SELECTIVE ATTENTION TO DYSPHORIC STIMULI BY DEPRESSED AND NONDEPRESSED INDIVIDUALS

by

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Ph.D. PSYCHOLOGY

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Abstract

The hypothesis that depressed individuals selectively attend to instances of depressive ideational themes (dysphoric stimuli) is derived from Beck's cognitive model of depression and general theories of information processing. A dichotic auditory shadowing task with alternating dysphoric and nondysphoric distraction was employed to assess relative allocations of attention to dysphoric and nondysphoric spoken prose by 88 mildly depressed, moderately and severely depressed, highly test-anxious nondepressed, and low test-anxious nondepressed university students. Only moderately and severely depressed Ss were significantly more distracted by dysphoric than nondysphoric stimuli, with Helplessness the most salient, and Failure the least salient, of ten depressive themes. All groups performed equally well with nondysphoric distraction. No subsequent changes of relative allocations of attention were found to result from experimenter-induced success-reward or failure-loss experiences. It is proposed that the results directly demonstrate depressive information processing disturbances at stimulus selection, which are congruent with Beck's formulations. The potency of descriptions of helplessness for the moderately and severely depressed groups support the Learned Helplessness model of depression. Selective attention to noncontingency may be a mechanism by which the cognitive set to perceive noncontingency produces perceptions of current helplessness.

Ph.D. PSYCHOLOGY

ATTENTION SÉLECTIVE À DES STIMULI DYSPHORIQUES CHES DES SUJETS DÉPRIMÉS ET NON-DEPRIMÉS

Leonard J. Shenker

Sommaire

L'hypothèse selon laquelle les individus déprimés portent leur attention de façon sélective sur des thèmes idéationnels dépressifs (stimuli dysphoriques) découle du modèle cognitif de la dépression formulé par Beck et des théories générales du traitement de l'information. A l'aide d'une épreuve d'écoute dichotique alternant des distracteurs dysphoriques et non-dysphoriques, la distribution de l'attention à des phrases de teneur dysphorique et non-dysphorique fut étudiée chez des étudiants répartis en trois groupes: déprimés, non-déprimés d'un haut niveau d'anxiété, non-déprimés d'un bas niveau d'anxiété. Seuls les sujets dont la dépression se trouvait modérée ou forte se révélèrent plus distraits par les stimuli dysphoriques que par les stimuli non-dysphoriques, le découragement étant le thème le plus marqué et l'échec le thème le moins marqué, parmi dix thèmes dépressifs. Tous les groupes se révélèrent identiques dans leur performance aux stimuli non-dysphoriques. La distribution relative de l'attention ne fut pas modifiée par des manipulations impliquant les dimensions réussite-récompense et échec-sanction. Il est suggéré que les résultats démontrent de façon directe des perturbations du traitement de l'information suite à la dépression, en accord avec les hypothèses de Beck, qu'ils sont relativement peu sujets à confusion, qu'ils localisent la perturbation à un stade spécifique du traitement de l'information. Les descriptions de découragement fournies par les sujets dont la dépression était modérée ou fortes sont telles qu'elles corroborent le modèle de découragement acquis (Learned Helplessness) de la dépression. L'attention sélective à la non-contingence peut ainsi être un mécanisme par lequel l'état cognitif sous-jacent à la perception de la non-contingence est lui-même la cause des perceptions du découragement en cours.

Contributions to Original Knowledge

Aaron Beck has proposed a cognitive model of depression which has stimulated considerable research and theoretical activity in recent years, and has provided the conceptual rationale for a system of cognitive therapy for depression. Although substantial research data have been generated which are consistent with Beck's model, little direct empirical evidence of the proposed cognitive disturbances have been available, partly due to the methodological difficulties of assessing disturbances of private processes. As well, the existing empirical data are generally unable to isolate the specific nature of the disturbance(s), since the dependent variables employed have tended to confound different stages of information processing with each other.

The present thesis makes both methodological and conceptual contributions to the understanding of cognitive disturbances in depression.

A methodology is employed which directly assesses biases in the selection of information from the environment. The measure of depressive bias in allocating attention is relatively direct, unobtrusive, and does not depend on inferences from behaviors which are likely to be affected by other aspects of depression. Hence, the assessment of selective attention bias in depression is relatively free from the confounding effects of variables such as reactions to experimental demand characteristics, interpersonal coping styles, self-presentation goals and strategies, and preceptions of real personal deficits and

rejections. In addition, the methodology permits the isolation of disturbances of one specifiable stage of active information processing.

The results of this study demonstrate that depressed individuals actively bias their perceptions of environmental events by idiosyncratically allocating attention to dysphoric stimuli. This finding is highly supportive of Beck's proposals of depressogenic disturbances in the processing of information, and of the prepotence of cognitive schemata which correspond to depressive ideational themes during depression. Hence, this thesis provides the first direct, unconfounded empirical support for the major proposals of Beck's model.

As well as providing empirical support for Beck's model generally, the present thesis elucidates one of the cognitive mechanisms responsible for the maintenance, and possibly the etiology, of depression.

In addition, this thesis supports and contributes to the Learned Helplessness model of depression. The finding that information which indicates helplessness is the most salient of the dysphoric stimuli for moderately and severely depressed subjects provides the first direct evidence for the hypothesized major cognitive component of learned helplessness - the cognitive set to perceive noncontingency. As well, the present thesis contributes to the model by presenting a mechanism by which the set to perceive noncontingency may produce current perceptions of helplessness, and consequent deficits in coping skills.

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This thesis is dedicated to the people I love most: my parents, my wife, Rosalee, and my daughters, Hannah and Mira.

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INTRODUCTION

Depression, or melancholia, has been described as a clinical syndrome for over two thousand years (Beck, 1967; Knoff, 1975). The Old Testament account of King Saul's madness constitutes a detailed description of psychotic depression (Hofling, 1977). Hippocrates' clinical description of "melancholia", and a long list of subsequent writers, philosophers, scientists, and poets have produced often eloquent phenomenological descriptions of human struggles with depression (Friedman & Katz, 1974). Beck (1966) has observed that clinical descriptions of depressive phenomena have remained remarkably constant from antiquity to the present.

Depression is not only an ancient affliction, it is a common one. Although estimates of its incidence in contemporary North America vary, probably due to the heterogeneity of diagnostic criteria and methodologies employed by different investigators (Rawnsley, 1968; Silverman, 1968; Ripley, 1977), recent estimates suggest that from 10 to 12% of North Americans will have a clinically significant depressive episode of sufficient severity to warrant treatment at some time in their lives (Secunda, Friedman & Schuyler, 1973; Schuyler & Katz, 1973; Lehmann, 1971). This is ten times the risk for schizophrenia (Becker, 1974; Lehmann, 1971), although schizophrenia is more common in psychiatric hospitals because it tends to be more chronic (Ripley, 1977; Lehmann, 1971). A National Institute of

Mental Health Special Report on the depressive disorders (Secunda, Friedman & Schuyler, 1973) estimated that depression accounts for 75% of all psychiatric hospitalizations, and that during any given year, 15% of all adults between the ages of 18 and 74 will suffer significant depressive symptoms. In a review of the epidemiology of depression, Ripley (1977) concluded that "depression is one of the commonest illnesses seen not only by the psychiatrist, but in the office of the family doctor and on general hospital wards" (p. 4), and Kline (1964) ascribed more human suffering to depression than any other single disease. Brown (1974) suggested that the incidence of depression is increasing, "....and is beginning to rival schizophrenia as the number one mental health problem" in the United States (p. xv).

Becker (1974) asserted that depression has possibly the highest incidence of any personality disturbance, and the highest mortality rate as well. Of approximately 22,000 suicides reported in the United States annually, the NIMH report (Secunda, et al., 1973) estimated that approximately 80% are related to a precipitating depressive episode.

In its milder forms, depression may be even more common. Bosse (1975) concluded from a survey of college students that mild depression occurs at some time in up to 75% of that non-clinical population.

Characteristics of Depression

Depressive disorders[1] are characterized by a heterogeneous array of psychological and physical disturbances (Becker, 1974; Beck, 1967). Beck (1967) has isolated 21 different symptom categories that occur significantly more frequently in depressed than nondepressed psychiatric patients, and has grouped them into four clusters: affective, cognitive, motivational, and vegetative disturbances.

Affective manifestations refer to changes in the individual's feelings or changes in overt behavior directly attributable to feeling states. They include dejected mood, often expressed verbally with adjectives such as sad, lonely, empty, bored, hopeless, blue, etc. As well, this cluster includes negative feelings toward the self, reduction in gratification, loss of emotional attachments, crying spells, and loss of the mirth response.

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[1]There is considerable semantic confusion in the literature on depression. The term, depression, is sometimes used to refer to dysphoric mood, which may vary from mild to severe (Becker, 1974; Mendels, 1970; Beck, 1967). At other times, the term denotes one or more of the affective disorders, as that designation is employed in the Diagnostic and Statistical Manual, 3rd Edition, of the American Psychiatric Association (DSM-III) (1980), which, in addition to dysphoric mood, generally includes alterations in motivational, cognitive, vegetative, and/or behavioral functions. In this thesis, the affective disturbances characteristic of depressive syndromes are referred to as depressed or dysphoric mood or affect. This usage is maintained along the entire severity continuum. The term, depression, is reserved for any of the clinical affective disorders, as described in DSM-III (APA, 1980), excluding manic states. Additionally, the phrase, clinically significant depression, is used in this thesis when the context requires a distinction between a depressive syndrome of sub-clinical severity, and depression of sufficient severity to warrant diagnosis as a psychopathological phenomenon.

Cognitive manifestations include low self-evaluation, negative expectations or pessimism, self-blame, self-criticism, indecisiveness, and body image distortions.

Motivational manifestations include loss of spontaneous motivation (paralysis of the will), avoidance, escapist, and withdrawal wishes, suicidal wishes, and increased dependency.

Vegetative manifestations include loss of appetite, commonly resulting in weight loss, sleep disturbances, loss of libido, fatigability, and retardation or agitation (from Beck, 1967, Pp. 14-43).

Given the polydimensional character of depressive disorders (Craighead, 1980) and the enormous variety of possible patterns and combinations of signs and symptoms (Mendels, 1970), no generally accepted, complete definition of depression has yet been proposed (Eastman, 1976), and Zung (1977) doubts whether a simple definition of depression is currently possible. There is, however, general agreement that depressive disorders are characterized by combinations of disturbances such as those described by Beck, although not all investigators agree with all of Beck's 21 symptom categories (e.g., Zung, 1977). Indeed, the defining diagnostic criteria of the depressive disorders stated in the American Psychiatric Association's recently revised Diagnostic and Statistical Manual (DSM-III, (1980)) consist of combinations of clinical features drawn from a list very similar, but not identical, to Beck's.

The Classification of Depression

The enormous diversity of clinical manifestations, as

well as the diversity of etiological models, have spawned numerous attempts to classify the depressive disorders (Depue & Monroe, 1978). A large number of subtypes have been suggested on the basis of differences in symptom clusters, clinical course characteristics, genetic and other biological variables, presumed etiology, and/or differences in specific treatment responses (Depue & Monroe, 1978; Kendell, 1976; Becker, 1974; Beck, 1967).

Miller (1975), in a review of the experimental literature, found that the most extensively used classification schemes in experimental studies of depression were the American Psychiatric Association's standard nomenclature (DSM-II), (1968), and the endogenous-reactive distinction. DSM-II divided the depressive disorders into three major divisions, psychotic, neurotic, and personality disorders. Psychotic depressive disorders were further subdivided by the unipolar-bipolar dichotomy[2], and involutional melancholia, a separate category which has proved relatively useless and largely ignored in clinical research (Miller, 1975; Spitzer, Endicott & Robin, 1977). Of the DSM-II distinctions, that between bipolar and unipolar may be the most valid, as there is evidence of important differences in behavioral symptomatology, clinical course, genetic risk factors, and pharmacological response (Depue & Monroe, 1979; 1978; Spitzer, Endicott, Woodruff & Andreasen, 1977; Seligman, 1978).

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[2]Bipolar depressives have had episodes of mania; unipolar depressives have not.

The endogenous-reactive/neurotic[3,4] distinction has received some empirical support, although the original presumed etiological dichotomy has remained unfounded (Kendell, 1976). There appear to be differences, at least among the extreme representatives of these two groups, with respect to symptom clusters, response to somatic treatments, and reactivity to environmental changes during the depressive episode (Depue & Monroe, 1978; Kendell, 1976; Seligman, 1978; Becker, 1974). However, there is little agreement, and conflicting evidence, about whether the distinction is best conceptualized as dichotomous or dimensional, whether there are characteristic differences with respect to the etiological importance of internal vs. external precipitating events, and whether there are differences with respect to the role of genetic risk factors. Depue and Monroe (1978) and Kendell (1976) concluded that clear boundaries between these subtypes are not yet evident, and may not exist at all. As well, the class of neurotic or reactive depression itself appears to be tremendously heterogeneous, and there is considerable disagreement about

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[3]This dichotomy has been variously described as endogenous-reactive, endogenous-neurotic, and endogenous-exogenous. There seems to be little difference in the meaning of these terms. Since endogenous-neurotic is the most widely used (Kendell, 1976; Depue & Monroe, 1978), that terminology will be used in this section.

[4]There is some relationship between the endogenous-neurotic dichotomy and the classifications of DSM-II. In general usage, psychotic and bipolar depressions, and involutional melancholia have tended to be considered endogenous with respect to etiology and treatment responses, whereas neurotic and personality disorders have tended to be considered neurotic /reactive (Miller, 1975).

whether it constitutes a single group or a heterogeneous collection of subgroups (Depue & Monroe, 1978; Kendell, 1976; Paykel, 1972a; 1972b).

Depue and Monroe (1978) summarized the status of current nosologies advocated in the recent literature by emphasizing "....that it is not presently known whether all of these subtypes will be valid or even useful distinctions" (p. 9). As well, numerous writers have proposed alternate nosologies based on a wide variety of criteria (e.g., Akiskal, 1979; Zung, 1977; Spitzer, Endicott & Robin, 1975; Paykel, 1972a; 1972b), and Craighead (1980) has recently called for an end to the use of the concept, depression, as a unifying construct, arguing that it may be more useful to examine each of the heterogenous disturbances separately.

The new standard psychiatric nomenclature, DSM-III (American Psychiatric Association, 1980), has grouped together all the depressive disorders, "regardless of severity, chronicity, course, or apparent association with precipitating stress" because of the absence of convincing evidence for etiological differences, and because they share important "clinical-descriptive features" (Spitzer, Endicott, Woodruff & Andreasen, 1977, p. 75). With the exception of the unipolar-bipolar dichotomy, which has been retained, none of the traditional subclassifications based on dichotomous subtypes was considered satisfactory. Instead, distinctions are employed such as episodic vs. chronic, major vs. minor, and psychotic vs. not psychotic. The reliability of diagnosis with this system,

and its utility for research, theory, and treatment remain to be evaluated.

The considerable degree of disagreement regarding the validity of different nosologies and definitions, and the notoriously low diagnostic reliability achieved using standard nomenclatures (Becker, 1974; Zubin, 1967; Beck, 1967) has led many investigators to operationally define depression in terms of the total number and severity of depressive signs and symptoms present, independent of primary diagnosis or subtype. This was the strategy employed by Beck in his influential study of 975 depressed and nondepressed psychiatric patients, in which the 21 characteristics described above were found to occur more frequently among depressed than nondepressed patients (Beck, Ward, Mendelson, Mock & Erlbaugh, 1961). In that study, he reported that pairs of psychiatrists using the standard psychiatric nomenclature (DSM-I), could agree on diagnostic category in only 56% of cases, but that ratings of depth of depression could be made with very high interrater reliability. When each patient was rated on the intensity of each of 22 signs and symptoms plus a global judgment of severity of depression, interrater reliability of the total depth of depression ratings ranged from .78 to .92 (Beck, 1967, p. 173).

Many investigators have subsequently employed a descriptive strategy similar to Beck's. Depth of depression is measured by totaling the number of depressive signs and symptoms present, weighting them for severity, and establishing a criterion "score" as the operational definition of depression.

Such an atheoretical strategy identifies individuals who manifest a criterion number and severity of the characteristics found to occur more frequently among depressed than non-depressed patients, without regard for patterns or clusters of symptoms, history, or presumed etiology.

Hence, a large and varied research literature has studied depression by selecting depressed subjects on the basis of measures of depth of depression[5]. Inventories of depressive symptomatology, such as the Beck Depression Inventory (BDI) (Beck, 1967) have commonly been used for this purpose. The BDI is an inventory which assesses the presence and intensity of the 21 symptom clusters described above as having been found to differentiate depressed from nondepressed patients. Each cluster is scored for severity, and the total score represents depth of depression. This score has been shown to have high concurrent validity with psychiatrists' ratings of depth of depression among clinical and nonclinical populations (Beck, 1967; Metcalfe & Goldman, 1965; Bumberry, Oliver & McClure, 1978). As discussed above, such ratings can be made with high reliability.

The descriptive strategy described above, without regard to nosological distinctions, is the approach taken in this thesis.[6] Depression, as the term is employed in this thesis,

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[5]Cf, the section on Empirical Tests of Beck's Model, below.

[6]This approach, of course, carries certain liabilities, particularly with respect to external validity. Issues related to this approach, and to the use of inventories such as the BDI to operationally define depression, will be further discussed in the final chapter of this thesis.

refers to any of the possible patterns and combinations of depressive characteristics which cumulatively achieve clinically significant severity of disturbance.

The Etiology of Depression

The heterogeneity of depressive characteristics have given rise to a large number of etiological models, which may be classified according to which group of processes is accorded primary etiological significance in the development and maintenance of depression, and the proposed mechanisms by which other, secondary characteristics are presumed to result from the primary disturbance.

The dominant view of depressive disorders in this century has been based largely on a motivational-affective model (Beck, 1963). Within this view, the heterogeneous manifestations of depression derive from primary disturbances of motivational and affective processes. Both DSM-I and DSM-II (American Psychiatric Association, 1952; 1968) clearly conceptualized depressive disorders as primary affective disorders, with the term, primary, indicating the etiological assumption with regard to the various manifestations of depression. For example, DSM-I defined the psychotic depressive reactions in terms of "a primary, severe disorder of mood with resultant disturbance of thought and behavior in consonance with the affect" (Beck, 1967, p. 239).

The dominance of affective-motivational models in the

psychology of depression[7] derives largely from the enormous influence of the early psychoanalytic theorists, most notably Abraham (1911/1960; 1916/1960), Freud (1917/1957), and Rado (1928/1951). In the main, classical psychoanalytic theories ascribed depressive symptoms to loss of an ambivalently loved object by an orally fixated individual, resulting in retroflected hostility. This model is still the most widely accepted formulation of depression, although there is little empirical evidence to support it (Akiskal & McKinney, 1975). Later ego-analytic revisionists, especially Jacobson (1953; 1971) and Bibring (1953), shifted emphasis from the earlier id psychology to ego disturbances, especially discrepancies between the self-concept and the ideal-self, and loss of self-esteem resulting from the ego's awareness of its helplessness with regard to its ability to gratify excessive narcissistic

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[7] In discussing the psychology of depression, the considerable research and theory which relates to the biochemistry of depression is omitted. Although not directly relevant to this thesis, the reader should be aware that, during the last twenty years, enormous advances in biochemical methodology and the widespread use of psychotropic drugs have spawned a large and important research literature on the biological correlates of depression and on possible genetic contributions (Schildkraut, 1977; Cadoret & Tanna, 1977; Brown, 1974; Friedman & Katz, 1974; Akiskal & McKinney, 1975). Beck, et al. (1979) estimate that hundreds of systematic studies relevant to the biological substrate of depression and its chemotherapy have been published in the past 15 years. Consistent with this research activity, numerous models of depression have been proposed which place primary etiological significance on derangements of central nervous system biochemical processes. Mainly, but not exclusively, these theories have centered on the functioning of CNS neurotransmitters. Much of this research and theory is reviewed in Depue (1979); Schildkraut (1977); Cadoret & Tanny (1977); Rubin & Kendler (1977).

needs. The emphasis on the effects of object loss upon ego functions clearly set the intellectual stage for later cognitive theorists, especially Beck (1967)[8].

