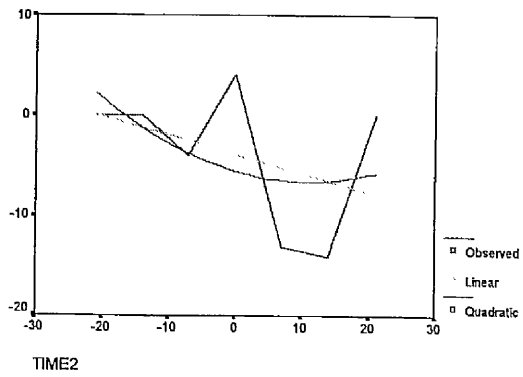

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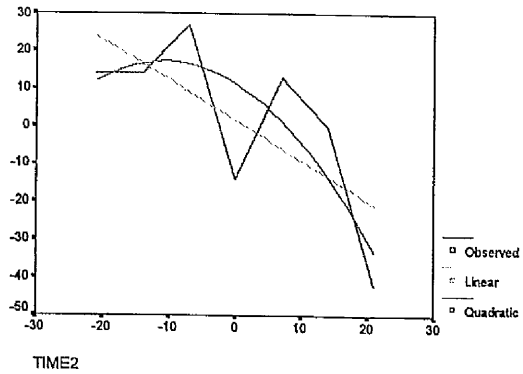

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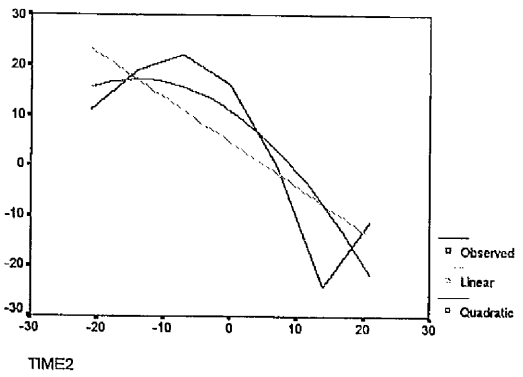

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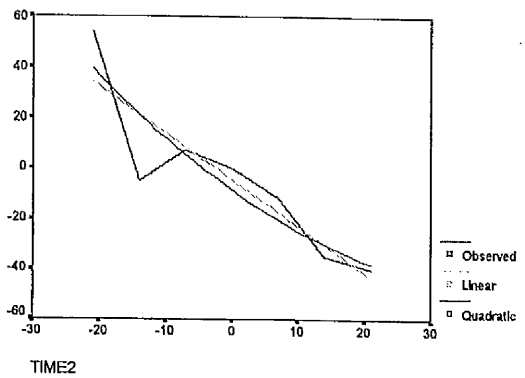

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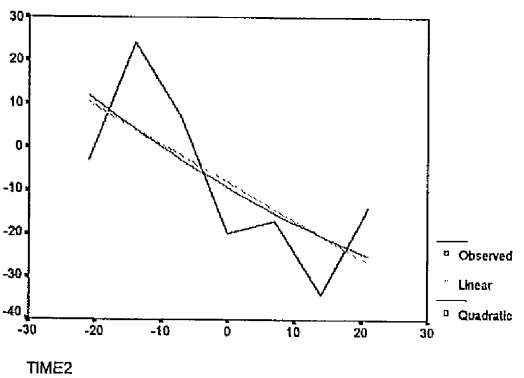

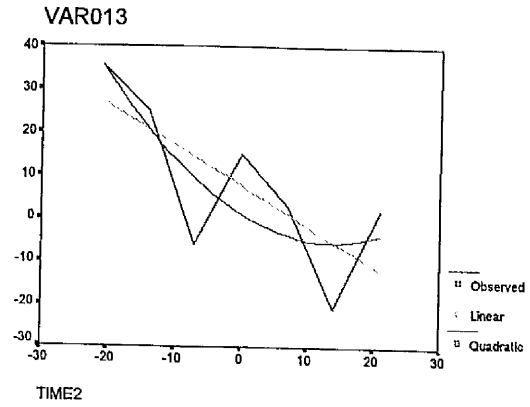
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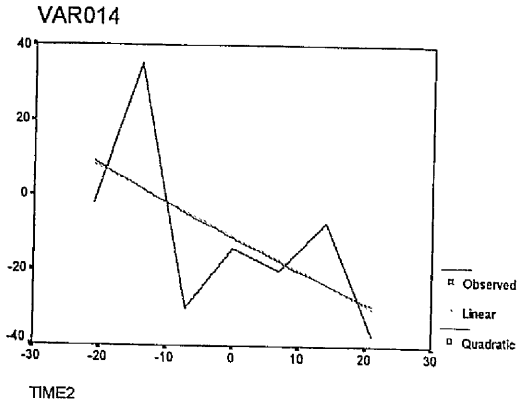
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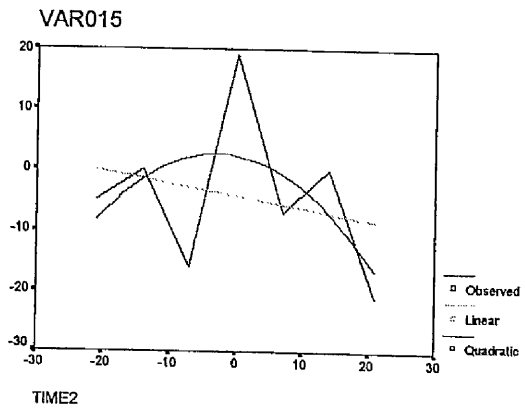
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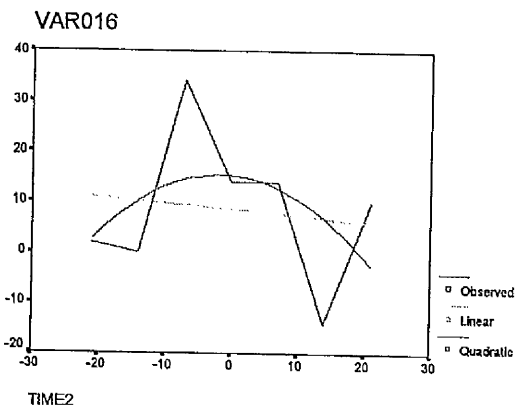
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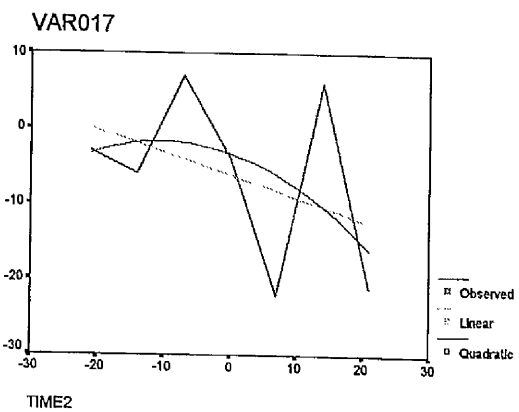
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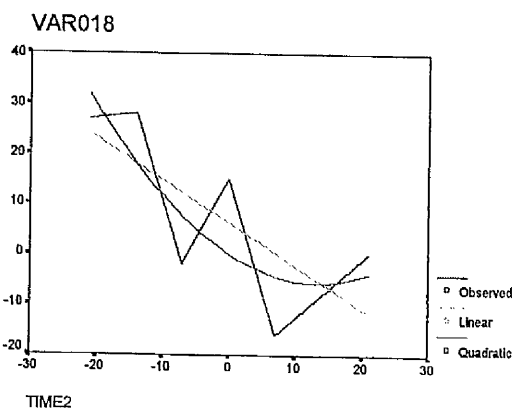
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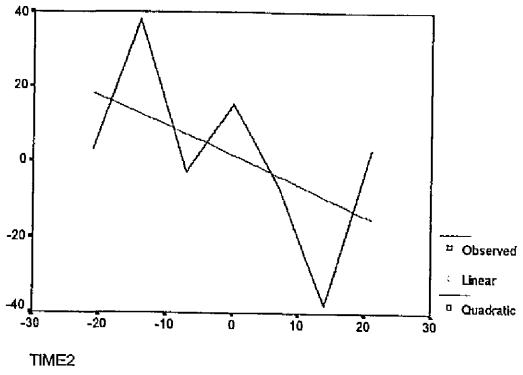

