Badawi, Isis Y.

COGNITIVE PROCESSES IN DEPRESSION: THE EFFECTS OF CONTENT
AND PRESENTATION VARIABLES ON ORGANIZATION AND RECALL

The University of North Carolina at Greensboro   PH.D.   1985

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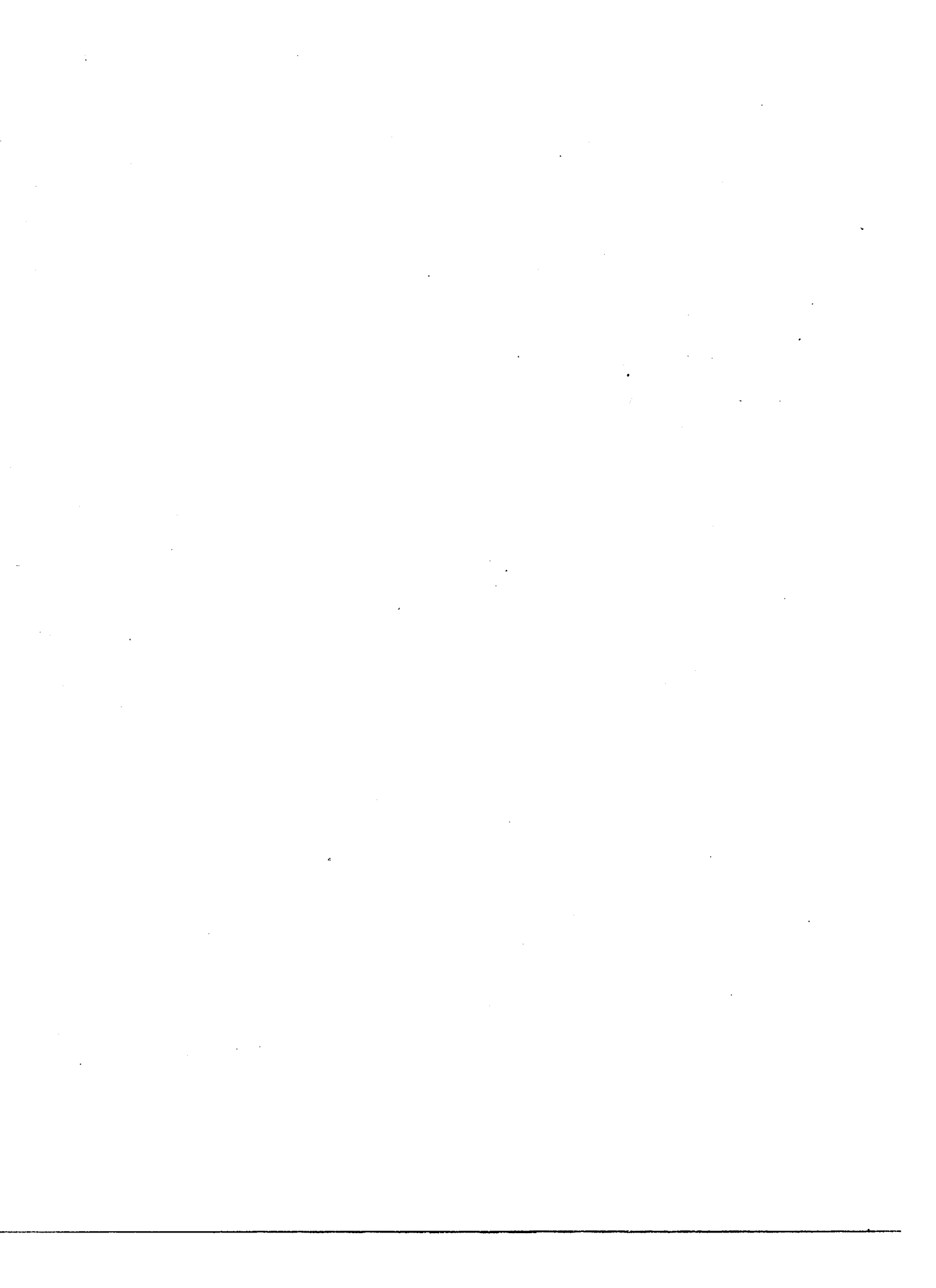
COGNITIVE PROCESSES IN DEPRESSION: THE EFFECTS OF CONTENT
AND PRESENTATION VARIABLES ON ORGANIZATION AND RECALL

by

Isis Y. Badawi

A Dissertation submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
1985

Approved by

_____

_____
Dissertation Advisers

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at the University of North Carolina at Greensboro.

Dissertation Advisers _R. Reid Hunt_

Rosemary O. Nelson

Committee Members _Robert H. Eason_

Jack Q. Bardon

June 10, 1985

Date of Acceptance by Committee

June 10, 1985

Date of Final Oral Examination

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BADAWI, ISIS Y., Ph.D. Cognitive Processes in Depression: The Effects of Content and Presentation Variables on Organization and Recall. (1985)
Directed by Drs. R. Reed Hunt and Rosemery O. Nelson. Pp. 190.

The purpose of the present research was to investigate the relationship between depressed affect and the organization and recall of positively and negatively valenced affective information. Experiment 1 examined the clustering and recall performance of inpatient depressives, psychiatric patients, and normals as a function of positive and negative words presented either randomly or in blocked fashion. Experiment 2 examined the recall performance of the same three groups of subjects as a function of positively and negatively valenced words that the subjects either rated or generated in an incidental recall task.

The results of Experiment 1 indicated that normals recalled more words than depressives, who recalled more words than the psychiatric patients. Negatively valenced words were recalled more often by the depressed subjects, whereas the two control groups recalled an equal number of negative and positive words. The performance of depressives resembled that of normals in reference to negative words and resembled the performance of psychiatric patients in reference to postive words. Analysis of the clustering scores suggested that all three groups clustered the information more readily following the blocked, compared to the random, presentation condition. Depressives tended to cluster the information more readily when the analysis was based on four categories than when it was based on two categories. The performance of the two control groups was not affected by the number of categories included in the analysis.

The results of Experiment 2 indicated that normals recalled more

words than either the depressives or the psychiatric patients, who did not differ reliably from each other. All three groups recalled more generated than presented words, and all three groups recalled equivalent percentages of negative and positive words following both presentation conditions. Analysis of the content of generated words indicated that depressives generated more negative than positive words, and more negative words than either the normals or the psychiatric patients. Subjects in both control groups generated more positive than negative words, and more positive words than the depressed subjects. The results of Experiment 2 suggest that while depressives generated more negative words than either of the two control groups, their recall performance indicated no bias in favor of the recall of negative information.

Taken together, the results of both experiments suggest that both content and presentation manipulations are important determinants of depressives' performance on memory tasks. These findings are discussed in light of current theories on the nature of cognitive deficits in depression.

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INTRODUCTION

Depressive disorders have typically been described in terms of disturbances of mood and affect. Over the past two decades, however, there has been an increasing interest in investigating the cognitive and behavioral difficulties associated with these disorders. The difficulties encountered by depressives have been documented on a variety of tasks, including expectations of success and failure (Friedman, 1964; Leob, Beck, & Diggory, 1971; Sacco & Hokanson, 1978), attributional style (Harvey, 1981; Kuiper, 1981; Mukherji, Abramson, & Martin, 1982; Risely, 1978), cognitive processing (Sternberg & Jarvik, 1976; Weingartner, Cohen, Murphy, Martello & Gerdt, 1981), problem solving (Dobson & Dobson, 1981; Petzel, Johnson, Johnson, & Kowalski, 1981), and psychomotor speed (Martin & Rees, 1966). In addition, recent investigations have suggested that depressives differ from normals in their perceptions of themselves, as well as their outlook on life and the future (Beck, 1963; 1974; Beck, Rush, Shaw, & Emery, 1979; Lewinsohn, Steimetz, Larson, & Franklin, 1981).

It is not quite clear, however, whether the observed differences contribute in part to the occurrence of the depressive affect, or whether they occur as a result of the depressive episode. The issue of causality, and the interaction between thought, emotion, and behavior, remain the topics of debate (Beck, 1976; Coyne, 1982; Coyne & Gotlib,

1983; Lazarus, 1982; Rogers, 1980; Royce & Diamond, 1980; Zajonc, 1980).
Furthermore, many of the reported findings are not altogether
noncontroversial. Friedman (1964) argued that the observed differences
are often relatively small when compared to the dramatic reports of
feelings of impairment and helplessness by the depressed subjects.
Miller (1975) proposed that in many instances the observed differences
may be a function of the severity or degree of psychopathology, rather
than uniquely associated with depression. Other investigators,
utilizing mildly depressed subjects (e.g., Dobson & Dobson, 1981), have
cautioned against generalizations to clinically depressed populations.

The above controversies notwithstanding, it has become evident that
depressives differ from normals along a variety of perceptual and
cognitive dimensions. The nature and significance of these differences
are incorporated within the current cognitive conceptualizations of
depression (e.g., Beck, 1976; Seligman, 1975). In my view, the value of
a cognitive conceptualization of depression is threefold. First, it
provides a theoretical framework which incorporates existing findings.
Second, it has generated a set of testable hypotheses about the nature
of cognitive distortions. Third, the ensuing research has provided new
insights in the understanding of these disorders. Such a perspective
has also led to the development of a new and highly successful form of
therapy based on cognitive interventions (Beck, 1976; Beck et al., 1979;
Rush, Beck, Kovacs, & Hollon, 1977).

The present research investigated the nature of the cognitive
processing characteristics of depressives as compared to other

psychiatric populations and normals. The presentation to follow provides a brief account of the description and incidence of depressive disorders, followed by a review of the literature on cognitive theory and research in depression. Finally, the purpose and rationale of the present research is presented.

Depressive Disorders: Description and Epidemiology

Depressive disorders constitute a varied clustering of symptoms that may range from subjective feelings of sadness, dysphoria, and helplessness to extreme incapacitation and loss of interest in all, or nearly all, activities. There have been numerous attempts to classify depressive disorders into more homogeneous subtypes as an aid to investigations if etiology and treatment, but several problems became apparent. The various sub-classifications were not sufficiently well defined to permit definitive diagnosis, and the overlap between descriptions often made agreements about diagnoses and judgments of severity difficult to attain. These problems were often compounded by the fact that there is still marked disagreement in the field as to whether depressive disorders are merely variants of one functional disorder, or whether each of the subtypes is diagnostically and etiologically distinct. In addition, many of the symptoms associated with depression are also found in descriptions of other diagnostic categories (Schatzberg, 1978). In addressing these difficulties, Wurmser (1978) described fifteen subtypes of neurotic depression and two subtypes of psychotic depression. Following his review, Wurmser concluded: "It has become painfully evident that the problem of

differential diagnosis still harbors many unsolved questions that pervade the entire field of depressions." (p. 293)

It is perhaps partly due to such disagreements that the latest revision of the Diagnostic and Statistical Manual (DSM-III, American Psychiatric Association, 1980) may prove to be of value in promoting a unified system of diagnosis based on operational definitions and descriptions of feature clusters rather than on any known or presumed etiological entities. The classification of depressive disorders in DSM-III distinguishes between the various subtypes on the basis of the specific pattern of symptom clusters and the duration of the depressive episode. Common to such descriptions are disturbances in one or more of four areas of functioning. These are disturbances in mood, thought, behavior, and vegetative or somatic functioning. Disturbances in mood refer to feelings of sadness, dysphoria, anxiety, and agitation. Disturbances in thought refer to reports of poor concentration and memory, as well as perceptions of helplessness and hopelessness. Behavioral disturbances are reflected in reports of fatigue, a reduction in activity level, and avoidance of previously pleasurable events. Finally, depression may also affect an individual's vegetative functioning as evidenced by frequent somatic complaints and disturbances in sleep and appetite. Such disturbances are often of sufficient magnitude that individuals experiencing depression may contemplate suicide as a last resort of escaping their pain.

Estimates of the point prevalance of depressive disorders (defined as the percent of the population experiencing depression at a given

time) have varied greatly because of the diagnostic difficulties mentioned above and because of differing sampling procedures (inpatient depressives, outpatient depressives, first admissions, etc.). Boyd and Weissman (1981) recently provided a comprehensive review of epidemiological studies in depression. They divided the data into three categories: depressive symptomatology, unipolar depression, and bipolar depression. Depressive symptomatology referred to the occurrence of depressive symptoms, identified by a cutoff point on a depression symptom scale. Unipolar depression corresponded roughly to a diagnosis of Major Depressive Episode as per DSM III criteria. Bipolar depression, consistent with DSM-III, was defined as depressives who had experienced at least one manic episode in the past. According to these subdivisions, the point prevalance of depressive symptoms ranged from 9 to 20 per 100. Estimates for unipolar depression ranged from 1 to 10 per 100. For bipolar depression, the estimates of incidence per year ranged from 10.8 to 20.8 per 100,000.

In addition to these estimates of prevalance, clinical reports indicate that 8% of clinically depressed individuals will not recover to their premorbid level of functioning within a two year period. Even of individuals who do recover, many will again experience depression within a ten to twenty year period (Beck, 1967).

In recent years, investigations have moved beyond issues of classification and epidemiology and have centered instead on the formulation of theories about the etiology and treatment of depression. There is general agreement that the distinction between unipolar and

bipolar disorders represents identifiable classifications, and researchers have typically confined their findings to one subgroup or the other.

The remainder of this paper concentrates on unipolar depression, defined largely by the presence of depressive symptomatology. Unless otherwise specified, the research reviewed reflects findings associated with the various degrees of severity of unipolar depressive disorders.

Beck's Cognitive Theory of Depression

The main premise of Beck's cognitive theory of depression is that cognitive processes influence emotional responses (Beck, 1971). Beck asserts that the relationship between cognition, emotion, and behavior is the same in normal responses and in abnormal conditions. In both cases, the individual's conceptualization of the situation determines the emotional and behavioral response. The difference between normal and abnormal responses lies not in this relationship, but rather in the conceptualization of the situation so that in abnormal conditions "conceptualizations are determined to a greater extent by internal processes which distort the stimulus situation." The type of distortion involved corresponds to certain emotional and behavioral patterns that characterize the various psychopathological conditions. Beck (1971) notes, for example, that the perception of danger leads to the emotional state of anxiety and to the behavioral response of avoidance, characteristic of anxiety states. The perception of loss leads to sadness, which is characteristic of depression. Beck differentiates between these perceptions on the basis of the individual's appraisal of

the situation, relative to other situations, and on the individual's perceived capacity to deal with them. Of importance here is not the objective impact of the situation, but rather the special idiosyncratic meaning attributed to it. The way the individual interprets the situation determines the emotional response that follows. Thus, even within a single diagnostic category such as social anxiety, it may not be possible to predict a priori which situations would lead to which emotions. This could only be determined by assessing the individual's thoughts about specific situations. The affect, therefore, may vary but remains congruent with the cognitions. To illustrate, Beck (1971) provides the following example. An individual was shown a picture of a coat of arms, to which he was initially indifferent. Later, when he believed that the picture may be that of his family's coat of arms, he experienced a sense of elation. The picture suggested that he may be of noble descent, an idea that was highly valued by this individual.

In addressing depressives' cognitions, Beck (1967) reports autobiographically on his observations of depressed patients undergoing classical psychoanalytic therapy. Beck noted that depressives appeared to show "two streams of consciousness." One stream paralleled verbalized thoughts under instructions of free association, while the other stream was less accessible, reflecting cognitive appraisals that typically precede a negative emotional response. Beck postulates that it is this second stream of consciousness that is important in understanding depression.

The depressed individual engages in these appraisals in an automatic rapid fashion. Although individuals may not be initially aware of the presence of such evaluative thoughts, they may be trained to monitor their occurrence. Beck (1976) proposed the following instructions to encourage the monitoring of automatic thoughts: "Whenever you experience an unpleasant feeling or sensation, try to recall what thoughts you have been having prior to this feeling." These automatic thoughts appeared to share several characteristics. They were reflective, specific or discrete, and seemed to be reasonable to the individual. In addition, while the specifics may have varied, these thoughts all shared the common theme of loss. Loss may refer to a tangible object, or to the perception that some event has detracted or in some way impinged on the individual's "personal domain" (i.e., self esteem or the people, objects, and ideals that the person values). The emotions that follow a sense of loss are those of sadness and depression. Beck noted that the depressed individual "regards himself as lacking in some element or attribute that he considers essential for his happiness." Beck provided the following examples of situations that typically lead to a negative emotional response:

1. Loss of a tangible object that gratifies the individual or is valued by the individual (e.g., money, or an object that has a sentimental value).

2. Loss of an intangible item (e.g., lowered self esteem following an insult).

3. A reversal in the value attached to some part of the "personal domain" (e.g., joking which was previously judged as an asset is now evaluated by the individual as a liability - "I'm a bufoon").

4. A discrepancy between what is expected and received (e.g., a salary increase is disappointing since it does not include increased status).

5. A fantasy or expectation of future loss (e.g., a wife experiences sadness in the spring anticipating her husband's departure on a summer business trip).

6. A hypothetical loss occurs when there could have been a loss, but the loss did not occur (e.g., a spouse experiences sadness when he sees his partner conversing with a man she could love).

7. A pseudo loss occurs when objectively an event does not subtract anything from the "personal domain", yet the individual incorrectly perceives the event as threatening (e.g., a person feels a loss when she spends money. She does not attend to the object gained or purchased).

It is important to note that the actual loss is not in itself sufficient in producing feelings of depression or low self esteem. In depression, it is often the case that perceptions of loss are incongruent with the objective account of the situation. The distinction between the subjective perceptions and the objective accounts of loss may differentiate between depression, grief reactions, and normal mood fluctuations. In depression, the individual exaggerates the loss and its current and future effects on his/her well-being. The predominance of perceptions of loss is a function of distortions of one's view of the self, the world, and the future. These distortions represent "cognitive errors" that are characteristic of depressives' automatic thoughts.

Additional Characteristics of "Cognitive Errors" in Depression

As noted above, depressives' thoughts typically denote feelings of loss, poor self esteem, and generally a negative view of oneself and

surroundings. The content of these thoughts reflect erroneous perceptions of situations, so that they are cast in a negative light. So far, the main emphasis has been on outlining differences between public (objective) and private (subjective) meanings. The private meanings are assumed to occur as a result of errors in perception and the selective processing of the available information.

Beck (1974) asserted that a thinking disorder, less gross and more specific than that found in schizophrenia, may be present in neurotic disorders, including depression. Beck et al. (1979) proposed several cognitive errors uniquely associated with depression. These errors arise from general assumptions or "cognitive schema" with which individuals interpret their interactions with their surroundings. These errors, together with the underlying assumptions, are outlined below:

	Cognitive error	Assumption
1.	Overgeneralizing	If it is true in one case, it applies to any case which is even slightly similar.
2.	Selective abstraction	The only events that matter are failures, deprivation, etc.. One should measure self by errors, weaknesses, etc..
3.	Excessive responsibility (assuming personal causality)	I am responsible for all bad things, failures, etc..
4.	Assuming temporal causality (predicting without sufficient evidence)	If it has been true in the past, then it's always going to to be true.
5.	Self Reference	I am the center of everyone's attention- especially my bad performances. I am the cause of misfortunes.

6. Catastrophizing   Always think of the worst.
                             It's most likely to happen to
                             you.

7. Dichotomous thinking   Everything is either one
                             extreme or the other (black
                             or white; good or bad).

(from Beck et al., 1979, p. 261)

The errors outlined by Beck et al. may be conceptualized either as content errors or as processing errors. Content errors refer to the predominantly negative content of depressives' thinking. Excessive responsibility, self reference, and catastrophizing may be viewed as content errors, where the depressed individual is overly concerned with his/her role in the negative events that occur. Processing errors, while they may result in oversensitivity to negative occurrences, refer to the manner in which the depressed individual arrives at a certain conclusion. Processing errors may be more general than content errors in that they characterize thinking processes along a variety of tasks and content areas. Such errors may be more easily detected in reference to negative content, but may nonetheless be operational in the processing of neutral or abstract information. Overgeneralization, selective abstraction, assuming temporal causality, and dichotomous thinking may be viewed in terms of processing errors. Recent investigations support the notion of processing difficulties in depression. Weingartner et al. (1981) found that depressives were less likely to organize information in repeated free recall trials. Silberman, Weingartner, and Post (1983) noted that depressives were less successful than controls in utilizing feedback in a problem solving task. Depressives tended to persevere in testing hypotheses after they

had been shown to be incorrect. Beck (1967; Kovacs & Beck, 1978) has often described depressives´ thinking as rigid and inflexible.

Beck (1974) argued that there may be a reciprocal interaction between depressives´ distorted ideas and the feelings they arouse, so that they tend to reinforce each other. The repetitive and indiscriminant activation of these erroneous assumptions or "cognitive schema" leads to continual affective arousal. This in turn leads to what Beck (1976) has termed a "vicious circle", a "circular feedback model", and the "downward spiral of depression."

The Role of Cognitive Schema in the Development and Maintenance of Depression

Beck (1967, p. 283) defined schema as a stable cognitive structure that determines how an individual processes information. Beck (1963) also noted that, in psychopathological conditions, certain idiosyncratic cognitive schema are "overmobilized and disrupt the delicate matching of incoming data with appropriate cognitive categories." In depression, such schema are characterized by what has been termed the depressives´ "cognitive triad" where individuals tend to negatively, and consistently, bias information about themselves, the world, and the future. These schema not only influence to what information the individual attends, but also how the information is classified and evaluated. Thus the schema influence attentional processes, as well as other processes such as categorizations, associations, abstractions, and memories.

The schema, once activated, become hypermobilized and function automatically in neutral situations. These repeated misinterpretations re-affirm the individual's initial feelings of loss and sadness. Depression is maintained because the negative emotions associated with the schema give rise to additional negative thoughts, and the vicious cycle occurs.

Addressing the issue of etiology, Beck (1967, 1976; Kovacs & Beck, 1978) suggested that depressive schema develop as a function of unfavorable "life situations" in early development. Situations that initially invoke negative evaluations are typically quite traumatic, such as the loss of a parent or the chronic and repeated exposure to failure, criticisms, and rejection. The negative thoughts that are associated with these experiences foster the formulation of depressogenic assumptions and the depressive schema. These schema may remain latent for many years. When the adult individual later encounters a situation that, in some respects, is similar to the initial traumatic event, the depressive schema become mobilized once again and an exaggerated negative emotional response occurs.

In recent years, a considerable amount of research has focused on verifying the role of schema in depression. Kuiper, Olinger, and MacDonald (1983) provided a comprehensive review of that research. The authors noted that there was considerable support for the notion of negative schema in depression, particularly in relation to self perceptions. Depressive self schema (e.e., negative schema about the self) have been shown to influence diverse cognitive processes,

including attention, recall, and expectancies.

The role of depressive schema in the development or etiology of depression is not entirely clear, however. Most of the research in this area has been correlational or retrospective in nature (see, for example, Lloyd, 1980). Beck's (Beck et al., 1979) notions that the depressogenic assumptions or "rules" that the individual possesses interact with life events are not well delineated. It is not entirely clear why some children sharing similar experiences later become depressed while others do not. Also vague are the conditions necessary for the re-activation of the initial rules.

While it is difficult to make predictions based on Beck's description of the development of depression, recently there have been attempts to identify factors associated with "vulnerability for depression." Kuiper et al. (1983) distinguished between depressive schema and vulnerability schema. They identified the depressogenic assumptions in terms of negative self schema, and the vulnerability for depression in terms of more generalized schema that encompass global social knowledge and beliefs about the world. They hypothesized that such a distinction may prove useful in identifying some of the factors contributing to the etiology of depression. The authors admitted that there is still little evidence to support such a hypothesis, and much research would have to be done before any conclusions can be made. Kuiper et al. also noted that they have conceptualized vulnerability primarily in terms of cognitive factors, but that other factors such as social and assertion skills may also prove useful in the examination and

conceptualization of vulnerability to depression.

Experimental Support for Beck's Cognitive Model of Depression

Initial support for Beck's model was based primarily on clinical observations, therapy notes, and patients' diaries between treatment sessions. Beck (1963) compared the thematic content of the speech and diaries of 50 depressives (38 neurotic depressives, and 12 psychotic or manic depressives) and 31 nondepressed controls (patients receiving treatment for reasons other than depression). Beck noted that the groups were distinguishable on the basis of the predominant themes in their reported thoughts.