The last 15 years have witnessed considerable interest in examining the psychology of depression within frameworks that are more amenable to empirical verification. In his review of the psychoanalytic formulations of the first half of this century, Mendelson (1958) concluded that they were characterized by,

> "....boldly speculative theoretical formulations and by insightful clinical studies....It was an era of large-scale conceptualizations and generalizations...but this era is drawing to a close...there are increasing demands for responsible, sober testing of theories and hypotheses." (Friedman & & Katz, 1974, p.x).

Several investigators have responded to the "empirical dilemmas" of psychoanalytic formulations (Mischel, 1973) by conceptualizing depression as a behavioral disorder. In the main, these models assume that positive, response-contingent reinforcement from one's social environment maintains adaptive, nondepressive behaviors, and that depressive behaviors derive from decreases in the sources, frequency, control, or potency

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[8]Psychoanalytic theories of depression are reviewed in Becker (1974) and Beck (1967). Contemporary psychoanalytic formulations are reviewed by White (1977), and contemporary treatment implications are discussed in White, Davis & Cantril (1977).

of positive reinforcement the individual receives. Hence, the locus of disturbance is held to be in behavior-environment interactions, with secondary, resultant affective, motivational, cognitive, and vegetative disturbances. Consistent with their foundations in empirical epistemologies, behavioral models avoid the elaborate hypothetical constructs characteristic of psychoanalytic formulations, and generally restrict their foci to observable or potentially observable phenomena.[9]

In the last 15 years, there has been a rapidly increasing theoretical and research literature which focuses on cognitive disturbances as the primary pathology in depression.

There has been a long history of thought in which the cognitive manifestations of depression were considered the central, primary aspects of the disorder. In an early statement of this view, Felix Platter (1602/1965) described melancholia as "....a kind of mental alienation, in which imagination and judgment are so perverted that without any cause the victims become very sad and fearful." He emphasized that the whole illness "rests upon a foundation of false conceptions" (Jelliffe, 1931). Similarly, Robert Burton, who authored the definitive 17th century text on melancholia, quoted a number of writers from antiquity to the 17th century who held that "afflictions of the mind" produce the affective disturbances (Hofling, 1977; Knoff, 1975; Beck, 1967). More recently, ego-psychoanalytic theorists, as discussed above, focused on disturbed

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[9]Behavioral models and research are reviewed by Schrader, Craighead & Schrader (1977); Wilcoxin, Schrader & Nelson (1976); and Eastman (1976).

cognitive functions, albeit conceptualized in terms of psychoanalytic constructs.

In addition, the past 15 years have seen a growing, general trend toward cognitive conceptualizations of behavioral phenomena throughout psychology. In many areas of psychological study, human beings have been increasingly conceptualized as responding not to objective stimulus characteristics, but to a cognitively mediated rendition of the stimulus. Emphasis has been increasingly placed on human beings acting <u>on</u> the stimulus field, and subsequently responding to the "stimulus-as-coded" (Lawrence, 1963), or the "stimulus-as-perceived" (Mischel, 1973). The influence of information processing models, in which people are conceptualized as actively creating their perceptual experiences (e.g., Neisser, 1967, 1976), provided scientifically acceptable methodologies and theoretical models for merging "methodological behaviorism" (Mahoney, 1974) with subjective representation. There have been clear trends over the last 15 years to incorporate cognitive mediation into theory and research in general behavior theory, emotion, personality, and the conceptualizations and treatments of a wide variety of behavioral disorders. Dember (1974) referred to these developments as a "cognitive revolution".[10]

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[10]These developments are beyond the scope of this thesis. They have been extensively discussed by, among others, Mahoney and Meichenbaum, both of whom have also contributed significantly to methodological and conceptual progress in these areas (Mahoney, 1974, 1977, 1978; Mahoney & Arnoff, 1978; Meichenbaum, 1974, 1977).

With this context, a cognitive model of depression has been been proposed by Beck (1967) which has profoundly influenced contemporary investigations and conceptualizations of the psychology of depression.

Beck's Cognitive Model of Depression

Aaron Beck has presented a comprehensive model of depression which assigns primary etiological importance to disordered cognitive processing, and to idiosyncratic cognitions containing systematic distortions of reality[11,12] (Beck, 1963, 1964, 1967, 1970, 1971, 1974, 1976; Beck, Rush, Shaw & Emery, 1979). Within this model, global negative conceptions of the self, the outside world, and the future, and systematic distortions in the interpretation of present and past events, are responsible for the onset and maintenance of depression. The characteristic affective, motivational, vegetative, and behavioral symptoms are held to follow from the disturbed ways in which the depressed individual structures his or her experiences.

It is a comprehensive model which deals explicitly with the phenomenology of depression (Rizley, 1978); its primary focus is on the subjective, internal events which are among the chief concerns of psychoanalytic theorists. However, it takes information actually obtained from depressed people as its main data;

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[11]Cognitive processes are "...all the processes by which sensory input is transformed, reduced, elaborated, stored, recovered, and used" (Neisser, 1967). These processes constitute the "...activity of knowing: the acquisition, organization, and use of knowledge" (Neisser, 1976).

[12]Beck defines a cognition as "any ideation with verbal or pictorial content" (Beck et al., 1979).

it employs concepts generally less complex and remote from actual observations, and more amenable to operationalization; it resorts only minimally to hypothetical constructs; hence, its main assertions are more amenable to empirical disconfirmation than traditional psychoanalytic theories. Thus, while retaining some of the concerns of psychoanalytic theorists, it satisfies many of the epistemological and methodological requirements of behavioral theorists.

Partly for the reasons described above, Beck's model poses a substantial challenge to psychoanalytic and behavioral models of depression, and has stimulated tremendous interest. Blaney (1977) noted that, along with Seligman's Learned Helplessness model[13], and Lewinsohn's behavioral model[14], the cognitive model proposed by Beck has "dominated the recent empirical literature on the psychology of depression....No other perspective appears to have generated more than a smattering of research" (p.203). Similarly, Rehm (1977) discussing a resurgence of interest in psychological aspects of depression in the last 5 to 10 years, argued that, in addition to Lewinsohn's and Seligman's models, Beck's model has been "most prominent and influen-

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[13]Learned Helplessness, a behavioral-cognitive model, will be considered in a subsequent section.

[14]Lewinsohn's model, which is beyond the scope of this thesis, attributes depressive behaviors to low rates of response contengent positive reinforcement. The model, and much of its supporting research emphasizes social skill deficits as predispositional factors. Major statements of the model can be found in Lewinsohn (1974a; 1974b). Critical reviews are in Schrader, Craighead and Schrader (1977), and Blaney (1977).

tial in behavioral research and clinical application" (p.788), and Krantz & Hammen (1979) noted that "The last 15 years have witnessed a surge of interest in cognitive models of depression" (p.611). In addition, Beck's model has spawned cognitive therapies of depression. Recent reviews of depression therapy outcome studies have included more than 16 recently published studies of cognitive therapy procedures based on Beck's theory (Beck et al., 1979; Craighead, in press).

However, despite the considerable interest in Beck's model, "...efforts to assess cognitions... have lagged behind the theoretical efforts" (Krantz & Hammen, 1979). Rizley (1978) concluded that Beck's model "has not yet received controlled empirical examination" (p.33). Although this conclusion may be overstated, there is clearly a need to evaluate the existing empirical support for Beck's model, to conduct controlled empirical examinations of the model's assertions, and to extend existing knowledge of the specific cognitive disturbances in depression. Those are the purposes of this thesis.

The heart of Beck's theory is the idea that depressive cognitive structures, or schemata[15], which become prepotent in depression, dominate the processes of selection, interpretation and evaluation of stimuli, distorting reality such that events are construed in support of three major conceptual patterns, a cognitive triad consisting of negative views of the self, the

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[15] Beck uses the word schemas as the plural of schema, whereas many writers (e.g., Neisser, 1967, 1976) maintain the Latin schemata. Except when quoting direclty, schemata will be used in this thesis as the plural of schema.

world, and the future. In addition, it is proposed that depressed individuals manifest systematic departures from logical thinking in the processing of certain types of information, resulting in further distortions of the meanings of events.

Since the way an individual structures an experience is held to determine his responses to it, the affective, motivational and vegetative characteristics of depression are considered to follow from the resulting systematic misinterpretations of reality. Thus, primary etiological significance is accorded to three cognitive phenomena: The cognitive triad, cognitive schemata, and disordered information processing.

The cognitive triad. Beck has noted that the verbalized thought contents of depressed individuals differ from those of nondepressed individuals by a preponderance of specific themes in the contents of the former group. The cognitions of depressed individuals are characterized by, for example, themes of low self-esteem, self blame, deprivation, overwhelming responsibilities, thoughts involving escape, and others (Beck, 1967, p.228). A crucial characteristic of these depressive, or idiosyncratic, cognitions is that they represent distortions of reality. Not just random inaccuracies and inconsistencies, but "....a systematic error, viz., a bias against themselves" (Beck, 1967, p.234). The depressive themes concern loss, or shrinkage of the individual's personal domain:[16,17] "The depressive's conceptions of

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[16]Beck (1976) describes an individual's personal domain as including all the objects and ideas which he judges to be of particular relevance to him. This would include an individual's self-concept, goals, values, the animate and inanimate

his valued attributes, relationships, and achievements is saturated with the notion of loss - past, present, and future. When he considers his present position, he sees a barren world; he feels pressed to the wall by external demands that cheat him of his meager resources and keep him from attaining what he wants" (Beck, 1976, p.106).

The idiosyncratic cognitions are grouped into three major patterns: negative constructions about the world, the self, and the future. When these three patterns dominate the individual's cognitions, experiences become construed in negative ways consistent with them.

1. The World. The depressed individual "...sees the world as making exorbitant demands on him, and/or presenting insuperable obstacles to reaching his life goals" (Beck et al., 1979, p.11). Interactions with the environment are consistently interpreted "...as representing defeat, deprivation, disparagement... all of which detract from him in a significant way"

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[16] objects in which he has an investment, as well as abstract ideas with which he identifies (p.56).

[17] The relationship between the concept of loss and the other depressive themes is not clear in Beck's writings. At times, Beck writes about loss or shrinkage of the personal domain as if this is simply one of the prominent themes within the cognitive triad. At other times, however, Beck treats loss as if it were a superordinate category, subsuming the other themes such as low self-esteem, deprivation, self blame, etc., as special cases of loss. The internal consistency of the model is enhanced by taking the latter interpretation, cf, the retionship between cognitive and affective characteristics of depression, below.

(Beck, 1967, p.255)[18].

2. The Self. The depressed individual consistently views himself in a negative way. He sees himself as "...defective, inadequate, diseased, or deprived" (Beck et al., 1979, p.11). He "...regards himself as deficient....or unworthy and tends to attribute his unpleasant experiences to a....defect in himself. In general, a dominant theme in his self-concept is the idea that he is "lacking some element or attribute he considers essential for his happiness" (Beck, 1974, p.6). Furthermore, he regards himself as undesirable and worthless because of his presumed defect, and tends to reject himself because of it" (Beck, 1967, p.255).

3. The Future. When the depressed individual considers the future, "....he anticipates that his current difficulties or suffering will continue indefinitely. He expects unremitting hardship, frustration, and deprivation" (Beck et al., 1979, p.11).

Other characteristics of depression are held to be consequences of activation of this triad of negative cognitive patterns. For example, motivational deficits result from "....the patient's pessimism and hopelessness. If he expects

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[18]Beck is inconsistent about whether this member of the cognitive triad consists of negative views of the world, as summarized here, or negative interpretations of experience. His most recent publications have tended to favor the latter (e.g., Beck et al., 1979), but he is not clear on this point.

a negative outcome, he will not commit himself to a goal or undertaking" (Beck et al., 1979, p.12). Similarly, affective symptoms follow from the individual's construals. For example, "The depressed patient....feels sad because he lowers his sense of worth by his negative evaluations [of himself]" (Beck, 1976, p.116).

Schemata. Why do depressed individuals persevere in the aversive, repetitive patterns of thinking and conceptualizing described by the cognitive triad, and why do they not revise their conceptualizations in the face of contradicting evidence?[19] Beck notes that, normally, "stereotyped or repetitive patterns of conceptualizing....[are generally]...regarded as manifestations of cognitive organizations or structures" (Beck, 1967, p.282). Hence, the patterns of depressive cognitions described by the cognitive triad similarly derive from cognitive structures, i.e., "relatively enduring component[s] of the cognitive organization" (ibid), which become prepotent during depression. Beck uses the term, schema, to designate such a cognitive structure.

The construct, schema, is generally understood to denote "...the complex pattern, inferred as having been imprinted in the organismic structure by experience, that combines with the

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[19] One way to answer these questions is to suppose that, instead of these cognitive patterns being aversive, they are gratifying in some way. Various psychoanalytic formulations take this approach, conceiving of these cognitive patterns as motivated and therefore gratifying a need arising from the disturbed activity of another set of processes. For example, ideas such as inverted rage (Freud, 1917) and a need to suffer to make restitution for (unconscious) wicked desires avoid this issue. Cognitive models share with behavioral models a reluctance to attribute hidden purpose to the phenomena under study.

properties of the presented stimulus object or of the presented idea to determine how the object or idea is to be perceived and conceptualized" (English & English, 1958). Further, "on the bases of the matrix of schemas, the individual is able to orient himself in relation to time and space and to categorize the interpret his experiences in a meaningful way" (Harvey, Hunt & Schroder, 1961). Similarly, Beck employs the construct of the schema as "a structure for screening, coding, and evaluating the stimuli that impinge on the organism" (Beck, 1967, p.283). The content of a schema is usually in the form of a generalization corresponding to the individual's attitudes, goals, values, and conceptions. Normally, "when a particular set of stimuli impinge on the individual, a schema relevant to these stimuli is activated. The schema condenses and molds the raw data into cognitions" (ibid).

In depression, schemata which correspond to the cognitive triad of depressive themes become prepotent, resulting in the processing of stimulus input in terms of those themes. One might say that the depressive schemata constitute a cognitive set, biasing the selection, interpretation, and evaluation of stimuli, and the implications of the resulting cognitions for future expectations. The result is that "idiosyncratic, depressive themes....which correspond to schemas which become prepotent in depression, pervade his interpretations of situations, his free associations, ruminations and reflections". As depression deepens, thought content becomes..."increasingly saturated with depressive ideas, almost any external stimulus is capable of evoking a depressive thought...The patient reaches

negative conclusions about himself based on the most scanty data, and shapes his judgments and interpretations according to his idiosyncratic preconceptions" (Beck, 1967, p.285).

This is understood in terms of the proposition that in depression, specific idiosyncratic schemata dominate the cognitive processes, and these schemata become increasingly dominant as the depression deepens. One underlying assumption is that there are a variety of ways in which any situation may be construed. How it actually is construed depends upon which schemata are selected to determine which aspects of the situation are attended to, and how the different aspects are synthesized, conceptualized, and interpreted.

Beck suggests that normally, "...a schema evoked by a particular external configuration is congruent with it. In such a case...the cognition resulting from the interaction of the schema with the stimuli may be expected to be a reasonably accurate....representation of reality" (Beck, 1967, pp.285-286). In depression, the idiosyncratic schemata displace more appropriate schemata, and "...the resulting interpretations deviate from reality to a degree corresponding with the incongruity of the schema to the stimulus situation" (ibid.). Thus, as idiosyncratic schemata become more active, they become evoked by stimuli less congruent with them. "...instead of a schema being selected to fit the external details, the details are selectively extracted and modeled to fit the schema" (Beck, 1967, p.286), resulting in increasing distortions in favor of the cognitive triad. As depression deepens, the idiosyncratic schemata so dominate cognitive activity that the individual's ability to

reality test becomes severely impaired because other, more appropriate schema are not available, and his depressive cognitions seem incontrovertible.

Disordered information processing. Beck argues that information processing in depression deviates in systematic ways from logical thinking, and that these deviations constitute a formal thought disorder. The focus here is on deviations of the processes by which events are made meaningful. These systematic procedural errors are held to contribute to the depressed individual's "belief in the validity of his negative concepts despite the presence of contradictory evidence" (Beck et al., 1979). These errors are described below (summarized from Beck et al., 1979):

1. Arbitrary inference (a response set) refers to the process of drawing a specific conclusion in the absence of evidence to support the conclusion or when the evidence is contrary to the conclusion.
2. Selective abstraction (a stimulus set) consists of focusing on a detail taken out of context, ignoring other more salient features of the situation and conceptualizing the whole experience on the basis of this fragment.
3. Overgeneralization (a response set) refers to the pattern of drawing a general rule or conclusion on the basis of one or more isolated incidents and applying the concept across the board to related and unrelated situations.

4. Magnification and minimization (a response set) are reflected in errors in evaluating the significance or magnitude of an event that are so gross as to constitute a distortion.
5. Personalization (a response set) refers to the patient's proclivity tolerate external events to himself when there is no basis for making such a connection.
6. Absolutistic, dichotomous thinking (a response set) is manifested in the tendency to place all experiences in one of two opposite categories; for example, flawless or defective, immaculate or filthy, saint or sinner. In describing himself, the patient selects the extreme negative categorization.

Beck contends that the conceptual distortions appear consistently only in ideational material with depressive content, e.g., themes of being deficient in some way. Other ideational materials do not show these systematic errors.

Primacy of cognitive factors in depression. As previously stated, Beck assigns primacy among the varied phenomena of depression to disturbed cognitive processes which lead to distortions in the construction of reality. All the other groups of symptoms are held to be secondary to the cognitive pathology, in particular the affective and motivational characteristics of depression.

The basic thesis is that "The affective response is

determined by the way an individual structures his experiences" (Beck, 1967, p.287). Hence, different interpretations of events lead to different affective responses. Beck is not consistent about relationships between specific cognitions and affects, but his main point is clear: it is the idiosyncratic way in which the depressed individual constructs his reality that is the immediate cause of the depressive affects. For example,

> "...the perception of loss produces feelings of sadness" (Beck, 1976, p.107).
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> "Sadness....stems from the patient's tendency to interpret his experiences in terms of being deprived, deficient, or defeated" (Beck, 1976, p.56).
>
> "...sadness is the result of the self-instigated lowering of the self-esteem" (Beck, 1976, p.12).
>
> "The nature of a person's emotional response... depends on whether he perceives events as adding to, or subtracting from...his personal domain" (Beck, 1976, p.56).
>
> "The thought content of depressed patients center on a significant loss. The patient perceives that he has lost something he considers essential to his happiness...he anticipates negative outcomes from any important undertaking; and he regards himself as deficient in the attributes necessary for achieving important goals...The sense of irreversible loss and negative expectations lead to the typical emotions associated with depression: sadness, disappointment, and apathy" (Beck, 1976, p.84).[20,21]

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[20] As indicated previously, if one takes loss or shrinkage of the personal domain to be superordinate to other themes such as low self-esteem, deprivation, defeat, etc., then these statements are consistent with each other and subsumed under the proposal that perception of significant loss or shrinkage of the personal domain elicits sadness.

[21] There is a gap in the model. Beck seems to assume that the perception of certain kinds of events and experiences elicit certain emotions. There is certainly justification for this proposal in the literature on emotion, e.g., Arnold (1960), R. Lazarus (1966), and Schacter & Singer (1962). However,

Motivational deficits similarly follow from the depressed individual's conceptualizations, specifically from his negative expectations of the future. For example, "The depressed patient expects negative outcomes, so he does not experience ordinary mobilization of the drive to make an effort. Furthermore, he does not see any point in trying because he believes the goals are meaningless. There is a general tendency for people to avoid situations they expect to be painful. The depressed patient perceives most situations as onerous, boring, or painful. Hence, he desires to avoid even the usual amenities of living" (Beck, 1974, p.16).