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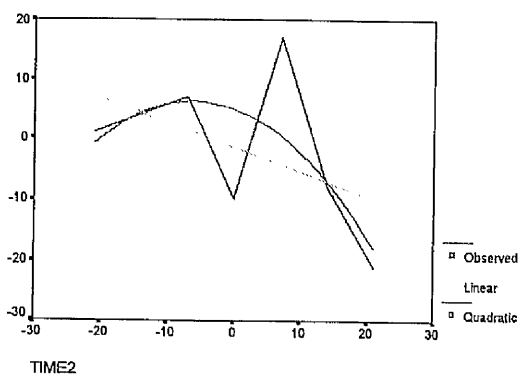

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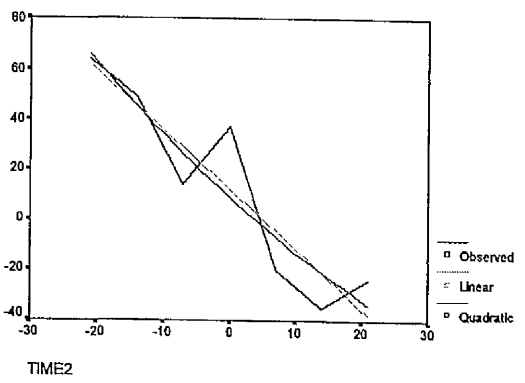

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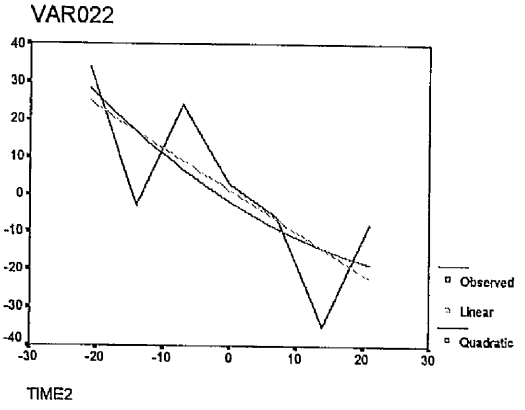

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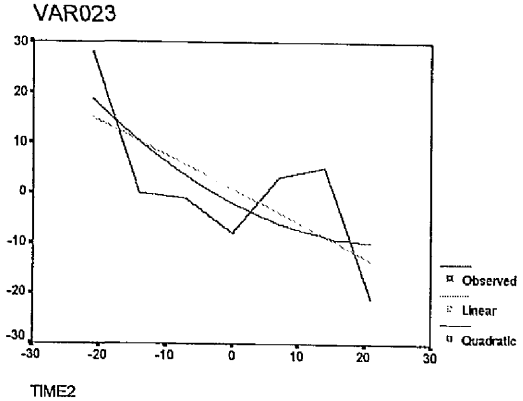

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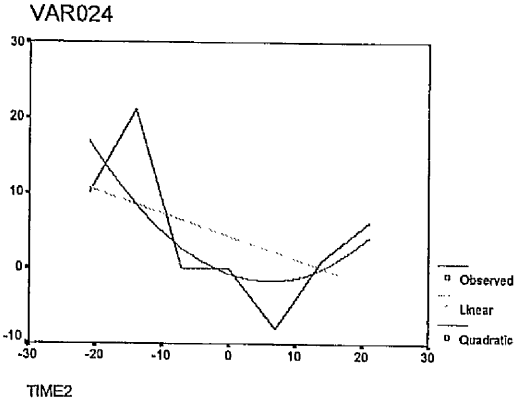

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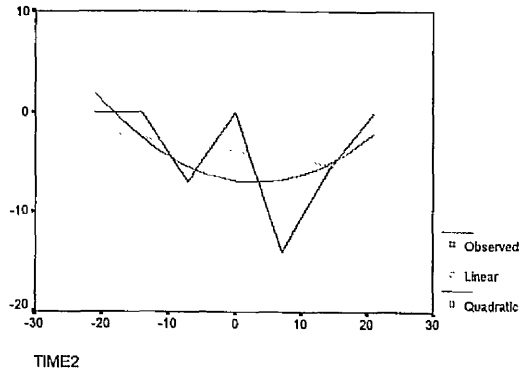

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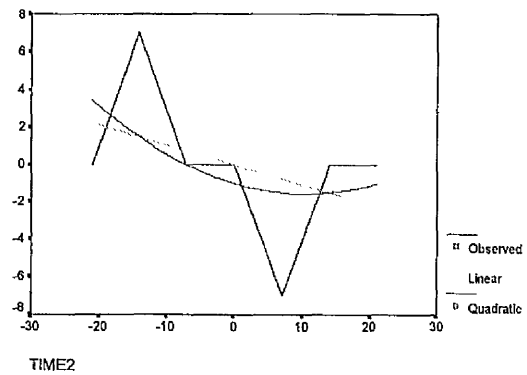

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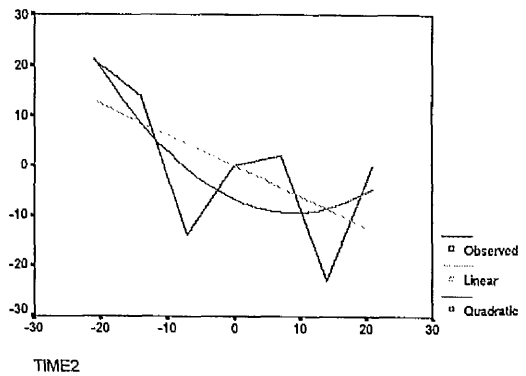

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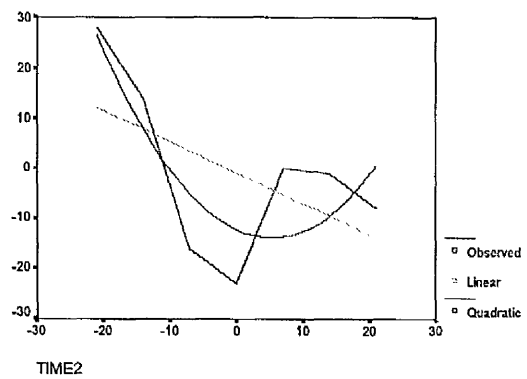

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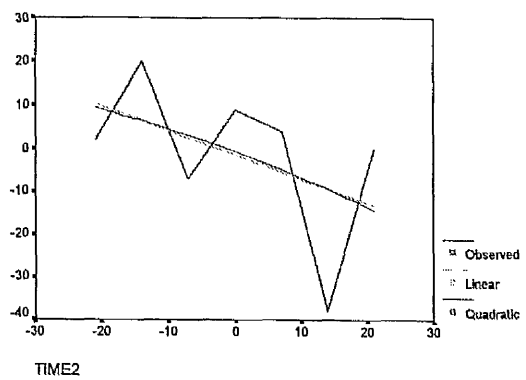