Anxious patients' cognitions centered around themes of apprehension and personal danger. Paranoid patients tended to report that others were to blame for their problems. Themes of optimism and self enhancement predominated the thoughts of hypomanic patients (patients in the manic phase of bipolar depression). In contrast to these groups, Beck noted that the predominant themes in depressives' cognitions were those involving self blame, deprivation, helplessness, a sense of overwhelming responsibilities, escape, and suicidal wishes. While Beck acknowledged the flaws inherent in subjective methods of data collection, he maintained that the assessment of his patients' thoughts and ideations were sufficiently distinct to allow such comparisons.

Beck and his coworkers later provided experimental support for the notion that depressives view themselves and their future negatively (two components of the cognitive triad). Loeb et al. (1971) employed two

card sorting tasks to examine the effects of success and failure on the levels of aspiration, self evaluations, expectations of success, and the actual performance of 20 depressive and 20 normal males. Prior to the first task, subjects were asked to estimate the probability of reaching a criterion goal within the seven trials allowed to complete the task (expectations of success). Prior to each trial, subjects were asked to predict how successful they would be on that particular trial (level of aspiration). Finally, after the completion of the task, subjects were asked to rate their performance on an 11 point scale (self evaluations). In the first task, subjects in each group were randomly assigned to a success condition (subjects allowed to reach criterion) or a failure condition (subjects were not allowed to reach success criterion). The second task was similar to the initial task except that none of the subjects was allowed to reach the criterion goal.

Leob et al. reported that depressives were equal to controls in their level of aspiration and the effort expended to complete the task. However, the depressed subjects appeared more pessimistic about their performance and judged their performance negatively, although there were no actual differences in performance time between the groups. Leob et al. also reported that depressed subjects who had been exposed to a success experience on the initial task tended to be more optimistic about their performance on the second task, and that their actual performance improved as a function of the success experience. However, this interpretation of the data was challenged by Miller (1975), and recent attempts to replicate this finding (improved performance following a success experience) suggest that depressives may be quite

insensitive to positive feedback (Ingram, Smith, & Brehm, 1983).

In summary, the Leob et al. study provided support for Beck's position on the predominance of pessimism and negative self evaluations in depression. However, the data on the effects of success experiences on future performance are inconclusive. It is noteworthy that this study has often been cited in support of Beck's theory of, and therapy for depression. Based on more recent interpretations of the data, the rationale often employed for providing success experiences in the treatment of depressives is questionable.

Further experimental evidence in support of Beck's theoretical position may be divided into three areas of research: (a) studies on negative thought content and the effects of negative self schema on processing self referent materials; (b) studies examining specific cognitive processing deficits in depression; and (c) analogue studies examining the effects of induced mood states on learning and memory. Each of these areas of research is reviewed separately below.

Studies Reporting Negative Thought Content and

Negative Self Schema

As noted earlier, negative content is a primary characteristic of depressives' thoughts. Controlled studies have discriminated depressives from normals on the basis of self descriptions and responses to materials with positive and negative affective connotations. Altaman and Wittenborn (1980) asked two groups of subjects to answer true or false to 134 self-descriptive items. The subjects were women in the New

Jersey area who had been treated for depression, but who had been out of the hospital for at least one month. The controls were volunteers from women's clubs matched on relevant demographic data. Sixty two discriminating items were identified. Factor analysis revealed five factors which the researchers labeled: (a) low self esteem, (b) preoccupation with failure (helplessness), (c) unhappy, pessimistic outlook, (d) vulnerability, and (e) lack of confidence. Similarly, in an inexact replication of that study, Cofer and Wittenborn (1980) found 43 self descriptive items that discriminated depressives from controls. Factor analysis was employed once again, and the following factors were identified: (a) unhappy outlook, (b) narcissistic vulnerability (uncertainty about one's self worth), (c) low self esteem, (d) critical mother, and (e) dependency fostering father. Together these two studies suggest that depressives, compared to normals, are more likely to have negative regard for themselves and to express helplessness and pessimism about the future.

Lewinsohn et al. (1981) recently conducted a one year longitudinal study in a large community sample. The purpose of the investigation was to identify the various cognitive characteristics thought to precipitate, or to be associated with, depression (e.g., the cognitive triad, irrational beliefs, attributional style, expectations of success and failure). The subjects were recruited from residents in Eugene and Springfield, Oregon. Of 20,000 individuals solicited, 998 subjects participated for the duration of the study. Sixty three subjects were depressed at the time of the initial assessment, 85 became depressed between the first and second assessment times (relapsed depressives and

new cases), 115 subjects had a history of depression but were not depressed for the duration of the investigation. The subjects completed extensive questionnaires, and those identified as depressives (as well as a random sample of normals) received two hour individualized diagnostic interviews.

The results indicated that, as expected, the various cognitive measures did discriminate between depressives and normals at the initial assessment. However, these measures did not predict which subjects would later become depressed, nor did they differentiate between subjects who had previously been depressed, but had recovered, and normals with no prior history of depression.

The investigators interpreted their findings as suggesting that the various cognitive characteristics typically associated with depression occurred concomittantly with the depressive episode, rather than in an etiological fashion. The authors questioned the value of these cognitive measures in the prediction of depression. However, they also noted that the measures did predict improvement. Depressed subjects initially identified as having more depression-related cognitions were less likely to improve during the follow-up period.

Lishman (1972a, b; Lloyd & Lishman, 1975) examined the relationship between negative and positive content and the incidental recall of normals and depressives. Lishman (1972a) first demonstrated that pleasant experiences were more readily recalled by normal subjects. Lishman asked subjects to recount personal experiences on 18 preselected topics (pleasant and unpleasant manipulation). Two weeks later, the

subjects' incidental recall of their initial accounts was examined. The results indicated that subjects tended to recall more pleasant than unpleasant events, and that the age and personality characteristics of subjects also contributed to better recall of pleasant events. Older subjects and subjects scoring high on extraversion and low on neuroticism indices (Eysenck Personality Invertory) tended to recall more pleasant events.

Lishman (1972b) used the above methodology with a group of patients with affective disorders (depressives and hypomanic patients- i.e., unipolar depressives and bipolar depressives in the manic phase). Results indicated that the patient population recalled fewer events than subjects investigated in the earlier study. Only 13 patients (out of 25 originally included in the study) recalled a sufficient number of events to allow for data analysis. Eight subjects were depressed and five were nondepressed (two recovered depressives and three hypomanic patients). Analysis of the recall data indicated that depressed subjects tended to recall more negative than postive events, while the nondepressed patients' recall was quite similar to that of the normal subjects investigated in the earlier study. The effects of age and other personality factors did not seem to be operational with this patient sample. Lishman interpreted his findings as indicating that "depressed affect alters the relationship between hedonic tone and memory." This effect seems to reverse itself, however, when patients are no longer depressed.

Lloyd and Lishman (1975) examined the speed of recall of life situations in response to a list of stimulus words and instructions to recall either pleasant or unpleasant experiences. The subjects were inpatients receiving treatment for depression. The results indicated that the more severely depressed subjects tended to recall unpleasant experiences at a faster rate than pleasant experiences, while the reverse was true for the less severely depressed subjects.

Lloyd and Lishman suggested that the "mental set" of the subjects may account in part for the observed results and that, during depression, recall processes may be preferentially directed towards unpleasant experiences, rendering them more accessible for recall. Lloyd and Lishman also suggested that there might also be more mental rehearsal for memories with negative emotional connotations. Addressing the effects of personality characteristics on recall, Lloyd and Lishman noted that subjects with high neuroticism scores displayed longer latencies for the recall of pleasant events. The authors suggested that depression speeds the recall of unpleasant experiences, while high neuroticism acts to retard the recall of pleasant ones. However, the authors also noted that recovered depressives respond in a manner similar to normals, suggesting that speed of recall of unpleasant experiences is closely associated with severity of depression.

Together, the above group of investigations suggest that negative thought content is indeed a prevalent characteristic of depressives' cognitions. Depressed subjects described themselves negatively, their views were more pessimistic, and their ideations reflected the

depressogenic assumptions described by Beck (1967). This negative thought content was also apparent in their recall of life experiences and the speed of recall of negative events.

Recently, the concept of depressive self schema (Kuiper et al., 1983) was advanced to account for existing findings, such as those noted above, and to further elucidate the nature of depressives' thought processes. As a theoretical construct, the term schema refers to a structured body of information that is stored in long term memory and that influences the organization and clustering of new information (Manusco & Ceely, 1980). Rogers (1977; see also Rogers, Kuiper, & Kirker, 1977). demonstrated that the self operates as an organizing schema in the encoding and organization of personal information. The self schema was found to exert both biasing and facilitative effects on the processing of personally relevant information (Kuiper & Derry, 1980).

Davis (1979a) examined the self schema hypothesis in depression. He utilized the incidental recall paradigm and the list of adjectives originally employed by Rogers et al. (1977). Clinically depressed and normal subjects were asked to make either semantic (word X means the same as word Y?) or self referent (does word X describe you?) decisions for 48 adjectives. Later, the incidental recall of the adjectives was examined. Davis reported that while normals showed the expected recall superiority for adjectives encoded under self-referent instructions, the depressed subjects' performance showed no such superiority. In interpreting his findings, Davis argued that some depressives show

nonschema based processing. He proposed a developmental model to account for these findings. Initially, the depressed individual experiences a sense of disorganization and uncertainty about him/herself, so that the functions of an integrated self schema may not be evident. As the depression persists, the self schema becomes integrated once again and develops the capacity to encode and organize personal information.

Utilizing a multi-trial free recall procedure to examine the influence of self schema on subjective organization, Davis (1979b) reached a similar conclusion. The subjects were nondepressed and mildly depressed undergraduate students. The subjects received a list of self descriptive adjectives, followed by multiple free recall trials. Davis reported low levels of subjective (self imposed) organization in the depressed group relative to the non depressed group. Davis again proposed that, in short term depression, the self schema does not function as an efficient organizer of personal information.

Davis and Unruh (1981) directly examined the developmental self schema model in groups of short term depressives, long term depressives, and nondepressed controls. Davis and Unruh utilized the multitrial free recall paradigm for lists of self descriptive adjectives and abstract nouns. In agreement with a developmental model, Davis and Unruh reported that the short term depressives showed the lowest levels of subjective organization for the self descriptive adjectives, and there were no meaningful differences in the subjective organization of the long term depressed and nondepressed groups. The authors proposed that

a developmental extension of Beck's model would render their findings consistent with a self schema conceptualization of depression.

Derry and Kuiper (1981) examined the content specificity of the self schema in depression. They argued that, given the well documented observations of negative self references and negative self evaluations in depression, it would be expected that the contents of depressives's self schema would be primarily negative. Derry and Kuiper cited research supporting the notion that schematic processing (i.e., organization and efficiency in processing) is most evident when the incoming information is congruent with the predominant content of the self schema. Based on this argument, schematic processing in depression would be demonstrated in reference to negative information about the self. The depressives' self schema would be expected to impart more elaborate traces in memory for negative self referent materials and not for positive ones (i.e., more efficient processing of schema congruent information). Derry and Kuiper also argued that the Davis (1979a, b) findings may have been due to the largely nondepressed content of the adjectives used in both studies.

Derry and Kuiper (1981) manipulated adjective content within an incidental recall procedure. They also employed a rating time (RT) measure as an index to efficiency of schematic processing. Depressives, normals, and nondepressed controls judged negative and positive content adjectives along structural (is word X printed in small letters?), semantic (does word X mean the same as word Y?), and self referent (does word X describe you?) dimensions. In support of a content specific self

schema, Derry and Kuiper reported that depressives recalled negative content adjectives more frequently than positive content adjectives, while the reverse was true for both control groups. In support of greater efficiency of schematic processing, Derry and Kuiper noted that RT for the self referent judgements were smaller than for either the structural or semantic orienting tasks, suggesting greater efficiency in the processing of personally relevant information. No group differences were found in the RT measure for the self referent judgements, indicating that depressives and nondepressives demonstrated schematic (i.e., efficient) processing.

Extensions of the above findings (Kuiper & Derry, 1982; Kuiper & MacDonald, 1982) have suggested that depressive self schema may only be evident in clinically depressed individuals. Mildly depressed subjects displayed equivalent recall for both positive and negative self referent adjectives (Kuiper & Derry, 1982), and longer RT for self referent ratings of both types of content (Kuiper & MacDonald, 1982). Thus, while normal and clinically depressed subjects displayed context specific schema, mildly depressed individuals displayed a self schema that incorporates both positive and negative content, but does not serve as an efficient organizer of either type of information. Kuiper et al. (1983) proposed a self schema model of depression in which the severity of depression is associated with schematic processing, namely specificity of content, efficiency and automaticity of processing, and consistency over time.

To summarize, the studies reviewed above document the prevalence of negative thought content in depression. It is noteworthy that the evidence for such a conclusion has been derived from a wide variety of methodologies. In addition to providing support for Beck's notions on depressive schema, the above studies have also extended Beck's model by specifying differences and similarities across levels of severity of depression. The depressive self schema may be most readily detected in clinically depressed populations, whereas for the mildly depressed (and short term depressives) such schema may not be sufficiently organized to exert their influence on the processing of personally relevant information. The developmental self schema model and the specificity of content model were advanced to account for such findings. It is still not clear, however, whether the critical variable is the severity of depressive symptoms or the duration of the depressive episode.

Studies Reporting Specific Cognitive Deficits in Depression

It has long been known that depressed patients frequently complain of, and often demonstrate, difficulties in concentration, thinking, and memory. Recent cognitive conceptualizations of depression have pointed to specific deficits in the processing of information (Beck et al., 1979) and have suggested the presence of a thinking disorder in depression (Beck, 1974; Braff & Beck, 1974). The nature and extent of such deficits have not been clearly detailed theoretically, and have been quite difficult to establish experimentally. This is partly due to the possible contribution of attentional and motivational processes and partly due to methodological difficulties (Miller, 1975). Recent

investigations have attempted to control for these shortcomings, and there is currently a mounting body of evidence demonstrating both memory deficits and deficits in abstractions and problem solving in the depressed.

In contrast to the studies reviewed in the previous section, where negative content and personal referents were the primary independent variables, the studies to be reviewed below utilized neutral test items and standardized and/or abstract tasks (e.g., Halstead Reitan Battery, Wechsler Memory Scale). Studies reporting poor memory performance have suggested impairments in a variety of cognitive processes. Henry, Weingartner, and Murphy (1973) examined the performance of unipolar depressives and bipolar depressives (both in manic and depressed phases) on two learning tasks (the performance data of the manic patients were presented by the authors in a separate report and will not be discussed here). The first task involved equivalent lists of eight random words presented serially. Subjects were asked to repeat the lists in the correct order, in each of six trials. The second task employed a free recall paradigm in which equivalent lists of 22 common words were presented for recall in any order. The subjects' performance was assessed both during periods when they were highly depressed and periods when they were relatively less depressed. The clinical state of the subjects (high vs. low levels of depression) was assessed daily by independent raters utilizing the Bunney-Hamburg 15 point ward rating scale. During periods of high levels of depression, there was a significant decrease in performance on the serial learning task for the second through the sixth trials, while there was no significant

difference in first trial performance as a function of depression state. In the free recall task, level of depression was directly associated with the subjects' recall performance. Specifically, subjects recalled more words when they were less depressed.

The authors argued that the first trial in the serial learning task reflected short-term memory storage, whereas trials 2 through 6 were indicative of long-term memory storage. Based on this argument, the authors interpreted their findings as indicative of deficits in the transfer of information from the short-term to the long-term memory stores, where information is integrated with existing knowledge (e.g., from trial 1). The authors also suggested that the results of the free recall task were consistent with such an interpretation, since the number of words in this task was too large for short-term memory storage.

It should be noted that this study did not employ a normal control group, so that the observed impairments may only be viewed in terms of varying degrees of severity of depression. However, this study also demonstrates that cognitive impairments in depression are reversible as a function of clinical improvement.

Sternberg and Jarvick (1976) examined short-term and long-term memory functions in a group of 26 hospitalized depressed patients. The subjects were tested before and after treatment with antidepressant medications, and their performance was compared to a group of matched normal controls. The tests employed required either the recall of paired items, the recognition of items presented pictorially, or a

combination of recognition and recall in response to pictures of individuals with ficticious names and occupations. Performance was assessed immediately and after a three hour delay. Subjects were tested again after 26 days of treatment with antidepressant medications (imipramine hydrochloride or amitriptyline hydrochloride).

Results indicated that the performance of depressed subjects (prior to treatment) was significantly lower than the control group on all measures in the immediate recall condition. The delayed recall condition revealed equivalent levels of forgetting in both groups. After 26 days of treatment, 20 of the depressed patients were judged to be either recovered or improved. These subjects, together with 13 of the normal subjects, were tested again. No practice effects were found for the normal subjects. For the recovered depressives, results indicated significant increases in recall on all tasks in the immediate recall condition. No significant differences were found in the rate of forgetting in the delayed recall condition, both compared to the normal group or and to the depressed group prior to treatment. Improvement in performance was directly related to the degree of improvement of the depressive symptoms. Subjects judged as recovered performed as well as the normal controls. These results suggested that only immediate recall was affected by the depressive state. Information, once acquired in short-term memory, remained relatively intact in long-term memory, and deteriorated at a rate comparable to that of the normal subjects.

Sternberg and Jarvick interpreted their findings in terms of a short-term memory deficit in depression, and as such their results may

be viewed as inconsistent with the Henry et al. (1973) study reviewed above. However, if one considers the differences in the tasks involved, and the authors' definitions of short-term memory, one might postulate that the deficits exhibited by depressives represent deficits in the elaborative encoding of large amounts of information (i.e., the processes involved in the elaboration and consolidation of the meaning of incoming information). Such deficits may not be apparent in tests of immediate recall of relatively few items (e.g., the first trial in the serial recall task employed by Henry et al., 1973), or in tasks requiring only shallow processing (e.g., structural processing) of the presented materials (see, for example, Davis & Unruh, 1981; Ingram et al., 1983; Weingartner et al., 1981- all these investigators found no differences in the recall performance of depressives and normals following the structural processing of words in an incidental recall paradigm).

Glass, Uhlenhuth, Hartel, Matuzas, and Fischman (1981) examined the performance of moderately depressed non-psychotic patients, and a group of matched controls, on tests of motor speed and short-term recognition memory. To examine the effects of treatment, the depressed subjects were tested prior to treatment and after periods of three-week imipramine therapy or placebo in a double blind multiple crossover design.

The motor speed tasks involved the alternate tapping of two buttons with the dominant index finger for five seconds in each of twelve trials, and a reaction time measure for lifting the index finger from a

button upon command for a total of 25 trials. The recognition task included digit series ranging in length from 1 to 6 digits. After a three-second exposure time and a one-second delay period, a single digit was presented and subjects were to indicate whether or not it appeared in the initial display by tapping one of two buttons. Reaction time was also measured in the recognition task.

Results indicated that depressives performed as well as normals on the two motor speed tasks and on the number of correct responses in the recognition memory task. The only difference between the groups was found in the reaction time measure in the recognition task, with depressives displaying longer reaction times than normals. Comparison of depressives' performance during periods of placebo and imipramine treatment showed a significant increase in the number of correct responses while patients were receiving medications, relative to periods when they were receiving a placebo. The reaction time measure revealed equivalent speed in the execution of the task, both during periods of medication therapy and periods of placebo. While the authors did not directly compare depressives' performance during treatment with that of normals, examination of the data reveals that depressives displayed faster reaction times (equivalent to normals) during periods of treatment (medications and placebo) relative to their performance at the initial assessment. Thus, it appears that while the reaction time measure did not vary as a function of medication treatment, the accuracy of the depressed subjects improved while they were receiving imipramine therapy.

In interpreting these results, the authors conceived of the short-term memory task in terms of a trade-off between speed and accuracy, so that correct responding may be achieved at the expense of reduced speed and vice versa. Within this framework, the performance of depressed subjects undergoing imipramine therapy would be indicative of improvements in short-term memory functions. Thus, the authors suggested the possibility of short-term memory deficit in depression. However, the authors also noted that their design was quite difficult to implement, and that the results may reflect differences attributable to task complexity, rather than to a specific deficit in short-term memory. The authors argued, however, that the data do support the presence of cognitive dysfunction in depression. Such dysfunction may not be attributed to attentional and motor speed factors, since performance on the simple motor speed tasks did not differentiate the groups or the treatment manipulations used. It is also interesting to note that the depressives' improved performance was not correlated with appreciable clinical improvement. The authors suggested that improvement in cognitive functions may precede observable changes in depressive symptoms.

Gibson (1981) compared memory functions in groups of elderly normals, elderly depressives, and patients with a definite diagnosis of dementia. Visual and auditory tasks were used to assess possible quantitative and qualitative differences between the groups. In the visual task, seven sets of line drawings of common objects were presented at the rate of one every 1 1/2 seconds, followed by verbal free recall trials. In the auditory task, the same procedure was

employed, but the stimulus materials were sets of monosyllabic words presented verbally.

The results indicated that the three groups differed significantly on the total recall measure. Normals recalled more items than depressives, who in turn recalled more items than the dementia patients. The serial recall data revealed the expected U shaped curve for both normal and depressed groups, reflecting both primacy and recency effects. The performance of the dementia patients did not reflect the primacy effect. No differences were found as a function of visual and verbal presentations, suggesting that the same cognitive processes were involved in both types of tasks.

Gibson proposed that memory impairment in depression may be viewed as a general suppression of cognitive processing, which is both temporary and reversible. In dementia, the impairments reflect cortical deterioration and permanent cognitive deficiencies. These deficiencies are quantitatively and qualitatively different from cognitive deficits secondary to depression.

The above group of studies point to the presence of a cognitive deficit in depression. The nature of this deficit has been described in terms of general suppression of cognitive functions, nonspecific cognitive impairment, deficient short-term memory storage, and impairment in processing information from the short-term to the long-term memory stores.

Two recent studies attempted to examine directly the nature of depressives' performance on memory tasks. In a series of experiments, Weingartner et al. (1981) examined the processing strategies employed by depressives and normals. Experiment I employed a levels-of-processing procedure. Ten unipolar depressives and ten matched controls were asked to perform either semantic (conceptually related words, e.g., "window" in response to "house") or acoustic (rhymes, e.g., "fan" in response to "man") orienting tasks on four lists of 40 common words. Free recall of the stimulus items was assessed after a 24 hour delay. A cued recall test was administered immediately following the subjects' free recall. The cues were the subjects' own responses given during the initial orienting tasks.

Results indicated that depressives' recall was equal to normals in the cued recall condition. Both groups recalled more words when the cues were provided, and there was no difference between the groups on the number of items recalled. Depressives also performed as well as normals in the free recall task following the acoustic orienting task. Differences between the groups were found only in the free recall following the semantic orienting task. Normals recalled significantly more words following semantic, compared to acoustic processing, and recalled significantly more words than depressives in this condition. depressives' performance showed no superiority for the semantically processed words compared to the acoustically processed words.

The authors argued that this pattern of results suggests that depressives typically utilize shallow or incomplete processing

strategies (i.e., they typically attend to the superficial attributes of words, e.g., rhymes, letter configurations). Impairment in the recall of the depressed subjects was only evident in tasks requiring elaborate encoding for storage in memory (e.g., following the semantic orienting task). Shallow processing (following the acoustic orienting task) and aided recall (in the cued recall condition) did not differentiate the groups. Experiment II examined organization and recall following a card sorting task. The subjects from Experiment I were studied again. They were asked to sort two sets of 32 cards each. One set was comprised of categorized items, while the other set was comprised of random words. Following the sorting task, the free recall of the items was assessed.

Results indicated that, in the sorting task, both groups utilized the inherent structure of the categorized set, and both groups imposed structure on the random set. However, depressed subjects imposed more structure than normals on the random set. Compared to normals, the depressed subjects sorted the cards into more sets and included fewer items in each set. Recall of the categorized items was equal in both groups, but recall of the random items was superior for the normal group.

Experiment III assessed the effects of different levels of structural organization of stimulus items on the subjective organization and recall of depressives and normals. The subjects were ten depressives and ten controls who had not participated in the above two experiments. The materials were seven lists of 32 items each. One list was comprised of random words, while the other six lists were

categorized. The number of items per category and the mode of presentation (blocked vs. random) were systematically varied in the categorized lists. Free recall of the items was assessed following each list presentation.

Results indicated that depressed subjects' recall and subjective organization did not differ from that of normals on lists that were inherently highly structured (few items per category presented in block fashion). Performance differences appeared when organization was less readily apparent (random presentation of categorized lists) and when stimulus materials were unrelated (random list).