Similarly, behavioral and vegetative characteristics of depression are held to be secondary. The thought content in depression is "...concerned with ideas of personal deficiency, impossible environmental demands and obstacles, and nihilistic expectations. As a result, the patient experiences sadness, loss of motivation, suicidal wishes, and agitation or retardation" (Beck, 1967, p.270).

Although Beck is quite clear in his contention that the immediate first cause of depressive affects is cognitive, he also proposes a circular feedback model in which a continuous interaction between cognition and affect may be produced. Thus, once the typical depressive affects are evoked by the erroneous

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[21] Beck's model contains no mechanism by which such perceptions or experiences elicit certain emotions. As Wright (1977) has noted, Beck's statements seem to imply some innate connection between certain experiences and certain emotions, but he does not directly address this issue. This gap in the model will not be addressed in this thesis, but is merely noted here.

conceptualizations, the evoked affects may facilitate the emergence of further depressive cognitions. Using structural constructs, Beck proposes the following sequence:

1. Schemata which correspond to the cognitive triad, when activated, stimulate affective structures connected to them.
2. Activation of affective structures are responsible for the subjective feeling of depression.
3. The affective structures innervate the schemata to which they are connected.
4. There is then a continuous, reciprocal causal relationship between cognitive schemata and affective structures, producing the downward spiral often seen once a depressive episode becomes established.[22]

(Beck, 1967, p.239; 1976, p.109-111)

Recently, Beck has added to this reciprocal interaction model, feedback which the depressed individual receives from the environment (Beck, et al., 1979). Since an individual's behavior influences the behavior of others whose behavior in turn influences the individual (Bandura, 1977), the depressed individual's

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[22]This sequence could be described without recourse to hypothetical constructs such as "affective structures". The work of Schacter & Singer (1962) could provide a model in which the evocation of depressive affects lead the individual to seek explanations. Given the cognitive proclivities which Beck's model describes, one would predict biases in the depressed individual's scanning of the external and internal environment for cues, and depressive distorted conceptualizations of those cues. The resulting explanations for the affect would be expected to be distorted, leading to increased dysphoria, etc.

behavior may well provoke rejections or criticisms from others, which in turn, may "activate or aggravate the person's own self-rejection and self-criticism....The resulting negative conceptualizations lead the patient...to further isolation" (Beck et al., 1979, p.17)[23,24,25].

Predispositional factors. Given the supposition that particular types of cognitions and processing distortions are the immediate causes of depression, questions of ultimate etiology remain. How and why do depressive episodes begin? Many people experience life situations of the sort that are considered depressogenic, e.g., major losses and/or failures, without becoming depressed. Indeed, some people seem to respond to such adversity with renewed efforts to replace the loss or overcome the failure, whereas others appear to respond to minor losses or failures with serious depressions. What sorts of events precipitate depressions in some people, and why do such people respond with depression?

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[23]Beck et al. (1979) also suggest here the possibility that rejection from others may be a precipitating event which leads to clinical depression (p.17). Cf the next section on the etiology of, and predisposition to, depression.

[24]Beck et al. also note that a strong social support system which continues to provide acceptance, respect and affection may provide buffers against the development of a full-blown depression (p.17).

[25]There is evidence that other people do indeed react to depressed individuals with hostility, rejection, anxiety, and depression (Coyne, 1976a; 1976b), and that depressed individuals tend to elicit fewer positive behaviors and evaluations from others than nondepressed individuals (Lewinsohn, 1974; Prkachin, Craig, Papageorgis & Reith, 1977).

Beck proposes that the development of particular types of concepts early in life predispose individuals to depressive reactions. Specifically, the development of early negative concepts about the self, the world, and the future are considered pathogenic for depressive reactions.

Beck is most definite about the role of self-concepts, i.e., the "clusters of attitudes about himself, derived from personal experiences, other's judgments of him, and his identifications with key figures" (Beck, 1967, p.275). Beck argues that once an attitude or concept has been formed, it can influence subsequent judgments and become more firmly set. For example, if a child gets the notion he is inept as the result of either a failure or being called inept, he may interpret subsequent experiences according to this notion. Each time he encounters difficulties in manual tasks he may have the tendency to judge himself inept. Each negative judgment fortifies the negative self image which facilitates negative interpretations of subsequent experiences. If it is not extinguished, the concept eventually becomes structuralized, i.e., it becomes a permanent formation in the cognitive organization. Such permanent structures are the schemata previously discussed.

The negative schemata may be dormant between depressive episodes, but "self diminishing concepts emerge with great force in depression" (ibid, p.276).[26] The activation of the negative

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[26]The mechanism by which schemata are sometimes dormant and at other times dominant is not clear. Beck deals with the types of events which evoke depressive schemata, and the sequalae once these schemata become dominant. In some of his

self-concepts lowers the individual's self esteem, as previously discussed. There is a long history of opinion that lowered self-esteem is of central importance in depression (e.g., Jacobson, 1953; Bibring, 1953; Freud, 1917).

Beck theorizes that negative generalizations about the self are organized under superordinate constructs such as "good" or "bad", which "...seem to be closely linked to affective responses. When an individual views himself as bad or undesirable he is likely to experience an unpleasant feeling such as sadness" (Beck, 1967, p.276)[27]. Thus, the vulnerability of the depression-prone individual consists of a constellation of negative attitudes about the self, the world, and the future. Negative generalizations about the self are connected to negative value judgments about the attributes. In addition, other schemata are part of the predepressive constellation, e.g., self-blame for the negative attributes. Not only does the individual consider himself lacking in an important attribute, but he is responsible for the lack. Negative expectations about the future are similarly manifested by such thoughts as "I will always be weak and get pushed around" (Beck, 1967, p.277).

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[26] writings, he invokes an energy concept reminiscent of psychoanalytic theories, and describes the energizing of certain depressive schemata by certain types of events. However, the mechanisms by which a premorbid constellation of cognitive schemata are activated in some manner by certain types of events, but do not enter into the cognitive functions at other times are not adequately specified.

[27] As previously noted, the nature and origination of the link between the cognitive judgments and the affective responses are assumed, but not specified.

In Beck's model, depression results from the interaction of the predepressive constellation with a precipitating event. Beck suggests several types of events which, for a predisposed individual, might be depressogenic:

a. Specific Stress:

- A situation resembling the situation(s) initially responsible for the formation of the depressogenic negative attitudes.
- A situation representing loss or shrinkage of the personal domain.
- A situation which lowers self-esteem.
- A situation in which important goals are thwarted or an insoluble dilemma posed.
- A physical disease.

b. A series of lower intensity stressful situations.

c. A nonspecific stressful event or series of nonspecific stressors.

d. A biochemical imbalance.

When the various components of the depressive constellation are activated by such an event(s), a sequence such as the following occurs:

> "The individual interprets an experience as representing a personal defeat or thwarting; he attributes this defeat to some defect in himself; he regards himself as worthless for having this trait; and since he regards the trait as an intrinsic part of him, he sees no hope of changing and views the future as devoid of satisfaction or filled with pain"
> (Beck, 1967, p.278)

Other Cognitive Models of Depression

Seligman's Learned Helplessness model. Seligman and his colleagues have proposed an important model of depression which is based on the consequences of learning that important events are independent of the individual's behavior[28] (Seligman, 1974; 1975; Miller & Seligman, 1973; 1975; Miller, Seligman & Kurlander, 1975; Klein & Seligman, 1976; Seligman, Klein & Miller, 1976).

The model of human depression is an extrapolation from an animal model which was constructed to explain various deficits produced by subjecting dogs to aversive, inescapable, uncontrollable electric shocks. Dogs who are so treated tend to show several distinct deficits in subsequent avoidance training (Overmier & Seligman, 1967; Seligman & Maier, 1967):

1. Failure to initiate escape responses, or slowness in making such responses compared to naive dogs. Often they seem to passively accept the shock. This is held to be a manifestation of a reduction in motivation to respond. Seligman reasons that normally, part of the incentive for making escape responses is the expectation that they will bring relief; the pre-treated dogs have learned that reinforcement is independent of responding.

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[28] An important event, i.e., reinforcement, is objectively independent of a response if the probability of reinforcement given the response equals the probability of reinforcement in the absence of that response. When the reinforcement is independent of all the individual's responses, then the individual "cannot control the reinforcement, the outcome is uncontrollable and nothing the organism does matters" (Seligman, 1974, p.95).

2. If they do make a response that terminates the shock, they have more difficulty than naive dogs in learning the response-shock termination contingency. This is held to be a manifestation of a cognitive deficit induced by the pretreatment. The animal is said to have acquired a cognitive set in which responding and shock are independent. This makes it more difficult to learn that responding does produce relief when the animal makes a response that actually terminates shock.

These deficits generalize from shock escape and avoidance to a variety of adaptive behaviors; as well, they can be produced by a variety of inescapable aversive stimuli. Similar deficits in escape and avoidance learning after pretreatment with inescapable aversive stimulation have been demonstrated in a variety of species (Maier & Seligman, 1976), including humans (Seligman, 1974; 1975).

The pattern of deficits described, termed learned helplessness, is considered to derive from learning that the aversive stimulation was not contingent upon the individual's responding, and generalizing to the expectation of noncontingency between other important events and responding.

It was argued that several characteristics of laboratory induced learned helplessness appear to be analogous to some of the central characteristics of human depression:

1. Motivational disturbance. Passivity in the face of trauma, i.e., slowness or failure to initiate responses to alleviate trauma is considered analogous to the

diminished response initiation and impoverished behavioral repertoires of depressed humans. Both are held to result from the motivational consequences of response-reinforcement independence.

2. Cognitive impairment. The cognitive deficit, i.e., retarded learning of response-relief contingencies, is considered to result from the cognitive set to expect important outcomes to be uncontrollable. This mechanism is held to underlie the negative expectations regarding the effectiveness of their actions that depressed humans exhibit.
3. Helplessness phenomena often dissipate with time, as typically occurs with the symptoms of human depressions.
4. Helpless animals often show anorexia, weight loss, and, in rats, depletion of brain norepinephrine, all characteristics associated with some human depressions.
5. Depressed humans often describe themselves as helpless, hopeless, and powerless. Furthermore, helplessness and hopelessness have been regarded by numerous theorists as central to depression, e.g., Bibring (1953), Melges & Bowlby (1969), Lichtenberg (1957), and Beck (1967).
6. Affective reactions. Although less well demonstrated, helpless animals and humans show dysphoric mood.

Extrapolating from these findings, it was proposed that the central phenomenon of some human depressions is learned helplessness: "Learning that outcomes are uncontrollable

results in the motivational, cognitive, and emotional components of depression" (Abramson, Seligman & Teasdale, 1978, p. 64). Seligman has been explicit in limiting the learned helplessness model to only those depressions "...in which the individual is slow to initiate responses, believes himself to be powerless and hopeless, and has a negative outlook on the future which had begun as a reaction to having lost his control over relief of suffering and gratification" (Seligman, 1974, p. 85).

Although the large research literature that has been spawned by the learned helplessness model has produced very mixed results[29], in general, these studies tend to demonstrate analogies between depressed individuals[30], and individuals who have been exposed to helplessness inductions, i.e., response-outcome noncontingency. In particular, similarities which appear to exist are the cognitive set to perceive response-outcome noncontingency, and deficits in adaptive problem-solving behavior when outcomes are response-contingent (e.g., Klein & Seligman, 1976; Miller & Seligman, 1973, 1975, 1976)[31].

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[29] Cf the entire issue of the Journal of Abnormal Psychology, 1978, 87(1).

[30] The majority of studies have used mildly depressed college students. However, replications have begun to be reported with clinical samples (e.g., Raps, Reinhard & Seligman, 1980).

[31] This summary and conclusion is clearly debatable. For example, opposing views have been cogently expressed by Costello (1978), and caution in interpreting this body of data has been urged by Depue & Monroe (1978).

Recently, in response to inadequacies of Learned Helplessness as a model of depression, Seligman and his colleagues have reformulated the model into a frankly cognitive model (Abramson, Seligman & Teasdale, 1978). It should be noted that the original model was itself cognitive in some respects. It was not the exposure to uncontrollability itself that was held to produce helplessness; rather it was the individual's interpretation of his situation and his predictions about future situations. To wit: "The depressed patient has learned or believes that he cannot control those elements of his life that relieve suffering to bring him gratification. In short, he believes he is helpless" (Seligman, 1974, p.98). Furthermore, the model understood events that precipitate helplessness depression in terms of the individual's interpretation of the event as indicating that he is helpless. However, in the large body of research literature that the learned helplessness model spawned, the cognitive aspects were largely eclipsed by a focus on objective response-reinforcement independence.

The reformulation combines major aspects of the old model with a revision of attribution theory. In addition to the old learned helplessness theory and literature, it draws most explicitly from the attribution theories and research of Heider (1958), Kelley (1967), Weiner (1972, 1974), and Rotter (1966). In short, the reformulated model proposes that a crucial process which occurs after an individual perceives noncontingency is the causal attribution he makes about his helplessness. It is the attribution made for perceived independence between his acts

and outcomes which determines the individual's expectations about future noncontingency; the expectations about future noncontingency in turn produce the symptoms of helplessness.

The nature of the causal attribution determines several crucial characteristics of the subsequent helplessness deficits. Abramson et al. argue that causal attributions for helplessness vary along three orthogonal dimensions: internal-external, stable-unstable, and global-specific. These dimensions are held to determine whether expectation of future helplessness will lower self-esteem, be chronic or acute, and be global or specific.

Internality. When an individual judges that an outcome is not contingent on any response in his repertoire, but that it is contingent on a response in the repertoire of a relevant other, he is making an internal attribution and is said to be personally helpless. If he judges that the outcome is also non-contingent upon any response in any relevant other's repertoire, then he is making an external attribution, and is said to be universally helpless. Both personal (internal attribution) and universal (external attribution) helplessness produce the cognitive and motivatonal deficits typical of helplessness, but only personal helplessness is held to also produce self-esteem deficits. In addition, the expectation of noncontingency about the loss of a highly desired outcome (or about the occurrence of a highly aversive outcome) is held to produce depressed affect in both personal and universal helplessness.

As a hypothetical example, Abramson et al. argue that a

father whose child is dying of leukemia is universally helpless if he makes the veridical external attribution, i.e., no response in his or any relevant other's repertoire can affect the outcome. He is likely to suffer the motivational and cognitive deficits of helplessness, as well as depressed affect. He will not, however, experience lowered self-esteem or engage in self-blame as long as he does not make an internal attribution.[32]

In addition to the internality of the causal attribution for helplessness, the attribution can vary along the orthogonal dimensions of stability and globality. When the attribution is to stable, rather than unstable, factors, the helplessness deficits are likely to be chronic. That is, if helplessness is perceived as deriving from factors that are not going to change, then the expectation of future helplessness is enhanced. Attributions to transient, or unstable, factors is not likely to produce chronic expectations of future helplessness, and consequently is not likely to produce chronic helplessness deficits. The globality of the attribution determines the extent to which the individual generalizes beyond the present situation. Consequently, this aspect of the attribution determines the generality of helplessness deficits. These dimensions combine. When helplessness is attributed to global and stable factors, broad transfer of helplessness will occur; attributing helpless-

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[32]Although Abramson et al. do not mention it, this distinction might be proposed as a mechanism which differentiates normal grief reactions from depression. Many writers have held that the chief phenomenological distinction lies in the self-esteem deficits of depression (e.g., Freud, 1917).

ness to specific and unstable factors leads to little transfer of helplessness. Again, both these dimensions are orthogonal to internality.

The reformulated model, which might be labelled an attributional-learned helplessness model, expands the explanatory power of the original, animal based model. It provides mechanisms for depressed affect and for lowered self-esteem, it reconciles learned helplessness with the now common finding that depressed individuals tend to make more internal attributions for failure than nondepressed people[33], and it explains variations in the generality and chronicity of helplessness deficits.

Rehm's behavioral self-control model. Rehm (1977) has presented a model of depression which incorporates some of the major proposals of Beck's, Seligman's, and Lewinsohn's models into a behavioral self-control framework. Her model is an adaptation of the self-control models which have been employed for the analysis and treatment of a variety of behavioral disorders by Mahoney & Thoresen (1974), Thoresen & Mahoney (1974), Goldfried & Merbaum (1973), Kanfer & Karoly (1972),

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[33] To the extent that the reformulated model adequately explains this finding, a major point of incompatibility with Beck's model is resolved. Beck's model predicts excessive perception of control for aversive events: "... the depressed person ... assigns the cause of an adverse event to an heinous defect in himself" (Beck, 1976, p.112). That is, he assigns too much responsibility to himself. The old learned helplessness model predicts perceptions of no control over the very same types of events. In the reformulated model, the individual may make a personally helpless attribution, e.g., "the cause of my school failure is my stupidity (internal attribution), and, since I am stupid, no response I could make will help me to pass (helpless)".

and Kanfer (1970, 1971).

Following Kanfer (1970, 1971), self-control is conceptualized as "those processes by which an individual alters the probabilities of a response in the relative absence of immediate external supports" (Rehm, 1977, p.790). The major phenomena of depression are held to follow from disturbances in three broad classes of self-control processes: Self-monitoring, self-evaluation, and self-reinforcement, as follows:

Self-monitoring. Depressed individuals are held to attend selectively to negative events. This proposal specifies a disturbance in selective attention processes; however, the objects or events to which depressed individuals are thought to attend are not specified beyond the general "negative events". These are defined as "stimuli which are aversive and other stimuli which are perceived as cues for aversive stimuli" (Rehm, 1977, p.792). In addition, depressed people are thought to monitor only the immediate consequences of their behaviors, and to fail to perceive and regulate their behavior in accordance with more delayed consequences.

Self-evaluation. In their evaluations of themselves, depressed people are held to often make inaccurate attributions of causality. Causal attributions are said to be either excessively external, engendering belief in the general uncontrollability of events, or excessively internal, engendering belief that events are controllable and aversive events must therefore result from personal incompetence. In addition, depressed people are considered to set excessively stringent criteria for self-evaluation.

Self-reward. Depressed people are characterized as consistently administering relatively low rates of self-reward and high rates of self-punishment. It has been argued by others that self-reinforcement and self-punishment have effects on behavior which parallel those of environmental reinforcement and punishment (e.g., Bandura, 1969, 1971, 1976; Thoresen & Mahoney, 1974; Marston, 1969). Rehm argues that a disturbed pattern of self-rewards and punishments in depression result partly from the self-monitoring and self-evaluation tendencies peculiar to depression.

The formulation of depression in terms of specific behavior self-control processes leads to a treatment program aimed at specific alterations of the processes involved. In an initial test, a self-control therapy program based on Rehm's model was judged more effective than nonspecific psychotherapy and waiting list control conditions (Fuchs & Rehm, 1977).

Of the three cognitive models of depression reviewed above, Beck's appears to be the most comprehensive and general, and hence, the least specific. His organization and categorization of the cognitive phenomena of depression, his eloquence in capturing and subsuming some of the phenomenology of depression within a framework that employs fewer, less complex, and less remote hypothetical constructs and hence stays closer to observable or reportable clinical phenomena, and his employment of conceptualizations more amenable to operationalization and therefore to empirical testing than psychodynamic formulations have made Beck's model enormously appealing.

Both Seligman's (reformulated) model and Rehm's model can be considered to be specific elaborations of aspects of Beck's more general formulations; thus, those two models elaborate and explicate more specific cognitive processes than Beck's, but deal with narrower realms of depressive phenomena. Predictions that can be derived from Seligman's and Rehm's models are consistent with Beck's formulations.

Empirical Tests of Beck's Model

A considerable volume of research data which bear on Beck's model of depression has been reported since Beck's initial major theoretical statement in 1967. Although much of this research was undertaken for the purpose of testing aspects of that model, some research undertaken for other purposes and reported in other contexts has also produced data which are relevant to Beck's model. The research literature reviewed below has been selected for its bearing on Beck's formulations without regard for the purposes of the researchers or the contexts in which they were reported.

The cognitive triad. The following research bears on the presence of the cognitive triad, i.e., cognitive contents dominated by negative views of the self, negative views of experience and/or the world, and negative views of the future.