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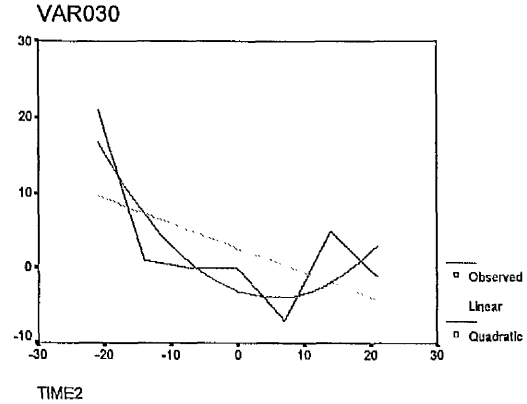

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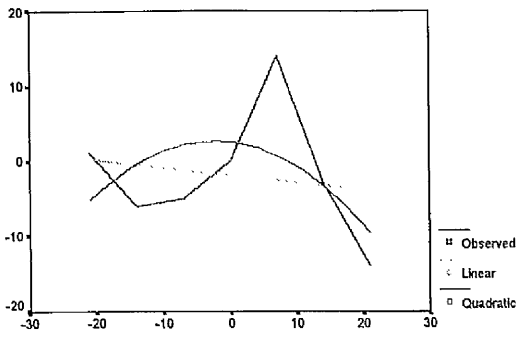

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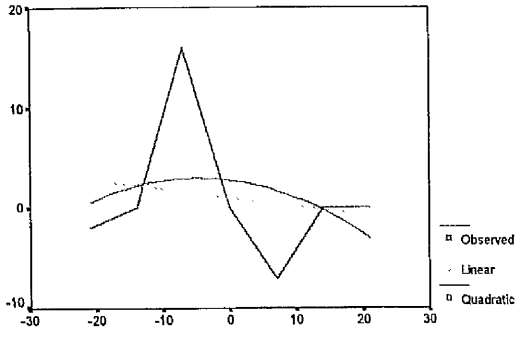

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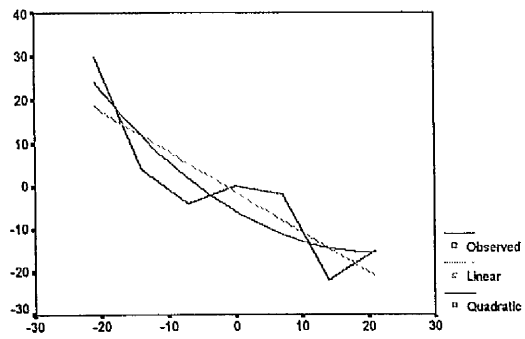

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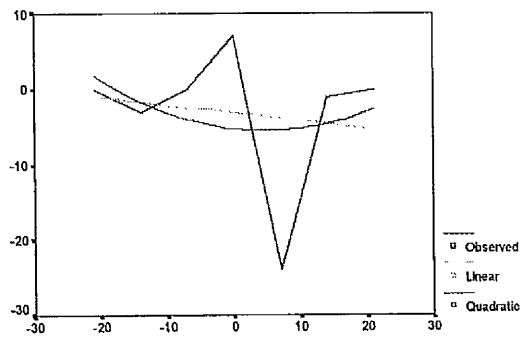

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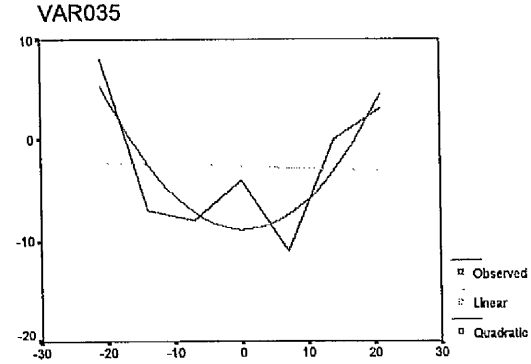

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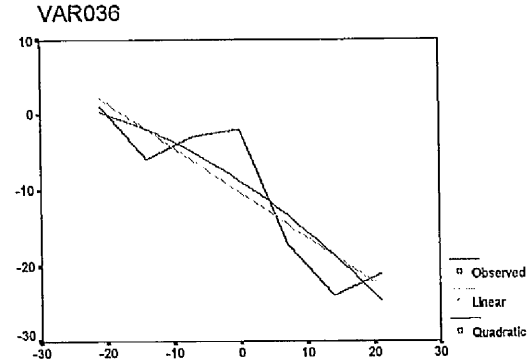

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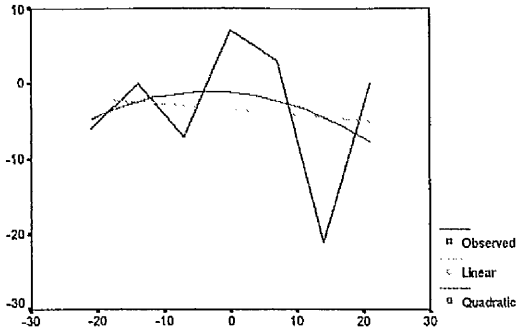

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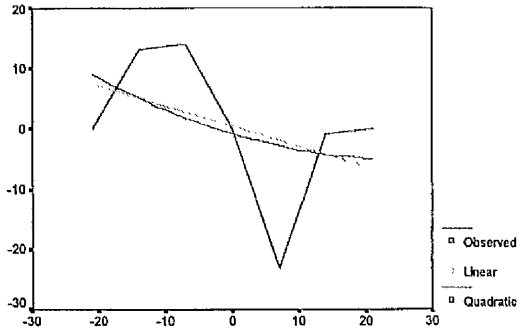

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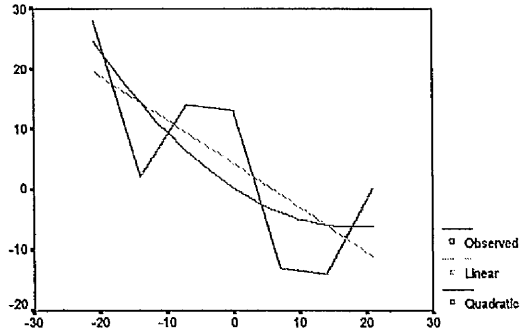

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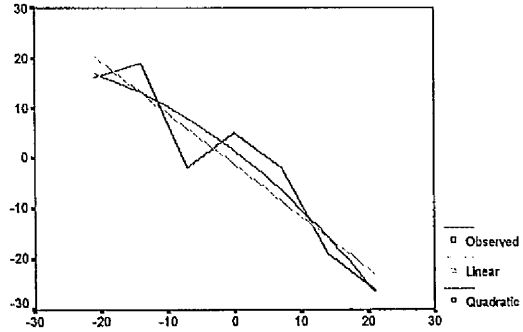

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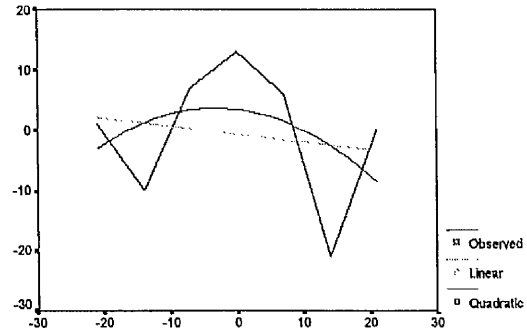