The authors interpreted the overall findings of the three experiments as indicative of impairments in elaborative processing on the part of the depressed subjects. In summarizing their findings, they stated that "it is as if the depressed patient, in processing words, is forming non-transformed copies of the stimulus material as opposed to generating and using encoding processes that would effectively transform and organize information, thereby producing more complete learning and recall." (p. 46)

Russell and Beekhuis (1976) also reported difficulties in utilizing organizational strategies in recall. These investigators examined the performance of schizophrenics, psychotic depressives, and normals on card sorting tasks. The materials were 30 common words drawn from six categories. Subjects were asked to sort the words (cards) into groups based on any system they chose, then to attempt to recall the words in any order. This procedure was repeated for six trials, or until

subjects recalled 20 items or more.

Results indicated that all the subjects utilized the semantic information in sorting the words. The subjects identified the categories on the first trial and made few adjustments on repeated sorting trials. The recall data indicated that only the normal subjects effectively utilized this perceived organization in recall. Both the schizophrenics and depressives failed to utilize this organization efficiently in repeated recall trials. The authors attributed the under-representation of structure in recall to difficulties in either encoding or retrieval processes. They noted, however, that such difficulties could not be explained by a lack of awareness of the semantic structure by the schizophrenic and depressed subjects.

The preceding two studies point to deficits in utilizing structure and organization in the processing of semantic information. These deficits are most readily apparent when the semantic structure is not provided at input. Although the depressed subjects appear to perceive the semantic relationships of stimulus materials (Weingartner et al., Exp. I; Russell & Beekhuis, sorting task), they seem unable to utilize this information in the elaborative encoding and retrieval of the to-be-remembered items.

Difficulties in utilizing structural cues by depressives can also be seen in studies examining abstractive abilities and problem solving strategies. Donnelly, Waldman, Murphy, Wyatt, and Goodwin (1980) examined the abstractive performance of hospitalized depressed patients and normal controls. Subjects were administered the category subtest

(CT) of the Halstead Reitan Neuropsycholgical Test Battery. The CT measures abstractive ability as well as "immediate adaptive ability." Error data were analysed for unipolar depressives, bipolar depressives, and normals. Results indicated that depressives had significantly more errors than the normal subjects. The error scores did not distinguish between the unipolar and bipolar subdivisions of depression. These investigators suggested that severe depression represents a functional state of the brain that is similar to the cerebral dysfunction observed in groups of brain damaged patients.

Silberman et al. (1983) examined the performance of depressives and normals on an abstract reasoning task. The subjects were inpatient depressives (unipolar and bipolar) and normal controls with no previous history of psychiatric disorders. The task involved the presentation of a series of sixteen trial, two choice, visual discrimination problems. Each problem was represented by a set of sixteen cards containing two stimuli that varied along eight dimensions. Subjects were told that one of the eight stimulus properties was designated as "correct" in each problem. They were to deduce the correct property by eliminating the incorrect properties as provided by feedback. To examine the number of correct hypotheses generated by the subjects, the tasks were administered twice. In the first presentation, feedback was provided following the choice of a set of properties by the subjects. In the second presentation, subjects were informed beforehand that they would be asked, at certain points, to list all the properties that they considered to be correct at that particular time.

Results indicated that there was no difference between the groups on the total number of hypotheses generated, but the depressed subjects generated fewer correct hypotheses than normals. Both groups performed better following the second presentation, where subjects listed all possible correct solutions, but the performance of depressives remained inferior to that of the normals in both presentation conditions. Severity of depression was correlated with performance on the second presentation condition, with the more severely depressed subjects generating fewer correct hypotheses.

The authors identified two types of errors in the performance of depressed subjects, poor focusing and perseveration on disconfirmed hypotheses. Poor focusing referred to the inability to narrow down the set of possible solutions following feedback. Perseveration referred to the tendency of depressed subjects to continue to entertain hypotheses after they had been shown to be incorrect. In interpreting these findings, the authors noted that in depression, elementary levels of logic, attention, and memory may be intact. In this experiment, the observed impairments reflected the inability to coordinate these functions in a manner that would render them useful in the solution of a complex task.

In summary, the above two studies demonstrated the presence of a thinking disorder in depression. Depressed subjects seemed unable to use information systematically in the solution of abstract reasoning and problem solving tasks. These findings are consistent with the results of earlier studies reporting deficits in the abstraction of verbal

materials (Braff & Beck, 1974). These deficits could not be attributed to problems in attention or psychomotor speed.

Several general conclusions can be drawn from the research reviewed in this section. First, the performance of depressed subjects on memory tasks suggests cognitive impairment. The nature of this impairment may be described in terms of deficits in the elaborative encoding processes that typically act to enhance recall. Second, the extent of the cognitive deficits are correlated with the severity of depressive symptoms. In more extreme cases (e.g., the psychotic depressives in the Russell & Beekhuis study), these deficits may be indistinguishable from those observed in schizophrenia. Third, clinical improvement is associated with improvements in organization and recall. Anti-depressant medications were shown to improve performance in the absence of other indications of clinical improvement, suggesting that improvement in cognitive processing may occur as a precurser to clinical improvement. Finally, there is also evidence for a thinking disorder in depression, characterized by difficulties in abstractions and problem solving. It was suggested that depressed subjects' performance reflects functional cortical deterioration.

The above group of studies lend support to Beck's general notions of cognitive dysfunction in depression. While these studies did not directly examine the concept of depressive schema, they all point to a more general cognitive deficit that is not limited to negative or depressed content. The above studies all utilized either neutral or abstract test materials and, as such, they can be viewed as elaborations

on Beck's descriptions of thought disorder in depression.

Analogue Studies Utilizing Mood Induction Techniques

Analogue studies of depression have examined the effects of experimentally induced mood states on organizational and encoding processes in learning and memory. Depressed and elated mood states are typically induced via post hypnotic suggestions or the Velten's mood induction procedure (Velten, 1968). In this procedure, subjects are asked to read many self referent sentences designed to arouse either depressed or elated mood states. To ensure that subjects are actually in the desired mood state, subjects are administered the Depression Adjective Checklist (DACL) prior to their participation in an experiment. Mood induction studies are a subset of a more general area of research dealing with state dependent learning. The "state" refers to any induced or naturally occuring circumstance that in some way alters an individual's normal functioning. Alcohol level, medications, anxiety states, and moods are all examples of "states." Most states are considered transient in that they do not characterize the ongoing functioning of the individual, but rather they occur periodically, producing identifiable effects on learning and recall. The research in this area has generally demonstrated that attentional and encoding processes are affected by the state of the individual, and that performance on learning tasks is at a higher level when acquisition and retrieval occur under the same state (see Eich, 1981 for a review).

The relevance of the mood dependent memory research to clinical depression may be summarized as follows. First, studies examining the effects of depressed mood on performance have manipulated the subjects' affective state experimentally. This manipulation controls for the confounding of other factors associated with the clincial entity of depression (Leight & Ellis, 1981). Second, the findings derived from this methodology have yielded noteworthy similarities between induced depressed mood states and clinical depression, as is discussed below. Third, and perhaps most importantly, the theoretical conceptualizations associated with this research point to specific processes that influence the memorability of affective information (Bower, 1981; Leight & Ellis, 1981). A recent review of state dependent effects has suggested that providing the subjects with cues during recall reduces the effects of the induced state (Eich, 1981). This observation is quite similar to that reported by Weingartner et al. (1981). In their examination of the processing characteristics of depressed subjects, they reported that depressives performed as well as normals in a cued recall condition, while there were significant differences between the groups when no cues were provided at recall.

As with clinically depressed subjects, the induction of depressed mood states has biasing effects on the processing of affectively toned materials and adverse effects on the processing and recall of neutral items. In a series of experiments, Bower, Gilligan, and Montiero (1981) examined the effects of depressed and elated mood states on the acquisition and recall of negatively and positively toned affective materials. Experiment I examined the extent to which the mood of

readers influenced their selection of the type of information that they found to be interesting and memorable. The subjects were 16 highly hypnotizable students who were instructed to experience either sad or happy moods via post hypnotic suggestions. The subjects read a narrative about two men who met for a game of tennis. One was happy and recounted positive events in his life, while the other was sad and complained of various difficulties and failures. After reading the narrative, subjects were asked to answer a five item questionnaire about the content of the narrative and the character with whom they identified. Twenty-four hours later, the subjects recalled the narrative while in a neutral mood.

Results indicated that depressed subjects identified with the sad character, while happy subjects identified with the happy character. The recall data indicated that subjects experiencing the depressed mood state during acquisition recalled more depressed content incidents than the non depressed subjects, suggesting enhanced memorability of mood congruent materials.

The remaining four experiments in the series reported by Bower et al., manipulated various aspects of the narrative as well as the induction of mood states during acquisition or recall of the narrative. The results indicated that the induction of depressed mood states influences both the acquisition and recall of the material, even when recall is assessed under neutral mood conditions. The reverse manipulation, neutral mood at acquisition and depressed or elated mood at recall, showed no differential effects on the content of recalled

materials. In addition, it was found that depressed subjects recalled more depressed content whether or not they identified with the character in the narrative (e.g., the same character reporting both sad and happy experiences).

In interpreting these results, Bower et al. suggested that mood congruent materials are more memorable because such materials intensify the feelings experienced by the subjects, and may therefore, be more easily associated with subjective memories recalled during the induced mood state. These associations allow the elaboration and consolidation of the memory trace. Bower (1981) also proposed that, the emotion experienced by individuals also acts as a memory unit that can enter into associations with incoming information, as well as previous information associated with that same emotion. The effects of such as association may be seen in the enhanced memorability of subjective experiences, compared to presented information, as well as the superior recall of mood congruent information.

Bower's (1981; Bower et al., 1981) conceptualization is consistent with recent investigations which demonstrated that subjectively generated materials are more memorable than materials presented by an experimenter (i.e., the "generation effect"). Slameka and Graf (1978) utilized various orienting tasks (e.g., synonym, rhyme, semantic categorization) in recognition and recall tasks. Subjects were either required to read related word pairs (e.g., rapid - fast, save - cave) or to generate appropriate words based on a given stimulus word and a first letter cue of the related word (e.g., rapid - f---, save - c---).

Slameka and Graf reported that the subject generated words were more readily recognized and recalled than the word pairs provided by the experimenter, regardless of the type of orienting task or the knowledge that a recall test would follow.

More recently, McFarland, Frey, and Rhodes (1980) examined the generation effect within an incidental recall paradigm. Subjects were asked to either generate a word to fit a specific context, or to decide whether an experimenter generated word fit the context of a sentence. Results indicated that the internal generation of words produced higher levels of memory performance than the semantic processing (i.e., rating word meanings) of the experimenter generated words. The authors proposed that the generation effect is the result of both the personal attributes inherent in the generated items, as well as the effort involved to perform the task, namely producing an item to fit a specific context.

If one were to examine the generation effect phenomenon with a group of depressed subjects, one would expect that the content of the generated words would vary as a function of the subjects' mood state. Depressed subjects would be expected to generate more depression related words than positive words, and nondepressed subjects would be expected to generate more neutral or positive words than depression related ones. Although the generation effect has not been examined directly with depressed populations, two studies discussed earlier (Lishman, 1972b; Lloyd and Lishman, 1975) suggest that the content and speed of recall of subjective memories of depressed subjects reflect a bias in favor of

depression related experiences (i.e., mood congruent generation effects). Recently, this effect was also demonstrated with a group of normal subjects experiencing induced depressed and elated mood states. Teasdale and Fogarty (1979) utilized the same procedures as those employed by Lloyd and Lishman (1975) with clinically depressed subjects. The Velten technique was used to induce either sad or happy moods in a group of normal subjects. The subjects were then instructed to recount either sad or happy personal experiences in response to a neutral set of stimulus words. The results indicated that subjects in the depressed mood state recalled sad events at a faster rate than happy ones. The reverse was true for the subjects in the happy mood state.

The above studies demonstrate instances of factors influencing the memorability of information. The mood state of the subjects, the source of materials (experimenter vs. subject generated), and the content of the items are all important determinants of how well information is later recalled. Mood congruent, and subject generated, items are better recalled by both depressives and normals, whether the mood state occurred naturally (e.g., clinical depression) or was induced experimentally. These findings suggest that similar cognitive processes may be involved in the processing of affective materials for both groups of subjects.

Other mood induction studies have demonstrated differential encoding strategies as a function of depressed mood. Leight and Ellis (1981) examined the recall and chunking of letter sequences in subjects with induced depressed or elated mood states. Experiment I examined the

effects of coding strategies on recall. The subjects were 25 undergraduate female students who were randomly assigned to either depressed, neutral, or elated mood states. On Day 1, subjects received an eight item list of letter sequences that varied along a spatial grouping dimension (e.g., B ONKI D, BO NK ID, BO NKI D). The list was presented for four trials, with a free recall test after each trial. The specific spatial groupings of the letter sequences remained constant across trials. Twenty-four hours later, the subjects returned for a second recall task. The mood states of the subjects were altered so that subjects who received a depressed mood induction on Day 1, now received either elated or neutral induction instructions. Subjects who received an elated mood induction on Day 1, received either depressed or neutral induction instructions. The second recall task was similar to the first task, except that the spatial grouping of letter sequences was varied across trials.

For the first recall task, results indicated that the different mood states did not reliably differentiate the groups on the total recall measure. However, the rate of improvement as a function of practice (Trials 1 through 4) revealed that the depressed subjects' performance improved at a slower rate than either of the other two groups. For the second recall task, results indicated that subjects who had been exposed to a depressed mood manipulation on either Day 1 or Day 2, performed significantly poorer than subjects who were never exposed to the depressed manipulation.

Leight and Ellis proposed that subjects exposed to the depressed mood induction acquired an inefficient coding strategy during first list recall. They also suggested that the transfer of the adverse effects of depressed mood from the first to the second task suggests that depressed subjects become increasingly rigid or inflexible, and that such rigidity is transferred to performance on similar tasks.

Experiment II was designed to replicate the significant findings obtained in Experiment I. In addition, the spatial variability of the letter series and all the possible combinations of depressed and neutral moods were examined across the first and second recall tasks. In the first recall task, results indicated that subjects exposed to the depressed induction recalled significantly fewer words than subjects in the neutral mood group. Depressed subjects' performance also improved at a slower rate. Recall on the second task was determined by the subjects' mood during the first task. Subjects who were depressed during the first task recalled fewer words than subjects initially in a neutral mood state. Mood state during the second recall task had no effects on recall. Examination of the data from the spatial variability manupulation revealed that depressed subjects chunked the letter series under the varied input manipulation, but that the overall integration of the letter sequences was superior for the subjects in the subjects in the neutral mood state.

Leight and Ellis suggested that depressives' impaired recall may be attributed, at least in part, to inefficient strategy learning. They further suggested that the transfer of inefficient strategies across

tasks may reflect a form of "cognitive suppression or crippling."

In contrast to these findings, Bower, Montiero, and Gilligan (1978) reported no differences between the total recall of sad and happy subjects. These experimenters manipulated mood during acquisition and retrieval of word lists. The subjects' mood state was induced via post hypnotic suggestions, and their performance was assessed in mood congruent and mood incongruent conditions. Bower et al. found the expected mood congruent superiority effects in recall. However, the performance of subjects who were depressed during acquisition and recall did not differ from the performance of subjects who had learned and recalled the lists under an elated mood condition. In discussing these findings, Bower (1981) suggested that since the subjects were highly susceptible to suggestion, then these findings may reflect demand characteristics. Subjects were instructed to do as well as they could; the effects of this demand may have masked to effects of depressed mood on overall performance.

The studies reviewed in this section document the effects of mood dependent performance on a variety of learning and memory tasks. In addition, the results reported by Leight and Ellis (1981) suggest cognitive processing deficits as a function of an induced depressed state. Depressed subjects' performance reflected deficits in the utilization of effective coding processes as well as a general reduction in performance level on learning and memory tasks.

Two primary cognitive formulations have been advanced to account for these findings. Bower (1981) proposed a network theory of state dependent retrieval in which an emotion serves as a memory unit that can enter into associations with events occurring coincidentally. Activation of this emotion facilitates the retrieval of associated events, as well as remote events associated with similar emotions. The results of such an activation could be seen in perceptual catagorizations, as well as free associations, and in the recall of remote personal events that share the same affective tone as the individuals's current state. As discussed earlier, this conceptualization is consistent with findings of superior recall for mood congruent materials, as well as findings of better recall for subject generated over experimenter generated materials.

Leight and Ellis (1981) proposed an interference model to account for the poor performance of depressed subjects on cognitive tasks. Leight and Ellis suggested that the cognitive state produced by depressed mood interferes with effortful learning processes. The depressed individual engages in task irrelevant processing (e.g., ruminations about depressed mood), thus reducing the amount of cognitive resources available for task relevant processing. They describe such interference in terms of cognitive rigidity. Leight and Ellis' conceptualization of effortful learning processes as important determinants of recall is consistent with McFarland et al.'s interpretation of the generation effect.

While neither of these theoretical positions specifically address the issue of memory impairment in clinical depression, they are quite consistent with the experimental findings discussed in the previous sections in this paper. Specifically, Bower's conceptual analysis on mood congruent recall is consistent with studies examining schematic processing and the efficient recall of negative life experiences by the depressed subjects (cf., Kuiper et al., 1983; Lloyd & Lishman, 1975). Similarly, Leight and Ellis' (1981) propositions of task irrelevant encoding and cognitive rigidity are consistent with studies reporting inefficient encoding strategies and perseveration in problem solving tasks (cf., Silberman et al., 1983; Weingartner et al., 1981).

In summary, the research on mood dependent performance extends the findings reported with clinical populations. The theoretical formulations advanced within this perspective provide a framework for understanding the nature of the observed cognitive impairment in clinical depression.

Purpose and Rationale of the Present Research

Statement of the Problem

The literature reviewed above clearly demonstrates the presence of cognitive impairment in depressed subjects. Theoretically, cognitive deficits are conceptualized in terms of processing errors that lead to negative emotional responses. The research on the nature and extent of such errors has suggested differences between depressives and normals along a variety of dimensions. Research on negative self schema

examined one aspect of the cognitive triad described by Beck, namely, the differential processing of negative and positive self referent information. This research supported the notion that depressives tend to view themselves negatively, and that such a view leads to the selective processing and recall of negative information about the self. Other research, utilizing neutral materials, has also demonstrated deficits in organization, recall, and problem solving strategies. This research supported the notion that depressives may exhibit specific processing deficits such as those described by Beck et al. (1979). Based on this research, one might characterize depressives' thinking as follows:

1. Depressives selectively process negative information about themselves (e.g., their choice of self descriptive adjectives, the rate and speed of recall of negative past experiences, and the selective encoding of negative content).

2. Depressives exhibit deficiencies in the elaborative processing of neutral or abstract items. Such deficiencies are best characterized by shallow processing, inefficient mnemonic strategies, and poor organization.

3. Differences between depressives and normals may not be apparent when the tasks employed do not require elaborative encoding by the subjects (e.g., incidental recall following structural processing, free recall following a blocked presentation of catagorrized lists).

4. Depressives' processing strategies may be described in terms of a rigid, inflexible approach to problem solving.

5. The observed deficits are highly correlated with the severity of the depressive episode.

These findings are consistent with Beck's general theoretical position. However, by specifying some of the situations where depressives' performances may or may not differ from that of normals, these findings also represent important elaborations and extensions of Beck's model. Despite such extensions, there remain several questions that are in need of further research. These may be summarized as follows:

1. Given that depressives exhibit cognitive deficits, are these deficits uniquely associated with depression, or do they only reflect the degree of severity of psychopathology, irrespective of diagnosis? Miller's (1975) review of the literature suggested that there is no evidence of a specific pattern of cognitive distortion in depression. McAllister (1981) suggested that the performance of depressives may sometimes be indistinguishable from that of patients with dementia or seizure disorders.

2. In reference to the cognitive triad, the available research demonstrated differential processing of negative self referent information. Is this selective processing also demonstrable with negative materials not directly related to the self (e.g., information about nonspecific negative events)?

3. Deficits in recall were apparent in a variety of tasks. However, research has also demonstrated that, under certain presentation conditions, differences between depressives and normals may not be observed. Is it possible to manipulate presentation conditions in a manner that would enhance depressives' recall of positive content information?

The present research attempted to address these issues within an information processing paradigm.

Statement of Purpose

The main purpose of the present research was to identify the cognitive processing characteristics that may be uniquely associated with depression. It seems reasonable to assume that the content of the information plays an important role in distinguishing between general processing deficits, and errors unique to the depressed state. Depressives would be expected to exhibit biases in favor of processing negatively valenced information, which would be consistent with Beck's model. It is also reasonable to assume that depressives would utilize inefficient or rigid organizational strategies (cf., Leight & Ellis, 1983; Weingartner et al., 1981). Since correct recall is generally assumed to be a function of elaborative encoding strategies, depressed subjects' performance on positively valenced materials would be expected to reflect the effects of their inefficient processing. Finally, presentation conditions, which influence the degree of elaborative processing on the part of the subjects, would be expected to

differentially affect depressives' performance. Presentation variables may, therefore, produce improvements in performance that may otherwise be relatively poor.

Specifically, the present research addressed the following questions:

1. How does depressives' organization and recall performance differ from that of normal and other psychiatric populations?

2. Does the performance of depressives vary as a function of positive and negative content?

3. Do depressives indeed benefit from the provision of organizational cues at input (e.g., blocked presentation of categorized lists, word generation task)?

Extrapolating from the theory and research reviewed in this paper, depressives' recall of negative information may be superior to their recall of positive information (cf., Derry & Kuiper, 1981; Lloyd & Lishman, 1975). Beck (1976) has suggested that the processing errors exhibited by depressives arise from the selective processing of available information, so that negative information is attended to, and processed, more efficiently than positive information. The results of such a processing bias may be seen in the content of depressives' thoughts and self evaluations, as well as in the differential processing of incoming negative and positive information. Hence, in constrast to other psychiatric populations, the processing deficits exhibited by

depressives would be highly dependent on the emotional valence of the presented materials. Depressives' performance may either be equivalent to that of normals or of other psychiatric patients, depending on the emotional valence of information. Depressives' performance would be similar to psychiatric patients on positively valenced materials, and similar to normals on negatively valenced materials.

Finally, the present research also examined the possibility of identifying situations where depressives' processing biases would be less apparent. Weingartner et al. (1981) manipulated presentation conditions and demonstrated that depressives' performance approached that of normals when stimulus materials were presented in a highly organized manner (e.g., the presentation of a few categorized items in blocked fashion). Research on the generation effect (cf. McFarland et al., 1981; Slameka & Graf, 1978) has indicated that the subjective generation of the to-be-remembered items greatly enhances recall performance. Although the generation procedure has not been examined directly with depressed populations, it is expected that depressives performance may be improved following the subjective generation of the target words. The present research examined these hypotheses with depressives, psychiatric patients, and normals, in reference to positive and negative materials. The assumption that depressives may benefit from specific types of stimulus presentations would be of particular clinical interest, since it may suggest ways of overcoming depressives' selective processing and recall of negative information.

In summary, the present research addressed the theoretical issues of specificity and degree of cognitive impairment in depression. Two separate, but related experiments were conducted to address these issues.

Experiment 1 examined the effects of random and blocked presentations of positive and negative words on free recall performance. In this experiment, subjects were asked to recall words that belonged to one of four content areas: positive personally relevant words, positive words that described general events, negative personally relevant words, and words that described negative events in general. These words were presented either in a random or blocked fashion. The four content areas were included in order to address the issue of selective processing on the part of depressives. Evidence of such differential processing would be reflected in their recall performance. Depressives would be expected to recall more negative than positive words and more negative personally relevant than general words, whereas the performance of control groups would be equivalent across content areas. The different presentation modalities attempted to address the issue of inefficient processing strategies in depression. The provision of a blocked presentation would be expected to enhance the organization and recall performance of all subjects, including depressives. Prior research has shown improved performance among depressed patients following blocked presentations. The present experiment is an attempt at replicating earlier findings of improved performance following the blocked presentation of highly organized lists (cf., Weingartner et al., 1981). However, in contrast to Weingartner et al.'s experiment, where categories of common objects

were used, the present experiment utilized emotional content in specifying the category groupings. The effects of the presentation manipulation would be reflected in improved recall following the blocked presentation condition, as compared to the random presentation condition.