The early studies reported by Beck and his colleagues consisted of analyses of therapy transcripts and manifest dream contents of depressed and nondepressed psychiatric patients. Beck and Hurvich (1959) had blind raters score the first twenty dreams reported by each of six matched pairs of depressed and

nondepressed patients in psychotherapy. In each pair of patients, the depressed patient's dreams showed greater frequencies of masochism and negative representations of the self. Masochistic dreams were defined by Beck & Hurvich (1959) as those in which the dreamer dreams about crying or feeling sad, or being deserted, rejected, thwarted, deprived, blamed, injured, ill or punished. Negative representations of the self occur when the dreamer is represented as defective, diseased, deformed, incompetent, or ugly. Beck and Ward (1961) replicated the dream study with a larger sample (219 patients), and found the same differences. Similar thematic differences were obtained from content analyses of the psychotherapy sessions of 50 depressed and 31 nondepressed psychiatric patients (Beck, 1967).

In a partial replication of Beck's early dream studies, Hauri (1976) compared the dream contents of individuals who had previously been hospitalized with a diagnosis of reactive depression but who were then symptom free, with the dreams of matched normal controls. Dream reports were collected in a sleep lab during both REM and NREM periods, thereby reducing the confounding with memory which had occurred in the earlier studies which had collected morning-after retrospective accounts. The main differences reported were the presence in the dreams of the formerly depressed Ss of more masochism, as defined by Beck and Hurvich (1959), and more "covert hostility out". The latter is scored when the dreamer dreams about hostile acts in the environment not involving the self. Such content is taken as indicating that the dreamer perceives

the environment as generally hostile, violent and threatening, but that the hostility is neither emanating from, nor directed specifically against, the self (Gottschalk & Gleser, 1969). The authors conclude that the obtained content differences reflect stable depressive personality characteristics, because the depressives were in remission. No pathological control group was used.

Several studies have reported correlations between themes of the cognitive triad and either clinically significant depression or depressed mood in normal Ss. Weintraub, Segal & Beck (1974) devised a semi-projective story completion test as an index of the presence of depressed cognitive content. Each incomplete story involved a principal character with whom S was asked to identify. Stories were completed by selecting one sentence from each of four sets of sentences. Each group of sentences constituted a category containing one of the following themes: expectation of discomfort, expectation of failure, negative interpersonal relations, and low self-concept. The test was administered to 30 normal male students five times over a 2-month period, and was preceded each time by the Depression Adjective Check List (Lubin, 1967), a self-report measure of depressed mood. The main finding reported was a time-specific relation between depressed mood and depressed cognitive content, such that frequency of depressive sentence completions was correlated with depressed mood. There was no measure of clinically significant depression.

Beck (1961) devised a projective test, The Focused Fantasy Test, in which E determines which of two characters in

a story S identifies with. The characters are always twins, one of whom is subjected to an unpleasant experience. Depressed psychiatric patients identified significantly more frequently than nondepressed psychiatric patients with the negative outcome twin. Beck concluded that these data reflect the negatively biased view of experience of the depressed patients (Beck, 1967).

Nelson (1977) found a positive correlation between scores of students on the Beck Depression Inventory (BDI) (Beck, 1967) and a self-report measure of several of the "irrational beliefs" posited by Ellis (1962) to be responsible for maladaptive emotional reactions. Although Ellis' irrational beliefs do not correspond exactly to Beck's descriptions of cognitive triad contents, the study supports the general hypothesis that distorting cognitive structures are present in depression.

Beck (1967, p.182) found significant negative correlations between depression and a measure of self-concept administered to depressed and nondepressed psychiatric in- and outpatients. The self-concept measure was an interviewer administered inventory of 25 self-rated personality attributes devised to reflect self-concept.

Laxer (1964) found that depressed inpatients demonstrated low self-concept on a semantic differential test on admission, but higher self-concept at the time of discharge. In comparison, a group of paranoid patients showed comparatively high self-concept throughout their hospitalization.

Teasdale and Rezin (1978) found significant correlations between self-reported frequency of thoughts implying criticisms

or devaluation of the self during forty 16-second trials, and self-reported depressed mood at the end of each 16-second period. Subjects were severely depressed day hospital patients.

Hammen and Krantz (1976) found that depressed female students rate themselves lower than nondepressed female students on a variety of interpersonally relevant attributes. Calhoun, Cheney and Dawes (1974) reported that depressed female college students are more likely than nondepressed students to attribute their depressed moods to causes within, rather than without, their personal control. The authors suggest that this reflects a self-blaming tendency.

Peterson (1979) reported significant correlations between BDI in a normal college student population and questionnaire responses indicating cognitions of self-blame and helplessness, when asked to imagine themselves in various undesirable roles and activities.

Altman and Wittenborn (1980) factor analyzed a self-descriptive inventory completed by women who had previously been hospitalized with diagnoses of depression but were out of hospital and symptom-free at the time of testing. Five factors discriminated the formerly depressed Ss from a similar group of normal women without psychiatric histories or symptoms. The authors described the factors as low self-esteem, helplessness with preoccupation with failure, unhappy pessimistic outlook, narcissistic vulnerability, and low confidence and incompetence. Descriptions of the first, second, and fifth factor map clearly onto Beck's descriptions of the negative view of self, and the

third factor maps clearly onto negative expectations of the future. Since the women in the depressed group were in remission at the time of testing, the authors conclude that these factors represent relatively stable personality characteristics of depressives. This interpretation is congruent with Beck's proposal of cognitive schema, corresponding to the contents of the cognitive triad, as enduring cognitive components which comprise the depression-prone individual's predisposition to depressive reactions. In a partial replication and validation study, Cofer and Wittenborn (1980) generated new inventory items from the factors derived in Altman and Wittenborn (1980). Factors labelled unhappy narcissistic vulnerability and low self-esteem were again derived. In this study, the authors collapsed helplessness, incompetence, and low self-esteem into one factor labelled low self-esteem, but state that it is unclear whether this is more usefully considered one broad category, as they have done, or several distinct categories. In addition, two new factors, not clearly related to Beck's formulations, emerged: a critical dissatisfied mother, and a dependency-fostering overprotective father.

Negative view of the future: Expectation of failure. Data relevant to Beck's assertion that depressed individuals are characterized by a pessimistic view of the future, and that the pessimism derives partly from self-concepts of inadequacy, are provided by studies with depressed Ss, which include measures of initial expectations for success on a variety of tasks. Beck's model would presumably predict that depressed

people would approach tasks which appear to require skill with low expectations of success, as a result of their general expectation of future failure and deprivation, combined with their self-blaming tendency to attribute present and expected negative events to their own inadequacies.

Loeb, Feshbach, Beck and Wolf (1964), Loeb, Beck, Diggory and Tuthill (1967), and Loeb, Beck and Diggory (1971) found that depressed, compared to nondepressed, psychiatric inpatients gave lower probability-of-success ratings before performing a card sorting task, whereas level of aspiration ratings did not differ between groups. Similarly, Lobitz and Post (1979) found lower initial expectations of success across a variety of tasks among depressed, compared to non-depressed, psychiatric inpatients. Similar results were reported by Rizley (1978) with depressed and nondepressed college students on a novel, apparent skill task.

On the other hand, quite a number of studies have failed to find differences in initial expectancy of success using a variety of skill and apparent skill tasks, and across samples of depressed and nondepressed psychiatric in- and out-patients from different populations, as well as depressed and nondepressed college students (Miller & Seligman, 1973; Hammen & Krantz, 1976; Abramson, Garber, Edwards & Seligman, 1978; O'Leary, Donovan, Krueger & Cysewski, 1978; Smolen, 1978; Golin & Terrell, 1977; Golin, Terrell, Weitz & Drost, 1979). The following studies suggest possible explanations.

Prkachin, Craig, Papageorgis and Reith (1977) found no

difference in rated probability of success for the second of two tasks between depressed and nondepressed psychiatric patients as well as nonpsychiatric controls. However, high correlations for all groups were obtained between prediction of success and actual performance on preceding trials. These data might suggest that the pessimistic expectations of depressed people, if they occur, might result from histories of perceived failures; one might question whether such histories would generate expectancies for poor performance on novel laboratory tasks which may bear little perceived relation to the life histories of depressed Ss. It may be that the inconsistent data about initial expectancy of success is a function of the perceived similarity between the various laboratory tasks used and real life tasks in the personal histories of depressed Ss. Perhaps less novel, more naturalistic tasks are required to test hypotheses about initial expectancy of success.

A pair of studies by Golin and his associates (Golin & Terrell, 1977; Golin, Terrell, Weitz & Drost, 1979) suggests another conclusion. In these studies, depressed and nondepressed college students (1977) and depressed and nondepressed psychiatric inpatients (1979) were given a chance-determined task involving the throwing of dice. In an active-involvement condition Ss threw the dice, whereas in a condition with no active involvement E threw the dice. It is generally the case among normal Ss that active participation in a chance-determined task fosters an illusion of control over outcomes, i.e.,

expectancy of success in chance-determined events which is higher than would be warranted by the objective probabilities associated with the event (Langer, 1975). Golin et al. (1977, 1979) reason that the elevation of expectancies usually produced by an illusion of control in a chance-determined task with active participation is mediated by a belief in one's competence. Therefore, if depressed Ss believe themselves generally incompetent, active participation should lower expectancies for success in the active participation condition. This hypothesis was confirmed in both studies. Nondepressed Ss showed the expected increase in expectancy for success in the active participation condition, whereas depressed Ss showed lower expectancies for success in the active participation condition. Golin et al. (1979) suggest that depressed Ss are not less optimistic in actual skill tasks, but are less optimistic under illusion of control conditions, and that the latter may be a more sensitive measure of generalized low-efficacy expectancies than the former.

A perhaps more intriguing observation to be made is that the differences in expectancy of success observed in the active participation, or player-control condition, appears to result from a nonveridical perception on the part of the non-depressed Ss. Although active participation fosters a perception of greater control, or alters Ss' perceptions of the task from chance-determined to skill-determined, this is an illusion since the real chance-determined nature of the task is unchanged. Hence, the greater expectancy for success shown by normal Ss

under active participation conditions results from a distortion of reality. One might conclude that the more pessimistic expectation of depressed individuals results from a more realistic, undistorted appraisal of reality. On the other hand, apparent differences in veridicality may be artifactual; they may coincidentally occur as an epiphenomenal consequence of the mechanism suggested by Golin et al., i.e., that both groups develop the illusion of control and it is the (illusory) perception of the active participation condition as skill-determined interacting with self-concepts of inadequacy that accounts for interaction between group and condition. The latter explanation is suggested by a small difference in the expectancies of the depressed groups such that their expectancies are lower in the active involvement than the noninvolvement conditions, but the authors do not report on a test of significance between these means.

Negative view of the future: Hopelessness. In addition to Beck, numerous writers have observed that a hopeless view of the future characterizes the expectations of depressed individuals, and that hopelessness is related to suicide (e.g., Farber, 1968; Melges & Bowlby, 1969; Kobler & Stotland, 1964; Stotland, 1969). Attempts to demonstrate these relationships empirically awaited the design of an instrument to assess hopelessness. Vatz, Winig and Beck (1969) adopted Stotland's (1969) definition of hopelessness as a set of negative expectations about the future, and designed and validated the Generalized Expectancy Scale, later renamed the Hopelessness

Scale (Beck, Weissman, Lester & Trexler, 1974), a self-report inventory consisting of 20 true-false statements about the future.

Several studies have reported highly significant correlations between the Hopelessness Scale and BDI scores of psychiatric patients (Minkoff, Bergman, Beck & Beck, 1973; Beck, Kovacs & Weissman, 1975; Abramson, Garber, Edwards & Seligman, 1978; Lester, Beck & Mitchell, 1979; Erikson, Post & Paige, 1975; Gottschalk, 1974).

As well, hopelessness appears to be the single best predictor of serious suicide attempts, and Beck (1976) suggests that it is the lethal component of depression. Intercorrelations of individual items on the BDI show that suicide wishes correlate more highly with hopelessness than with any other item (Beck, 1967). Factor analyses of the BDI have isolated a factor with high loadings for only two items, hopelessness and suicide wishes (Cropley & Weckowicz, 1966; Pichot & Lempérière, 1964). Ganzler (1967) tested groups of normal Ss and mixed psychiatric patients who differed with respect to rated suicidality and the presence of a current life crises. Although the psychiatric patients and the normals in life crises tended to rate their current life situations negatively, only the suicide-risk groups rated the future negatively. Similarly, Minkoff et al. (1973) and Beck, Kovacs et al. (1975) found significant correlations between estimated seriousness of suicide intent in mixed groups of inpatient suicide attempters, and scores on the Hopelessness Scale. Wetzel (1976) obtained similar data with

mixed psychiatric patient samples of suicide attempters and also suicide "ideators" who had planned, but not attempted, suicide.

Lester, Beck and Trexler (1975) studied a group of suicide attempters, and found high correlations between ratings of the seriousness of the suicide intent and both BDI and Hopelessness Scale scores. In this, as well as the abovementioned studies, seriousness of suicide intent was assessed by both self-reported intent to die and a scale of suicide intent based upon the circumstances of the suicide action (Beck, Herman & Schuyler, 1974). In a most interesting follow-up four years later, Lester, Beck and Mitchell (1979) reported on the subsample of the suicide attempters studied in 1975 who subsequently did commit suicide. Examination of the 1975 data of the 14 Ss who subsequently committed suicide showed higher hopelessness and BDI scores than either the group whose intent to die had been rated "no" or "uncertain" in 1975, but their scores were not different from the group rated "yes" on intent to die in 1975 but who did not subsequently commit suicide. This latter group also had higher BDI and Hopelessness Scale scores in 1975 than the "no" or "uncertain" group.

It is noteworthy that all the studies reported here of the relationship between hopelessness and suicide showed that intent to die correlated more highly with Hopelessness Scale scores than with BDI scores, although both correlations were significant. This suggests that the relationship between hopelessness and suicidality is not specific to depression, although both factors are correlated with depression. The

relationship between hopelessness and suicidality in the above studies held across diagnostic groups and across levels of depression.

Abstract thinking. Studies of the ability of depressed people to engage in abstract thinking has some indirect bearing on Beck's model. Although the relationship between impaired ability to abstract, i.e., "to think of a general quality or idea apart from the particular instances on which it is based" (Braf & Beck, 1974, p.456), and Beck's model has not been explicated, one might speculate that if depressed individuals have fewer and idiosyncratic schemata available with which to classify events, then they would have more difficulty than people whose information processing is not so limited, in abstracting general qualities or ideas from events, especially events that are incongruent with the depressive themes hypothesized to be prepotent in depression.

Braf and Beck (1974) compared the abstraction ability of two groups of hospitalized patients with primary diagnoses of depression or schizophrenia and a group of nonhospitalized normal Ss. Both depressed and schizophrenic groups showed abstraction deficits compared with normal controls, with schizophrenics demonstrating more impairment than depressives. Recently, Donnelly et al. (1980) reported impaired abstraction ability among hospitalized depressives compared to nonhospitalized normal Ss. In similar studies, neither Andreasen (1976) nor Saltzman et al. (1966) found differences in abstraction ability between depressed and nondepressed psychiatric patients.

In light of the conflicting data, and methodological weaknesses of the two studies reporting group differences, an impairment of abstraction ability specific to depression cannot be said to have been convincingly demonstrated. Donnelly et al. (1980) did not include a pathological control group, and therefore cannot exclude an impairment due to nonspecific degree of disturbance, or the deadening impact of hospitalization. These possibilities gain credence in the light of Braf and Beck's (1974) finding of abstraction impairment in both their psychiatric groups as compared to normal controls. Lang and Buss (1965), reviewing the deficit literature in schizophrenia, concluded that decreased abstracting ability is best predicted by degree of disorder rather than diagnostic type. Braf and Beck (1974), in discussing their data suggest that various kinds of conceptual disorganization may generally characterize patients who are sufficiently distressed and/or disorganized to warrant hospitalization. Other researchers in schizophrenia have made similar points (e.g., Saltzman et al., 1966; Harrow et al., 1972). Braf and Beck (1974) suggest the need to look at specific conceptual areas, where conceptual differences between diagnostic groups might be found, rather than global conceptual tasks. At the time of this writing, no such studies were found.

Information processing distortions. In Beck's model, the cognitive contents described as the cognitive triad, and the schemata to which they correspond, produce disturbances in the processing of information yielding depressogenic interpretations, evaluations, conclusions and uses of information. Consequently,

events are misconstrued in ways congruent with various depressive themes. Several distinct lines of research bear on these proposals.

A number of studies have examined changes in expectancy for success on various skill and chance-determined tasks following success and failure on previous trials. Normally, individuals adjust their expectancies for success on future trials based on previous outcomes, particularly when they believe the outcomes are dependent on their performance, i.e., a skill-determined task, rather than when they believe that outcomes are independent of performance, i.e., chance-determined tasks (Rotter, Liverant & Crowne, 1961; James & Rotter, 1958; Alloy & Abramson, 1978). This pattern would seem to represent accurate information processing, i.e., correctly evaluating one's performance and using that information to assess the likelihood of future success on the same task in instances in which a stable factor (i.e., skill) determines outcome.

Several studies have compared depressed with nondepressed Ss with respect to expectancy changes resulting from success and failure on skill and chance-determined tasks. Most of these studies were undertaken for the purpose of testing predictions of the learned helplessness model of depression, but the data also bear on predictions which can be derived from Beck's model. Beck proposes that depressed individuals are characterized by negative self-concepts, including beliefs of incompetence and ineffectiveness, as well as the cognitive set to interpret

experience as reflecting negatively upon the self. If information processing is distorted in accordance with these characteristics, then depressed, but not nondepressed, individuals should have more trouble perceiving response-contingent success when they believe success is dependent upon personal skill (and perhaps effort) than when they believe success to be chance-determined. Therefore, Beck's model would predict that depressed Ss would differ from nondepressed Ss such that nondepressed Ss would exhibit larger expectancy-for-success changes following success on skill than chance-determined tasks, whereas depressed Ss would exhibit similar expectancy changes on skill and chance-determined tasks. In addition, depressed Ss should exhibit smaller expectancy changes following success on skill tasks than nondepressed Ss.

It is not completely clear what Beck's model predicts about expectancy changes following response-contingent failure. Beck has interpreted large expectancy changes following failure for depressed compared to nondepressed psychiatric inpatients as supporting his model (Loeb, et al., 1964, 1967). It may. His model characterizes depressed people as highly sensitized to experiences reflecting badly upon the self. As well, using such distorting conceptual processes as over-generalization and magnification, the meaning of a failure with respect to the self's adequacy and competence would be exaggerated. This could be expected to produce excessive reactions by depressed Ss to failure, including unreasonably large reductions in self-perceived adequacy, and subsequent

large reductions in expectancy for success. However, one might also make the opposite prediction. If depressed people are characterized by generalized self-concepts of inadequacy, incompetence, etc., and also by generalized pessimistic expectations about the results of their efforts, then they should begin tasks with low expectancy for success (see review, above); failure feedback should be congruent with their initial expectancy, thereby producing little change in expectancy for success on future trials.

A number of such studies have produced data which support Beck's model, as outlined above. Most of these studies report total expectancy change, collapsing success and failure conditions, since this distinction is not relevant to the learned helplessness hypothesis. However, for the purposes of reviewing data relevant to Beck's hypotheses, success and failure conditions are separated wherever possible in this review.

Several studies have reported smaller expectancy changes following both success and failure for depressed compared to nondepressed students in skill, but not chance, tasks (Klein & Seligman, 1976; Miller & Seligman, 1973, 1976; Miller, Seligman & Kurlander, 1975). Although the implications of the failure condition for Beck's model are unclear, the results of the success condition are predicted by Beck's model, as discussed above.