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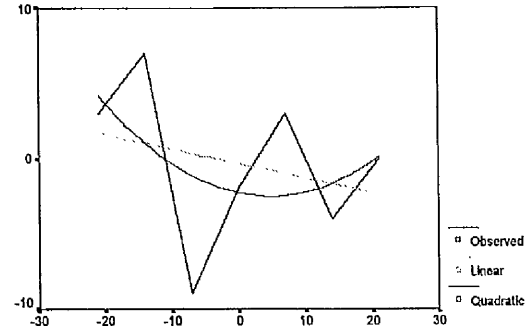

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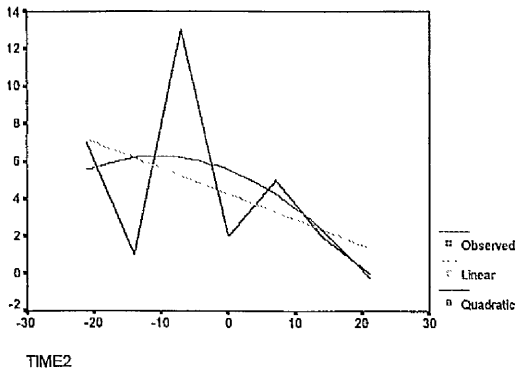

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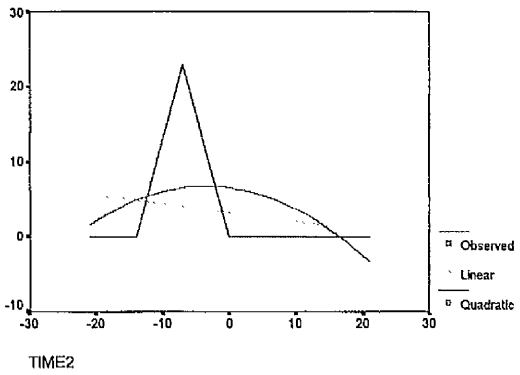

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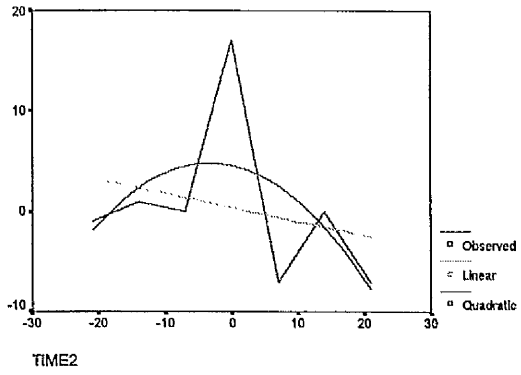

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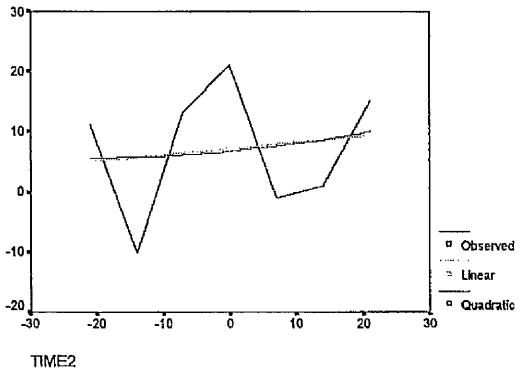

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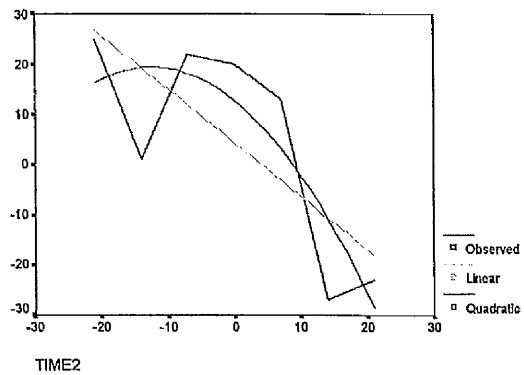

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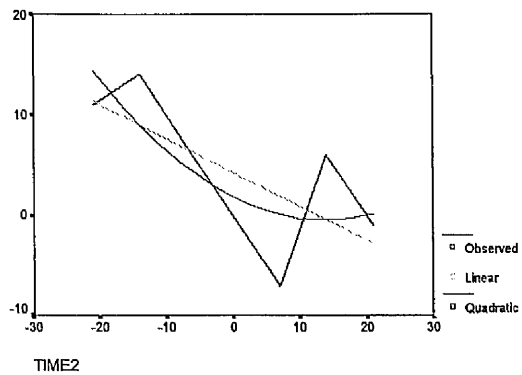

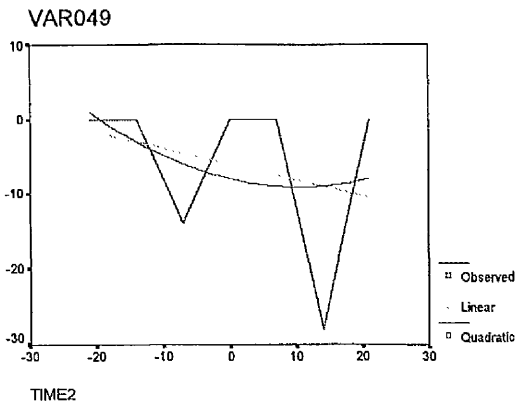
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-30
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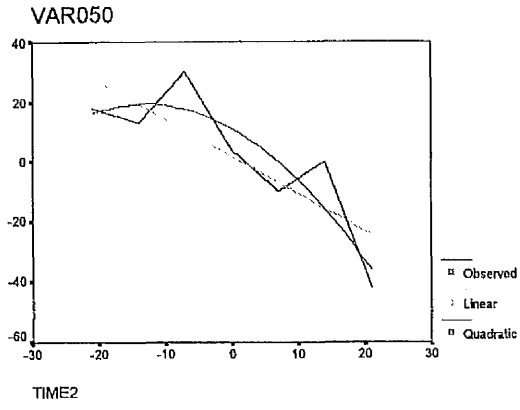
20
30
Observed
Linear
Quadratic
TIME2