Experiment 2 examined the effects of subject-generated versus experimenter-generated negative and positive words on an incidental recall task. In this experiment, subjects were asked either to rate negative and positive words on a semantic orienting task (the meaningfulness of words) or to generate words to fit either a negative, positive, or ambiguous context. These manipulations were included in order to assess the effects of context specific processing on subsequent recall. Both the semantic orienting task (which directs the subject's attention to the meaning of a word within a specific context) and the generation task (in which subjects produce words to fit a specific context) encourage the processing of words as a part of specific content units. Thus these manipulations attempted to enhance attentional processes by requiring subjects to attend to each individual word within a specified context. Any differential processing of negative information by depressives would be expected to decrease following both of these manipulations, since subjects were required to attend equally to negative and positive valenced words. In other words, the effects of these manipulations would be expected to mask the processing bias in favor of negative information by the depressed subjects. The recall performance following the generation task would be expected to be superior to recall following the semantic orienting task for all

subjects for all types of content, reflecting the "generation effect" which has previously been reported in reference to normal subjects (cf., McFarland et al., 1981; Slameka & Graf, 1978).

In conclusion, the two experiments addressed issues related to the specificity and degree of processing errors in depression. The various manipulations attempted to identify situations where depressives' performance would reflect biases in favor of processing negative information, as well as situations where such biases would be less apparent. It was hoped that the findings would shed some light on the role of presentation variables in the recall of positive information by the depressed subjects. Such presentation variables would have important implications for planning intervention strategies with depressed individuals.

CHAPTER II

EXPERIMENT 1

Method

Subjects

There were 20 subjects in each of three groups: inpatient depressives, inpatient psychiatric controls, and normal controls. The groups were matched on age, sex, and educational level. In addition, the two inpatient groups were matched, as closely as possible, on the number of days they had been in the hospital prior to their participation in this study. These matching criteria were used to control for the effects of advancing age, duration of hospitalization, and differing vocabulary skills on performance. Intelligence level (I.Q.) was not used in the matching criteria, since tested I. Q. levels may have been altered as a function of the disorders under investigation, so that true matching would not be possible.

Subjects in the two inpatient groups were selected from two inpatient psychiatric facilities in Greensboro, North Carolina. The normal subjects were selected from employees at both facilities, as well as other individuals matched according to the selection criteria. All subjects participated in this study on a voluntary basis. A copy of the letter requesting permission to conduct research at both inpatient facilities and the consent form completed by all subjects are presented

in Appendix A.

Subject Selection

The criteria for inclusion in the three groups were as follows. For the inpatient depressives group, subjects' primary admission diagnosis was that of a unipolar depressive disorder according to DSM III (Diagnostic and Statistical Manual, third edition, American Psychiatric Association, 1980). In addition, the diagnosis of unipolar depression was not superimposed on any other disorder as indicated by multiple diagnoses on Axis I, or a personality disorder as indicated by a diagnosis on Axis II. These admission diagnoses were provided by the admitting psychiatrists and were available in the patients' charts. These diagnostic criteria are compatible with the Research Diagnostic Criteria for Depression (RDC) (Spitzer, Endicott, & Robbins, 1978), but they also take into account the effects of multiple diagnoses, which are not typically included in the Research Diagnostic Criteria. Finally, subjects were included in this group if their score on the Beck Depression Inventory (BDI) (Beck, Ward, Mendleson, Mock, & Erbaugh, 1961; see Appendix B) was 20 or above.

Demographic and diagnostic data on the 20 patients included in the depressives group are presented in Table 1 (Table 1 and all subsequent tables are contained in Appendix C). The three men and 17 women included in this group had a mean age of 40.2 years (range 20 - 56 years), and an average of 12.8 years of education (range 10- 16 years). These patients had been in the hospital an average of 8.95 days (range 1 - 30 days) prior to their participation in the study. Based on the

aforementioned selection criteria, there were six patients with the diagnosis of Major Depression - Recurrent, two patients with the diagnosis of Major Depression with psychotic features, seven patients with the diagnosis of Major Depression - Single Episode, three patients with the diagnosis of Adjustment Disorder with Depressed Mood and suicidal ideation and/or attempts, and two patients with the diagnosis of Dysthymic Disorder. The mean BDI score for these patients was 29.75 (range 20 - 52).

Patients were included in the Psychiatric Control group if they had received any diagnosis with the exception of depression, mental retardation, alcoholism, drug addiction, or disorders with suspected organic etiology. In addition, only patients who scored 10 or below on the Beck Depression Inventory were included in this group.

Details of the demographic and diagnostic data on each of the 20 psychiatric control subjects are presented in Table 2. The sample was comprised of three men and 17 women. Their mean age was 38.35 years (range 25 - 59), and they had completed an average of 13 years of education (range 11 - 17). These patients had been in the hospital an average of 8.45 days (range 1 - 18) prior to their participation in this study. Several of these patients had received multiple diagnoses. Only the general diagnostic categories are mentioned here. There were seven patients with the diagnosis of Schizophrenia (with its various subtypes), two patients in each of the following diagnostic categories, Atypical Psychosis, Acute Psychotic Episode, Schizoaffective Disorder, Paranoid disorder, and Schizophreniform Psychosis; and one patient in

each of the diagnostic categories of Somatization Disorder, Manic Episode, and Adjustment Disorder with Mixed Emotional Features. The mean BDI score for these patients was 5.75 (range 0 - 10).

Patients who had received electro convulsive treatment (ECT) were excluded from the study. No attempts were made to control for medications received by the two inpatient groups. The assumption was that the medications would bring the performance of these subjects closer to that of the normal subjects so that any differential findings would be in the conservative direction. Experimental support for this assumption is found in studies reporting improved memory functioning following treatment with anti-depressant medications (imipramine or amitriptyline) (Sternberg & Jarvik, 1976); and reports of increased speed of information processing in schizophrenic patients following treatment with anti-psychotic medications (Saccuzzo & Braff, 1981).

Subjects in the normal control group were selected on the basis of no previous inpatient psychiatric admissions, and no outpatient psychiatric treatment for a period of at least 12 months prior to their participation in this study. In addition, only subjects who scored 10 or below on the Beck Depression Inventory were included in this group.

Descriptive data on the 20 normal subjects as well as their scores on the BDI, are presented in Table 3. Two men and 18 women comprised this group. Their average age was 40.0 years (range 25 - 57), and they had completed an average of 13 years of education (range 12 - 16). The group's occupations included office workers, students, homemakers, nurses, and managers. The mean BDI score for the normal subjects was

3.1 (range 0 - 9).

Experimental Design

Experiment 1 utilized a free recall paradigm. A 3 (group type) x 2 (mode of presentation) x 2 or 4 (content areas) experimental design was employed. The first factor, group type was a between subjects factor, and refers to the classification of the three groups included in this experiment, namely, depressives, psychiatric controls, and normals. The second factor, mode of presentation, was a within subjects factor, and refers to the manner in which categorized word lists were presented. Each subject received two categorized lists, but the order of presenting the words within a list was either random or blocked. In the random presentation condition, the word order was randomized for each subject. In the blocked presentation condition, all the words belonging to a category were presented in succession. The third factor (also a within subject's factor), content areas refers to the content of the words included in both lists. The two content areas refer to negatively and positively valenced words. The four content areas refer to the further classification of negative and positive words along personally relevant and general dimensions. Based on this classification, the four content areas were: negative personally relevant words, negative general words, positive personally relevant words, and positive general words. Each subject received two lists that contained eight words from each of the above four categories, for a total of 32 words in each list. One list was presented in random order, and the other list was presented in a blocked fashion. Ten subjects in each of the experimental groups

received List 1 in the random order and List 2 in the blocked order.
The remaining ten subjects in each group received List 2 as the random
list and List 1 as the blocked list. In the random list, the order of
the items was randomized for each subject. In the blocked list, the
order of presenting the categories was counterbalanced across subjects
in each group. The order of words within each category was random.
There were four different sequences for presenting the categories, with
five subjects in each group receiving a different sequence. These
sequences are presented in Appendix D. All subjects received the random
list followed by the blocked list in order to control for the effects of
experimenter imposed organization on the recall of the random list.

Experimenter

The experimenter for both Experiment 1 and Experiment 2 was the
present author. The experimenter reviewed patients' charts, conducted
screening interviews, and administered the BDI for all subjects. The
experimenter also determined group assignments and completed all aspects
of data collection and analysis.

Materials

The words used for this experiment, their frequency of occurrence
in written text, and the procedure for determining the four content
areas (negative and positive, personally relevant and general) are
presented in Appendix E.

Two lists of 32 words each were constructed based on positive and negative content. Half the items in each list reflected personal emotional content (e.g., gloomy, sad or happy, elated), and the other half reflected more general positive and negative content (e.g., disaster, war or achievement, success), resulting in the following four categories: (a) negative personally relevant items, (b) general negative items, (c) positive personally relevant items, and (d) general positive items.

The mean frequency of the words (mean frequency of occurrence per 100,000 words of written text; Kucera & Francis, 1967) in the four categories was higher for positive (mean 61.71) compared to negative words (mean 36.29), and for general (mean 71.19) compared to personally relevant words (mean 30.81). However, the mean frequency within each of the four categories (positive and negative personally relevant and general words) was equated as much as possible across presentation conditions (i.e., across the random and blocked lists, see Appendix E). This procedure ensured that the two lists were approximately equal in difficulty. Any differences in the recall performance of the depressed subjects in favor of negative content cannot be attributed to word frequency, since the negative words had lower frequencies of occurrence than the positive words.

Procedure

Each word was typewritten in IBM courier typeface in the center of a 3 x 5 white index card. In the random presentation condition, no information about content was provided, and the 32 cards were shuffled

prior to presentation for each subject. In the blocked presentation condition, subjects were informed that each eight items presented in succession denoted a single category. The category name was provided by the experimenter.

In this experiment, subjects were informed of the recall task to follow. The instructions given to subjects prior to the experiment are presented in Appendix F-1. The word lists were presented to each of the subjects individually in a quiet room in their respective treatment facilities or places of employment. The subjects were asked to read each word aloud then turn the card face down. Each word was presented for 5 seconds, or less, depending on the speed in which the subject read the word. In the event that the subject could not read the word, or if the 5 seconds had elapsed, the experimenter read the word aloud and the subject was asked to repeat it. Subjects who misread more than two words in each list were excluded from the study. Only one subject was excluded from the study because of poor reading skills.

Following the presentation of each list, (random and blocked) subjects were asked to recall the words verbally in any order they chose. Subjects were encouraged to guess. No time limit was imposed on the recall period. Recall performance was recorded verbatim by the experimenter.

Dependent Measures

The dependent measures for this experiment were the total number of words recalled, and the degree of organization (i.e., clustering) in the

recall performance of the three groups of subjects. Of interest here is the function of group type (depressives, normals, and psychiatric patients), mode of presentation (random and blocked), and content (negative and positive, both personally relevant and general) on these dependent measures.

Scoring Recall Performance. A measure of recall was obtained as a function of two content areas (positive and negative words), and as a function of four content areas (postive and negative personally relevant and general words). The two measures of recall were included in order to compare the effects of a global measure of content (negative and positive) to those of more specific content distinctions (i.e., the personal relevance and generality of positive and negative words).

In scoring recall based on two content areas, recall of negative and positive words were summed across the personal relevance and general dimensions. Scores based on four content areas were obtained by examining the words recalled in each of the four content categories separately. Words were scored as correct if the subject recalled the word as presented, or if he/she recalled a derivative of the presented word. For example, the recall of the word "kindness" was scored correct, if the subject said "kindness", "kindly", or "kind". Errors in recall (i.e., repetitions of the presented items and extra list intrusions) were disregarded.

Scoring Organizational Performance. Estimates of clustering in the free recall data were obtained by the adjusted ratio of clustering measure (ARC) proposed by Roenker, Thompson, and Brown (1971). The ARC

yields a single measure of clustering for each subject, across the content areas, for each of the presentation conditions. The clustering score refers to the probability of recalling items that belong to the same category in succession. For example, if a subject recalled only two items from each of the four categories, but each was recalled in succession, the resulting score would denote perfect clustering. Conversely, if a subject recalled two items from each category, but the order of the words recalled was random, then the resulting score would indicate little or no clustering. A clustering score may range from (-1) to (+1), with a score of (0) indicating chance performance.

Clustering scores were also obtained as a function of two and four content areas. As with the recall data, clustering based on two content areas was obtained by regarding personally relevant and general words as instances of a single category, negative or positive. Clustering scores were based only on the words recalled correctly. For example, if a subject recalled two items correctly from a single category, followed by an incorrect word, and two more items form that same category, the content of the incorrect word was disregarded, and the four words were considered as four continuous repetitions within a single category.

Results

The data for this experiment were examined both in terms of correct recall and the degree of clustering of the words recalled. The recall and clustering data were analysed separately as a function of two content areas (negative and positive words) and four content areas (negative and positive personally relevant and general words).

Recall Performance (Based on Positive and Negative Content)

The recall performance of the three groups of subjects as a function of negative and positive content, and random and blocked presentation is presented in Table 4 and in Figure 1 (Figure 1 and all subsequent figures are contained in Appendix G). An analysis of variance performed on the number of words recalled (Table 5) indicated that the performance of the three groups differed significantly, F (2,57) = 12.66, $p<.0001$. Post hoc analysis of this result (Tukey Test, p=.05, Table 6) indicated that the overall recall of normals (mean = 6.58) was superior to that of depressives (mean = 5.77), which was in turn superior to the recall of performance of the psychiatric controls (mean = 4.45). Negative words were recalled more often (mean = 5.87) than positive words (mean = 5.33), F (1,57) = 6.10, $p<.016$. These main effects are qualified by a significant Group x Content interaction, F (2, 57) = 3.83, $p<.027$, indicating that the negative and positive words were differentially recalled by the three groups of subjects. Post hoc analysis (Tukey Test, Table 7) indicated that depressives recalled more negative (mean = 6.47) than positive (mean = 5.07) words, while the other two groups did not differ reliably on the recall of negative and positive words. Further, depressives did not differ from normals on the recall of negative words (means = 6.47 & 6.65 for depressives and normals respectively), and both groups recalled significantly more negative words than the psychiatric controls (mean = 4.5). On the recall of positive items, the performance of depressives (mean = 5.07) did not differ from that of psychiatric controls (mean = 4.4), and both groups recalled fewer positive words than normals (mean = 6.52).

The performance of the three groups did not differ as a function of presentation conditions as indicated by a nonsignificant main effect for presentation (F<1), and a nonsignificant Group x Presentation interaction F (2, 57) = 2.12, p>.10. Finally, the recall of negative and positive items did not vary as a function of presentation for any of the groups as indicated by a lack of significant interactions among these variables.

To summarize, the significant findings in the above analysis indicated that normal subjects recalled more words than depressed subjects who, in turn, recalled more words than the psychiatric controls. Negatively valenced words were recalled more often than positively valenced words by the depressed subjects, whereas the two control groups recalled an equal number of negative and positive words. The performance of depressives resembled that of normals in reference to negative words and resembled the performance of the psychiatric controls in reference to the positive words.

Recall Performance (Based on the Four Content Areas)

The recall performance of the three groups as a function of negative and positive, personally relevant and general words, and random and blocked presentations is presented in Table 8, and in Figure 2. The analysis of variance (Table 9) indicated that recall differed reliably among the three groups, F (2,57) = 12.66, p<.0001. Post hoc analysis (Tukey Test, Table 10) indicated that normals recalled more words (mean = 3.293) than depressives (mean = 2.88), who in turn recalled more words than the psychiatric controls (mean = 2.22). Recall was differentially

affected by the four content areas as indicated by a significant main effect for content, F (3, 171) = 3.03, $p < .03$. Post hoc analysis (Tukey Test, Table 11) indicated that the negative general words (mean = 3.09) were recalled more frequently than the positive general words (mean = 2.55). There was no reliable difference between the positive personal words (mean = 2.78) and the negative personal words (mean = 2.78), and neither of these content areas differed significantly from the general negative and positive content areas. The recall performance of the three groups did not differ as a function of presentation, and none of the interactions was significant: (see Table 9).

The finding that the general negative words were recalled more frequently than the general positive words is surprising, especially when compared to the analysis based on two content areas reported above. In that analysis, the recall of normals and psychiatric controls was equivalent across positive and negative items, and only the depressives demonstrated preferential recall for negatively valenced words. Perhaps this difference could be attributed to the performance of the two control groups on the recall of negative items. Of the negative words they recalled, more words belonged to the general than the personal negative content areas. While the post hoc analysis did not indicate a significant difference between the total number of general and personal negative items recalled, inspection of Figure 2 indicates the tendency of normals and psychiatric controls to recall more general than personal negative content items. At any rate, this difference could not be attributed to the frequency of the words since the frequency of the general positive words was generally higher than that of the general

negative words (see Appendix E).

Clustering Scores (Based on Positive and Negative Content)

The percent of clustering as a function of groups, positive and negative content, and random and blocked presentations is presented in Figure 3. Analysis of variance (Table 12) indicated that the positive and negative words were clustered more readily following the blocked presentation condition then the random presentation condition, , F (1, 57) = 11.65, $p < .001$. The groups differed in the amount of clustering as a function of presentation in a marginally significant manner, F (2, 57) = 2.79, $p < .069$. Post hoc analysis (Tukey Test, Table 13) indicated that for depressives clustering was equivalent across presentation conditions (mean = .169 & .177 for random and blocked presentation respectively) while both the control groups clustered the information more readily following the blocked, compared to the random, presentation conditions (means = .10 versus .45 and .09 versus .38 for normals and psychiatric patients respectively. In addition, while the three groups did not differ on the amount of clustering following the random presentation, they did differ in the amount of clustering following the blocked presentation condition. Following blocked presentation, clustering was equivalent for the two control groups, (mean = .45 & .38) and both groups clustered the information more readily than depressives (mean = .17).

Clustering Scores (Based on Four Content Areas - Negative and Positive Personally Relevant and General Words)

The amount of clustering as a function of group type, the four content areas, and presentation conditions is presented in Figure 4. Analysis of variance (Table 14) indicated that all three groups clustered the information more readily following the blocked presentation condition, F (1, 57) = 19.74, $p<.0001$. The performance of the three groups was comparable across presentation conditions, which is indicated by a nonsignificant main effect for groups, and a nonsignificant Group x Presentation interaction (Fs<1).

In summary, the analysis of clustering performance across the two content areas revealed that the two control groups clustered the information more readily following the blocked presentation while depressives' performance was not affected by presentation conditions. Clustering across the four content areas revealed that all three groups clustered the information more readily following the blocked presentation, indicating that all subjects were more sensitive to the differences among the categories when they were presented in blocked fashion.

Discussion

The most notable findings in this experiment indicate that depressives' recall performance is highly dependent on content. The depressed subjects recalled more negative than positve words, whereas the two control groups recalled an equivalent amount of negative and

positive information. Depressives' recall of negative information was indistinguishable from that of normals. In reference to positive information, however, depressives' performance resembled that of the psychiatric control group.

It is noteworthy that there were no differences attributable to the interaction of group type and content when four distinct categories (negative personal and general, positive personal and general) were used in the analysis. This finding might indicate that depressives' differential recall of negative information reflects a global bias in favor of negative content and is not limited to negative information that has personal relevance. Such a conclusion must be qualified, however, because the personal relevance of the items was not determined for each individual subject. Regardless, the data are consistent with recent findings of depressives' processing bias in favor of general negative items compared to neutral items on a tachistoscopic recognition task (Powell & Hemsley, 1984); and to reports of differential processing of negative words on lists with negatively and positively valenced words (McDowall, 1984).

The present findings speak to research on the depressives' self schema (cf., Derry & Kuiper, 1981; Kuiper et al., 1983). Kuiper et al. (1983) have hypothesized that depressives are more likely to recall negative self referent information, compared to positive self referent information, because such information is consistent with the depressives' self schema. Kuiper et al. did not directly examine differences in recall as a function of personal relevance and general

dimensions of negative words. The present findings suggest that depressives tend to process both types of information more readily than positive information, self referent or general. The findings may, therefore, be viewed as indirect support to Beck's conceptualization of depressives "cognitive triad", where the depressed individual views him/herself, the world, and the future negatively.

In summary, the findings of the recall data indicated that while normals recalled more words than depressives, the two groups' performance on the negative items was quite similar. This finding suggests that examination of depressives' processing deficits can only be understood in light of the content of the presented materials. Thus, it is noteworthy that earlier reports of difficulties encountered by depressives were based on performance as a function of neutral materials (cf., Sternberg & Jarvik, 1976; Weingartner et al, 1981), and abstract reasoning tasks (cf., Donnelley et al., 1980; Silberman et al., 1983). The present findings suggest that processing deficits in depression may not be apparent in reference to negatively valanced materials. Depressives recall was equivalent to that of normals on the negative words, and inferior to normals only in reference to the positively valenced words.

The performance of the three groups on the organizational measure (clustering scores) indicate that when the words were presented randomly, the three groups organized the information in a comparable manner; both in reference to positive and negative content (two category clusters) and in reference to negative and positive personally relevant

and general content (four category clusters). In reference to the four categories, all three groups utilized content more readily in organizing the information following the blocked, as compared to the random, presentation condition. In reference to the two more global content areas of positive and negative words, however, only the two control groups showed higher clustering following the blocked presentation condition. Depressives used content for organizing information only in reference to the four content areas specified by the experimenter.

Further, the clustering data provide indirect evidence for the cognitive rigidity associated with depression (cf., Leight & Ellis, 1981; Weingartner et al., 1981). Instructions given prior to the blocked presentation specified four content areas, clustering scores based on the four content areas (negative and positive, personally relevant and general) reflect the subjects sensitivity to the presentation instructions, while clustering across the more global content areas of positive and negative words reflects spontaneous organization and is not directly related to the presentation and recall instructions. Thus, it appears that depressives were more influenced by the presentation instructions than by the salience of the negative and positive content of the words in general.

The clustering data are interesting since they suggest that the provision of organizational structure at input specifies the types of organization depressives use in recall. This interpretation is consistent with reports of inefficient organizational processing in depression. Weingartner et al. (1981) proposed that depressives do not

engage in organizational processes spontaneously. When provided with organizational structure at input, however, their performance becomes quite similar to that of normals. Similarly, on a task of solving pronounceable nonsense syllables, Leight and Ellis (1981) described the performance of subjects in a depressed mood state as rigid and inflexible.

Finally, it should be noted that the provision of organizational structure at input did not result in improved recall performance for any of the groups. This finding suggests that either subjects were not using content to organize information in memory, or that organization based on the affective valence of the information does not facilitate recall. Based on the improvements on clustering performance following the blocked presentation condition, the second hypothesis seems more plausible. The affective valence of a word may not provide sufficient information to retrieve a specific word from episodic memory. Affective information may be more useful in classifying classes of events rather than the specifics of any one occurrence. In the present experiment, the blocked presentation provided subjects with information about the affective content of the words presented. However, within each content area there were eight words that shared the same affective tone. Affective information enabled subjects to group words together based on content, but did not provide sufficient information for a decision of which word, out of several alternative words within a content area, was the target word to be recalled. In other words, in the blocked presentation, the classification of the stimulus materials along affective dimensions produced improvements in clustering, but did not

produce improvements in recall.

The overall findings of Experiment 1 suggest that the provision of organizational cues that direct subjects' attention to each specific word would produce better recall than the provision of general content classifications. Experiment 2 examined this hypothesis by requiring subjects to attend to each of the target words within a semantic orienting task. In addition, Experiment 2 examined the effects of generating the to-be-remembered items on recall. The generation of words, by necessity, requires the use of attentional processes on the part of the subjects.

CHAPTER III

EXPERIMENT 2

Method

Subjects

The subjects for this experiment were the same subjects who participated in Experiment 1. Each subject served in both experiments, with the order of experiments being counterbalanced across subjects in each group. Instructions to subjects did not indicate that they would participate in two separate experiments, but only that they would be required to complete several different tasks. Details of instructions given to subjects who participated first in Experiment 2 are presented in Appendix F-2.

Experimental Design

This experiment utilized a word generation paradigm, with incidental recall to follow (cf., McFarland et al., 1980; Slamecka & Graf, 1978). A 3 (group type) x 2 (mode of presentation) x 2 (content areas) experimental design was used for this investigation. The first factor, group type was a between subjects factor and refers to the classification of the three groups of subjects, as described in reference to Experiment 1. The second factor, mode of presentation, was a within subjects factor and refers to the manner in which sentences were presented. Each subject received 15 sentences that had a word

underlined and 15 sentences that had a word missing. For the completed sentences, subjects were asked to rate the underlined words based on how well they fit within the general meaning of the sentences. For the sentences with the missing words (sentence frames), subjects were asked to complete the sentence with a word that best fit the general meaning of the sentence. The third factor, content (also a within subjects factor), refers to the affective content of the completed sentences, as well as the general affective content areas suggested by the sentence frames (see section on materials below). The content of the completed sentences reflected either negative, positive, or neutral affective tone. The affective tones suggested by the sentence frames were either negative, positive, or ambiguous (i.e., it was not clear based on the sentence frame whether the sentence suggested negative or positive affective tones). Subjects received the 30 sentences in a random order. After they had rated the words (in the completed sentences) and generated words to fit the sentence frames, the subjects' incidental recall of all the target words was assessed.