Garber and Hollon (1980) found that nondepressed, but not depressed, students exhibited the expected large expectancy changes following success on skill, but not chance,

tasks. No between group differences were found following failure. As well, depressed students did not differ in their expectancy changes between skill and chance, whereas nondepressed students did. In this study Ss also estimated the probability of another S's success. Depressed Ss did not differ from nondepressed Ss in the expectancies generated for another's success in any condition. This finding led the authors to conclude that depressive cognitive distortions are specific to their belief about their own skilled action, and that differences between depressed and nondepressed Ss' expectancies reflect differences in what Bandura (1977) has described as self-efficacy expectations. This is clearly supportive of a self-esteem interpretation of differences in expectancy changes.

A recent attempt to replicate the expectancy-change findings with clinical populations has been reported by Abramson, Garber, Edwards and Seligman (1978). They found that depressed psychiatric inpatients show smaller expectancy-for-success changes following failure in skill, but not chance, tasks than schizophrenic or nonschizophrenic nondepressed inpatients. No between-group differences were found following success. This is a different pattern of results than those reported above with college student samples. The group differences following success were not found. As well, the differences following failure contradict the earlier findings of Loeb et al. (1964, 1967), who found large drops in expectancy for success following failure among hospitalized depressives.

Not all studies which have measured expectancy changes

following success and failure on skill tasks have found differences between depressed and nondepressed groups. Failures to find such differences with college student samples were reported by Willis and Blaney (1978), Sacco and Hokanson (1978), and McNitt and Thornton (1978). Hammen and Krantz (1976) found no differences in expectancy following success, but depressed students lowered their expectancy more than non-depressed students following failure. Similarly, no differences following success or failure were found between depressed and nondepressed psychiatric patients by O'Leary, Donovan, Krueger and Cysewski (1978) or Smolen (1978). Seligman (1978) has argued that the failure to find smaller expectancy changes among the clinically depressed Ss in O'Leary et al. (1978) and Smolen (1978) is attributable to the confounding and antagonistic effects of other primary psychopathology in their depressed samples, and that when the effects of alcoholism are partialled out of O'Leary et al's data, the predicted differences in expectancy change appear.

In summary, substantial evidence has been adduced that demonstrates smaller expectancy changes following success on skill tasks by depressed compared to nondepressed students. These findings support Beck's hypotheses of information processing distortions in depression. However, these findings are far from unanimous, and have not been replicated in clinical populations.

It is argued here that small expectancy changes following success on skill tasks demonstrate processing disturbances

rather than merely demonstrating the presence of depressive content. Since depressed Ss tend to approach tasks with low expectancy of success (see review in previous section), veridical interpretations and uses of evidence of success on a skill task as information about one's ability to perform that task well, should produce large increases in expectancy for success on future trials of the same task.

The implications for Beck's model of expectancy changes following failure are less clear. The pattern of results are less consistent than those of success conditions, and the predictions which can be deduced from Beck's model are not apparent.

In the only attempt which could be found to more directly assess the logical errors posited by Beck to characterize depressive information processing, and to examine their parameters, Hammen & Krantz (1976) developed a story completion task in which Ss read brief stories involving characters in potentially problematic situations. Subjects are asked to "put themselves in the character's place and imagine how she might think and feel". Each story is followed by 3 or 4 questions, each with 4 response options. The questions pertain to the character's thoughts, feelings, and expectations as she considers her situation. Each group of response options contains one of each of the following types of judgments: depressed-distorted, non-depressed distorted, depressed nondistorted, and nondepressed nondistorted. The depressed-nondepressed distinction refers to the presence of negative content, e.g., negative interpretations

of experience with respect to interpersonal relations, low self-concept, negative expectations, etc. The distorted-nondistorted distinction refers to the presence of the logical distortions proposed by Beck, e.g., overgeneralization, arbitrary inference, magnification, etc.

Hammen and Krantz (1976) administered the test to depressed and nondepressed female college students. Depressed Ss gave more depressed-distorted, and fewer nondepressed-nondistorted responses than nondepressed Ss. No group differences were found in the frequencies of nondepressed-distorted or depressed-nondistorted responses. These data support Beck's assertions of logical distortions which alter information processing, and which are specific to depressive contents rather than a generalized deficit of logical processing ability.

In a follow-up validation study, Krantz and Hammen (1979) extended Hammen and Krantz's (1976) findings to other populations. The same patterns of results, i.e., more depressive-distorted responses by depressed Ss were obtained from samples of depressed and nondepressed college students, depressed psychiatric outpatients, and depressed and nondepressed psychiatric inpatients. The authors argue that the instrument "...taps a biased manner of evaluating situations that emphasize negative, self-critical, or pessimistic interpretations that are not warranted by the events themselves" (Krantz & Hammen, 1979, p.617).

Causal attributions. Beck's model proposes that depressed individuals tend to misconstrue events to reflect

personal inadequacy and incompetence, and tend to blame themselves for their perceived inadequacies. Support for these proposals come from studies in which causal attributions for positive and negative events of depressed and nondepressed individuals are examined. The general pattern of data indicates that depressed individuals engage in a self-devaluing attributional style, making relatively more internal attributions for negative events and relatively more external attributions for positive events. Nondepressed individuals show a self-enhancing, opposite pattern in which internal attributions are more likely to be made for positive outcomes and external attributions for negative outcomes.

In achievement and apparent achievement tasks, Klein, Fencil-Morse and Seligman (1976), and Rizley (1978) found that depressed students were more likely to attribute failures to internal factors such as ability and effort, and successes to external factors such as luck and ease of task. Nondepressed students showed the opposite tendency, i.e., to attribute failures to external factors and successes to internal factors. Kuiper (1978) found that depressed students were more likely than nondepressed students to make internal attributions for failure; no group differences were found in attributions for success. Seligman, Abramson, Semmel and von Baeyer (1979) employed a questionnaire on which attributions were requested for 12 hypothetical situations, 6 with good outcomes and 6 with bad outcomes. Depressed students, relative to nondepressed students, made more internal, stable, and global attributions

for bad outcomes, and more external and unstable attributions for good outcomes. In addition to the internality dimension, it is noteworthy that depressed Ss' attributions for bad outcomes tended to also be stable and global, congruent with Beck's suggestion of depressive information processing being dominated by schemata corresponding to a pervasively flawed self, and depressive attributions for good outcomes tended to also be unstable, a tendency which would likely minimize the corrective impact of good outcomes which might otherwise alter the depressed individual's negative expectations and negative views of experience and the world.

An intriguing perspective on these data is provided by the social psychology literature on what is termed the self-serving bias in normal attributions (Bradley, 1978; Miller & Ross, 1975; Miller, 1978; Alloy & Abramson, 1979). The bias referred to is the normative tendency to take credit for good outcomes and to attribute bad outcomes to external factors. This is the pattern of success-failure attributions demonstrated by nondepressed Ss in the studies reported above. In general, it is argued that such a self-serving attributional style is motivated, and deployed for the purpose of enhancing self-esteem. It should be noted that such a tendency is not necessarily veridical; reality may be distorted in the interest of maintaining positive self-esteem. In this respect, a recent study by Alloy and Abramson (1979) yielded interesting results, related to the studies reviewed above of depressive attributions for good and bad outcomes. Alloy and Abramson (1979) examined the

degree of control depressed and nondepressed students reported having over environmental outcomes, when outcomes were actually contingent upon Ss' responses and also when outcomes were actually independent of responding. Nondepressed Ss overestimated the degree of contingency between their responses and outcomes, i.e., manifested an illusion of control, when noncontingent outcomes were frequent and/or desirable, and underestimated the degree of contingency when contingent outcomes were undesirable, i.e., represented failure. The depressed Ss' judgments of contingency were accurate in all conditions.

In this study, the group differences in judgments of contingency resulted from self-enhancing distortions by nondepressed Ss, and veridical judgments by depressed Ss. Presumably, the failure of depressed Ss to distort reality damages, or at least fails to protect, self-esteem. Although the normal self-serving bias has been interpreted in motivational terms (Bradley, 1978; Miller & Ross, 1975; Miller, 1978), Beck's model would predict the failure to engage in such self-enhancing distortions in information processing terms, without need for a motivational construct.

It should be noted that all studies reviewed of causal attributions for good and bad events, and Alloy and Abramson's (1979) study of judgments of control, employed depressed and nondepressed college students with no pathological control.

Self-reinforcement. One aspect of information processing with implications for self-esteem is the phenomenon of self-

reinforcement (Bandura, 1969, 1971, 1976, Marston, 1969; Thoresen & Mahoney, 1974; Rehm, 1977). Lobitz and Post (1979) discern three separate but related components of self-reinforcement: self-expectation, self-evaluation, and self-reward. Self-expectation of depressed Ss has been reviewed in an earlier section.

Four studies have examined the self-evaluative tendencies of depressed people by having Ss evaluate their own performances on skill tasks. The tendencies proposed by Beck of depressed people to construe events as reflecting negatively upon the self, and the dominance in processing information of schemata corresponding to low self-concepts and negative expectations, would clearly predict that depressed Ss would evaluate their own performances more negatively than would nondepressed Ss. In the three studies reported by Loeb et al. (1964, 1967, 1971), depressed psychiatric patients rated their performances on a card sorting task as poorer than did nondepressed psychiatric controls. The finding that the groups did not differ in actual performance or levels of aspiration suggest that the lower self-evaluations of the depressed Ss reflects a processing distortion.

In a similar study, Lobitz and Post (1979) also reported lower evaluations of own performance by depressed psychiatric inpatients compared to nondepressed psychiatric inpatients. In this study, Ss also evaluated the performances of others. Depressed Ss exhibited higher evaluations of the performances of others than the performances of selves, whereas the self-other distinction was not significant for nondepressed Ss. The

authors conclude that depressed patients are not universally negative, but, unlike nondepressed Ss, are more critical of themselves than of others.

Several studies have compared frequencies of self-reward in depressed individuals. Self-reward is clearly linked to self-evaluation, but the two do not necessarily correspond. Bandura (1971) and Nelson and Craighead (1977) argue that an individual who perceives his response as correct may not necessarily consider the response as "commendable" and worthy of reward. Similarly, a perceived incorrect response may not necessarily be thought deserving of punishment. Other judgments are likely involved, e.g., judgments of task difficulty or personal effort.

Rozensky, Rehm, Pry and Roth (1977) found that hospitalized depressed patients self-reinforced less and self-punished more frequently than nondepressed controls following performances on a skill task. There were no objective between-group performance differences. Nelson and Craighead (1977) found that depressed students self-reinforced less often than nondepressed controls, but no differences were found in rate of self-punishment. However, the authors point out that self-reinforcement and self-punishment measures in this study were confounded with the effects of positive and negative feedback administered prior to the self-reinforcement measures.

Lobitz and Post (1979) found that depressed psychiatric inpatients exhibited lower levels of self-reward than non-depressed psychiatric controls. Similar to their finding with

respect to self-evaluation, depressed Ss exhibited higher levels of reward for others than for self, although the self-other distinction was not significant for nondepressed Ss.

The pattern of data in these studies is clearly one of lower levels of all three components of self-reinforcement by depressed Ss. In addition, the Lobitz and Post (1979) data suggest that the lower levels of self-reinforcement are related to critical cognitions about the self, and to processing distortions specific to information with evaluative implications for the self. Nelson and Craighead (1977) state that "The relative frequency of a person's self-reinforcing or self-punishing responses is presumed to reflect a more general tendency for the person to evaluate the self in a positive or negative way" (p.380).

Selective attention. Selective attention of depressed individuals is one component of information processing which has received virtually no research attention, although Beck's model predicts disturbances[34]. Three studies have been found which have some (remote) bearing on this issue.

Mischel, Ebbesen and Zeiss (1973) induced mildly negative or positive moods in normal students with tape-recorded instructions to imagine various negative or positive scenes. Subjects were subsequently free to peruse complimentary and uncomplimentary information about themselves. Subjects

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[34] Selective attention in Beck's model will be discussed more fully in a subsequent section.

in whom negative moods had been induced spent more time looking at uncomplimentary material than Ss in whom positive mood had been induced. The authors suggest that mood valence influences selective attention to positive or negative information about the self.

Kirschenbaum and Karoly (1977) reported that normal students who monitored mistakes as they performed math problems were subsequently less self-confident and reported more dysphoric mood than similar Ss who monitored success, suggesting that selectively attending to information reflecting badly on the self may induce dysphoric mood. O'Hara and Rehm (1979), however, failed to find differences in self-reported mood of normal students who self-monitored either pleasant or unpleasant events over a 28-day period.

Memory. Several studies have examined disturbances in the recall stage of information processing during depression. If depressive information processing is dominated by schemata representing cognitive triad themes, one would predict that recall would similarly be biased in favor of information congruent with those themes.

Lishman (1972) and Lloyd and Lishman (1975) found that depressed psychiatric patients tended to recall negatively toned material more easily than positively toned material, whereas the opposite was true of nondepressed patients. Their dependent measure was latency from a signal to recall; severity of depression significantly correlated with the ratio of latency

to unpleasant memories/latency to pleasant memories (U/P). Depressed Ss showed both shorter latencies to unpleasant memories and longer latencies to pleasant memories.

Teasdale and Fogarty (1979) noted that Lishman (1972) and Lloyd and Lishman (1975) cannot differentiate changes in accessibility of unpleasant-pleasant memories from changes in the categorization of memories, i.e., are Ss likely to categorize the same remembered event as unpleasant when they are depressed but pleasant when they are not? As well, the correlational nature of the data do not allow any causal conclusions. To rectify these shortcomings, Teasdale and Fogarty (1979) induced depressed and happy moods in normal students via Velten's (1968) procedure, whereby Ss read lists of positive or negative self-referent statements. This procedure has been shown to induce self-reported depressed and happy moods in student samples (Velten, 1968; Strickland et al., 1974; Hale & Strickland, 1976; Coleman, 1975). Latency to retrieve pleasant memories was longer than latency to unpleasant memories when mood was depressed, whereas the reverse was true following the happy mood induction. The effect resulted from increased latency to pleasant memories following the dysphoric mood induction. To determine whether the effect resulted from changes in accessibility or categorization, memories were rated by blind judges for pleasantness-unpleasantness. The judges' ratings concurred generally with those of the Ss', leading the authors to conclude that the effect of dysphoric

mood is on accessibility, rather than classification.

In a similar study, Isen, Shalker, Clark and Karp (1978) manipulated the moods of normal students by having Ss win or lose a computer game in a laboratory setting. Winners were better able to recall previously learned positive personality trait words than losers, but no effect was found on ability to recall unpleasant or neutral words. It should be noted that in both Teasdale and Fogarty (1979) and Isen et al. (1978), mildly dysphoric or euphoric moods were induced in normal Ss. The data do indicate, however, that people experiencing depressed mood show more difficulty recalling pleasant compared to unpleasant memories. In both studies, no evidence is presented for the proposal that cognitive disturbances cause affective disturbances; rather it was shown that procedures which induce mood changes also alter memory processes.

One might also question whether it is the induced mood which affects memory, or the mood-induction procedure. It is possible that the procedure directly affects memory in addition to affecting mood. In this regard, Teasdale and Fogarty (1979) point out that their study and that of Isen, et al. (1978) employed different mood induction procedures, yet obtained similar memory effects. They argue that this supports their contention that the memory changes were caused by the induced moods rather than directly by the mood induction procedures.

It is noteworthy that studies of clinically depressed psychiatric patients (Lishman, 1972; Lloyd & Lishman, 1975) as well as studies of normal Ss in whom mildly dysphoric mood had been induced (Teasdale & Fogarty, 1979; Isen et al., 1978) found significantly smaller ratios of latency to retrieval of unpleasant memories to retrieval of pleasant memories (Unpleasant/Pleasant) among depressed Ss than nondepressed Ss. Among clinically depressed patients, the correlation between Unpleasant/Pleasant and BDI scores derived from both decreased latency to unpleasant, and increased latency to pleasant memories, with greater depression. In both studies of normal Ss, mood inductions only affected an increased latency of retrieval of pleasant memories, with no change in latency to unpleasant memories. Teasdale and Fogarty (1979) speculated that mild mood disturbances may affect the accessibility of pleasant cognitions, whereas more severe clinical depressions may also increase the accessibility of negative cognitions.

In related, but somewhat different paradigms, several studies examined the relative recall of positive and negative performance feedback of depressed and nondepressed people. Wener and Rehm (1975) gave positive and negative performance feedback to depressed and nondepressed female students participating in an apparent interpersonal intelligence task. Depressed, but not nondepressed, Ss subsequently underestimated the number of times they had made a correct response. Since correct responses had been reinforced with a signal, the authors interpret these data as reflecting distortions during recall,

rather than distorted evaluations of their performances. Buchwald (1977) similarly reported that depressed, but not non-depressed, students underestimated the number of correct, reinforced trials on a learning task, although there was no relationship between depression and actual performance.

Nelson and Craighead (1977) also found that depressed students recalled less positive and more negative feedback than nondepressed control Ss. This difference occurred during conditions of high, but not low rate of positive reinforcement, and low but not high, rate of negative reinforcement. That is, differences in recall occurred during reinforcement conditions that were maximally incongruent with the proposed cognitive set of depressed people. The authors argue that it is particularly under such conditions that Beck would predict the greatest distortion.

It is noteworthy that although depressed Ss recalled more negative feedback than nondepressed Ss, this difference resulted from the consistent underestimation of the freqeuncy of negative feedback of the nondepressed Ss. In contrast, depressed Ss were consistently accurate in their recollections of frequency of negative feedback. In this instance, as previously noted in other situations, depressed Ss did not engage in distortions of reality in which nondepressed Ss engaged, distortions that presumably would enhance self-esteem.

DeMonbreun and Craighead (1977), using procedures similar to those of Nelson and Craighead (1977), examined the recall of positive reinforcement in clinical populations. In an

unusually well-controlled study, they compared depressed psychiatric outpatients, nondepressed psychiatric outpatients, and nondepressed nonpsychiatric control Ss drawn from a similar population. In addition to the recall data, in one of the very few attempts to specify the stage of information processing at which distortion occurs, they also obtained trial-by-trial reports of Ss' perceptions of the valence of the feedback. Although no group differences were found in the immediate perception of feedback, depressed Ss recalled having received less positive feedback than did either control group. This difference was obtained under conditions of high rate of positive feedback, but not under low rate of positive feedback, i.e., the condition most incongruent with depressive cognitions. In addition, only the depressed Ss were significantly inaccurate. In Nelson and Craighead's (1977) study, depressed Ss were more accurate than nondepressed Ss in their recall of negative feedback, but recall of negative feedback was not measured in DeMonbreun and Craighead's (1977) study.

The general pattern of results which emerges from the studies of memory is one of cognitive bias in the directions predicted by Beck's hypotheses of cognitive triad dominance and information processing disturbances. Some question is raised about whether all the differences observed between depressed and nondepressed recall tendencies result from depressive distortions of reality, or from failures to engage in the self-enhancing distortions in which nondepressed Ss engage. Although some differences between clinical and non-

clinical populations are suggested, the general pattern is one in which information recall by depressed individuals is biased in a manner similar to their biasing of immediate perceptions: interactions with the environment are remembered by depressed people as having reflected "defeat, deprivation and disparagement" (Beck, 1967, p.255).

These data, taken together with the findings that depressed people tend to evaluate their performances more poorly, and engage in self-deprecating attributions for success and failure, support the idea that, in depressive reactions, "the perception of environmental feedback may play a more important role than the feedback per se" (DeMonberun & Craighead, 1977, p.311; Mischel, 1973).

Etiology. The research reviewed above bear on proposed cognitive contents and on disturbances of information processing as characteristics of depression. However, Beck's model is also an etiological one. One of its central hypotheses is that the idiosyncratic cognitive contents and the disturbances of information processing cause the various other characteristics of depression. Chief among them are the affective and motivational components of depression.