VAR050
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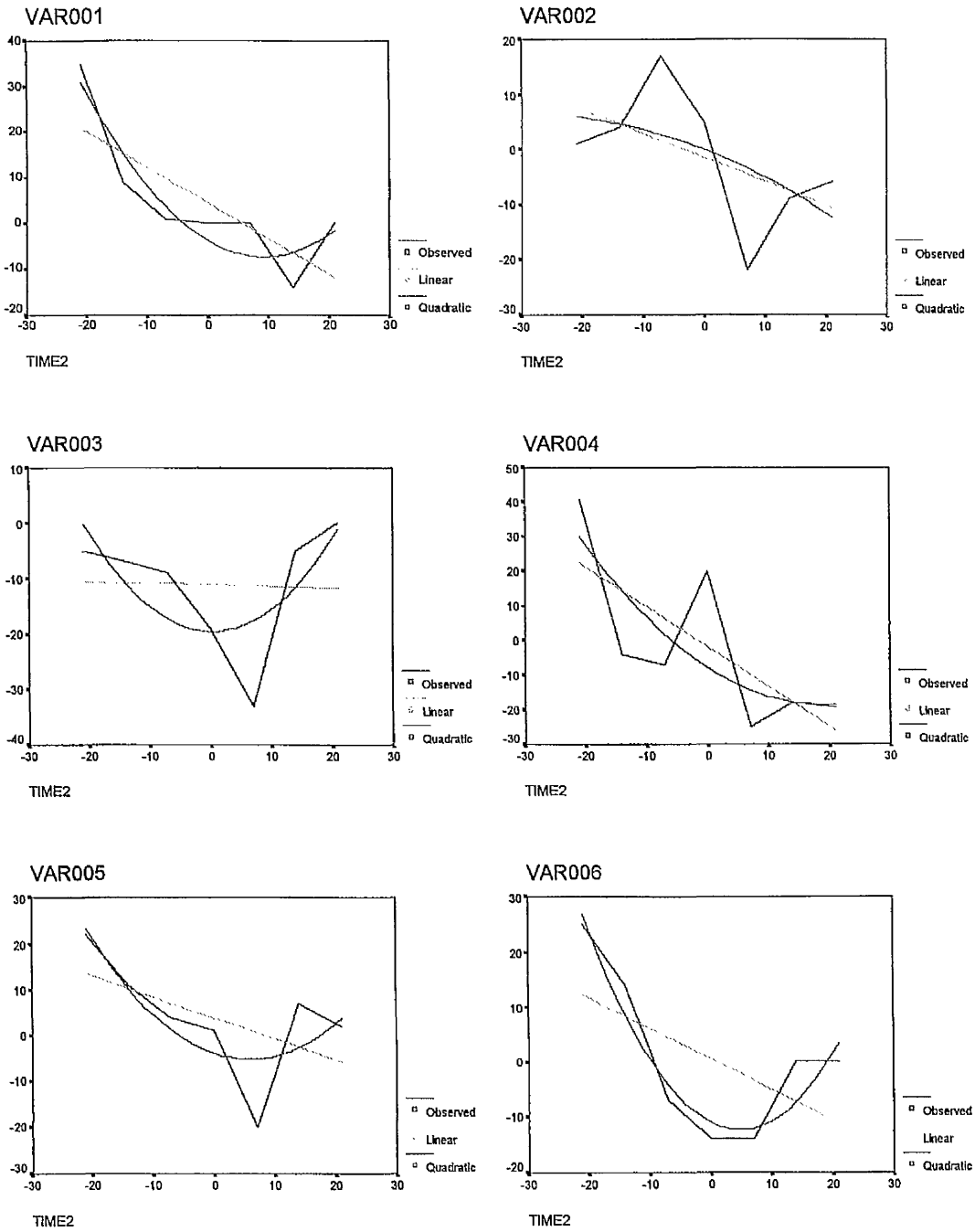
Observed
Linear
Quadratic
TIME2

Idiographic plots of memory distortion scores



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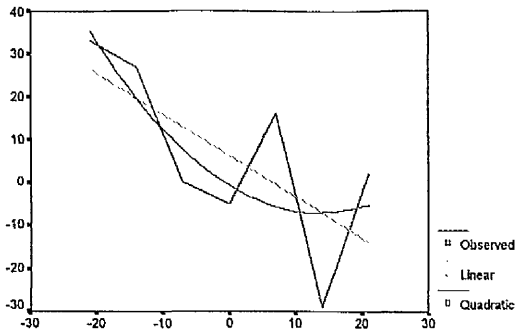

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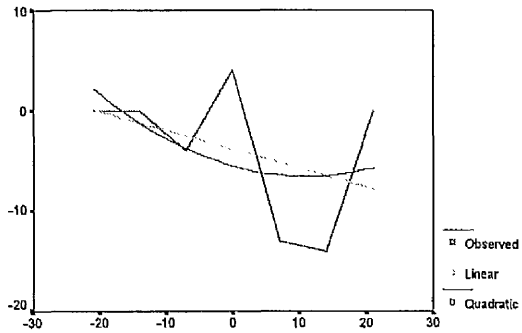

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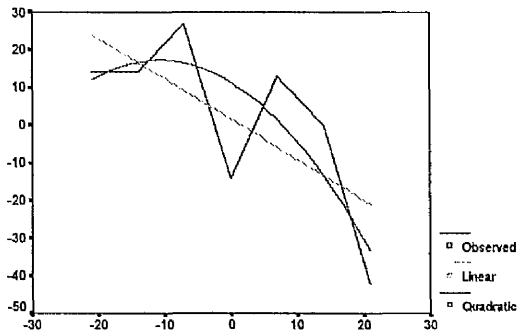

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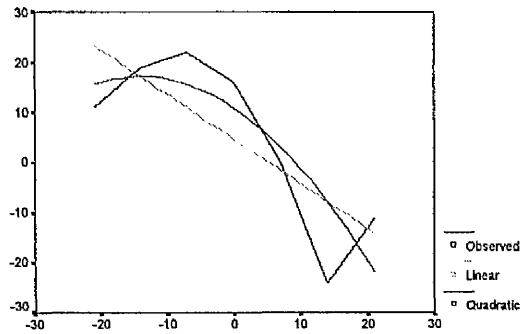

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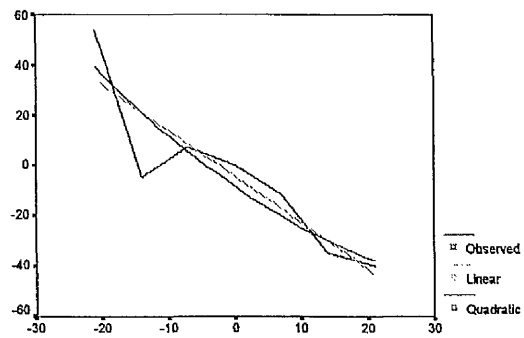

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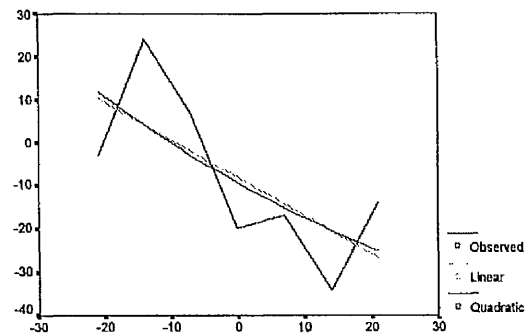

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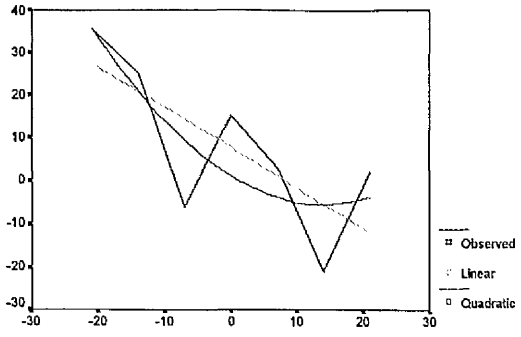

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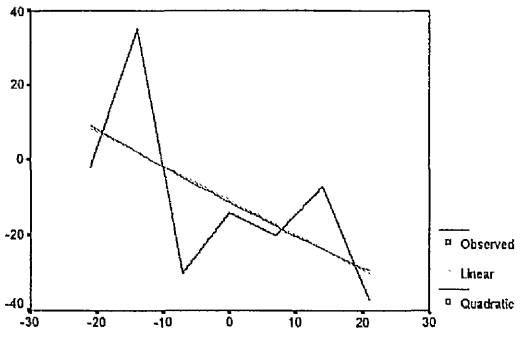