Materials

The materials used for this experiment, together with the selection procedures for these materials, are presented in Appendix I. Thirty sentence frames (sentences with a key word missing) were selected based on negative, positive, and ambiguous affective content, with ten sentence frames belonging to each of the content areas. A group of 10 normal subjects, who did not participate in the present experiment, were asked to complete the 30 sentence frames with words that best fit the

general meanings of the sentences. This procedure produced completed sentences that reflected either negative content (drawn from the negative sentence frames and a subset of the ambiguous sentence frames), positive content (drawn from the positive sentence frames and a subset of the ambiguous sentence frames), and neutral content (in a few cases subjects completed the ambiguous sentences frames in a neutral affective tone). These completed sentences were used for the semantic rating task included in this experiment. The original sentence frames (i.e., the completed sentences with the key words removed) were used for the generation task included in this experiment. The completed sentences reflected negative, positive, and neutral content because once the ambiguous sentence frames had been completed, the affective tone of the sentences could be determined. Furthermore, since the 10 sentence frames were completed along three different affective tones, there was an unequal number of completed sentences in each of the negative, positive, and neutral content areas. The sentence frames suggested either negative, positive, or ambiguous content and there were 10 sentence frames in each of these content areas.

The ten sentence frames in each content area (positive, negative, and ambiguous) were divided into two groups of five frames. For the generation task, a subject received 15 sentence frames (five in each content area). For the semantic orienting task, the words that were produced by one of the normal subjects described above, were inserted in the remaining 15 frames, producing 15 completed sentences. Based on this procedure, two sets of sentence frames and two sets of completed sentences were constructed, with 15 of the original sentence frames in

each set.

Two subjects in each of the experimental groups were randomly yoked to one of the normal subjects referred to above. One of the experimental subjects received fifteen sentence frames, and fifteen sentences completed by the normal subject to which he/she had been yoked. The other experimental subject received the completed sentences as sentence frames, and the sentence frames as completed sentences. This yoking procedure ensured that the target words in the completed sentences appeared equally often across groups. Similarly, each sentence appeared equally often as an incomplete frame across the three groups. Furthermore, the target words of the completed sentences had been furnished by other subjects (i.e., the sample of 10 normal subjects), thus avoiding experimenter bias.

Procedure

The sentences were typed in IBM courier typeface in the center of 3 x 5 white index cards, with a line indicating the missing words in the sentence frames, or with the target words underlined in the completed sentences. Subjects were given a sheet of paper with spaces provided to record the generated words and the target words in the completed sentences. The presentation of the generation and semantic orienting task was randomized for each subject by shuffling the cards containing the sentences and sentence frames prior to presentation.

For the generation task, subjects were asked to complete the sentence frames with a single word. For the semantic orienting task,

subjects were asked to rate the extent to which the target words fit the sentence on a five point scale. Subjects were asked to write both the generated words and the target words (together with their ratings) on a sheet of paper provided by the experimenter. This procedure ensured that the target words were attended to by the subjects.

Subjects were asked to read the sentences aloud, then complete the sentences or rate the target words in writing. No time limit was imposed on completing these tasks. However, subjects who experienced difficulty in reading a sentence, or who did not read the sentence within 20 seconds, were asked to repeat the sentence after the experimenter had read it aloud to them. Following the completion of these tasks, subjects were asked to recall verbally all the target words (both generated and underlined) in any order they chose. No time limit was imposed on the recall period, and guessing was encouraged. Responses were recorded verbatim by the experimenter.

Dependent Measures

The dependent measures for this experiment were the overall recall performance and the content of the generated items. Of interest here is the recall performance of the three groups of subjects as a function of presentation conditions and content. In addition, the content of the generated items was examined in relation to each of the group types.

Scoring Recall Performance. Since subjects received a different number of sentences in each of the content areas, recall performance was recorded in terms of the percentage of words recalled in each of the

positive, negative, and neutral content areas, both in reference to the generated and presented items. Percentages were obtained by dividing the number of words recalled within a content area by the total number of words (presented or generated) in that content area. It should be noted that the total number of neutral items, both presented and generated, constituted less than 10% of the target words (see Appendix I). Hence, analysis of the recall data did not include recall as a function of neutral content.

Scoring the Content of Generated Items. Ratings of the content of the generated items were obtained by two judges who rated the completed sentence frames along negative, positive, and neutral content areas for each subject. In the event the judges did not agree on the emotional valence of a sentence, this sentence was regarded as a neutral sentence. Thus, for the positive and negative content areas there was perfect agreement between the judges on the emotional valence of the generated words.

Results

The data for this experiment were examined both in terms of correct recall and the content of the words generated by the three groups of subjects. Analyses of these dependent measures are presented separately below.

Recall Performance

The percent of words recalled as a function of groups, positive and negative content, and presented and generated items are presented in

Figure 5 and in Table 15. Analysis of variance performed on the recall data (Table 16) indicated that the three groups of subjects differed on the percentages of words recalled, F (2, 57)= 7.43, $p<.001$. Post hoc analysis of this difference (Tukey Test, Table 17) indicated that normals recalled significantly more words (mean = 40.87%) than depressives (mean = 31.75%) or psychiatric controls (mean = 26.58%), who did not differ significantly from each other. All three groups recalled more generated than presented words, F (1, 57) = 41.49, $p<.0001$. No significant interactions occurred among any of the independent variables (Fs<1), indicating that all three groups recalled equivalent percentages of positive and negative items, and their performance was equally affected by the presentation conditions.

Content of Generated Items

The content of the generated items by the three groups of subjects is presented in Figure 6 and in Table 18. The three groups, taken together, generated different percentages of positive, negative, and neutral words, F (2, 114) = 239.93, $p<.0001$ (Table 19). Post hoc analysis of this difference (Tukey Test, Table 20) indicated that subjects generated more positive (mean = 7.32) than negative words (mean = 6.45), and more positive and negative words than neutral words (mean = 1.23). However, this result is qualified by a significant Group x Content interaction, F (2, 114) = 7.93, $p<.0001$. Post hoc analysis (Tukey Test, Table 20) indicated that normals generated more positive (mean = 8.15) than negative (mean = 6.05) or neutral (mean = .80) words, and more positive words than either the depressives (mean = 6.1) or the

psychiatric controls (mean = 7.7). Psychiatric controls generated more positive (mean = 7.7) than negative (mean = 5.8) or neutral (mean = 1.5) words, and more positive words than the depressives. Depressed subjects generated more negative (mean = 7.5) than positive (mean = 6.1) or neutral (mean = 1.4) words, and more negative words than either the normals (mean = 6.05) or the psychiatric controls (mean = 5.8). The generation of neutral items was not significantly different among the groups.

In summary, the results of this experiment indicate that while depressives recalled fewer words than normals, their recall of negative and positive words was equal across presentation conditions. In addition, while depressives generated more negative words than either of the control groups, their recall performance indicated no bias in favor of the recall of negative information. Finally, all three groups recalled more generated than presented items, which indicates that the generation effect occurs in reference to psychiatric patients and depressives as well as normal subjects.

Discussion

The findings of this experiment suggest that presentation variables play an important role in determining depressives' recall of positive and negative information. When depressed subjects were required to rate words along a semantic dimension, or to generate a word to fit a specific context, their preferential processing of negative information was no longer apparent. In addition, depressives' performance following the generation task indicates that their recall performance improves at

a comparable rate as that of the normal subjects.

The results indicate, however, that while depressives and normals recalled comparable percentages of positive and negative words, depressives' overall performance remained inferior to normals and more closely resembled the performance of the psychiatric controls. This finding suggests that depressives exhibit processing difficulties that are not attributed solely to a processing bias in favor of negative information. In this experiment, the semantic orienting task and the generation task encouraged subjects to process the meanings of individual words. This resulted in equivalant recall across content areas, but did not result in eliminating the overall performance differences between depressives and normals.

This finding suggests that when the effects of content are minimized (e.g., by presenting neutral materials or by manipulating presentation conditions), the performance of depressives becomes as poor as that of psychiatric patients for whom cognitive difficulties have been well documented. This finding is, therefore, consistent with McDowall's (1984) finding that presentation variables may act to eliminate processing biases in favor of negative content by depressives, and with research indicating that under some circumstances the performance of depressives may be indistinguishable from that of psychotic patients (cf., Russell & Beekhuis, 1976). This finding is also consistent with Beck's assertion that depressives exhibit a thinking disorder. Such a disorder may be characterized by the preferential processing of negative information, but it may also be

characterized by a more general processing deficit of neutral and positive information.

The content of the generated words indicates that depressives were more likely, than either normals or psychiatric controls, to complete ambiguous sentence frames in a negative affective tone. This finding is consistent with research on mood dependent effects on performance. Depressives tended to interpret the ambiguous frames consistently with their depressed mood state. The findings of this experiment suggest, however, that once depressives generate positively valenced information, they were just as likely to recall this information as the negative content materials.

CHAPTER IV

GENERAL DISCUSSION

The research presented here investigated the relationship between depressed affect and the cognitive processing of negatively and positively valenced affective materials. Experiment 1 examined the recall and organization performance of depressives, normals, and psychiatric patients on a free recall task, following the random and blocked presentations of lists categorized along negative and positive affective dimensions. Experiment 2 examined the performance of the three groups of subjects on an incidental recall task following a semantic orienting task and a generation task of negatively and positively valenced sentences and sentence frames. Experiment 2 also examined the effects of ambiguous context on the content of items generated by the three groups of subjects. The main purpose of this investigation was to identify the cognitive processing characteristics that may be uniquely associated with depression.

The overall results showed that under some presentation conditions (e.g., the presentation of negative and positive words in Experiment 1 and the generation of words to fit ambiguous contexts in Experiment 2), the content of presented materials differentially affected the performance of depressed subjects, whereas there were no content related effects on the performance of the two control groups. In Experiment 1, depressives recalled more negative than positive words. Their

performance was equivalent to that of normals on negatively valenced words, and more closely resembled the performance of psychiatric patients on positively valenced words. In Experiment 2, depressives generated more negative than positive items, and more negative items than either of the two control groups. Under other presentation conditions (e.g., the semantic orienting task and the generation task in Experiment 2), the effects of content on the performance of depressives was less apparent. Following both the generation and semantic orienting tasks, depressed subjects recalled equivalent amounts of negative and positive information.

The clustering measure in Experiment 1 showed that the three groups' organization was comparable following random presentation. Following blocked presentation, however, clustering of the three groups differed as a function of the content areas upon which the clustering analysis was based. When clustering was examined as a function of the four content areas specified by the presentation instructions (negative and positive, personally relevant and general words), all three groups clustered the information more readily following blocked presentation than following random presentation. When clustering was examined as a function of the two more global content areas not directly specified by the experimenter (negative and positive words), only the two control groups clustered the information more readily following the blocked presentation. Clustering of depressives was equivalent across presentation conditions and showed no improvement as a function of presenting the words in a blocked fashion. As noted earlier, the performance of depressives on the organizational measure may be viewed

as an example of cognitive rigidity that has often been reported in reference to depressives' performance on cognitive tasks (cf., Leight & Ellis, 1981; Weingartner et al., 1981).

Relationship of the Present Findings to Previous Research

Previous research has indicated that depressives tend to recall more unpleasant than pleasant past experiences (Lloyd & Lishman, 1975) and to recall negative, compared to positive, self referent information (Derry & Kuiper, 1981). More recently, researchers have demonstrated that depressives exhibit a bias in favor of general negative information that is not directly related to self evaluations or personal experiences (McDowall, 1984; Powell & Hemsley, 1984; Slife, Miura, Thompson, Shapiro, & Gallagher, 1984). McDowall (1984) also demonstrated that in some situations, depressives exhibit the expected bias in favor of processing and recalling negative information, while in other situations depressives recall equivalent amounts of negatively and positively valenced words. Depressed subjects who recalled lists that contained positive and negative words presented randomly showed the expected recall bias in favor of negative content. Subjects who rated negative and positive words on a pleasantness rating scale prior to recall, and subjects who recalled lists that contained only negative or only positive words, recalled equivalent amounts of negatively and positively valenced affective information. Equivalent recall across negative and positive content has been reported by other investigators as well (e.g., Frith et al., 1983; Roth & Rehm, 1980). These authors suggested that the preferential recall of negative information by depressives may be

limited to personal memories and experiences. However, as McDowall (1984) noted, the failure to obtain the expected bias in favor of negative information may have been due to characteristics of the experimental designs employed. Frith et al. (1983) required subjects to rate the stimulus words on a pleasantness rating scale prior to recall. Roth and Rehm (1980) obtained self descriptive ratings of the to-be-remembered negative and positive words. Failure to obtain content related differences in the recall of depressed subjects in the studies reported by Frith et al. (1983) and Roth and Rehm (1980) suggests that presentation variables play an important role in depressives' preferential processing and recall of negative information. When subjects were given free recall instructions for lists that contained negative and positive words, the expected selective recall of negative information was obtained. When subjects were required to rate positive and negative words along some subjective dimension (pleasantness or self reference) prior to recall, the bias in favor of negatively valenced materials was no longer apparent.

The results of the present investigation support and extend earlier findings on the effects of content and presentation variables on depressives' recall performance. The results of Experiment 1 suggest that depressives' bias in favor of negative information may be equivalent across both personally relevant more and general content areas. Depressives recalled more negative than positive words, but there were no differences attributable to the subdivision of negative words into personally relevant and general dimensions. This finding is consistent with earlier research on the preferential recall of negative

information, but it also suggests that the bias exhibited by depressives may not be limited to past experiences or personal attributes.

The effects of presentation variables can be seen in reference to Experiment 2. When depressives were asked to rate negative and positive words along a semantic dimension, and when they were asked to generate the to-be-remembered items, their preferential recall of negative information was no longer apparent. The findings of Experiment 2 also suggest that the orienting tasks used in the present investigation influenced depressives' recall performance in the same manner as earlier research that required subjects to rate the words along subjective dimensions, namely, personal relevance and pleasantness ratings. Thus, it appears that tasks that require depressives to attend to each of the presented words individually may result in equivalent recall across negatively and positively valenced materials. Some support for this hypothesis can be seen in reference to recall performance following the blocked presentation of the negative and positive words in Experiment 1. The experimenter- imposed organization of the stimulus materials did not result in an elimination of the preferential recall of negative items by the depressed subjects. As noted earlier, this manipulation directed the subjects' attention to the emotional valence of the presented words but did not emphasise the distinctiveness of any of the words within a particular content area. It is suggested that depressives' recall of negative information may occur despite externally imposed organization of affective tones, but that tasks that require subjects to attend to each of the presented words individually may eliminate depressives' preferential recall of negative information.

The findings of the present investigation also suggest that deficits exhibited by depressives may not be due solely to the bias of processing negative information at the expense of positive information. In Experiment 2, when the effects of content were minimized, depressives recalled equivalent amounts of negative and positive information, but their recall remained inferior to that of normal subjects and more closely resembled the performance of the psychiatric patients. The finding that depressives recalled equivalent amounts of negative and positive information is consistent with earlier reserach findings reported above. However, the finding that depressives' recall remained inferior to that of normals, also suggests that there may be a general processing deficit that is not limited to negative and positive content information.

Previous research examining depressives' performance as a function of neutral content materials (cf., Gibson,1981; Henry et al., 1973; Sternberg & Jarvik, 1976; Weingartner et al., 1981) has indicated the presence of a cognitive deficit in depression. The nature of this deficit has been described in terms of a general suppression of cognitive functions (Gibson, 1981), and as a deficit in the elaborative processing of information (Weingartner et al., 1981). The findings of Experiment 1 indicate that depressives' recall of negative words was equivalent to that of normal subjects. Thus, in reference to negative content, depressives did not exhibit deficits attributable to a suppression of cognitive functions or to a lack of elaborative processing. In reference to positive information, however, depressives recalled fewer words than normals. This pattern of results suggests

that the content of the materials plays an important role in determining whether or not the hypothesized cognitive deficit in depression would be apparent.

The findings of Experiment 2 may be viewed as consistent with research utilizing neutral materials. In Experiment 2, the presentation conditions minimized the effects of content by encouraging subjects to process the meanings of words within specified contexts. As noted earlier, these manipulations eliminated the effects of content because subjects were required to attend to and to process each of the words individually. Such manipulations also emphasized the distinctive meanings of each of the words rather than their general affective tones. Recall performance following these manipulations indicated that depressives recalled equivalent amounts of negative and positive information, but their recall remained inferior to that of normals. This finding suggests that in addition to the content specific processing bias in favor of negative information, depressives also show deficits that are not directly related to content, which is consistent with Gibson's (1981) and Weingartner et al.'s (1981) interpretations.

Depressives' performance on the organization measure indicated that they utilized content more readily in organizing the information, following the blocked presentation, only in reference to the four content areas specified by the experimenter. This finding is consistent with Weingartner et al.'s observations that depressives tend to "form non-transformed copies of stimulus events", indicating that they do not spontaneously engage in elaborative organizational processes. Taken

together, the findings of Experiments 1 and 2 indicate that processing deficits in depression may be a function of the affective valence of the information, as well as more general deficits in the elaborative processing of information.

Theoretical Implications

Beck (1974) has suggested that depressives exhibit a thinking disorder that is more specific and less gross than that found in schizophrenia. Beck et al. (1979) suggested that the thinking disorder associated with depression is characterized by errors in the interpretation of situations, so that they are cast in a negative light. These errors influence depressives' perceptions of themselves, their world, and their future, as well as their thoughts, images, and recollections. As discussed earlier (see section on "additional characteristics of cognitive errors"), the errors identified by Beck et al. may be conceptualized in terms of content errors or in terms of processing errors. Content errors refer to the predominantly negative content of depressives' perceptions and thoughts. Processing errors refer to the manner in which depressives arrive at certain conclusions. Processing errors are more general than content errors in that they characterize thinking processes along a variety of tasks and content areas. Such errors may be more easily detected in reference to positively and negatively valenced affective materials, but may nonetheless be operational in reference to neutral or abstract information.

The findings of the present investigation suggest that both content and processing of errors may be operational in depression. In reference to content errors, the results of Experiment 1 indicate that depressives tend to selectively process and recall negative information. In addition, the content of the items generated by depressives in Experiment 2 show a bias in favor of interpreting ambiguous situations in a negative light. These findings lend direct support to Beck's position on the predominence of negative content in depressives' thoughts and the tendency of depressives to attend selectively to negatively valenced affective materials.

In reference to processing errors, the results of depressives' clustering performance following the blocked presentation in Experiment 1 suggest that depressives were less likely, than the two control groups, to utilize organizational processes spontaneously. In Experiment 2, following the generation and semantic orienting tasks, depressives recalled equivalent amounts of negative and positive information, but their recall remained inferior to that of the normal subjects. Thus, processing errors were apparent in the absence of the bias attributable to the preferential processing of negative information. Such processing errors reflect deficits that are not exclusively related to the emotional content of presented items. These findings, therefore, provide indirect support for the conceptualization of two types of processing errors in depression. Such a conceptualization was based on the errors identified by Beck et al. (1979) and as such, may be viewed as an elaboration on Beck's general theoretical model.

In considering the possible mechanisms that may account for these findings, the theoretical formulations of Bower (1981) and Leight and Ellis (1981) provide different but complimentary interpretations. Bower (1981) proposed a network theory of state dependent retrieval in which emotions serve as memory units that can enter into associations with other events occurring coincidentally. The activation of an emotion facilitates retrieval of associated events, as well as remote events associated with similar emotions. According to this theory, mood congruent materials are more memorable because such materials intensify the emotions being experienced by the individual and thus facilitate the recognition of events associated with these emotions. Bower's state dependent learning theory has often been cited in reference to the differential recall of negative information by depressed subjects. Bower's conceptualization is consistent with findings from Experiment 1 where depressives' recall reflected mood congruent processing and retrieval. Mood congruent effects on performance were also found in reference to the content of the generated items by the three groups of subjects in Experiment 2. In completing the ambiguous sentence frames, depressives generated more negative than positive words while the two control groups generated more positive than negative words.

Leight and Ellis (1981) proposed an interference model to account for the poor performance of depressives on cognitive tasks. Leight and Ellis suggested that depressed affect produces changes in the cognitive state of the individual and thus interferes with effortful learning processes. According to this model, the depressed individual engages in task irrelevant processing (e.g., ruminations about oneself), thus

reducing the amount of cognitive resources available for task relevant processing. This conceptualization is consistent with earlier findings of general cognitive deficits in depression and with the results of the recall data of Experiment 2 in the present investigation. The performance of the depressed subjects following the generation and semantic orienting tasks showed comparable performance across content areas, but overall recall performance indicated that depressives' recall was equivalent to the psychiatric patients, for whom cognitive deficits have been well documented. Leight and Ellis' model is also consistent with the interpretation of cognitive rigidity on the part of depressives. Clustering performance along negative and positive content areas reflected spontaneous organizational strategies, since organizing information along these two dimensions was not directly specified by the presentation instructions. The fact that depressives clustered information only along the four content areas specified by the presentation instructions and not spontaneously along positive and negative content, may indicate that depressives exhibit one type of cognitive rigidity as described by Leight and Ellis (1981).

In summary, the theoretical formulations presented above provide complimentary interpretations of the findings of the present investigation. Beck's propositions on the thinking distortions of depressives and Bower's mood dependent learning model are consistent with the content related effects found in the present investigation. Mood congruent processing was evident in depressives' recall performance on Experiment 1 and the content of the items they generated in Experiment 2. The propositions of the more general interference model

(Leight & Ellis, 1981) were evident in the recall performance in Experiment 2. The finding that depressives' performance was highly dependent on content and presentation conditions suggests that depressives selectively process negative information when both types of content are presented in the same list. When depressives were required to process individual words within specific contexts, the effects of content became less apparent. The relatively poor performance of depressives, irrespective of content, suggests that depressives may also exhibit deficits that are not directly related to the preferential processing of negative information.

Clinical Implications

Beck's theoretical model emphasized the role of preferential processing of negative information in the maintenance of depression. Beck proposed that the tendency of depressives to interpret situations in a negative light results in intensifying their depressed mood and in turn leads to further distortions of environmental events. According to this model, the reduction of the cognitive processing bias in favor of negative information would result in the alleviation of the depressed mood. One purpose of the present investigation was to identify situations where depressives' bias in favor of processing negative information may be less apparent. The findings suggest that depressives' recall of positive information was equivalent to their recall of negative situations when they were required to attend to the presented materials within a specified context. Thus, depressives recalled equivalent amounts of negative and positive words when they

rated words according to how well they fit within the general meaning of a sentence and when they generated the words that they were later asked to remember. These findings suggest that in reference to events occurring naturally in the environment, depressives would tend to attend selectively to negative information about themselves and their surroundings, and that they would be more likely to attend to negative than positive feedback about themselves. Depressives may not benefit from the provision of positive feedback unless they are specifically directed to attend to each positive event. Therapeutic approaches that encourage patients to monitor the positive events in their daily lives may draw the patients' attention to the presence of positive life events and thus act to modify the tendency of patients to recall and report spontaneously more negative than positive occurrences. Beck's cognitive therapy for depression includes components that attempt to modify depressives' negative thought content by requiring patients to monitor and challenge their negative thoughts, as well as components that encourage patients to actively test the assumptions, hypotheses, and conclusions that they hold. In cognitive therapy, patients are instructed to keep daily records of their negative thoughts, and to generate alternative, more realistic interpretations of those negative thoughts. Patients are also instructed to engage in activities designed to maximize the probability of experiencing the positive events that occur naturally in the environment. Speculating from the present findings, it is suggested that the active involvement of patients in monitoring and modifying their negative thoughts may be an important variable in understanding the effective theraputic elements in cognitive

behavioral interventions for depression.