Most of the studies reviewed above are correlational studies, in which depressed individuals are shown to engage in cognitive processes which differ in some respect from those of nondepressed individuals. Although positive findings are consistent with Beck's causal hypotheses, they are also consistent with hypotheses of causality in the other direction, e.g., the

traditional psychiatric conceptualization of depression as a primary affective disorder, with cognitive alterations secondary to, and a result of, the affective state. As well, correlational data are consistent with models in which both cognitive and affective disturbances result from a primary disturbance of some other system, e.g., disturbances of biochemical brain processes or of behavior-environmental reinforcement relationships. Studies which were experimental, used mood induction procedures to produce mildly disturbed moods among normal Ss, and then demonstrate differences in cognitive functioning between different mood states. Such studies, if they are relevant to clinically significant depression, demonstrate cognitive effects of altered mood; Beck's etiological model requires demonstrations that cognitive phenomena such as those he describes cause consequent mood changes.

In his explications of the cognitive model, Beck has provided eloquent narratives of case histories and anecdotal clinical observations, as well as intuitively compelling analyses of cognitive-affective-motivational-behavioral relationships which argue for the primacy of the cognitive disturbances, and the reasonableness of the consequent emotional, motivational, and behavioral symptoms which follow. The following studies provide evidence bearing on the causal components of Beck's model.

In Beck's (1967) early content analyses of the psychotherapy sessions of depressed and nondepressed psychiatric patients, in addition to differences in content, Beck reported

consistent temporal contiguity between the contents of reported thoughts and affects, and also logical consistency between them, i.e., the specific affects were congruent with the specific thought content (p.287).

Evidence for a causal relationship between thinking negative, self-devaluing thoughts and dysphoric mood has been presented by a series of studies in which normal Ss were instructed to read lists of either negative, positive, or neutral self-referent statements. In the first of these studies, Velten (1968) reported that reading negative or positive self-referent statements induced self-reported depressed or euphoric mood compared to reading neutral self-referent statements[35]. In subsequent studies using Velten's procedure with normal college students, reading negative self-referent statements, compared to positive or neutral self-referent statements, has produced lowered mood, retarded rate of speech, slowed psychomotor speed in a writing task, reduced reinforcer effectiveness, reduced eye-contact, increased helping behavior, and slowed reaction time (Strickland, Hale & Anderson, 1975; Hale & Strickland, 1976; Coleman, 1975; Aderman, 1972; Gouaux & Gouaux, 1971; Matheny & Blue, 1977; Natale, 1977a, 1977b; Scheier & Carver, 1977).

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[35] Velten's (1968) procedure has been referred to previously in this review. However, in those references, the mood induction was an independent variable in studies which attempted to examine the effects of induced dysphoric mood on cognitive functioning, e.g., memory. The present discussion deals with induced mood as a dependent variable for the purpose of examining evidence pertaining to the affective consequences of cognitive disturbances.

Coleman (1975) argued that the effects of Velten's procedure supports the hypothesis that negative self-evaluation causes the dysphoric affect characteristic of depression. However, Blaney (1977) pointed out the need for a comparison of the effects of reading Velten's (1968) self-referent statements with the effects of reading sad statements with no self-reference before a self-esteem interpretation can be accepted.

In an empirical challenge to the self-esteem interpretation of the results of Velten's procedure, Frost, Graf & Becker (1979) noted that approximately half of Velten's dysphoric mood induction statements contain suggestions of the somatic sensations associated with depression, e.g., fatigue, sleepiness, etc. They divided Velten's dysphoric induction statements into those containing somatic suggestions and those containing self-devaluation statements. Normal students who read the self-devaluation statements did not subsequently report more depressed mood, nor did they differ on the BDI, than students who read Velten's neutral statements. In contrast, Ss who read the somatic suggestion statements subsequently scored significantly higher on the BDI than Ss in the self-devaluation condition; they also self-reported more dysphoric mood, but this difference only approached significance. The authors suggest that the effects of Velten's procedure result more from suggestions of bodily sensations associated with depression than from self-devaluation.

Blaney's (1977) critique, and Frost et al's (1979) data cast doubt on the self-devaluation interpretation of the

cumulative results of studies which have employed Velten's (1968) procedure. However, as Frost et al. (1979) point out, the procedure is nonetheless a cognitive manipulation. At the very least, this literature supports the contention that reading dysphoric statements, as an analgoue of thinking dysphoric thoughts, causes mildly dysphoric mood and several behavioral changes compatible with those seen in depression. It should be noted as well, that this entire research literature deals with the induction of mild mood changes in normal student volunteers. Although the data are compatible with Beck's model, they do not provide direct evidence about events mediating clinically significant depression.

Teasdale and Bancroft (1977) employed a somewhat different cognitive manipulation to induce dysphoric mood in a sample of depressed psychiatric patients. Subjects were instructed to think thoughts with unspecified "happy" or "unhappy" content. Subjects reported more depressed mood after thinking thoughts with happy content than thoughts with unhappy content. In one of the very few attempts to validate a self-reported mood measure, simultaneous records of EMG recordings from the corrugator supercilii muscle were collected. Schwartz (1975) had previously shown that sad imagery was correlated with facial EMG activity characterized by large responses of the corrugator supercilii muscle for both normal and depressed Ss. In Teasdale and Bancroft (1977), Ss' magnitude estimations of depressed mood significantly correlated with the corrugator EMG, which was significantly higher while

thinking unhappy than happy thoughts.

In a recent study of Velten's (1968) procedure with a clinical population, Raps, Reinhard and Seligman (1980) demonstrated a reduction of depressive symptomatology following Velten's mood-elation procedure. Reading Velten's positive self-referent statements resulted in decreased self-reported depressive affect and reversal of impaired performance on an anagram task. These effects were demonstrated by samples of medical patients rendered helpless by inescapable noise, a common helplessness-induction procedure, as well as depressed psychiatric in- and out-patients. The effects were relative to Ss from those populations who were given Velten's mood-neutral statements, and also to groups of waiting control Ss. This study deals with the ethical and methodological problems of demonstrating experimentally a relation between clinically significant depression and a cognitive manipulation by reversing an already existing clinically significant depression with a cognitive manipulation. Although these data are clearly supportive of the hypothesized causal relation between thinking dysphoric thoughts and clinical depressive symptomatology, it provides only limited support for Beck's causal proposals; it is not necessarily the case that a process which diminishes depressive symptoms is the one which caused them.

Employing a different paradigm, Teasdale and Rezin (1978) failed to demonstrate a reduction in clinically significant depressed mood resulting from experimentally-induced reductions in depressed thinking. In this study, the frequency

of negative thoughts among severely depressed day hospital patients was reduced by a task requiring Ss to process external information at a high rate. These authors used a single-subject design and found that, although some Ss reported improvements of mood, the group effects were nonsignificant. The authors suggest that the thought-reducing manipulation was not sufficiently effective in reducing the frequency of negative thoughts.

Two experimental studies have attempted to manipulate belief about the self and assess consequent affective reactions. These studies are directly relevant to Beck's assertion that derogatory beliefs about the self, or low self-concepts, produce depressive affect.

Ludwig (1975) presented experimenter-manipulated results of psychological testing to normal female students. Feedback indicating that the individual was immature and uncreative induced depressed mood.

Golin, Hartman, Klatt, Munz and Wolfgang (1977) similarly presented depressed and nondepressed students with the supposed results of personality tests which indicated inferiority on 9 personality dimensions. This feedback caused depressed, but not nondepressed, students to increase psychophysiological arousal, as measured by the GSR, and to subsequently react to observing a sad model with self-reported sadness. The non-depressed, but not the depressed, Ss responded to positive feedback with arousal and subsequent sadness in response to a sad model. The authors conclude that events that diminish

self-esteem cause depressed Ss to be more affectively reactive to dysphoric events.

Experimentally induced success and failure in skill tasks have also been considered as self-esteem manipulations (Loeb, Beck & Diggory, 1971). Given the self-blaming tendencies ascribed to depressed individuals, Beck's model would predict large reductions in self-esteem following failure; since loss of self-esteem is considered by Beck to precipitate depression among predisposed individuals, the model would predict increases in other depressive symptomatology following failure. As well, it is a common clinical belief that depressed people are particularly vulnerable to failure experiences (Becker, 1974).

With the exception of the previously reviewed studies which have examined the effects of failure on expectancies for success on future trials, surprisingly few studies have examined the effects of failure and success experiences on depressed people. Rosenzweig (1959), in an early study, found that following success or failure, depressed psychiatric patients changed their self-ratings on the evaluative factor of the semantic differential more than did normals. He concluded that depressives exaggerate the evaluative aspects of situations so that their environment is continually perceived in terms of how it reflects their self-worth. Similarly, Hammen and Krantz (1976), found that depressed students who received failure feedback subsequently exhibited lower self-ratings than did depressed Ss who had received success or no

feedback. The latter two groups did not differ from each other, indicating that success feedback did not cause depressed Ss to improve their self-ratings. Neither failure nor success feedback affected the self-ratings of nondepressed control Ss; nor did feedback affect any group's frequency of depressed-distorted responses on the story completion task, described in a previous section. It is noteworthy that, although depressed Ss in Hammen and Krantz (1976) and Rosenzweig (1959) responded to failure feedback with lower self-esteem ratings, no affect was demonstrated on the measure of the information processing distortions hypothesized by Beck to mediate depressive reactions.

One study assessed the effects on performance of success and failure. Loeb, Beck and Diggory (1971) studied performance on a card sorting task of depressed and nondepressed psychiatric patients. Depressed patients reacted to success with better performance and to failure with poorer performance, supporting the conceptualizations of depressive hyperreactivity to evaluation, and the proposed behavioral consequences of self-esteem manipulations. Interestingly, nondepressed Ss reacted to success with poorer performance and to failure with better performance.

Two studies failed to find differences between depressed and nondepressed responses to success or failure. Loeb, Feshbach, Beck and Wolf (1964) found that both depressed and nondepressed psychiatric patients responded to experimentally induced success with happier self-reported mood, increased

self-confidence, and perceived others as happier, than did Ss who had failed. No between-group differences were found. Golin, Jarrett, Stewart and Drayton (1980) found no differences on self-reported depressed, anxious, or hostile moods between depressed and nondepressed Ss following failure to succeed on an anagram task and win a reward, nor following success and reward.

In summary, the effects of success and failure on depressed compared to nondepressed individuals are unclear. The few studies which have examined self-esteem, performance, and affective reactions have employed varying independent and dependent variables, and have reported mixed results.

Cognitive therapy of depression. One test of the utility of a model of psychopathology is its role in spawning effective therapy procedures. However, the efficacy of therapy procedures derived from an etiological model provide very limited support for the etiological components of the model. As discussed in a previous section, the procedures which diminish symptomatology bear no necessary relation to those that caused it. In addition, therapy outcome studies are notoriously riddled with inherent methodological problems which restrict the researcher's ability to confidently ascertain which specific treatment variables are responsible for which outcome phenomena[36]. Two outcome studies are summarized below.

[36]The difficulties of therapy outcome research are beyond the scope of this thesis. An excellent discussion of the conceptual and methodological weaknesses of this literature, with comprehensive coverage of cognitive therapy for depression, is contained in Craighead (in press). A less critical review of the outcome studies is contained in Beck, et al. (1979).

As outcome studies of cognitive therapy for depression, they are representative of the genre. As well, the two chosen are easily the most widely cited from this group.

Rush, Beck, Kovacs and Hollon (1977) compared cognitive therapy derived from Beck's model (Cf, Beck, Rush, Shaw & Emery, 1979) to pharmacotherapy with imipramine hydrochloride, one of the tricyclic antidepressant medications commonly prescribed for the treatment of moderate to severely depressed patients. Tricyclic antidepressants appear to be the most effective chemotherapies for reducing acute depressive symptoms of both unipolar and bipolar depressions (Beck et al., 1979, p.255). Patients were moderately to severely depressed outpatients with no primary diagnosis of other psychiatric disorder, contraindications for tricyclic medication, or a previous failure on a clinical trial with a tricyclic medication. Forty-four patients were treated with either cognitive therapy or pharmacotherapy. Pre-post comparisons of BDI scores revealed that cognitive therapy produced larger decreases of depressive symptomatology than pharmacotherapy. These group differences were reported to have been maintained at 1-year follow up (Kovacs, Rush, Beck & Hollon, 1979).

Bridger (1978) has criticized this study on the grounds that a normally adequate pharmacotherapy regimen would have contained a review of the effects of the initially prescribed drug, and a switch to a different class of drugs, e.g., one that increases available serotonin rather than noradrenaline, for the expected substantial percentage of patients who did

not respond to imipramine. It is argued that such a shift might have washed out the superiority of cognitive therapy. Nonetheless, Craighead (in press) in a review of treatment outcome studies, concludes that "Because of the relative effectiveness of this brief cognitive therapy procedures to such a well-established antidepressant medication with a clinically depressed population, this study has made a major impact in the area of depression treatment research" (p.17).

In the second widely cited outcome study, Shaw (1977) assigned 32 depressed students who were self-referred for treatment at a university health center to either cognitive therapy, behavior therapy emphasizing interpersonal skills training, nondirective therapy, or a waiting-list control group. Prospective Ss were screened to exclude individuals who were serious suicide risks, psychotic, or who presented nondepressive primary psychopathology. Pre-post BDI scores indicated greatest symptom reductions among the group who received cognitive therapy, with both behavioral and nondirective therapies more effective than the waiting-list group. At one month follow-up, the superiority of cognitive therapy to behavior therapy was no longer significant, but all therapy groups generally had maintained their gains.

Overview and Critique of the Research Literature

The preceding review of the empirical tests of Beck's model provides a picture of mixed support. Very little support can be said to have been adduced for Beck's etiological proposals; nor can these proposals be said to have been refuted.

The general pattern of data more clearly supports Beck's hypotheses concerning the presence of the idiosyncratic cognitive contents described as the cognitive triad. In general, the data are consistent with the proposal that depressed, compared to nondepressed, individuals conceptualize the self, experience, and the future in the negative ways described by Beck. As well, information processing by depressed, compared to nondepressed, individuals appears to be biased in support of those conceptualizations, although some questions are raised about whether this bias necessarily involves distortions of reality. These general patterns emerge from the studies of both clinical and nonclinical samples. Some support, albeit very limited, has been obtained for the specific logical errors posited by Beck to characterize depressive information processing. Finally, although these statements appear to be fair descriptions of general patterns of results, there is considerable disparity between different studies. None of the above conclusions can be said to have been unanimously demonstrated, although that must be inevitable in any area of clinical research.

However, all the conclusions summarized above must be tempered by a discussion of methodological weaknesses which pervade this entire research literature, and which, at the very least, render the conclusions derived from it tentative. The following is a summary of those methodological weaknesses which characterize a large percentage of the research literature reviewed above, and which the present study was designed, in

part, to address.

Skinner (1950) long ago noted that progress in an area of scientific investigation awaits the development of a good dependent variable. Perhaps the most pervasive problem involved in testing hypotheses about cognitive processes concern construction of an adequate dependent variable. The cognitive phenomena held by Beck to be of central importance to depression are private, internal phenomena, not amenable to direct observation by researchers. This has impeded their study.

However, as Meichenbaum and Cameron (1974) have argued, the individual does have access to his or her cognitions. Hence, self-reports provide a useful index of the internal events that are held to affect mood and behavior. Nearly all the research reviewed here which measured a cognitive process or content has used self-report measures of those events.

However, self-report data must be interpreted cautiously. Despite their clear utility, self-report measures of cognitive phenomena may be particularly vulnerable to serious contamination. For example, Orne (1962) has warned of the dangers to internal validity of uncontrolled demand characteristics, i.e., "the totality of cues which convey an experimental hypothesis to the subject" (Orne, 1962, p.779), and the tendency of subjects to try to conform to their perceived experimental predictions. Teasdale and Bancroft (1977) have noted that self-report measures are particularly vulnerable to the effects of experimental demand. These considerations argue for caution in interpreting the results of studies in which the main dependent

variables are self-reports of internal processes and states. In particular, the dangers appear especially strong in situations in which two groups are compared, if there may be systematic differences in the susceptibility to demand characteristics between the two groups. This is likely the case, particularly in studies which compared depressed with nondepressed college students. Coyne, Metalsky and LaVelle (1980) have argued that mildly distressed Ss are particularly susceptible to demand characteristics. In addition, one of the commonly noted characteristics of depression is increased compliance (Beck, 1967; Becker, 1974). Hence, differences in the self-reports of depressed and nondepressed Ss may reflect, to an unknown degree, between group differences in perceptions of, and attempted compliance with, experimental demand characteristics.

This problem appears to be particularly troublesome in this literature, since most Ss have been assigned to groups on the basis of self-report inventories with very high face validity. Answering questions on an inventory such as the BDI in the direction of high depression may well create the demand to be consistent in other responses, e.g., to give depressive responses on self-report dependent variables, which also have high face validity, or to respond in whatever ways Ss think depressed individuals should respond, for example, to provide low self-esteem self-report data, or low expectancies for success following failure, etc.

Similarly, between-group differences on self-report measures might reflect differences in habitual interpersonal

coping styles. Lewinsohn (1974), Coyne (1976) and Forrest and Hokanson (1975) have proposed models which conceptualize depressive behaviors as instrumental behaviors for the elicitation of sympathy and concern, and the escape or avoidance of interpersonal threat. Several writers have suggested that the pessimistic verbalizations and self-effacing statements elicited from depressed Ss via self-report procedures might be understood as serving the same purpose with respect to the experimenter, or as habitual responses to situations with interpersonal or ego-threatening aspects (Lobitz & Post, 1979; Sacco & Hokanson, 1978). This interpretation is supported by Sacco and Hokanson's (1978) data which showed significant differences in the self-reported expectancies for success of depressed Ss depending on whether the experimenter was present or absent. A similar argument could be built from Goffman's (1959, 1971) impression management conceptualization, such that depressed Ss and nondepressed Ss might differ with respect to presentation of self strategies or habits. Gurtman[37] has argued that all the dependent measures reviewed in this literature may be sensitive to differences in presentation-of-self strategies. As suggested in a different context, above, since depressed Ss have typically been identified on the bases of transparent self-report inventories, whatever self-presentation tendencies might influence people to answer questionnaire items in depressive directions might also influence them to score

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[37]Gurtman, M. Personal communication, 1980.

more depressed on the various self-report measures. These arguments apply equally to performance measures which have no built-in control for differences in demand characteristic effects, differences in self-presentation tendencies, motivational differences, etc.

In a telling instance of unjustified reliance on self-report measures, Golin et al. (1979) found differences between depressed and nondepressed Ss on self-reported expectancy of success in a task involving the throwing of dice. However, no congruent difference was obtained in the betting behaviors of Ss, although it was predicted that expectancy of success should correlate with betting behavior. The authors gratuitously concluded that the groups differed in expectancy of success, and that betting behavior was not sensitive to the differences. An obviously more cautious conclusion would have questioned the validity of self-reported expectancy for success in that study, since the self-reported measure was not consistent with the Ss' behavior. The data should have called both measures into question.

In addition, trial-by-trial self-reports, such as the expectancy of success ratings employed by Seligman and his associates (Klein and Seligman, 1976; Miller & Seligamn, 1973, 1976) are very likely obtrusive measures, altering the phenomena to be measured (Blaney, 1977; Dweck & Gilliard, 1975). The same problems likely interfere with all trial-by-trial self-report procedures, e.g., those employed by DeMonbreun and Craighead (1977) and Teasdale and Rezin (1978).

In summary, the dependent measures commonly employed to

demonstrate differences in cognitive events between depressed and nondepressed groups may be measuring, instead, differences in perceptions of, and reactivity to, demand characteristics, differences in self-presentation styles, instrumental coping strategies, and/or differences in motivation. Dependent variables are needed which are less sensitive to, or control for, these potentially confounding variables, and which are not obtrusive.

In addition, dependent variables, with the characteristics described above, are needed which can assess cognitive mediation directly, rather than assess the predicted consequences of hypothetical disturbances of mediation. For example, studies are cited in support of cognitive theory, which show that certain types of events produce some of the symptoms of depression. For example, Coleman's (1975) contention that the affective consequences of Velten's (1968) mood induction procedure support a self-esteem interpretation of depression. What is needed is to show that certain ways of processing this information are depressogenic, whereas other ways are not, or that some cognitive structures which interact with these events produce depressive symptoms, whereas others do not. The research need is to determine that depressed Ss engage in cognitive mediating processes which differ from those in which nondepressed Ss engage, not just that the cognitive content is biased. I.e., the need is to show depressive disturbances in processing environmental information. To paraphrase Mischel (1973) and Hammen and Krantz (1976), one must show that depressed people

do something different than nondepressed people in their apprehending of reality.