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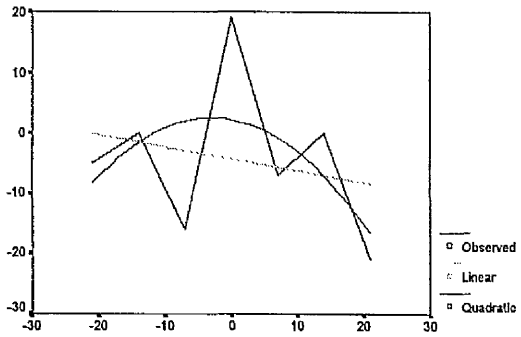

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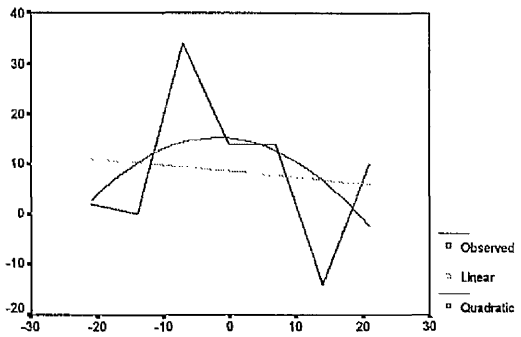

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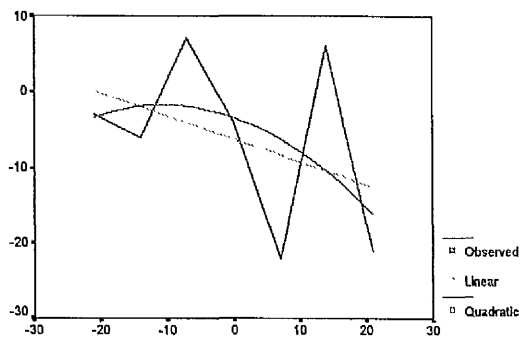

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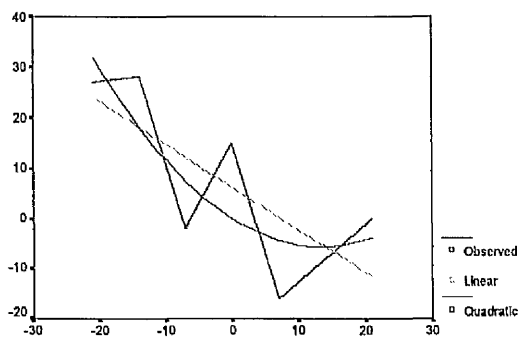

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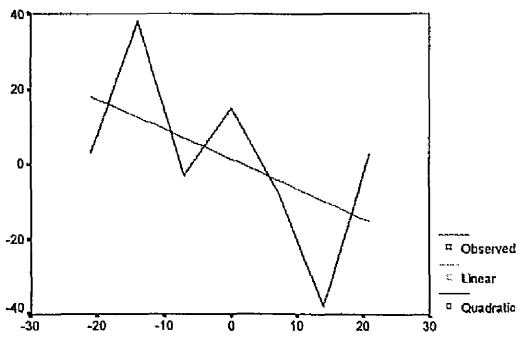

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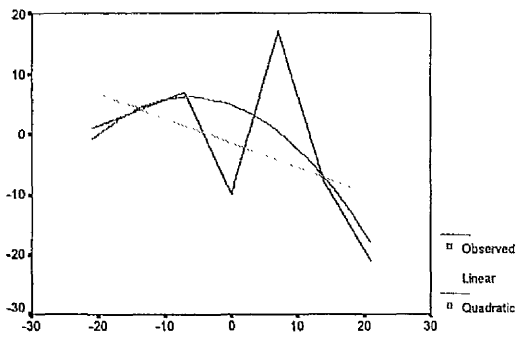

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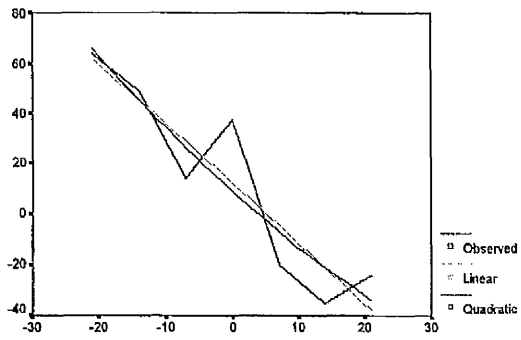

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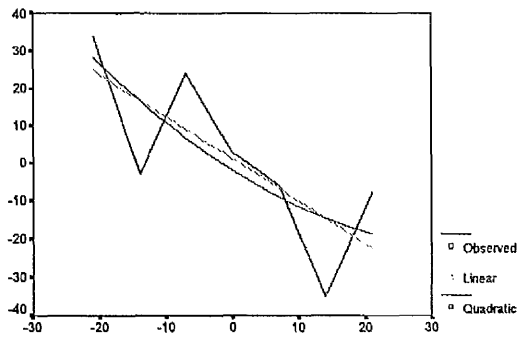

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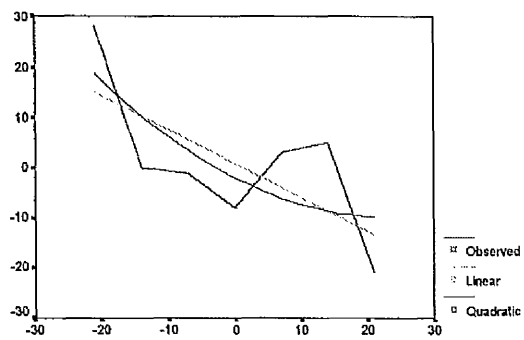

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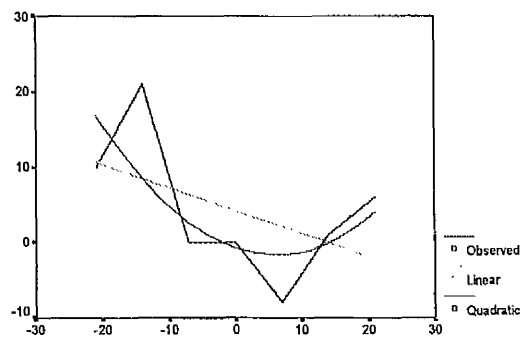

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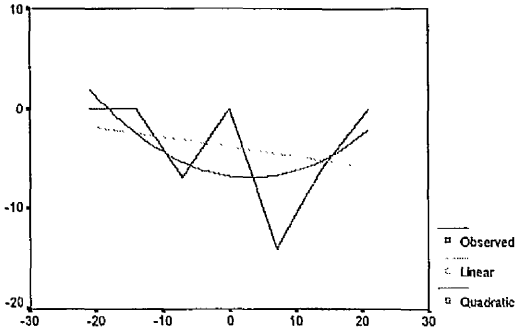

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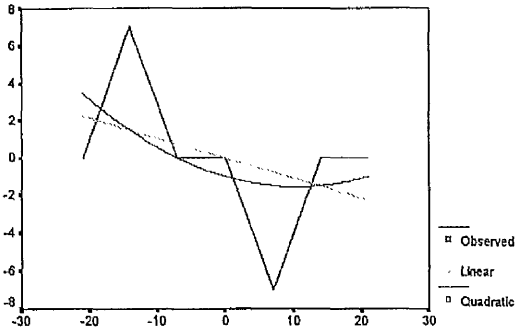