The results of the present investigation suggest that the elimination of the processing bias in favor of negative information may not result in the amilioration of the more general cognitive deficit that may be present in depression. Interventions that focus on minimizing the preferential processing of negative information by depressives may not be effective in eliminating the more general cognitive deficits experienced by depressed individuals. Recent research (e.g., Silverman, Silverman, & Eardley, 1984; Simons, Garfield, & Murphy, 1984) has suggested that improvements in cognitive functioning in depression may not be limited to manipulations that attempt to influence patients' cognitive processes directly. The research reported by Simons et al. (1984) indicates that improvements on cognitive measures were obtained when patients were treated with medications in the absence of any direct focus on modifying cognitive activity. Addressing the issue of predisposition for depression, Silverman et al. (1984) reported that depressives' scores on the Dysfunctional Attitude Scale (DAS) indicated that dysfunctional thinking was more prominent during periods of depression than during periods when patients did not exhibit depressive symptomatology. Silverman et al. suggested that maladaptive thoughts occur as a result of the depressive episode rather than predispose individuals to depression. Together, the investigations of Simons et al. and Silverman et al. indicate that while there is a thinking disorder associated with depression, this disorder occurs concommitantly with the depressive episode and remits as a function of overall clinical improvement. These findings also suggest that the

amelioration of depressive symptomatology may not be dependent on changes in cognitive processes but rather any treatment that alleviates the depressed mood would also produce improvements in cognitive functioning.

In summary, the findings of the present investigation suggest that the active ingredients in cognitive therapy may be related to the deliberate involvement of patients in monitoring and modifying their dysfunctional thoughts. The finding that cognitive deficits were apparent in the absence of content related distortions suggests that the cognitive deficit in depression is not limited to differential processing of negative information. Recent research findings also suggest that maladaptive thoughts occur as a function of the depressive episode and that improvements on cognitive measures are not limited to interventions that address cognitive processes directly, but rather improvements occur as a function of the remission of depressive symptomatology in general.

Summary and Conclusions

The present research investigated the relationship between depression and the organization and recall of positively and negatively valenced affective information. The overall findings suggest that content and presentation variables are important determinants of depressives' preferential processing and recall of negative information. The findings further suggest that the deficits exhibited by depressives may not be limited to affectvely toned materials.

This investigation replicated previous research by demonstrating that depressed patients recall negative information more readily than positive information. The current findings also contributed to the existing body of research in several ways. First, the results showed that depressives' preferential recall of negative information was not limited to personally relevant materials. Depressives' recall performance reflected a bias in favor of processing negative inforamation in general. Second, following some presentation conditions, depressives' differential recall of negatively toned materials was eliminated. Third, the cognitive deficits exhibited by depressives occurred in the absence of content-related effects. These findings are important since the majority of previous research has focused either on investigating the effects of content on depressives' recall or on identifying processing errors related to neutral materials and abstract tasks. The concurrent examination of content-related errors and general processing errors may provide a clearer picture of the cognitive characteristics associated with depression.

Current theoretical formulations (cf., Beck, 1976; Bower, 1981; Leight & Ellis, 1981) provide partial explanations of the present findings but none of these models can clearly account for the two types of cognitive deficits indicated by the present investigation. The theory advanced by Beck suggests that cognitive distortions in depression are bound by the affective content of information. Bower's model of state dependent learning emphasizes the role of emotions in facilitating the encoding and retrieval of mood congruent materials. Leight and Ellis' interference hypothesis addresses the general

cognitive deficit associated with depressed mood. A conceptualization of depressives' cognitive deficits in terms of content-'specific and general processing errors would explain many of the diverse findings reported in the literature in reference to depressives' performance on cognitive tasks. Depressives have been shown to perform as well as normals in some situations and as poorly as psychotic patients in others. Depressed subjects have also been shown to recall more negative than positive information in some situations but not in others. The conceptualization of two types of cognitive deficits in depression would suggest that presentation variables may differentially affect the processing of affectively toned and neutral materials. In reference to the present findings, perhaps the presentation variables included in Experiment 2 acted to suppress depressives' recall of negtative information rather than to enhance their recall of positive information. Other presentation variables may enhance the recall of positive and neutral materials. For example, Weingartner et al. (1981) demonstrated that depressives' performance approached that of normals when categorized lists of common objects were presented in a highly organized manner. Sternberg and Jarvik (1976) found no difference in the recall performance of depressives and normals on lists that contained a small number of neutral words. McDowall (1984) reported that depressed subjects who recalled lists that contained only positively valenced words performed as well as depressed subjects who recalled lists that contained only negative words. McDowall suggested that the presentation of lists that are comprised exclusively of positive words enhances the recall of positively valanced materials.

One of the primary limitations of the present investigation was that neutral content materials were not included in the examination of the effects of presentation variables on depressives' recall performance. Future research would need to make systematic comparisons of content and presentation variables on recall to demonstrate the specific characteristics of depressives' cognitive processes. Systematic comparisons among content and presentation variables might provide clues to the relationship between depressed mood states and the cognitive difficulties associated with them.

In conclusion, it is suggested that the current theoretical models need to incorporate findings attributable to content specific processing errors as well as to a general cognitive deficit in depression. Future research might focus on clarifying the relationships among content and presentation manipulations. Identification of these relationships would lead to a better understanding of the interaction of emotions and thoughts in general, and depressed affect and cognitive difficulties in particular.

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APPENDIX A

1. LETTER REQUESTING PERMISSION TO CONDUCT RESEARCH

2. CONSENT FORM

APPENDIX A--1

Letter Requesting Permission to Conduct Research

Dear Sir,

I am writing to request your permission to conduct a
a research project at the Adult Unit at Charter Hills Hospital.
This research is being conducted under the supervision of Drs.
Rosemery O. Nelson and R. Reed Hunt of the Psychology Department
at the University of North Carolina at Greensboro.

The primary focus of this research is on investigating the
cognitive correlates of depression. It has long been known that
depressed patients often complain of, and frequently demonstrate,
difficulties in thinking, concentration, and memory. Recent
theoretical formulations have attributed a causal role to cog-
nitive factors in the etiology and maintenance of depression
and some current therapies attempt to alleviate depressives
symptoms via cognitive interventions. The specific nature and
extent of cognitive difficulties in depression have not, however,
been well understood or researched. Recent investigations have
demonstrated specific cognitive deficits associated with depre-
ssion. These investigations have also identified several
factors that may influence the performance of depressed subjects
on tasks of concentration and recall. For example, it has been
found that depressives are more likely to dwell on and recall
only negative information about themselves and their experiences.
Depressives, however, were also shown to benefit from organiza-
tional factors, such as the amount of information to be recalled
at a given time as well as the manner in which information is
presented.

The present research attempts to examine these factors
systematically with groups of inpatient depressives as well as
other psychiatric populations and normals. It is hoped that
the findings of this research will shed some light on the role
of cognitive factors in the maintenance of depression as well
as identify some of the cognitive characteristics that may be
uniquely associated with a depressive episode. It is also hoped
that this line of research will eventually lead to the
development of more efficient intervention strategies in the
treatment of depressive disorders.

Enclosed is a brief statement of the methods to be employed
in this project. Also enclosed are copies of the consent form

and debriefing statement to be completed by the participants. This research has been reviewed, and approved, by the Human Subjects Committee of the Psychology Department at the University of North Carolina at Greensboro. A copy of the approval form is attached.

I hope that this proposal will meet with your approval. If you have any questions, or if I can provide you with any further information, please let me know.

Sincerely,

Isis Badawi, M. A.
Graduate Student
UNC-G

Rosemery O. Nelson, Ph.D.
Professor
UNC-G

Enclosures:

1. Human Subjects Committee approval form
2. Methods employed in the present investigation
3. Consent form
4. Debriefing statement

APPENDIX A-2

Consent Form

I _____, hereby agree to participate
in a psychological research project conducted by Isis Badawi
under the supervision of Drs. Rosemery Nelson and R. Reed
Hunt, of the Psychology Department at the University of North
Carolina at Greensboro. This research is designed to examine
the meaningfulness of various types of information.

As explained to me, my eligibility for participation will
be determined based on a review of my chart (and/or a brief
personal interview) as well as my responses on a structured
questionaire. If selected, and if I still wish to participate,
I will be required to complete several tasks scheduled during
a single 60 minute session. I was informed that my identity,
as well as any personal information about me, will be kept
confidential and that information derived from my responses
will be reported on as a part of a larger group of participants.

I understand that I may withdraw from this project at
any time, if I should so desire.

Signed_____

Witness_____

Date _____

APPENDIX B

BECK DEPRESSION INVENTORY (BDI)

APPENDIX B

Beck Depression Inventory (BDI)

DS_____

Name_____   Date _____

On this questionaire are groups of statements. Please indicate
which statement from each group most closely describes how
you feel, by circling the number beside the statement you selected.

A   0   I do not feel sad.
     1   I feel blue or sad.
     2a   I am blue or sad all the time and I can't snap out of it.
     2b   I am so sad or unhappy that it is very painful.
     3   I am so sad or unhappy that I can't stand it.

B   0   I am not particularly pessimistic or discouraged about
          the future.
     1   I feel discouraged about the future.
     2a   I feel I have nothing to look forward to.
     2b   I feel that I won't ever get over my troubles.
     3   I feel that the future is hopeless and that things
          cannot improve.

C   0   I do not feel like a failure.
     1   I feel I have failed more than the average person.
     2a   I feel that I have accomplished very little that is
          worthwhile or that means anything.
     2b   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 (parent,
          husband, wife).

D   0   I am not particularly dissatisfied.
     1a   I feel bored most of the time.
     1b   I don't enjoy things the way I used to.
     2   I don't get satisfaction out of anything any more.
     3   I am dissatisfied with everything.

E   0   I don't feel particularly guilty.
     1   I feel bad or unworthy a good part of the time.
     2a   I feel quite guilty.
     2b   I feel bad or unworthy practically all the time now.
     3   I feel as though I am very bad or worthless.

```
F    0    I don't feel I am being punished.
     1    I have a feeling that something bad may happen to me.
     2    I feel I am being punished or will be punished.
     3a   I feel I deserve to be punished.
     3b   I want to be punished.

G    0    I don't feel disappointed in myself.
     1a   I am disappointed in myself.
     1b   I don't like myself.
     2    I am disgusted with myself.
     3    I hate myself.

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

I    0    I don't have any thoughts of harming myself.
     1    I have thoughts of harming myself but I would not carry
          them out.
     2a   I feel I would be better off dead.
     2b   I feel my family would be better off if I were dead.
     3a   I have definite plans about committing suicide.
     3b   I would kill myself if I could.

J    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.  I can't stop it.
     3    I used to be able to cry but now I can't cry at all
          even though I want to.

K    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.
     3    I don't get irritated at all at the things that used
          to irritate me.

L    0    I have not lost interest in other people.
     1    I am less interested in other people now than I used
          to be.
     2    I have lost most of my interest in other people and
          have little feeling for them.
     3    I have lost all my interest in other people and don't
          care about them at all.

M    0    I make decisions about as well as ever.
     1    I try to put off making decisions.
     2    I have great difficulty in making decisions.
     3    I can't make any decisions at all any more.
```

N   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 and they make me look unattractive.
    3   I feel that I am ugly or repulsive looking.

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

P   0   I can sleep as well as usual.
    1   I wake up more tired in the morning than 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 early every day and can't get more than five hours sleep.

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

R   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 any more.

S   0   I haven't lost any weight, if any, lately.
    1   I have lost more than five pounds.
    2   I have lost more than ten pounds.
    3   I have lost more than 15 pounds.

T   0   I am no more concerned about my health than usual.
    1   I am concerned about aches and pains or upset stomach or constipation.
    2   I am so concerned with how I feel or what I feel that it's hard to think of much else.
    3   I am completely absorbed in what I feel.

U   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 C

TABLES

Table 1

Demographic and Diagnostic Data

on the Inpatient Depressives

Subject	Age	Education (years)	Sex	Diagnosis	BDI Score	Days in Hospital
1	35	12	F	Dysthymic Disorder	28	4
2	56	12	F	Major Depression Single Episode	29	5
3	31	12	F	Major Depression Single Episode	33	6
4	27	10	F	Adjustment Disorder with depressed mood	41	7
5	44	15	F	Major Depression Recurrent	20	9
6	20	14	M	Major Depression Single Episode	29	13
7	31	12	F	Adjustment Disorder with Depressed Mood	23	10
8	28	12	F	Major Depression Recurrent	24	15
9	50	16	F	Dysthymic Disorder	21	30
10	52	16	M	Major Depression with Psychotic Features	49	11
11	44	12	F	Major Depression Single Episode	20	23
12	31	14	F	Major Depression Recurrent	52	1
13	54	13	F	Major Depression with Psychotic Features	20	3

Table 1 (cont'd)

Subject	Age	Education (years)	Sex	Diagnosis	BDI Score	Days in Hospital
14	26	12	M	Major Depression Single Episode	24	1
15	39	12	F	Major Depression Recurrent	38	7
16	49	12	F	Major Depression Single Episode	27	6
17	53	12	F	Adjustment Disorder with Depressed Mood	22	30
18	44	12	F	Major Depression Recurrent	32	10
19	55	12	F	Major Depression Single Episode	22	2
20	35	14	F	Major Depression Recurrent	41	7

Table 2

Demographic and Diagnostic Data

on the Psychiatric Patients

Subject	Age	Education (years)	Sex	Diagnosis	BDI Score	Days in Hospital
1	46	11	F	Acute Psychotic Disorder	10	7
2	57	15	F	Schizophrenia Paranoid type	8	7
3	54	12	F	Schizophreniform Psychosis	0	7
4	24	12	F	Atypical Psychosis	10	2
5	59	12	F	Schizophrenia Paranoid Type	5	17
6	21	13	F	Schizophrenia Paranoid Type	9	10
7	34	15	F	Schizophreniform Psychosis	1	4
8	35	12	F	Atypical Psychosis	7	10
9	29	12	F	Schizophrenia Paranoid Type	7	15
10	29	16	M	Schizophrenia - Chronic Undifferentiated	4	10
11	55	12	F	Schizophrenia Disorganized Type	1	10
12	28	12	F	Manic Episode	5	12
13	44	16	F	Schizoaffective Disorder - Excited Type	7	1

Table 2 (cont'd)

Subject	Age	Education (years)	Sex	Diagnosis	BDI Score	Days in Hospital
14	47	12	F	Somatization Disorder	7	5
15	28	12	M	Paranoid Disorder	7	6
16	35	17	F	Acute Paranoid Disorder	6	4
17	46	11	F	Adjustment Disorder with Mixed Emotional Features	1	7
18	33	12	M	Schizophrenia Undifferentiated Chronic with acute Exacerbation	10	8
19	26	12	F	Acute Psychotic Episode	10	18
20	25	14	F	Schizoaffective Disorder	2	9

Table 3

Descriptive Data on the Normal Subjects

Subject	Sex	Age	Education (years)	Occupation	BDI Score
1	F	27	12	Student	1
2	M	37	13	Manager	7
3	F	49	12	Receptionist	1
4	F	47	14	Manager	1
5	F	52	12	Office clerk	1
6	M	27	12	Student	4
7	F	43	14	Homemaker	3
8	F	27	14	Office clerk	1
9	F	25	12	Student	4
10	F	46	13	Salesperson	2
11	F	47	15	Homemaker	2
12	F	34	14	Typist	9
13	F	36	12	Cashier	1
14	F	36	12	Student	1
15	F	43	13	Receptionist	3
16	F	43	12	Office Clerk	9
17	F	41	12	Typist	3
18	F	57	12	Mental Health Worker	2
19	F	38	14	Nurse	7
20	F	45	16	Nurse	0

Table 4

Recall Performance as a Function of Group
Type, Positive and Negative Content, and
Random and Blocked Presentations
(Experiment 1)

	Depressives		Normals		Psychiatric Controls	
	Negative	Positive	Negative	Positive	Negative	Positive
Random	6.95 (mean)	5.35 (mean)	6.50 (mean)	6.60 (mean)	4.05 (mean)	4.35 (mean)
	43.43 (%)	33.43 (%)	40.62 (%)	41.24 (%)	25.31 (%)	27.18 (%)
Blocked	6.00 (mean)	4.65 (mean)	6.80 (mean)	6.45 (mean)	5.00 (mean)	4.45 (mean)
	37.50 (%)	31.65 (%)	42.56 (%)	40.31 (%)	31.25 (%)	27.82 (%)

Total number of words in each content area = 16.

Percentages were obtained by dividing the mean number of words
recalled in a content area by the total number of words in that
content area.

Table 5

Analysis of Variance Performed on the
Number of Words Recalled
(Experiment 1)

Group Type (3) x Content (2) x Presentation Conditions (2)

Source	df	MS	F
Group	2	93.13	12.66 ***
Subject (Group)	57	7.357	
Content	1	17.60	6.10 **
Group x Content	2	11.50	3.83 *
Content x Subject (Group)	57	2.88	
Presentation	1	.03	.02
Group x Presentation	2	5.035	2.12
Presentation x (subject (Group)	57	2.37	
Content x Presentation	1	.2	.05
Group x Content x Presentation	2	5.03	1.02
Content x Presentation x Subject (Group)	57	4.11	

*$p < .03$

**$p < .02$

***$p < .0001$

Table 6

Tukey Test Performed on Overall

Recall Performance

(Experiment 1)

	Depressives	Normals	Psychiatric Controls
Mean number of words recalled	5.775	6.587	4.450

p $\leq$ .05

df   = 57

MSe   = 3.964

Minimum Significant Difference = .757

Normals > Depressives > Psychiatric Controls

Table 7

Tukey Test Performed on Recall Per-

formance as a Function of Groups

and Negative and Positive words

(Experiment 1)

	Depressives	Normals	Psychiatric Controls
Negative (mean)	6.475	6.65	4.5
Positive (mean)	5.07	6.52	4.4

p   = .05

df   = 57

MSe = 3.964

Minimum Significant Difference = .757

For Depressives   Negative > Positive

For Normals and
  Psychiatric Controls   Negative > Positive

For Negative Words   Depressives > Normals ≃ Psychiatric
                                                              controls

For Positive Content   Normals > Depressives and Psy-
                                                    chiatric controls
                                   Depressives ≃ Psychiatric Controls

Table 8

Recall Performance as a Function of

Groups, four content areas, and

Presentations

(Experiment 1)

	Depressives				Normals				Psychiatric Controls			
	Negative		Positive		Negative		Positive		Negative		Positive	
	Per-sonal	Gen-eral	Per-sonal	Gen-eral	Per-sonal	Gen-eral	Per-sonal	Gen-eral	Per-sonal	Gen-eral	Per sonal	Gen-eral
(mean) RANDOM	3.55	3.40	2.9	2.45	3.2	3.3	3.65	2.95	1.85	2.2	2.25	2.1
(%)	44.0	42.5	36.25	30.62	40.0	41.25	45.62	36.87	23.12	27.5	28.12	26.25
(mean) BLOCKED	2.8	3.2	2.55	2.5	2.9	3.9	3.1	3.35	2.4	2.6	2.4	2.05
(%)	35.0	40.0	31.87	31.25	36.25	48.75	38.75	41.87	30.0	32.5	30.0	25.65

The Total Number of Words in each Category = 8

Percentages were obtained by dividing the mean number of words recalled in a

category by the total number of words in that category.

Table 9

Analysis of Variance Performed on the

Number of Words Recalled

(Experiment 1)

Group Type (3) x Content (4) x Presentation Conditions (2)

Source	df	MS	F
Group	2	46.56	12.66 ***
Subject (Group)	57	3.67	
Content	3	5.92	3.03 *
Group x Content	6	2.16	1.11
Content x Subject (Group)	171	1.95	
Presentation	1	.01	.02
Group x Presentation	2	2.51	2.12
Presentation x Subject (Group)	57	1.18	
Content x Presentation	3	1.57	.71
Content x Presentation x Group	6	1.74	.79
Content x Presentation x Subject (Group)	171	2.20	

*$\underline{p}$ < .0001

***$\underline{p}$ < .05

Table 10

Tukey Test Performed on Recall Per-

formance (four content areas,

Experiment 1)

	Normals	Depressives	Psychiatric Contols
(mean)	3.293	2.88	2.22

$\underline{p} \leq .05$

$\underline{df} = 171$

$\underline{MSe} = 2.202$

Minimum Significant Difference = .392

Normals > Depressives > Psychiatric Controls

Table 11

Tukey Test Performed on the Recall of

Negative and Positive, Personally

Relevant and General Words

(Experiment 1)

	Negative Personal	Negative General	Positive Personal	Positive General
(mean)	2.78	3.09	2.78	2.55

$\underline{p}$ = .05

$\underline{df}$ = 171

$\underline{MSe}$ = 2.202

Minimum Significant Difference = .497

Negative General ⊋ Positive General

Table 12

Analysis of Variance Performed on the Clus-

tering Data as a Function of Presenta-

tion (2) x Groups (3) for

Experiment 1

Source	df	MS	F
Group	2	.11	.94
Subject (Group)	57	.11	
Presentation	1	1.37	11.65 **
Presentation x Subject (Group)	57	.33	2.79 *

*p < .069

**p < .001

Table 13

Tukey Test Performed on the Cluster-

ing Scores (two content areas;

Experiment 1)

	Depressives	Normals	Psychiatric Controls
Random	.169	.103	.096
Blocked	.177	.453	.381

p ≤ .05

df = 57

MSe = .118

Minimum Significant Difference = .125

In Random Presentation: No Difference between the three Groups.

In Blocked Presentation: Normals = Psychiatric Controls
Both Groups > Depressives

For Normals and Psychiatric Controls:
Blocked > Random

For Depressives: Blocked = Random

Table 14

Analysis of Variance Performed on the Clus-

tering Data (four content areas;

Experiment 1)

Presentation (2) x Groups (3)

Source	df	MS	F
Groups	2	.08	.67
Subjects (group)	57	.124	
Presentation	1	2.49	19.74 ***
Group x Presentation	2	.04	.76
Presentation x Subject (Group)	57	.120	

***p < .0001

Table 15

Recall Performance as a Function of

Groups, Presentation Conditions,

and Content (Experiment 2)

	Depressives		Normals		Psychiatric Controls	
	Positive	Negative	Positive	Negative	Positive	Negative
Read	25.01%	27.05%	35.19%	29.11%	23.47%	16.15%
Generate	38.24%	37.29%	52.18%	47.06%	35.64%	33.40%

Table 16

Analysis of Variance Performed on the Percent of Words recalled

as a Function of Group Type (3) x Content (2) x Presen-

tation Conditions (2) (Experiment 2)

Source	df	MS	F
Groups	2	4190.53	7.43 **
Subjects (Group)	57	564.11	
Content	1	158.87	.51
Groups x Content	2	307.25	.99
Content x Subject(Group)	57	311.76	
Presentation	1	12284.13	41.49 ***
Presentation x Subject (Group)	57	296.09	
Content x Presentation	1	31.44	.09
Content x Presentation x Group	2	77.72	.23
Content x Presentation x Subject (Group)	57	341.79	

**p < .001

***p < .0001

Table 17

Tukey Test Performed on Overall Recall

Performance

(Experiment 2)

Depressives	Normals	Psychiatric Controls
31.75	40.87	26.58
(percent recall)	(percent recall)	(percent recall)

p   ≤ .05

df   =   57

MSe   = 341.80

Minimum Significant Difference = 7.034

Normals > Depressives = Psychiatric Controls

Table 18

Content of Generated Words

(Experiment 2)

	Depressives			Normals			Psychiatric Controls		
	Nega-tive	Posi-tive	Neut-ral	Nega-ative	Posi-tive	Neut-ral	Nega-tive	Posi-tive	Neut-tral
(mean)	.7.45	6.1	1.45	6.05	8.05	.8	5.8	7.7	1.5
(percent)	49.66	40.66	9.66	40.33	54.33	5.33	38.66	51.33	10.0

Each subject generated a total of 15 words.

Percentages were obtained by dividing the number of words generated in each content area by the total number of words generated.