Without a direct measure of processing differences, differential support for a cognitive model is difficult to demonstrate. For example, demonstrations of depressogenic cognitive content may veridically reflect reality. There is considerable evidence which demonstrates a variety of actual social skill deficits and objective deficits in competence (e.g., Lewinsohn, 1974 reviews some of this research). Similarly, it appears that depressed people really do experience more rejecting, hostile, and anxiety reactions from others than nondepressed people (e.g., Coyne, 1976(a), 1977(b); Lewinsohn, 1974(a); Prkachin et al., 1977). Hence, if depressed people experience more frequent negative events than nondepressed people, then negative views of self, world, and future may be appropriate and veridical, and not reflect disturbed ways of apprehending reality. Beck's model requires demonstrations of differences in what depressed and nondepressed people do as they process information. Further, this must be accomplished while minimizing the threats to internal validity discussed above. Hammen and Krantz (1976) argued similarly that "...additional research is needed to examine the hypothesized internal events that mediate depressive behaviors..." (p.578).

In a related issue, only three studies reviewed here attempted to specify the stage of information processing at which distortions occur (viz., DeMonbreun & Craighead, 1977; Hammen & Krantz, 1976; Krantz & Hammen, 1979). Although Beck's

model emphasizes distortions which occur during stimulus uptake, interpretation, and evaluation, almost all reported measures of those distortions are confounded with memory. This is especially serious in light of the data reviewed which demonstrate depressive distortions which occur during recall. Only Hammen & Krantz (1976; also, Krantz & Hammen, 1979) demonstrated processing disturbances relatively unconfounded with memory. DeMonbreun and Craighead (1977) in their attempt to separate immediate perception of feedback from recall of feedback found distortions only at recall. What are needed to empirically examine disturbances of information processing are assessment procedures which can isolate for examination specifiable stages of information processing, and which do not confound the different processes. In general, the procedures used to study cognitive disturbance in depression have had the effect of collapsing all stages of information processing. However, understanding the nature of the proposed cognitive disturbances requires systematic analysis of separate stages since, as Broadbent (1977) has asserted, the cognitive processes involved at various levels of processing are not the same.

In addition to inadequate DV's, a major methodological weakness of this research literature concerns the failure of many studies to utilize adequate control groups. Thirty-three of the studies reviewed compared a depressed group with a non-depressed group, but did not include a group with nondepressive psychopathology. With such a design, between-group differences

specific to depression cannot be demonstrated. Any variable which covaries with depression might be responsible. Although the most frequently used subject selection criterion in these studies, the BDI, is less sensitive to general psychopathology than other self-report measures (Rizley, 1978), it is nonetheless sensitive to nondepressive psychopathology, e.g., anxiety (Carroll, Fielding & Blashki, 1973). Hence, results of depressed-nondepressed comparisons, in the absence of a non-depressed psychopathological control group, may be related to a correlated pathology, such as anxiety, or may be a general characteristic of psychopathology. Frank (1973), for example, has argued that all forms of psychopathology share the common characteristic of demoralization. Seligman, Klein & Miller (1976) observed that few controlled studies of normals, depressives, and individuals with nondepressed psychopathology have found differences between depressives and normals that are unique to depression. Similarly, in his review of the depression deficit literature, Miller (1975) concluded that psychological deficits were more often related to severity than type of psychopathology. Rizley (1978), in discussing his own data, cautioned that inferences about cognitive changes specific to depression require comparisons with groups exhibiting low levels of depression and high levels of other psychopathology.

Information Processing, Selective Attention, and Depression

Beck's model is essentially an information processing model. Such conceptualizations focus on the ways in which the individual "searches the environment for cues, selects cues

that are relevant to thought and action, integrates new information with old, and makes decisions that eventuate in observable behavior" (I.Sarason, 1975, p.28). Beck's model predicts pervasive disturbances at all stages of processing.

One of those stages, a critical early step in any information processing sequence, is selective attention, i.e., "the internal mechanisms that determine the significance of stimuli" (Kahneman, 1973, p.2). It is with these processes that "the organism appears to control the choice of stimuli that will be allowed, in turn, to control its behavior. The organism selectively attends to some stimuli, or aspects of stimulation, in preference to others" (ibid.). Thus, by controlling information uptake, selective attention processes determine, in large measure, the nature of the individual's perceived world.

Various models of attention and its role in perception have been proposed. Broadbent (1958) proposed a perceptual "filter", which screens out irrelevant information peripherally. Treisman (1964a,b) modified Broadbent's filter to an attenuator, which merely attenuated, but did not stop, irrelevant information. Deutsch and Deutsch (1963) proposed a model wherein all inputs activate central memory traces, some of which are then selected for further processing. Neisser (1967) did away with attention entirely, proposing instead gradations of processing, from preliminary, crude processing by pre-attentive mechanisms to the detailed analysis-by-synthesis accorded the objects selected for focal attention. Kahneman (1973) proposed a model which

synthesized the numerous earlier theories, incorporating central aspects of each. Although Kahneman's model is utilized in this thesis to conceptualize the role of selective attention in perception because of its comprehensiveness, the differences between theories of attention are not crucial to this thesis. All include processes "by which an individual maintains heightened awareness of a limited range of stimuli" (Schneider, 1977, p.167), and all propose mechanisms which are compatible with Beck's model of depression.

Kahneman's model of information processing consists of 6 sequential stages of perceptual analysis, each of which provides the input to the next stage:

1. Sensory Registration and Storage. This is the initial stage of sensory registration and temporary storage in sensory memory.
2. Unit Formation. The stimulus field is partitioned into segments.
3. Figural Emphasis. This is the stage of selective attention; some units receive figural emphasis, i.e., they are more completely processed and thereby become figural, or salient. The decision made at this stage, i.e., the amount of attention allotted different aspects of the stimulus field, affects subsequent processing in several ways. Attended events are more likely to be perceived consciously and in detail, have a higher probability of eliciting and controlling responses, and are more

likely to be stored in permanent memory.

4. Activation of Recognition Units. Kahneman's "recognition units" appear to correspond to the cognitive structures which other theorists, e.g., Neisser (1967) and Beck (1967) refer to as schemata. This stage is essentially a matching operation between features of the attended stimulus and those of the schema. In Beck's model, this is the stage during which prepotent schema are activated by inappropriate stimuli, yielding distorted perceptions of events. It is noted that this operation depends on the outcome of the previous operation whereby aspects of the stimulus field are selected for focal attention. Activation of a recognition unit is a matter of degree; the greater the figural emphasis accorded in the previous stage, and the closer the match between stimulus and schema, the more strongly it can activate a recognition unit. In this stage, a percept is created.
5. Selection of Interpretations. Interpretations, or conclusions are selected, and meaning is assigned the recognition units activated in the previous stage. The interpretations selected are determined by the degree of activation of recognition units; perceptual set affects the likelihood of activation of recognition units and interpretations. It is at this stage in Beck's model that the activated depressive schemata

give rise to distorted conclusions, meanings, and evaluations of events.

6. Response Selection. The perceptual interpretations selected in the previous stage serve as input for subsequent stages of processing, including storage in permanent memory and the selection and control of responses. An uninterpreted event will have little or no effect on these stages. Response readiness makes some response classes more easily available than others.

Kahneman's model shares with other models (e.g., Neisser, 1967, 1976) the idea of a finite, limited capacity to perform mental work:

> "....mental activity requires two types of input to the corresponding structure: an information input specific to that structure, and a nonspecific input, which may be variously labelled 'effort', 'capacity', or 'attention'. To explain man's limited ability to carry out multiple activities at the same time, a capacity theory assumes that the total amount of attention which can be deployed at any time is limited".
>
> (Kahneman, 1973, p.9)

Hence, decisions are continually made about which aspect of the stimulus field will be attended to, and which will be relegated to background. At the stage of figural emphasis, some events, or aspects of events, are made salient, and others make relatively little impact.

The allocation of attention to some objects rather than others alters the nature of the information which is delivered to subsequent stages. Hence, the control of those choices is

instrumental in determining the individual's perceptual world to which he or she responds. Kahneman describes choices in the allocation of attention as the individual's "allocation policy". The allocation policy is guided by prior intentions. These may be either momentary or "enduring dispositions", which are long-standing learned or innate tendencies to allocate attention to certain classes of stimuli at the expense of others. In addition, the individual's allocation policy may be altered following a tentative recognition that an object or event is significant, that is, partial activation of a recognition unit which belongs to a class of prepotent units. This is a "recursive" path in which a latter stage of the information processing sequence (activation of recognition units) alters the activity at an earlier stage (figural emphasis).

If depressed people have allocation policies which devote an unusual amount of effort to attending to stimuli representative of the categories of the cognitive triad, then many of the cognitive phenomena reported by Beck and the research literature reviewed above could follow directly from the biasing of perception at the relatively early stage of processing at which stimuli are selected for figural emphasis. Given such allocation policies, perceptual experience would be dominated by negative perceptions of the self, the world, and the future, because cues relevant to such schemata are selected for further processing at the expense of cues appropriate to schemata representing more cheerful, self-enhancing, and optimistic schemata. In addition, Beck's model of prepotent depressive schemata would also predict such an allocation policy. Since allocation policies

are affected both by prior intentions, and also by the recursive path leading from the activation of important recognition units (schemata), the frequent activation of prepotent depressive schemata would be expected to influence the earlier stage such that frequent partial activation of recognition units for depressogenic perceptions, which would be expected to occur given Beck's proposal of prepotent depressive schemata being activated inappropriately, would consistently bias allocations of attention toward depressogenic events or aspects of events. Such an allocation policy, whether the cause of, or the result of, the prepotency of depressive schemata, would be expected to produce the cognitive distortions described by Beck and demonstrated in the research literature.

This idea is represented by different cognitive theorists in different ways. Neisser (1976) is particularly clear on this point. "In one sense, when it is viewed as an information-accepting system, a schema is like a <u>format</u> in a computer-programming language. Formats specify that information must be of a certain sort if it is to be interpreted coherently. Other information will be ignored or will lead to meaningless results....[However] a schema ....also functions as a <u>plan</u>, of the sort described by Miller, Galanter, and Pribram (1960). Perceptual schemata are plans for finding out about objects and events, for obtaining more information to fill in the format ....The schema determines what is perceived....because information can be picked up only if there is a developing format ready to accept it....Perception is inherently selective" (p.55).

It should be noted here that only Hammen and Krantz (1976; also, Krantz & Hammen, 1979) employed a research design which provides information about distortions occurring at the stages of activation of recognition units and selection of interpretations, the stages corresponding to the logical errors posited by Beck to distort information processing, and only DeMonbreun and Craighead (1977) employed a design which specified distortion during the recall stage of processing. The remainder of the research findings are ambiguous with respect to the stage of information processing at which distortions occur, and hence, are unable to determine whether unusual allocation policies, activation of inappropriate schemata, or selection of idiosyncratic interpretations, or all of these, are responsible for depressive cognitions.

If depressed people have unusual allocation policies, then the entire information processing sequence would be biased to favor the perceptual experiences described by Beck. This would occur because such an allocation policy would provide biased information to the next stage, that of activation or recognition units, or schemata. Hence the perceived importance of depressive aspects of events, and the evaluations and interpretations of them, would follow from a disturbance in the selection of information at stimulus uptake, whether or not disturbances originate at later stages. If the biasing occurs at stimulus uptake, then the distorted, depressive perceptions, conclusions, and other cognitions might result from intact perceptual processes operating on biased information, rather

than from pathology of the processes themselves. Furthermore, such allocation policies would bias attention quite automatically and habitually.

Mischel et al. (1973), in introducing their study of selective attention to positive and negative information about the self as a function of affective state, discussed the importance of such selectivity for self-esteem:

> "An especially pervasive but thus far neglected feature of self-regulation is the person's selective exposure to different types of positive and negative information about himself. Almost limitless 'good' and 'bad' information about the self is potentially available...depending on where one looks and how one searches. An individual can seek, and usually find, information to support his positive or negative attributes, his successes or failures, almost boundlessly....The individual's positive and negative feelings about himself, presumably hinge on selective attentional processes through which the individual exposes himself only to particular types of information from the enormous array potentially available to him. By means of such selective attention the individual presumably can make himself feel either good or bad....and, in the extreme, can generate emotions from euphoria to depression" (p.129-130).

Beck's theory does incorporate biases of selective attention, both as part of his formal model, and also, as part of his informal, but compelling, descriptions of depressive cognitive activity. In the first instance, one of the processing "errors" held by Beck to contribute to faulty interpretations of events is "selective abstraction...(which) consists of focusing on a detail taken out of context, ignoring other more salient features of the situation and conceptualizing the whole experience on the basis of this fragment" (Beck et al.,

1979, p.14). In the second instance, selective attention is included in Beck's descriptons; for example:

> "...any psychopathological condition is characterized by sensitivity to particular types of experiences. The depressed person tends to extract elements suggestive of loss and to gloss over other features that are not consonant with, or are contradictory to, this interpretation. As a result of of such 'selective abstraction', the patient often interprets daily events in terms of loss and is oblivious to more positive interpretations" (Beck, 1976, p.119).

> " The depressed person evidently screens out, or fails to integrate, successful experiences that contradict his negative view of himself" (ibid).

Similarly, after reviewing the cognitive distortions of depressed individuals, Hammen and Krantz (1976) assert, "It is as if, for example, the individual selectively attends only to dysphoric or pessimistic information or selectively interprets events to establish or verify pessimistic hypotheses" (p.577).

Similarly, Rehm (1977) incorporated this aspect of cognitive theory into her self-control model of depression, positing "selective attention to negative events" as one of the self-control deficits.

In summary, one of the information processing distortions proposed by Beck to characterize depression is a selective attention bias towards information which is congruent with negative views of the self, world, and future. However, the clear emphasis in his model is jointly on the contents of cognitions, and on the later stages of information processing

whereby interpretations, meanings, and evaluations are formed. Similarly, selective attention biases in depression have received extremely little research attention; again most of the research relevant to Beck's model has focused on interpretations, evaluations, and recall of input. Yet, unusual allocation of attention policies which favor dysphoric events could be expected to produce many of the cognitive phenomena described in the theoretical and research literature; such allocation policies could be expected to produce the prepotent schemata which Beck describes. As well, Beck's assertion of prepotent schemata which correspond to depressive themes could be expected to correspondingly influence allocation policy such that the attentional bias would result as a consequence. Cognitive sets are generally considered to include biased selectivity, e.g., Leff, Gordon and Ferguson (1974) described cognitive set as "a plan to select specific types of data for processing or to perform specific mental operations on information being processed. Cognitive sets can influence perceptual experience through (a) giving priority to certain types of stimuli or certain dimensions of stimuli, or (b) determining associations, meanings, interpretations, or "transformations of perceptual constructs" (p.396). Hence, most of the empirical support for Beck's model could be predicted from a persistent allocation policy to selectively attend to dysphoric events. As well, such an allocation policy would predict, and be predicted by, the processing disturbances described by Beck's model.

The Present Investigation

The hypotheses. Beck's model of depression in conjunction with general theories of information processing would predict that depressed individuals selectively attend to those aspects of the stimulus field which are congruent with the ideational themes found to be prominent during depression. If so, then such a selective attention bias may be a cognitive mechanism which mediates the cognitions and processing disturbances posited by Beck to constitute the primary disturbances in depression. In addition, biased selective attention would support Beck's contention that during depression, cognitive schemata which correspond to depressive themes become prepotent, dominating information processing. This thesis proposes three hypotheses related to those assertions:

1. Depressed individuals, but not nondepressed individuals, habitually and automatically selectively attend to stimuli which constitute instances of the ideational themes found to be prominent during depression.

If the hypothesized selective attention bias is related to depressive cognitive disturbance in the manner described above, then the magnitude of the selective attention bias should covary with the severity of depression. Hence,

2. The tendency of depressed individuals to selectively attend to instances of depressive ideational themes is greater among more severely than less severely depressed individuals.

Furthermore, if, as argued above, selective attention

bias is a mechanism which mediates depressive reactions, then events which precipitate or exacerbate depression should increase the bias. In Beck's model, experiences of loss precipitate depression; in addition, experiences of failure are commonly considered precipitating or exacerbating events for depressive individuals (Becker, 1974). Hence,

3. Experiences which combine loss with failure increase the bias of depressed individuals to selectively attend to instances of depressive ideational themes.

The dependent variable. This study employs a dichotic auditory shadowing task to measure selective attention to different classes of stimuli. Shadowing is an experimental procedure whereby the subject repeats a message aloud while simultaneously receiving the message (Mayberry, 1979). In a dichotic auditory shadowing task, the subject shadows the messages received at one ear, while attempting to ignore different, irrelevant messages received at the other ear. The shadowed message is the target; the irrelevant message is a distractor.

Broadbent (1952) and Cherry (1953) initially introduced the dichotic shadowing procedure to study subjects' abilities to comprehend spoken language under different distraction conditions. Since that time, variations of the task have been employed mainly to study either selective attention, or the effects of stimulus properties on language comprehension[38]. In

[38]Reviews of the uses of shadowing tasks in the experimental study of attention are contained in Norman (1976) and Kahneman (1973).

the main, these studies varied the properties of either target or distractor or both, and tested subjects' recall of either the shadowed or irrelevant stimulus.

Since one of the goals of the present study is to assess patterns of selective attention without the confounding effects of memory processes, recall procedures are not employed. Rather, contents of the distractor stimuli are varied, and the immediate effects of experimentally controlled distractor content on shadowing performance are assessed. Both target and distractor stimuli consist of approximately one-minute of connected, meaningful prose. For each subject, half the distractor stimuli describe instances of common depressive themes, and half describe affectively neutral events. All target stimuli are neutral with respect to depressive content. The measure of selective attention bias to depressive material is the difference between subjects' shadowing performances with neutral, compared to depressive, distraction content.

There is considerable evidence that, in dichotic tasks, there is some limited processing of the distractor stimuli so that subjects are affected by the meaning of the messages (e.g., Cherry, 1953; Cherry & Taylor, 1954). As well, the content of the unattended message determines whether, and to what extent, it is perceived (Moray, 1959, 1969).

If depressed individuals have allocation-of-attention policies which devote an abnormal proportion of their limited capacity to attending to dysphoric events, then that group's shadowing performance will suffer when such material is

presented as distraction. This would occur since, according to Kahneman (1973), strong predispositions automatically and habitually influence individual's moment-to-moment allocation policies, i.e., characteristics which are habitually attended to in this manner are likely to be attended to whenever they occur. Since an individual has a limited capacity for attention, in a difficult shadowing task, increases in the figural emphasis of one stimulus occur at the expense of the other stimulus. Hence, a strong figural emphasis of depressive-content distractor stimuli will be simultaneously accompanied by decreases in figural emphasis of the target stimulus and, therefore, poorer formation of shadowing responses to the target.

In summary, given a limited capacity for attention and a difficult shadowing task requiring considerable effort, when distractor stimuli are presented to which subjects habitually attend, subjects' attention will shift from the target to the distractor, resulting in a simultaneous decrease in shadowing performance. Hence, differences in the distracting properties of different message contents on shadowing performance reflect differences in allocation policies for the distractor stimuli.

Similar procedures have been employed to study attentional phenomena among schizophrenic patients by Schneider (1976), and recently, by Straube and Germer (1979)[39]. Wrote Straube

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[39]The procedures employed in these two studies are similar in concept to the experimental task employed in the present experiment. There are, however, many differences of actual materials and experimental procedure which are not necessary to enumerate here.

and Germer (1979):

> "The dichotic shadowing technique is considered a sensitive test of selective attention because the task demands relatively complete and immediate engagement of the S's attention. It tests an early level of information processing by limiting the extent to which a subject can attend to the irrelevant stimuli presented....The source of attentional dysfunction is pinpointed by measuring the effect of experimentally varying stimuli from the ear that is to be ignored...on the ability to shadow material in the opposite ear" (p.346).