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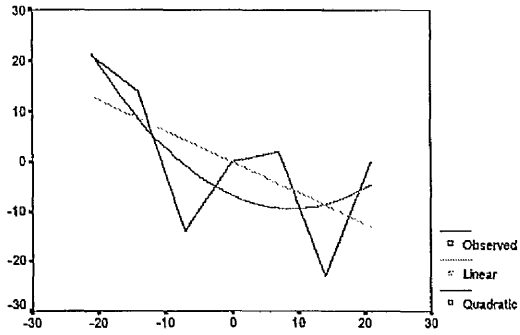

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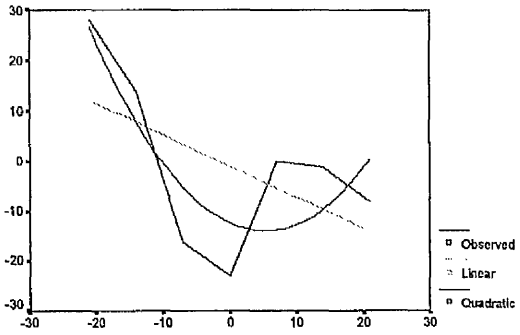

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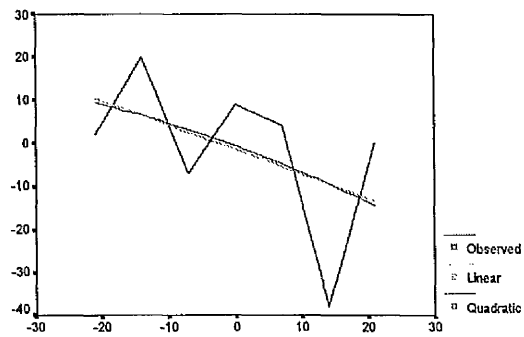

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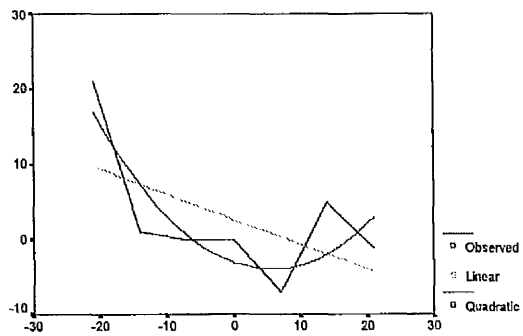

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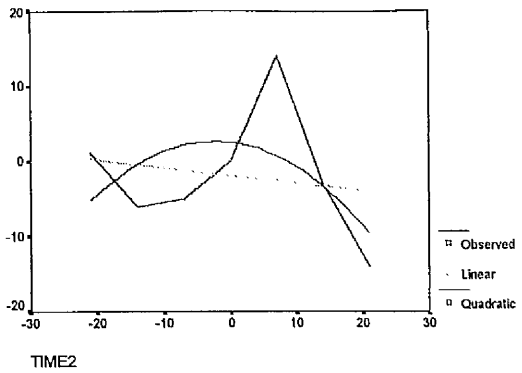

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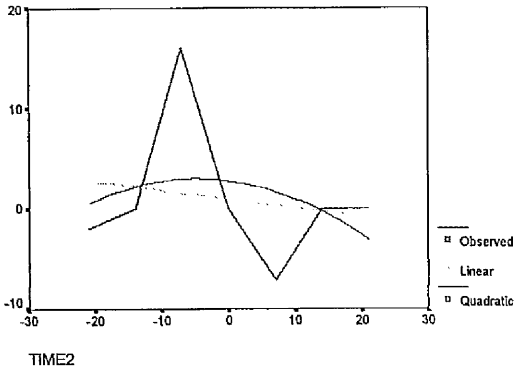

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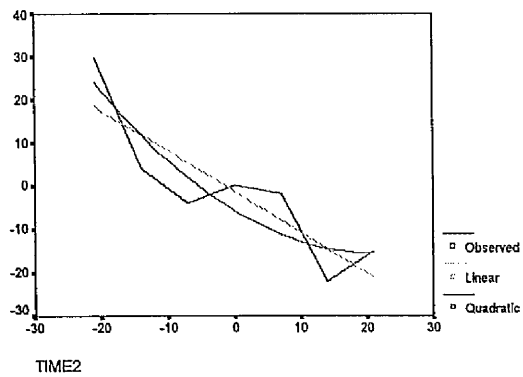

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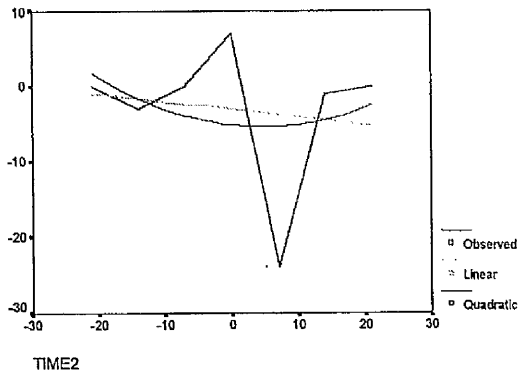

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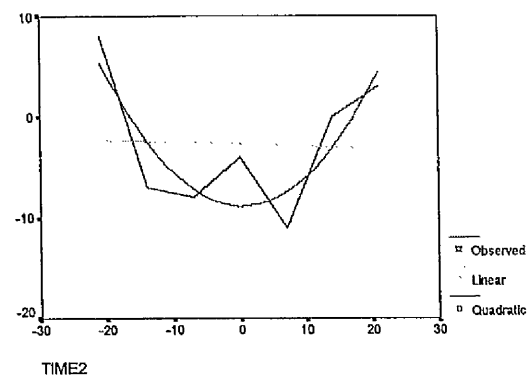

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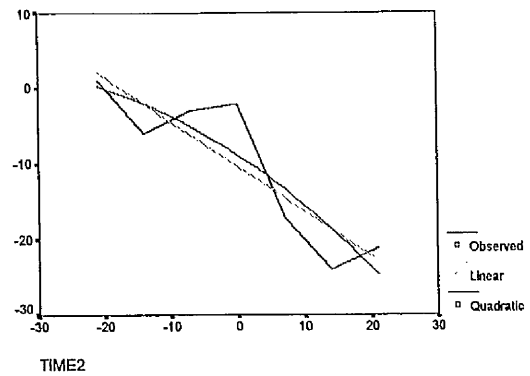

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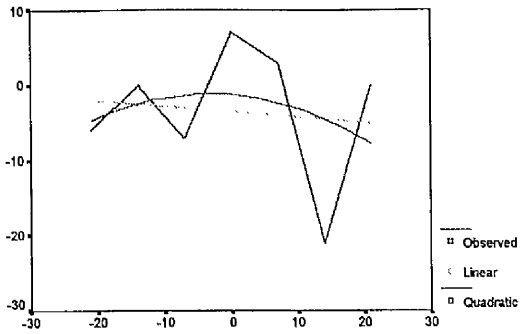

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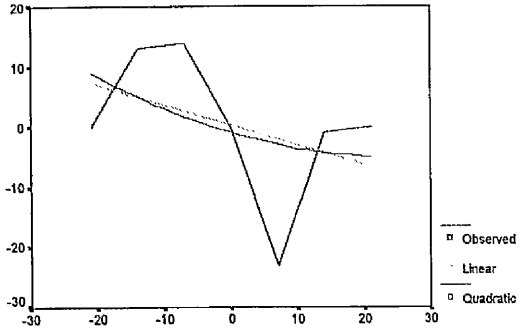