Table 19

Analysis of Variance Performed on the

Content of Generated Words as a Function

of Content (3) x Groups (3)

(Experiment 2)

Source	df	Ms	F
Groups	2	0	0
Subject (Group)	57	0	
Content	2	649.71	293.39 ****
Group x Content	4	21.46	7.93 ***
Content x Subject (Group)	114	2.70	

****$p < .00001$

***$p < .0001$

Table 20

Tukey Test Performed on the Content

of Generated words

(Experiment 2)

	Depressives	Normals	Psychiatric Controls	TOTAL
Negative (mean)	7.5	6.05	5.8	6.45
Positive (mean)	6.1	8.15	7.7	7.32
Neutral (mean)	1.4	.8	1.5	1.23

p   =   .05

df   =   114

MSe   =   2.707

Minimum Significant Difference = .713

        For Content of Generated words:
                Positive > Negative > Neutral

        For Groups: Depressives
                Negative > Positive > Neutral

                Normals and Psychiatric Controls
                Positive > Negative > Neutral

        For Groups x Content:
        Positive words, Normals > Psychiatric Controls>Depressives

        Negative words, Depressives > Normals = Psychiatric
                                      Controls

APPENDIX D

SEQUENCES FOR PRESENTING THE FOUR CATEGORIES IN

THE BLOCKED PRESENTATION CONDITION IN EXPERIMENT 1

APPENDIX D

Sequences for Presenting the Four Categories

in the Blocked Presentation condition in

Experiment 1

	Order of Presentation			
	1	2	3	4
Sequence 1	Positive Personal	Negative Personal	Positive General	Negative General
Sequence 2	Negative Personal	Positive General	Negative General	Positive Personal
Sequence 3	Positive General	Negative General	Positive Personal	Negative Personal
Sequence 4	Negative General	Positive Personal	Negative Personal	Positive General

Five subjects in each of the three experimental groups (depressives, Psychiatric controls, and normals) received the same sequence of presentation. Ten subjects in each group received Sequences 1 and 3 when List 1 was presented in blocked fashion, and ten subjects received Sequences 2 and 4 when list 2 was presented in blocked fashion, resulting in the following four subgroups.

Subject	Blocked List	Sequence
1 - 5	1	1
6 - 10	2	2
11 - 15	1	3
16 - 20	2	4

APPENDIX E

1. WORDS USED IN EXPERIMENT 1, TOGETHER WITH THEIR
    FREQUENCIES OF OCCURRENCE PER 100,000 words

2. PROCEDURE FOR SELECTING WORDS IN EACH OF THE FOUR
    CONTENT AREAS IN EXPERIMENT 1

APPENDIX E

Words Used in Experiment 1, Together with

their frequencies of occurrence per

100,000 words [a]

	List 1		List 2	
	Content Area	Frequency	Content Area	Frequency
	(Positive Personal)		(Positive Personal)	
1.	tenderness	4	pleasure	62
2	kindness	8	peaceful	26
3	happiness	23	friendly	61
4	fulfillment	12	affection	18
5	merry	8	joy	40
6	love	232	energetic	11
7	exciting	29	passion	28
8	delighted	16	cheerful	10
	(Positive General)		(Positive General)	
1	glorious	16	victory	61
2	unity	71	humor	47
3	success	93	holy	49
4	spring	127	home	547
5	liberty	46	wisdom	44
6	beauty	71	vacation	47
7	advancement	10	accomplishment	10
8	freedom	128	Sunshine	8
	(Negative Personal)		(Negative Personal)	
1	grief	10	bitterness	18
2	lonely	25	worthless	3
3	discouraged	15	weak	32
4	anguish	8	shame	21
5	despair	21	hurt	37
6	agony	9	gloomy	3
7	jealous	4	depressed	11
8	sad	35	withdrawn	4

[a]   According to Kucera and Francis (1967)

APPENDIX E (cont'd)

List1			List 2	
Content Area	Frequency		Content Area	Frequency
(Negative General)			(Negative General)	
1 collapse	7		Poverty	20
2 death	277		extinction	3
3 wreck	8		hunger	17
4 destruction	38		decay	14
5 prison	42		pollution	6
6 bomb	36		rape	5
7 catastophe	11		abuse	18
8 infection	8		war	464

APPENDIX E (cont'd)

Procedure For Selecting Words In Each Of

The Four Content Areas In

Experiment 1

Sixty students enrolled in introductory psychology classes were asked to rate 324 words along positive and negative emotional content on a seven point scale. The 324 words were selected by the experimenter from various adjective checklists (e.g., the Depression Adjective Checklist - DACL and from a word thesaurus). The subjects were given the following instructions:

> This is a list of words that contains positive and negative adjectives and nouns. Positive words describe happy emotions or experiences and events that most people feel are positive ones. Negative words describe sad emotions or incidents that are generally viewed as negative and undesirable. Please read each of the words and rate it for its emotional content on a scale of 1 - 7, where a score of (1) would denote an extremely negative word and a score of (7) would denote an extremely positive word.

1	2	3	4	5	6	7	
Extremely Negative			neutral (no emotional content)				Extremely Positive

Words that had a mean rating of 6 or above were considered positive; words that had a mean rating of 2 or below were considered negative.

The same 60 students were then given the same list of 324 words, with instructions to rate the words along personal relevance and general content dimensions on a seven point scale.

The subjects were given the following instructions:

> This is the same list of words that you have
> just rated for emotional content, only the
> order of the words has been changed. Please
> read each of the words again and rate them
> according to how well a word describes an
> emotion or a feeling that a person might ex-
> perience. For example, words such as sad and
> happy would be considered descriptions of
> personal emotions, whereas words such as
> haven and rape would not. Please rate the
> words for their descriptive value of an
> emotion, regardless of whether the emotion
> is a sad or a happy one. The same scale of
> 1 - 7 will be used, with a score of (1)
> given for words with little descriptive
> value and a score of (7) for words that are
> typically used in describing emotions or the
> way a person might feel about him/herself.

not	1	2	3	4	5	6	7	highly des-

not descriptive of personal emotions

moderately descriptive

highly des- criptive of personal emotions

Only words that had been selected as denoting positive

or negative content were considered in reference to the per-

sonal relevance and general content dimensions. Of the nega-

tive and positive words, only words that had a mean rating

of 6 or above on the personal relevance scale were considered

to be descriptive of personal emotions. Negative and positive

words that had a mean rating of 2 or below were considered to

be general content words. This procedure produced positive

words that were descriptive of personal emotions, positive

words that denoted general positive content, negative words

that were descriptive of personal emotions, and negative words

that denoted general negative content.

The final lists of words included in this experiment were selected on the basis of the highest ratings obtained in each of the four content areas described above.

APPENDIX F

1. INSTRUCTIONS TO SUBJECTS RECEIVING EXPERIMENT 1
       FOLLOWED BY EXPERIMENT 2

2. INSTRUCTIONS TO SUBJECTS RECEIVING EXPERIMENT 2
       FOLLOWED BY EXPERIMENT 1

APPENDIX F

Instructions to Subjects

Subjects receiving Experiment 1 followed by Experiment 2.

> We are interested in what makes some words easier
> to remember than others. You will be shown some
> words printed on index cards. You will be asked
> to read each word aloud, then place the card face
> down on the table in front of you. After you have
> finished reading all the words, I will ask you to
> try and remember as many of the words as you can.
> You may say the words in any order you like. You
> are not expected to remember all the words, but
> please try and guess at words you're not sure of.
> Do you have any questions so far?

The instructions were repeated if necessary.

> O. K. I will show you each word for five seconds.
> If you find a word difficult to read, I will read
> it first then I'll ask you to repeat it after me.
> When we have finished with all the cards you will
> have as much time as you need to try and remember
> the words. Try and remember as many words as you
> can, in any order you like. Please guess at the
> words you're not sure of, then let me know when
> you have finished.
> Are you ready?   Here is the first card.

The cards were presented one at a time, then placed face down

after the subject had read the word or repeated the word

after the experimenter. After all the words had been read,

the experimenter collected the cards.

> O. K. now try and remember as many words as you can.

If the subject paused for longer than 30 seconds, the experi-

menter again encouraged the subject to guess. If the subject

indicated that he/she had completed recall, the task was

terminated.

> That was fine, thank you.

Now I am going to show you another list of words.
These words are printed on cards just as in the
first list, only this time each eight words will
be about the same topic or category. For example
words like cat, dog, and horse all belong to the
category of animals. I will tell you the name
of the category or topic of each eight words be-
fore you start reading the words that belong to
the category. Just as with the other list, you
will be asked to read each word aloud, then place
the card face down on the table. Again, you will
have five seconds to read each word. If you have
difficulty, I will read the word and ask you to
repeat it aloud. After we have finished with all
the words, you will again have as much time as
you need to try and remember the words. Try and
remember as many words as you can, in any order
you like. As before, guess at words you're not
sure of and let me know when you have finished.
Any questions?

The instructions were repeated as necessary.

Prior to presenting the first card the experimenter named the

category.

Ready? The first eight words in this list are
all about (category name), here is the first word.

After the first eight words had been presented, the experimenter

named the next category. Starting with the second category,

only the category name was said by the experimenter. This

procedure was repeated until the subject had read eight words

in each of four categories.

O. K. now try and remember the words.

The procedure for providing prompts and terminating the task

was the same as described above.

Thank you. That was fine. The hard memory work
is over. You may take a couple of minutes to
rest before we go on to a different task.

Now we are interested in the way sentences
convey information. We would like to know
how sentences are constructed and how cer-
tain words are chosen to fit in a sentence
so that it would make sense. I will show
you cards with sentences printed on them.
Some sentences will have an important word
underlined and other sentences will have
some key word missing. Your task will be
to complete the sentences with the missing
words. You are to write a word that you
think best fits the general meaning of
the sentence. For the sentences that have
an underlined word, you are to copy that
word, then rate it on a scale from 1 - 5
according to how well you think that word
fits within the sentence. The higher the
number you assign to the word, the more
meaningful it is to you. For example, if
you think a word fits very well within the
sentence, you may rate it as a 5. If you
think the word does not fit at all within
the meaning of a sentence, you may rate it
as a 1. You may rate the words as 2 or 3
or 4 depending on how well you think the words
fit, bearing in mind that the higher the
number that you assign the better the fit in
your opinion.
Do you have any questions?

The instructions were repeated as necessary.

Please read the sentences aloud before you
complete the missing words or copy and rate
the underlined words. Here is a sheet of
paper on which I would like you to write
the words that complete the sentences with
the missing words and to rate the underlined
words in the sentences that are already
complete. Please copy the underlined words
before you rate them.
Any questions?   Ready?
Here is the first sentence. Please read it
aloud before you fill in the missing word or
rate the underlined word.

The sentence cards were presented one at a time. Subjects

were allowed 20 seconds in which to read the sentences. If the

subject had not read the sentence within 20 seconds, the

experimenter read the sentence aloud then the subject was

asked to repeat it. The experimenter then asked the subject

to write the missing word or to copy and rate the underlined

word. When the subject had completed the task for all the

sentences, the experimenter removed the cards.

> Thank you. This will be quite helpful to us.
> but there's one more thing we need to do. Please
> try and remember the words you used to complete
> the sentences and the words that you rated in the
> sentences that were already complete. You can
> say them in any order, and please guess at words
> you may not be sure of. You may take as much
> time as you need to try and remember the words,
> but please let me know when you have finished.

The procedure for providing prompts and for terminating the

task was the same as that described above.

> That's all, thank you for your time. I appreciate
> your cooperation on completing all these tasks.

The subject was debriefed and escorted to the door.

Instructions to subjects receiving Experiment 2 followed by

Experiment 1.

Subjects receiving the incidental recall task first

were given the following initial instructions:

We are interested in people's choice of words
and how their choices influence the general
meaning of a sentence. I will show you cards
with sentences printed on them. Some of the
sentences have been completed by other people
and other sentences have an important word
missing. The completed sentences have an
important word underlined. Your task will be
to complete the sentences with the missing
words.....

The remainder of the instructions for this task was the same

as those stated above. The instructions for the free recall

task were identical to those described earlier in reference to

Experiment 1.

APPENDIX G

FIGURES ·
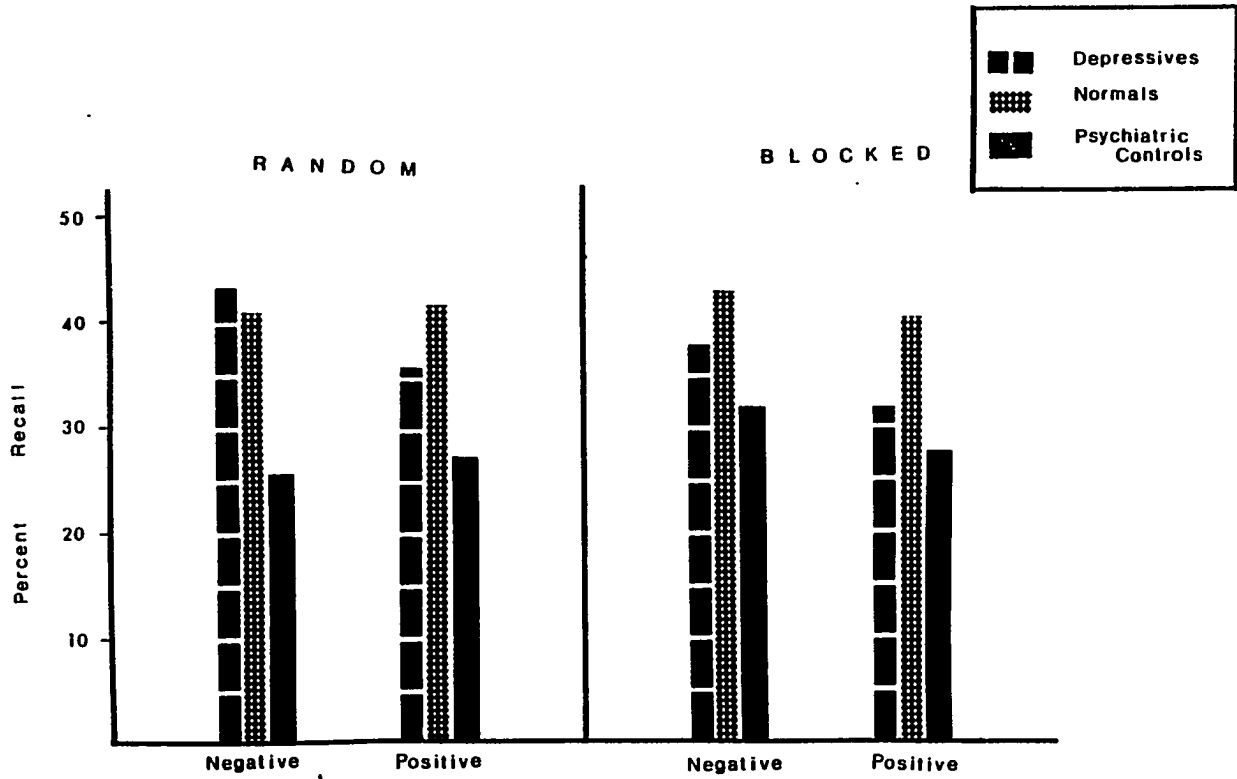
Figure 1: Percent Recall as a Function of Groups,
Content (Negative and Positive words),
and Presentation Conditions (Experiment 1)
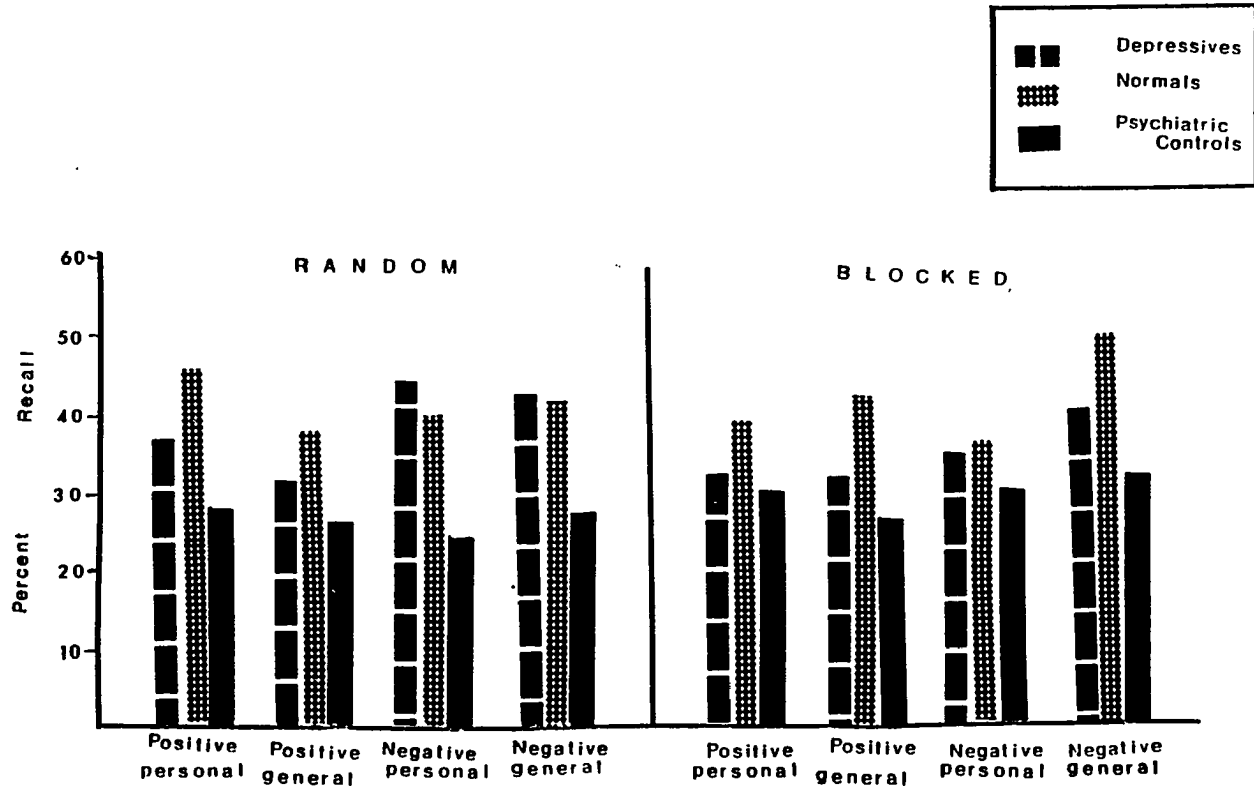
Figure 2 : Percent Recall as a Function of Groups,
Content (negative and positive, per-
sonally relevant and general words),
and Presentation Conditions (Experiment 1)
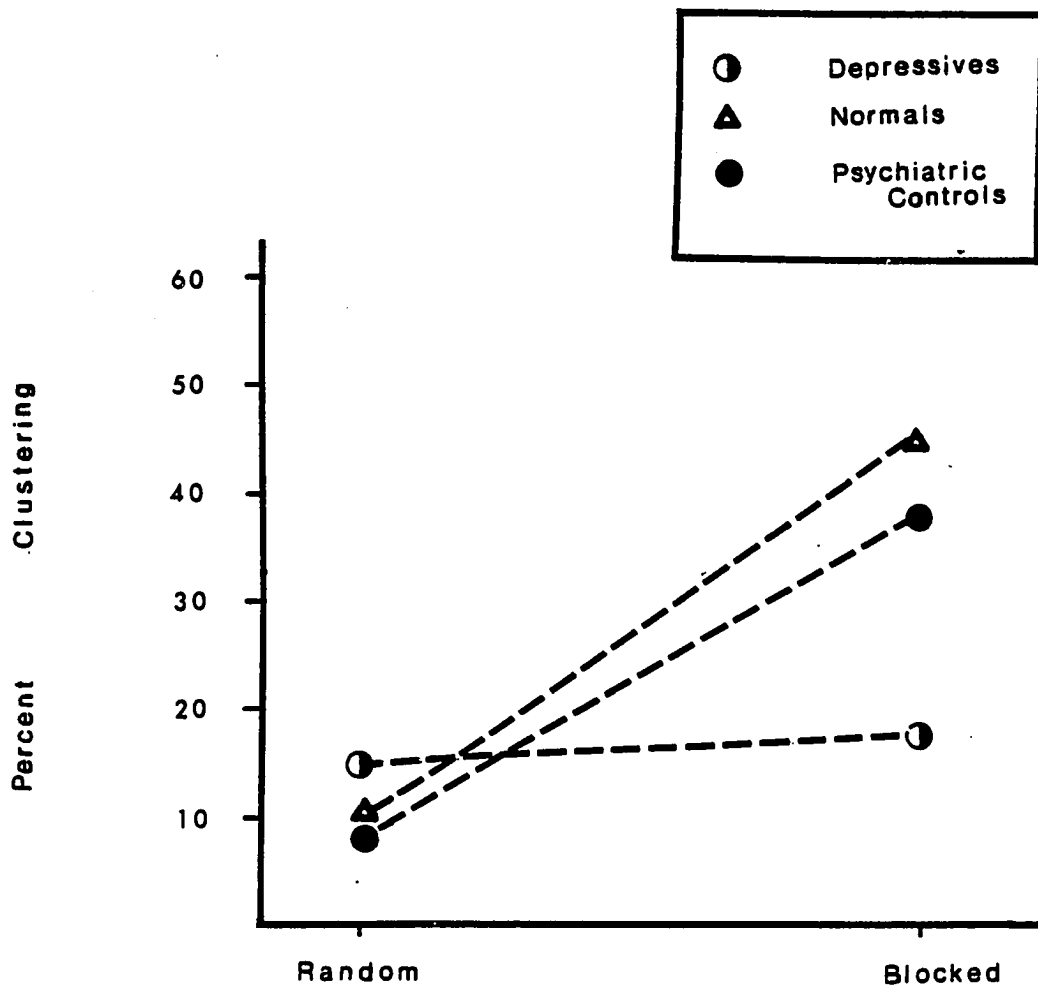
Figure 3 : Clustering Performance based on two
Categories (negative and positive
content: Experiment 1)
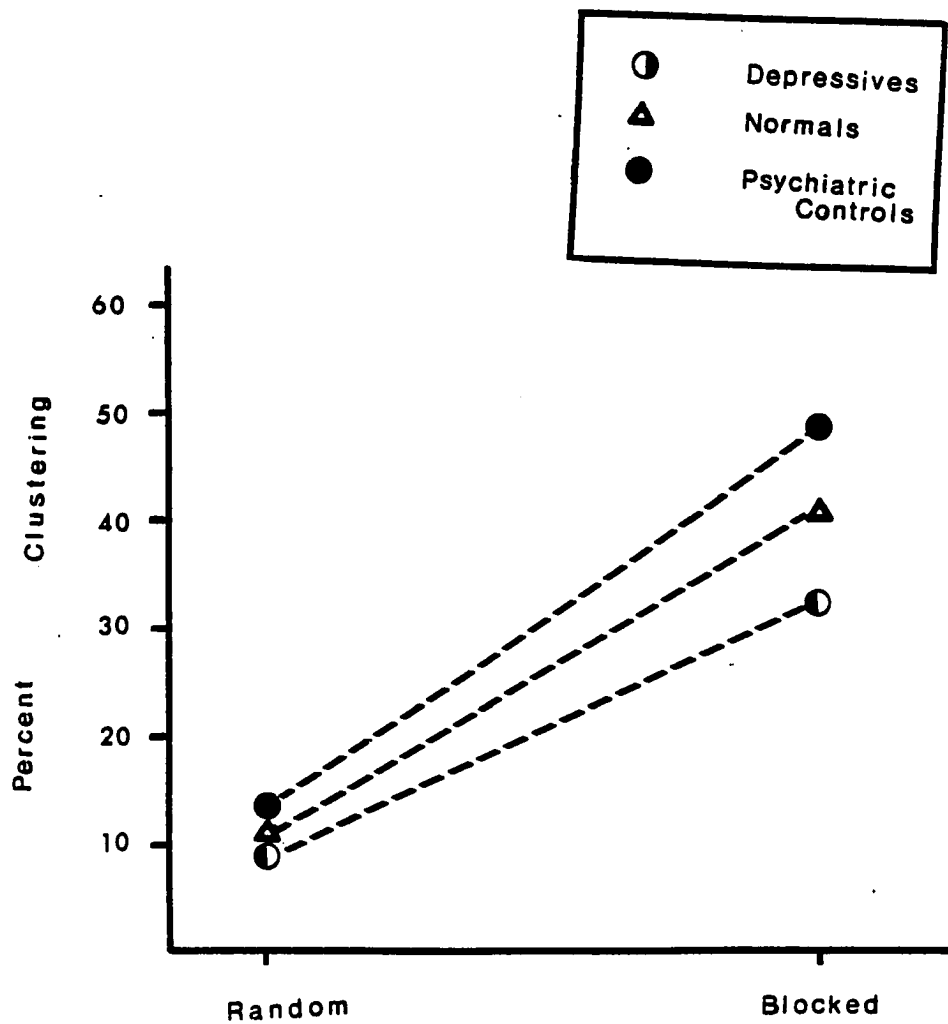
Figure 4: Clustering Performance based on four Categories (negative and positive, personally relevant and general content) Experiment 1
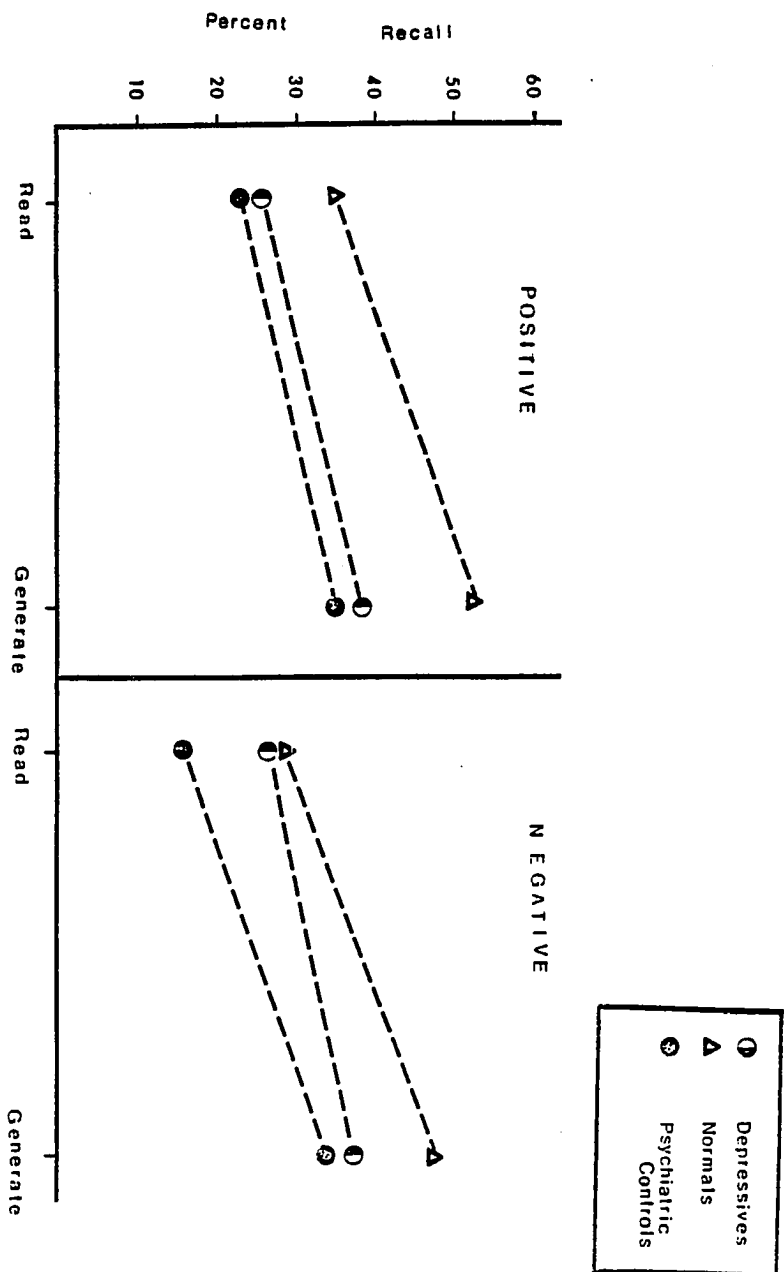
Figure 5: Percent Recall of Positive and Negative Words
as a Function of Groups and Presentation
Conditions (Experiment 2)
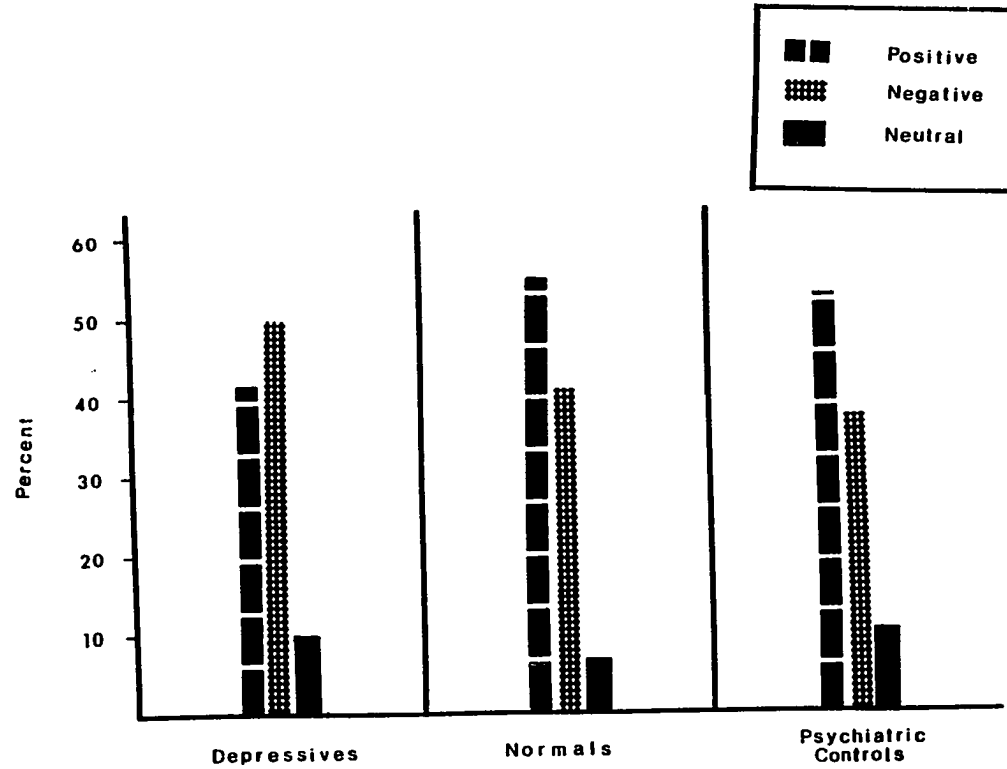
Figure 6: Percent Negative, Positive, and Neutral
Content of the Generated Words
(Experiment 2)

APPENDIX H

INDIVIDUAL DATA

APPENDIX H

RAW SCORES FOR EXPERIMENT 1

Recall Data (There were eight words in each of the categories)

Inpatient Depressives

Subject	Random				Blocked			
	NP	NG	PP	PG	NP	NG	PP	PG
1	3	3	6	4	2	3	3	2
2	4	5	4	1	3	4	2	1
3	3	3	1	3	3	4	1	3
4	4	3	4	2	3	3	2	0
5	3	4	6	2	3	3	3	4
6	7	5	2	1	2	1	3	4
7	1	4	4	2	7	1	0	3
8	2	4	2	2	2	5	4	4
9	5	2	6	4	3	4	3	2
10	3	2	0	4	0	4	2	6
11	2	2	1	0	1	1	1	3
12	2	2	1	0	4	5	1	1
13	3	4	0	5	3	2	4	1
14	4	5	2	1	3	3	3	2
15	5	4	1	2	1	2	3	3
16	4	5	2	3	4	4	3	1
17	3	2	4	2	3	3	2	2
18	7	4	2	6	5	5	6	3
19	2	2	4	0	3	4	3	2
20	4	3	3	3	1	3	2	3
(Mean)	3.6	3.5	2.9	2.45	2.8	3.2	2.55	2.5

Normal Controls

Subject	Random				Blocked			
	NP	NG	PP	PG	NP	NG	PP	PG
1	5	4	4	4	4	3	0	3
2	3	5	3	2	3	4	2	1
3	2	2	3	2	2	3	2	2
4	2	4	6	1	4	5	6	4
5	3	3	4	2	2	3	4	3
6	4	3	4	4	5	6	2	5
7	3	3	4	3	0	5	3	2
8	0	5	4	2	2	3	4	2
9	2	3	3	5	4	4	2	2
10	1	4	4	0	1	3	3	1
11	5	3	3	5	4	5	5	5
12	2	4	3	3	3	3	3	4
13	4	1	3	3	5	1	3	5
14	2	2	4	2	5	1	4	3
15	2	4	3	2	0	4	3	5
16	5	4	3	7	7	3	5	4
17	5	3	4	0	4	5	0	6
18	4	3	6	3	0	5	5	3
19	6	4	2	2	2	3	4	3
20	4	2	3	7	1	6	5	4
(Mean)	3.2	3.3	3.65	2.95	2.9	3.9	3.1	3.35

Psychiatric Controls

Subject	Random				Blocked			
	NP	NG	PP	PG	NP	NG	PP	PG
1	1	3	4	3	3	1	5	0
2	2	1	3	0	1	3	1	1
3	0	1	2	1	2	0	2	0
4	1	2	2	2	3	1	3	1
5	1	2	4	2	4	3	0	4
6	3	3	5	2	4	4	3	2
7	4	2	2	5	0	4	2	2
8	3	2	2	2	5	3	2	1
9	2	2	2	3	0	2	0	3
10	0	2	0	2	2	3	0	5
11	3	1	2	3		3	3	2
12	0	3	0	3	2	2	2	3
13	3	4	5	2	4	4	5	2
14	4	4	2	3	3	3	5	4
15	1	4	1	1	2	2	7	2
16	3	1	2	1	0	4	3	0
17	2	1	2	1	3	4	1	0
18	1	1	1	1	2	2	0	4
19	2	3	2	1	4	1	2	2
20	2	2	2	4	3	2	2	3
(Mean)	1.85	2.2	2,25	2.1	2.4	2.6	2.4	2.05

Clustering Data (percent)

Inpatient Depressives

	Two Categories		Four Categories	
	Random	Blocked	Random	Blocked
Subject				
1	-.033	-.250	-.055	.090
2	.097	.065	.020	.500
3	.315	.512	.285	.377
4	-.096	.500	-.070	.428
5	.226	.272	.173	.253
6	-.315	.687	-.186	.500
7	-.103	.177	-.293	.175
8	.210	.227	-.190	.118
9	.309	.586	.025	.500
10	-.159	-.382	-.046	-.310
11	.752	-.197	-.363	1.00
12	1.0	-.315	1.0	-.219
13	.173	0	.143	0
14	.60	.103	.419	.441
15	.428	1.0	.613	1.0
16	-.289	-.152	-.020	.450
17	-.372	-.052	-.200	.090
18	.392	.646	.236	.776
19	0	-.239	.333	.143
20	.268	.420	.104	.130
(Mean)	.155	.177	.096	.321

Normal Controls

	Two Categories			Four Categories	
	Random	Blocked		Random	Blocked
Subject					
1	.197	.060		-.029	-.08
2	.031	.470		.061	.50
3	.130	.420		.182	.182
4	.451	.410		.644	1.0
5	.200	.380		.143	.143
6	.076	.603		.146	.50
7	-.460	.250		-.044	.047
8	-.097	.327		.185	.60
9	.031	.539		.061	.640
10	-.130	-.157		-.141	.20
11	.536	1.00		.401	1.00
12	.20	.634		.314	.402
13	.103	.317		-.452	.553
14	-.052	.339		-.190	.671
15	-.555	.078		-.200	.143
16	.174	.410		.165	.258
17	.308	1.0		.315	.618
18	-.017	.418		-.212	.227
19	.364	1.00		.404	1.00
20	.538	.563		.507	.507
(Mean)	.102	.453		.113	.410

Psychiatric Controls

Subject	Two Categories		Four Categories	
	Random	Blocked	Random	Blocked
1	.512	.428	.170	.687
2	-.428	.401	-.250	1.00
3	1.00	1.00	1.00	1.00
4	.200	1.00	.069	1.00
5	-.333	.756	.380	.484
6	.195	.224	-.095	.153
7	.817	1.00	.197	1.00
8	.420	.024	-.081	.327
9	-.449	-.428	-.081	-.428
10	0	1.0	0	1.0
11	.710	.420	.710	.142
12	0	.420	0	-.081
13	0	-.166	.020	.020
14	.031	.677	-.070	.359
15	.462	-.101	1.00	.246
16	.176	1.00	-.075	1.00
17	-.500	-.333	-.429	1.00
18	-1.00	.666	0	.333
19	-.090	.130	-.090	.420
20	.210	-.500	.285	-.136
(Mean)	.096	.380	.129	.471

APPENDIX H (Cont'd)

RAW SCORES FOR EXPERIMENT 2

Recall Performance (Percent)

Inpatient Depressives

	Read		Generate	
Subject	Positive	Negative	Positive	Negative
1	42.85	57.14	71.42	62.52
2	42.85	28.57	28.57	25.00
3	25.00	33.33	0	28.57
4	0	12.5	0	22.22
5	57.14	57.14	0	88.88
6	12.50	42.85	66.66	50.00
7	0	37.50	71.42	28.57
8	66.66	28.57	0	25.00
9	33.33	37.50	42.85	40.00
10	0.	0	37.50	50.00
11	16.66	20.00	21.42	16.66
12	43.75	16.66	12.50	54.54
13	33.33	33.33	28.57	50.00
14	40.00	28.57	100.00	12.50
15	14.28	0	40.00	28.57
16	14.28	35.71	62.5	8.33
17	12.50	20.00	42.85	60.00
18	14.28	14.28	50.00	42.85
19	14.28	0	28.57	14.28
20	16.66	37.5	60.00	37.500
(Mean	25.01	27.05	38.24	37.29

Normal Controls

Subject	Read Positive	Negative	Generate Positive	Negative
1	28.57	14.28	42.85	42.85
2	50.00	33.33	37.50	33.33
3	25.00	28.57	50.00	50.00
4	50.00	33.33	50.00	66.66
5	50.00	28.57	44.44	50.00
6	50.00	16.66	66.66	62.50
7	33.33	22.22	37.50	33.33
8	37.50	25.00	70.00	75.00
9	50.00	28.57	28.57	57.14
10	28.57	12.50	55.55	40.00
11	50.00	71.43	75.00	83.33
12	0	33.33	33.33	83.33
13	0	25.00	66.66	20.00
14	28.57	28.57	50.00	33.33
15	28.57	25.00	-4.44	0
16	57.14	57.14	85.71	83.88
17	50.00	37.50	62.52	42.85
18	14.28	16.66	37.50	50.00
19	37.50	20.00	55.55	20.00
20	33.33	25.00	50.00	14.28
(mean)	35.19	29.11	52.19	47.06

Psychiatric Controls

	Read		Generate	
	Positive	Negative	Positive	Negative
Subject				
1	0	0	14.28	16.66
2	28.57	14.28	55.55	40.00
3	0	12.50	50.00	16.66
4	14.28	12.50	25.00	11.11
5	37.50	33.33	37.50	33.33
6	14.28	0	42.85	60.00
7	25.0	14.28	33.33	83.33
8	42.85	0	22.22	40.00
9	33.33	11.11	0	50.00
10	25.00	16.66	20.00	0
11	55.55	0	33.33	0
12	16.66	22.22	40.00	40.00
13	25.00	33.33	12.50	16.66
14	37.50	14.28	66.66	50.00
15	25.00	60.00	60.00	25.00
16	0	14.28	20.00	11.11
17	16.66	14.28	55.55	60.00
18	12.50	0	42.85	14.28
19	31.25	50	31.25	66.66
20	28.57	0	50.00	33.33
(mean)	23.47	16.15	35.64	33.40

Content of Generated Words

Inpatient Depressives

Subject	Positive	Negative	Neutral
1	7	8	0
2	7	8	0
3	4	10	1
4	5	9	1
5	4	9	2
6	6	8	1
7	7	7	1
8	7	8	0
9	7	5	3
10	8	6	1
11	7	6	2
12	4	11	0
13	7	6	2
14	2	8	5
15	5	7	3
16	8	6	1
17	7	5	3
18	8	7	0
19	7	7	1
20	5	9	0
(Mean)	6.1	7.45	1.45

Normal Controls

Subject	Positive	Negative	Neutral
1	7	7	1
2	8	6	1
3	8	6	1
4	8	6	1
5	9	6	0
6	6	8	1
7	8	6	1
8	10	4	1
9	7	7	1
10	9	5	1
11	8	6	1
12	9	6	0
13	9	5	1
14	8	6	1
15	9	6	0
16	7	6	2
17	8	7	0
18	8	6	1
19	9	5	1
20	8	7	0
(mean)	8.15	6.05	.8

Psychiatric Controls

Subject	Positive	Negative	Neutral
1	7	6	2
2	9	5	1
3	4	6	5
4	4	9	2
5	8	6	1
7	9	6	0
8	9	5	1
9	6	4	5
10	10	5	0
11	9	6	0
12	10	5	0
13	8	6	1
14	6	6	3
15	10	4	1
16	5	9	1
17	9	5	1
18	8	6	1
19	8	6	1
20	8	6	1
(Mean)	7.7	5.8	1.5

APPENDIX I

1. SENTENCES AND SENTENCE FRAMES USED IN EXPERIMENT 2.

2. PROCEDURES FOR SELECTING THE SENTENCES AND SENTENCE
     FRAMES (EXPERIMENT 2)

APPENDIX I

Sentences and Sentence Frames

Used in Experiment 2

The stimulus materials for Experiment 2 were ten sentence frames in each of the negative, positive, and ambiguous content areas. These frames, together with the words used to produce the completed sentences are presented below.

Positive Sentence Frames

1. _____ makes me happy.

   Words used to complete the frame

birthdays	people
singing	love
relaxation	love
food	food
love	love

2. The man regarded the trophy as a symbol of his_____.

   Words used to complete the frame

luck	sucess
ego	courage
accomplishment	manhood
prowess	ability
effort	accomplishment

3. My favorite teacher was particularly_____.

   Words used to complete the frame

realistic	helpful
humorous	funny
bright	helpful
expressive	nice
beautiful	pretty

4. _____ makes me feel proud.

   Words used to complete the frame

achieving	success
accomplishments	success
success	accomplishing
singing	accomplishments
sex	accomplishment

5. _____ are very enjoyable.

   Words used to complete the frame

friends	parties
movies	holidays
vacations	children
people	people
women	women

6 My father _____ me.

   Words used to complete the frame

loves	loved
loves	loves
respects	loves
loved	loved
likes	loves

7 When I need help I usually depend on_____.

   Words used to complete the frame

friends	friends
friends	friends
friends	friends
family	husband
parents	friends

8 My _____ is my best quality.

   Words used to complete the frame

personality	body
friendliness	truthfulness
personality	sincerity
patience	kindness
personality	body

9. My father's best quality is his_____.

       words used to complete the frame

        dedication   accomplishment
        endurance   love
        intelligence   generosity
        patience   patience
        leadership   heart

10. _____ is equivalent to happiness.

       Words used to complete the frames

        sex   love
        life   togetherness
        peace   joy
        satisfaction   security
        love   love

Negative Sentence Frames

1. The girl was awakened by a _____ dream.

    words used to complete the frame

scary	scary
frightening	bad
bad	bad
noisy	scary
horrible	wild

2. I find it hardest to stop my habit of _____.

spitting	worrying
smoking	laziness
facetouching	eating
smoking	scratching
drinking	pot

3. I can't stand children who _____.

    Words used to complete the frame

cry	cry
scream	whimper
whine	whine
spit	spit
scream	scream

4. I suffer most from_____.

    Words used to complete the frame

fear	worrying
colds	paranoia
worrying	anxiety
loneliness	fatigue
boredom	work

5   My father's chief fault is his_____.

    Words used to complete the frame

temper	drunkeness
silence	compulsiveness
temper	stubborness
conceit	education
narrowness	stubborness

6. It is so depressing to be_____.

    Words used to complete the frame

       alone   broke
       busy   alone
       overworked   sick
       sick   .   me
       lonely   tired

7. _____ is disgusting.

    Words used to complete the frame.

       dirt   dirt
       coconut   rape
       violence   '   ignorance
       slime   quitting
       death   odor

8. Failure is usually due to_____.

    Words used to complete the frame

       inability   worry
       unknown   uneasiness
       incompetence laziness
       insecurities irresponsibility
       quitting   poor-planning

9 I don't like to think about_____.

    Words used to complete the frame

       death   death
       loss   death
       school   tragedies
       depression   death
       war   quitting

10. I feel _____ when others do better.

    Words used to complete the frame

       cheated   nervous
       hurt   jealous
       envious   depressed
       ambivalent   bad
       inferior   offended

Ambiguous Sentence Frames

1. I _____ when put under pressure.

    Words used to complete the frame

work	sweat
sweat	rush
work	tense
adapt	panic
break	perform

2. The average person is _____.

    Words used to complete the frame

smart	stupid
boring	normal
good	dull
uninformed	okay
thirty	nice

3. _____ is part of everyone's experience.

    Words used to complete the frame

learning	society
pain	rejection
failure	work
life	life
learning	sadness

4. It is _____ to find friends one can talk to.

    Words used to complete the frame

nice	hard
necessary	difficult
necessary	nice
difficult	hard
good	good

5. My mind is _____.

    Words used to complete the frame

clear	empty
racing	alive
sharp	distracted
active	tired
restless	great

6.   Many people my age are_____.

     Words used to complete the frame

       wild   stupid
       older   mothers
       employed   mature
       wealthy   confused
       older   partyers

7   Firm control leads to_____.

     words used to complete the frame

       success   anxiety
       authority   success
       revolt   discipline
       resistance discipline
       authority   restrictions

8   Most educators are_____.

     Words used to complete the frame

       smart   fools
       overworked knowldgable
       intelligent women
       unaware   stuffy
       hard   smart

9   Real life stories usually have _____ endings.

       sad   unclear
       strange   good
       happy   sad
       good   good
       unusual   sad

10   Life is _____.

     Words used to complete the frame

       wonderful   great
       life   challenging
       short   numbing
       hard   great
       happy   great

Procedure for Selecting the Stimulus

Materials used in Experiment 2

Ten students enrolled in introductory psychology classes
were asked to complete 106 sentence frames (sentences with a
key word missing). These sentences were selected by the
experimenter and were designed to reflect either positive,
negative, or neutral affective content. The subjects were
given the following instructions:

> Here are some incomplete sentences. Please complete
> each sentence with a word that best fits the general
> meaning of the sentence. Try to avoid cliches, as
> much as possible. There are no right or wrong ans-
> wers, we only request that you complete the sentences
> with a single word.

The completed sentence frames were rated by two independent
judges along positive, negative, and neutral content. Inter-
judge agreement was obtained for each sentence by dividing
the number of agreements by the number of agreements plus
disagreements for the sentence content across the ten subjects.
Only sentences that received 90% agreement rate, or higher,
were retained for selection in each of the content areas.

In selecting the stimulus materials for this experiment,
the intention was to obtain 10 sentences in each of the three
content areas, positive, negative, and neutral. The results
of the scaling procedure described above indicated, however, that it
was not possible to obtain neutral sentences based on the
frames included for scaling.

Findings of the scaling study indicated that the judges achieved a high degree of agreement (mean = 97%, range 91% - 100%), but none of the sentences was judged to be neutral. The criteria for including a sentence in each of the content areas were as follows. For the positive sentences, at least eight of the ten subjects had completed the sentence in a positive affective tone, and none of the subjects had completed the sentence in a negative affective tone. For the negative sentences, at least eight of the subjects had completed the sentence in a negative affective tone, and none of the subjects had completed it in a positive affective tone. For the neutral sentences, at least eight of the subjects had completed the sentence in a neutral affective tone. Examination of the completed sentences indicated that there was a high degree of consistency among the subjects in completing the negative and positive sentence frames, but the neutral sentence frames were completed to denote either positive or negative affective tones. For example, in completing the frame (the a average person is _____.) some subjects used positive words to complete the frame (e.g., good, smart, happy) while other subjects used negative words to complete the same frame (e.g., dull, boring, stupid). There were few instances where subjects completed the neutral frames in a neutral tone. In the example above, one subject completed the frame with the word (average). Thus, this group of sentence frames was more accurately described as ambiguous. The criteria for

including a sentence in this ambiguous content area were
that at least four subjects had completed the sentence to
denote a positive affective tone, and at least four subjects
had completed the same sentence to denote a negative affec-
tive tone.

The above selection criteria resulted in an unequal
number of negative, positive, and neutral completed sentences.
For example, in reference to the ambiguous sentence frame
presented above, if six subjects had completed the frame in
a positive affective tone, and four subjects had completed
it in a positive affective tone, then the frame was considered
ambiguous. Similarly, a frame was considered ambiguous if
four subjects had completed it in a positive affective tone,
and four subjects had completed it in a negative affective
tone, and the remaining two subjects had completed it in
a neutral affective tone. In other words, the frames were
ambiguous as long as the key words were missing. Once the
frames were completed, the resulting sentences indicated
either positive, negative, or neutral content. Thus, the
completed sentences included in this experiment reflected
either negative, positive, or neutral affective tones, while
the sentence frames (i.e., sentences with a key word missing)
suggested negative, positive, or ambiguous affective
connotations.