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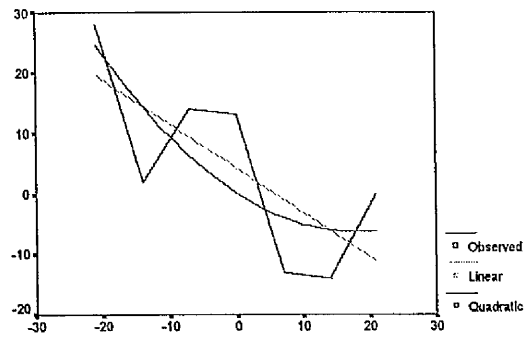
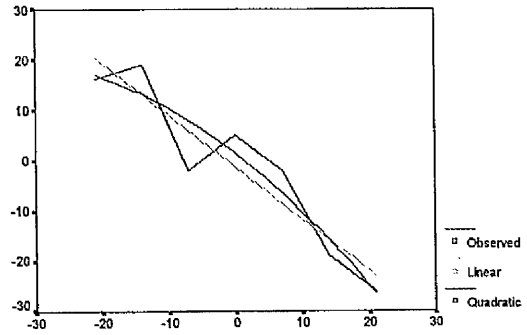
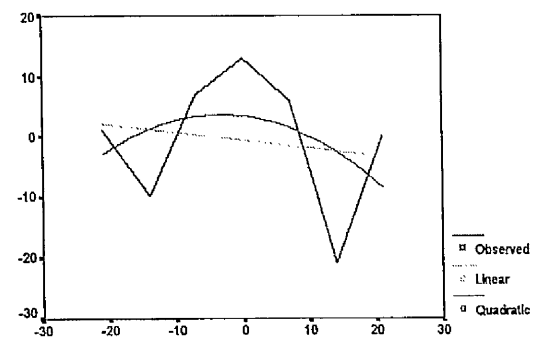


VAR040



VAR041



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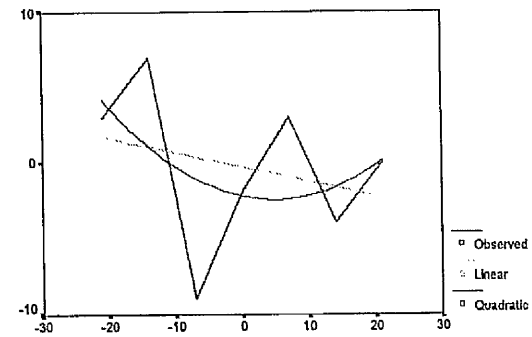

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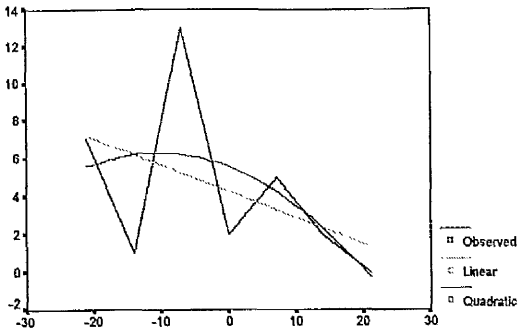

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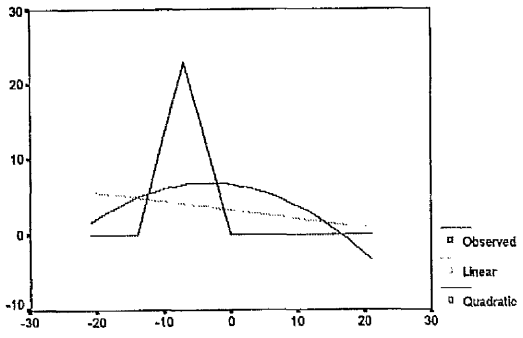

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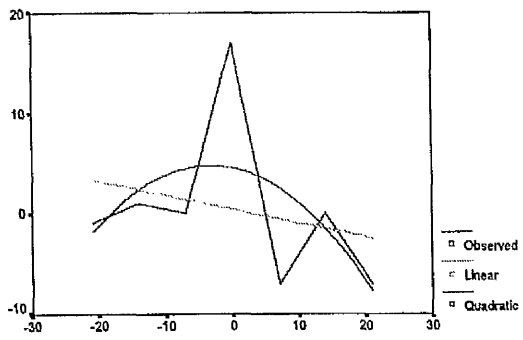

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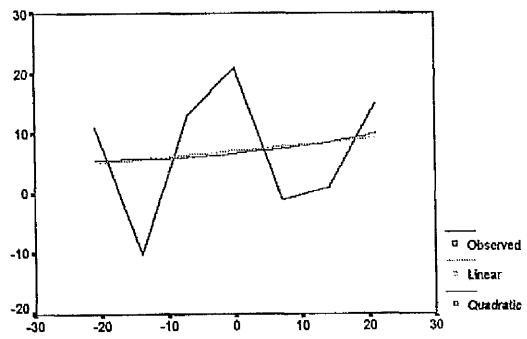

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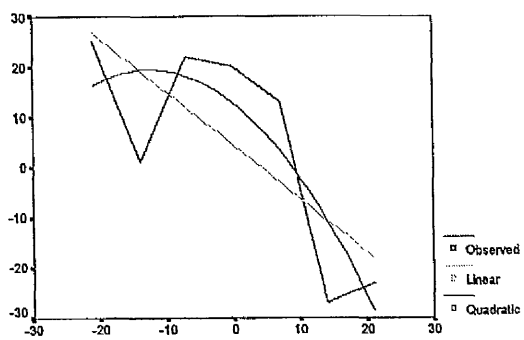

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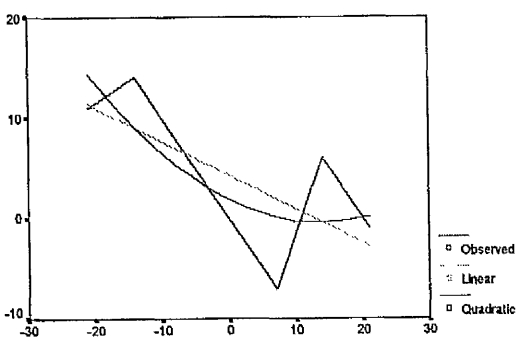

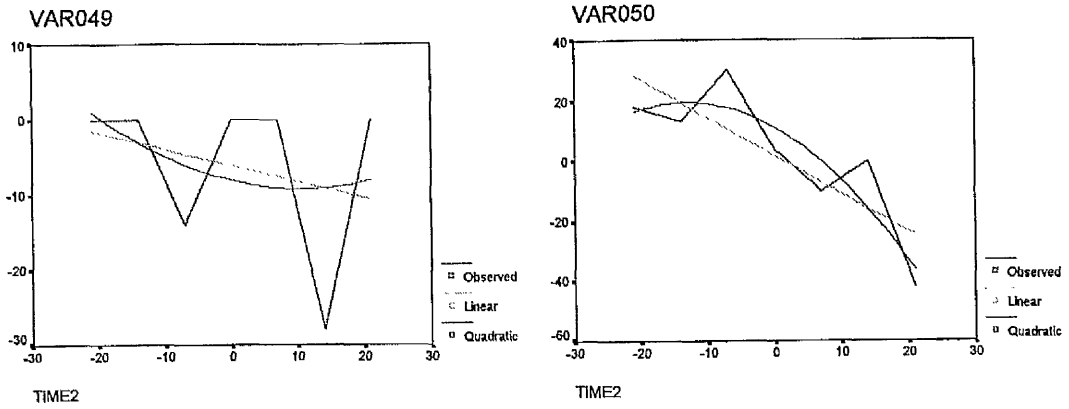
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Quadratic
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Observed
Linear
Quadratic
TIME2