Commenting on the advantages of dichotic shadowing tasks, Neisser (1976) wrote:

> ".....First, the task itself is relatively familiar. We have all spent time in crowded rooms trying to follow one speaker rather than another...Second, it presents the subject with a more or less continuous and meaningful event over a substantial period of time. It is one of the few experimental procedures that offer information to perceivers in a natural way and allow the perceptual cycle to run its normal couse" (p.81).

It is felt that the dependent variable employed in this study circumvents many of the methodological difficulties found in the research literature on cognitive aspects of depression. Group differences in reactions to demand characteristics, interpersonal coping styles, self-presentation goals and strategies, and motivation could be expected to affect only overall performance, independent of the distraction condition. In part, this relative imperviousness to those potential confounds derives from the use of the stimulus condition under study as distraction, rather than target. The subject is not required to respond to the depressive-content

material; it is relatively unattended unless it becomes disruptive. It is difficult to imagine how group differences on these variables might differentially affect shadowing performance in the presence of one class of relatively unattended distraction but not in the presence of the other class of distraction. In this regard, each subject, by performing alternately with dysphoric and non-dysphoric distraction, is his or her own control for differences along these variables. As well, the task permits conclusions about differences in allocation of attention, as distinct from pathology or deficit of attentional ability. If one group has less ability than another, then their shadowing performance would differ under both distraction conditions. If they differ only under the dysphoric distraction condition, then that difference is most reasonably ascribed to different allocation policies.

In addition, the task employed measures, relatively directly, differences at a specific stage of information processing. Relatively little inference is required to ascribe performance differences to a specific difference in a specific stage of information processing. The task allows demonstration of differences in the active processing of information from the environment. To again paraphrase Mischel (1973) and Hammen and Krantz (1976), the dependent measure assesses differences in what depressed subjects do in their active processing of environmental information which differs from the manner in which nondepressed individuals process the same information. In particular, task performance measures are not

dependent upon memory processes, thereby unconfounding attention from memory. As well, these assessments are made unobtrusively; unlike many of the dependent measures previously employed, there appears to be little room for the measurement procedures to alter the processes being measured.

Comparison groups. The subjects under study are mildly, moderately, and severely depressed college students. As argued in a previous section, differences between this group and a control group of nondepressed students could result from factors correlated with depression, or from characteristics common to psychopathology in general. A third comparison group is required to rule out these hypotheses.

One of the most likely confounds, especially in a population of depressed college students, is anxiety. Beck (1967) noted that depression and anxiety are often associated. Miller, Seligman and Kurlander (1975), discussing previous research with depressed college students, noted that "Examination of anxiety...is especially important. Anxiety often accompanies depression and the depressed and nondepressed groups may have differed in level of anxiety, as well as in level of depression" (p.348). In that study, they were unable to find depressed-nonanxious subjects to fill that cell of their intended design, although they did include an anxious-nondepressed group. Similarly, Lazarus (1968) noted that "[Although] it is sometimes difficult to separate depression from 'anxiety'...it is important to separate....[them] and to stress that they usually have different antecedents" (p.84), and, Wolpe and Lazarus (1966)

asserted that depression is often a consequence of "anxiety that is unusually intense or prolonged" (p.162).

Several researchers have reported significant correlations between various measures of state and trait anxiety, and measures of depression across varied populations. Zuckerman and Lubin (1965) reported that the Mood Adjective Check List (MAACL) Anxiety-scale significantly correlates .72 with clinical ratings of depression, and the MAACL Depression-scale correlates .34 with anxiety. Krantz and Hammen (1979) reported correlations in a college student sample of .69 between depressed mood and tension-anxiety. Miller et al. (1975) found correlations of .41 between BDI and IPAT Anxiety-scale scores in their student sample. O'Hara and Rehm (1979) reported a median correlation of .53 between daily self-ratings of anxiety and depressed mood by normal college students. Teasdale and Fogarty (1979) found that normal students in whom depressed mood was induced using Velten's (1968) induction procedure also became significantly more anxious, a finding that should have prevented them from concluding that subsequent memory effects were due to depressed mood.

Because of the close association of depression and anxiety, especially in college student populations, it is difficult to experimentally separate these two states. Indeed, considering the difficulty of finding depressed nonanxious college students, one must wonder whether groups of depressed-nonanxious college students would be so unique as to prohibit valid generalizations from such samples to depressed populations. However, it is

essential that experimental studies of depression among students employ an affectively distressed, preferably anxious, comparison group so that experimental differences between depressed and non-depressed groups can be ascribed to depression rather than anxiety. For this purpose, highly test-anxious nondepressed students, and low test-anxious nondepressed students comprised two control groups with which depressed students were compared.

Test anxiety is situation-specific (I.Sarason, 1975b). Students who exhibit high test-anxiety tend to respond to situations in which their performance is being evaluated with debilitating anxiety, including high autonomic arousal and intrusive cognitive preoccupations with "....such things as feelings of inadequacy, anticipation of punishment, loss of status and esteem..." (Meichenbaum, 1972, p.370). It can be predicted from test-anxiety theory that high test-anxious students will experience high anxiety which is subjectively distressing and debilitating of performance, in situations in which their performances are being evaluated. However, unlike individuals with generalized anxiety, no performance deficits or subjective distress are necessarily exhibited in other kinds of situations (I.Sarason, 1975b; Wine, 1971). As well, although there is some statistical relationship between depression and test-anxiety, the correlation of .25 found between the BDI and measures of test anxiety in a student population (Lavelle, Metalsky & Coyne, 1979) is considerably lower than those found between depression and more generalized anxiety.

Hence, it seems likely that students who are highly

test-anxious but not depressed could be located, and that these students would experience high, debilitating, and subjectively distressing anxiety when placed in a testing situation with cues indicating performance evaluation. For these reasons, highly test-anxious students were selected as controls for nondepressive psychopathology and subjective distress. Three groups of subjects, depressed, highly test-anxious nondepressed, and low test-anxious nondepressed facilitate comparisons which could yield information about processes reasonably likely to be specific to depression in the population studied. Specifically, if the depressed group manifests the effects predicted, and both comparison groups do not, then the effects may more reasonably be considered specific to depression.

Experimental predictions. The following experimental predictions are made:

1. Depressed subjects will commit more shadowing errors when distraction consists of instances of depressive themes than when the content of distraction is not relevant to depressive themes. The shadowing performances of nondepressed groups will not be differentially affected by different distraction contents.
2. The difference between frequency of shadowing errors with depressive theme distraction and shadowing errors with nondepressive theme distraction will be greater for moderately and severely depressed subjects than for mildly depressed subjects.

3. The depressed group will increase the difference in frequency of shadowing errors with depressive theme distraction compared to nondepressive theme distraction following a failure-loss experience, but not following either success-reward or no feedback conditions.

METHODS

Overview

Three groups of male and female university students were studied: depressed, highly test anxious nondepressed, and low test anxious nondepressed. Subjects were selected for the study and assigned to one of the above groups on the basis of scores on several self-report inventories administered to a large number of students during classes.

The subjects who were selected participated in one experimental session, generally within three days of the screening procedure. The primary experimental task was a monaural auditory shadowing task with binaural stimuli. That is, Ss shadowed auditory verbal stimuli presented through one earphone (the target stimuli) while task irrelevant verbal stimuli were simultaneously presented through the other earphone (the distractor stimuli). Each target and distractor stimulus consisted of approximately one minute of meaningful, connected prose.

Two types of distractor stimuli were used, differentiated on the basis of their content. Half the distractor stimuli described situations, events and ideas which constitute manifestations of common depressive themes, and were dysphoric in mood. These stimuli are referred to as dysphoric distractor stimuli. The remaining distractor stimuli were non-dysphoric, i.e., neutral in thematic content and mood.

The subjects' shadowing responses were recorded onto

cassette tapes, and the tapes scored for shadowing errors. The data of primary importance for each group of Ss are the differences between the number of shadowing errors committed with dysphoric distraction and the number of errors committed with non-dysphoric distraction.

After completing a self-report inventory of current moods and feelings, several shadowing practice trials, and one baseline trial, all Ss performed two shadowing tasks. Task 1 consisted of ten target stimuli, five presented simultaneously with dysphoric distraction and five with non-dysphoric distraction.

Following Task 1, Ss received predetermined, non-performance related success or failure feedback about their performance, and a monetary reward or loss. One-third of the Ss received no feedback at all.

After the manipulated feedback, all Ss performed the second shadowing task, Task 2, which consisted of ten additional target stimuli, half with dysphoric and half with non-dysphoric distraction.

Finally, Ss were debriefed and paid for their participation.

Subjects

The subjects were ninety male and female McGill University undergraduate students recruited during their classes in the following manner.

The experimenter (E) selected courses for canvassing from a wide variety of faculties and undergraduate levels within the university. In each case, after obtaining the

permission of the instructor, E arrived at the beginning of the class. The following instructions, which had previously been memorized, were delivered to the class:

> "My name is Len Shenker. I'm conducting a psychology study here at McGill, and I'm looking for people who would like to participate.
>
> The first part of the study involves filling out some questionnaires, which will take all together about fifteen minutes. The second part of the study has to do with different moods and feelings and selective listening. Of the people who fill out these questionnaires now, a sample representing a wide variety of scores will be contacted and asked to participate in the second part of the study. The second part will take about an hour and a half, and subjects will be paid for their participation. The amount of money earned will vary, but most subjects will be paid around five dollars.
>
> Those of you who participate in the second part will be given a pair of earphones. What you'll be asked to do is listen to verbal material coming through the earphones to one ear and repeat out loud what you're hearing while you're hearing it. At the same time, different verbal material will be coming through the other earphone. It's an interesting task to do; there's nothing un-

pleasant in the procedures.

I'd like to hand out these questionnaires now. They ask for your name, address, and phone number so I can contact people who are eligible for the second part, but of course, the information on them will be entirely confidential.

If you would not be willing to participate in the second part, then don't take a package of questionnaires. I'd like as many people as possible to participate, but, obviously, only those who want to.

Are there any questions?"

After delivering these instructions and answering questions, E gave a manilla envelope containing a packet of questionnaires to each student who agreed to participate. The package, which may be found in Appendix A, contained the following material, in order:

1. Cover sheet requesting S's name, address, phone number, age and sex.
2. Beck Depression Inventory (BDI) Beck et al., 1967). This inventory, originally constructed for individual, oral administration, was modified in the following ways:

   The questionnaire was retitled, "Personal Inventory - I".

   The original instructions were altered to read as follows:

"On this questionnaire are groups of statements. Please pick out the one statement in each group which best describes the way you feel today, that is, right now! Be sure to read all statements in the group before making your choice for that group. Then, place a check (✓) to the left of the statement which best describes the way you feel right now. If none of the statements in a group fits exactly the way you feel, then select the one which is closest. Do not skip any groups."

Each group of statements was set apart with white space, and the twenty-one groups were entitled, "Group A" to "Group U".

3. Test Anxiety Scale (TAS) (Sarason, 1972). This questionnaire was retitled, "Personal Inventory - II".

4. Language Proficiency Questionnaire. This questionnaire was written by E to eliminate from consideration students whose proficiency and familiarity with English is poor. It consists of the following questions and instructions:

What is your mother tongue, i.e., the language you spoke most often as a child?

French _____

English _____

Other _____

If your mother tongue is not English, please answer the next two questions.

How well do you speak English? (Circle one.)

1	2	3	4	5	6	7
not at all			moderately well			excellently

How many years of school were done in English as the language of instruction?

(Check one.)

_____ less than 1 year

_____ 1 year

_____ 2 years

_____ 4 or more years

Students completed the questionnaires immediately, while their classmates who chose not to volunteer either remained in their seats or left the room. When all completed questionnaires had been collected, E left, saying either that he would return at the end of the class period to make appointments with Ss eligible for the second phase of the study, or that he would contact eligible subjects by telephone that same evening.

The experimenter scored the questionnaires immediately upon leaving the room, and, in most instances returned to the classroom at the end of the class period to make appointments with eligible Ss. On some occasions this was not possible and Ss were contacted by telephone, in most cases that same evening. Most Ss were scheduled to participate in the experimental session within three days of the initial screening. All Ss who participated in the experimental session did so within seven days of the screening; prospective Ss who were unable to participate within seven days were discarded.

Subject selection criteria. Three groups of Ss were selected, as follows:

1. Depressed Ss. Students who scored 10 or higher on the BDI were selected for this group. A BDI score of nine or higher is the criterion of depression commonly adopted in research with nonclinical population (e.g., Miller & Seligman, 1973, 1975; Miller, Seligman & Kurlander, 1975; Golin & Terrell, 1977; Golin & Hartz, 1979; Smolen, 1978; Teasdale, 1978). Ten was selected as the criterion for this study to achieve greater separation between depressed and nondepressed groups. As well, ten is the cutting score which Beck (1967) recommended for nonclinical populations, and which has been shown to correspond to clinically significant depression in a college student population (Bumberry et al., 1978). Scores on the TAS were not considered in selecting Ss for this group. Hence, this group consisted of depressed Ss, some of whom were also highly test anxious and others who were not.

2. Highly test anxious nondepressed Ss. The criterion for high test anxiety was a score of 20 or higher, out of a possible maximum score of 37, on the TAS. This range corresponds to the upper quartile in Sarason's (1975) standardization study. In addition, only Ss who also scored 7 or lower on the BDI were included in this group. Thus, Ss in this group are highly test anxious and nondepressed.

3. Low test anxious nondepressed Ss. Students whose TAS and BDI scores indicated both low test anxiety and the absence of clinically significant depression were eligible for this group. The criterion for low test anxiety was a score of

11 or lower on the TAS. This range corresponds to the lower quartile in Sarason's (1975) standardization study. In addition, only students who also scored 7 or lower on the BDI were selected for this group.

It is noted that students who scored 8 or 9 on the BDI fell between the selection criteria for any of the groups and were consequently ineligible for the study. As previously noted, students with BDI scores of 9 are commonly classified as depressed, and those with scores of 8 as nondepressed. However, it would seem that elimination of these borderline Ss creates groups that can more confidently be defined as depressed and nondepressed.

For the sake of brevity, the three groups will be hereafter referred to as the Depressed, Test Anxious and Healthy Control groups, respectively.

In addition to the criteria outlined above, only students who indicated a high level of proficiency with spoken English were eligible for any of the groups in this study. The language criterion was one of the following patterns of responses on the English Language Proficiency Questionnaire:

a. Students who stated that English is their mother tongue, i.e., the language they spoke most often as a child.

b. Students whose mother tongue is not English but who rate their spoken English 5 or more on the 7-point scale and who completed 3 or more years of school with English as the language of instruction.

c. Students whose mother tongue is not English but who rate their spoken English 6 or 7.

Each S who met the criteria for one of the groups was given an appointment to participate in an experimental session. The three groups were filled at equal rates. That is, equal numbers of depressed, test anxious and healthy control Ss were selected and tested each week.

Most Ss participated in an experimental session within three days of the screening procedure. Since depth of depression in many depressed university students appears to decline over time (Bumberry et al., 1978), no S participated in an experimental session more than seven days after taking the screening battery, and Ss who were tested more than three days after the screening were re-administered the entire battery when they arrived for the experimental session. Subjects whose retest scores no longer met the selection criteria were removed from the sample. Of the 100 Ss who were originally selected, ten were removed in this manner, leaving 30 Ss per group. In addition, one depressed S's data was lost when a research assistant failed to turn the tape recorder on for part of the session[1], and one test anxious S's data was deleted because he spoke too unclearly for his responses to be scored. This left the final sample of eighty-eight Ss, distributed as follows:

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[1]This was not discovered until the judges attempted to score this S's tape and found part of the record missing.

29 Depressed Ss[2,3]

19 female

10 male

29 Highly Test Anxious Nondepressed Ss

19 female

10 male

30 Low Test Anxious Nondepressed Ss

14 female

16 male

Stimuli

Each stimulus used in the experiment was comprised of two elements: A target stimulus consisting of approximately 120 words of meaningful, connected, spoken prose recorded on one channel of an audio cassette tape, and a simultaneously presented distractor stimulus consisting of approximately 100 words of meaningful, connected, spoken prose recorded on the other channel. The scripts on which the audio tapes were based were written by E. Three different sets of scripts were prepared: target stimuli, which became the stimuli which Ss shadowed, and two types of distractor stimuli, dysphoric and

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[2]The depressed group was comprised of 15 mildly depressed, 10 moderately depressed and 4 severely depressed Ss. These categories are based on validation studies of the BDI which indicate that scores of 10 to 15 correspond to psychiatric ratings of "mildly depressed", scores of 16 to 23 to "moderately depressed", and 24 to 63 to "severely depressed" (Beck, 1967; Bumberry et al., 1978; Oliver & Burkham, 1979).

[3]As expected, most depressed Ss were also test anxious. Of the 29 depressed Ss, only three manifested low test anxiety.

non-dysphoric. The characteristics of the three sets of scripts are described below.

Dysphoric distractor stimuli. The central ideational themes of these scripts are themes which have been consistently described in the clinical literature as common depressive concerns, preoccupations and beliefs. As a group, these scripts are centered on the themes of helplessness, rejection, loss, hopelessness, escape, personal deficiency, failure, deprivation, loneliness, and negative view of the world. Each script describes events, ideas and images which illustrate and support two or more of these themes.

In addition, these scripts were written to be dysphoric in mood or affective tone, i.e., the words, phrases, images, events and ideas are such that nondepressed people would generally describe each script with negative adjectives associated with depressive mood. For example, people would describe these scripts as sad, discouraging, unhappy, etc. The specific content areas with which different scripts deal are quite varied, e.g., some deal with interpersonal relations, some with ecological problems, material possessions, personal achievement, etc.

The procedures for validating these judgments and selecting the scripts to be used in the experiment are described in a subsequent section. Two representative dysphoric scripts are presented below; all dysphoric distractor scripts are included in Appendix B.

Dysphoric Distractor Script D-1

A dominant characteristic of modern societies is the helplessness and impotence of the individual.

In simpler societies, people could direct their own lives, their efforts could make a difference. Now, individuals are helpless. Like passive blades of grass, they are blown this way and that, powerless to influence the forces that determine their lives. In many respects, people's lives are governed by faceless bureaucracies, important decisions about them made by computers. A terrible sense of impotence pervades modern life, as people bow to the sure knowledge that they are powerless to affect their own lives, much less make an impression on the society around them.

Dysphoric Distractor Script D-3

People often come to grief because they lose something on which their entire life was based. It can happen when someone very close is lost, either through death, illness, unfaithfulness, or loss of affection. It may be a parent who dies, or becomes old and unable to protect and care for you. It may be a lover, without whom the world is empty, life is barren, and there is no joy. One can also lose important personal attributes, without which life holds only despair. This can happen when one becomes less attractive, less energetic, or less intellectually capable.

Non-dysphoric distractor stimuli. These scripts are identical to the dysphoric scripts in physical characteristics,

but differ in content. Non-dysphoric scripts do not deal with depressive themes, and are not dysphoric in mood or affective tone. They would not be generally described by nondepressed people with negative mood adjectives. As well, they were written to avoid positive themes and moods. Hence, they might best be described as dealing with nondepressive ideational themes, and neutral in mood or affective tone.

The specific content of these scripts are quite varied, e.g., some deal with underwater plant life, some with the production and uses of cotton, teaching children to read, the proper storage of wine, and virtues of clear writing, etc. Some of these scripts were written entirely by E, others were adapted for this study from a variety of books on many subjects.

Validation and script selection procedures are described in a subsequent section. Two representative non-dysphoric scripts are presented below; all non-dysphoric scripts are included in Appendix C.

Non-Dysphoric Distractor Script N-2

Wine must be stored properly to avoid spoiling. There are several general principles for storage of wines. Corked bottles should lay on their sides. The wine keeps the cork moist and prevents it from shrinking and admitting air. The safest storage is in a rack that gives each bottle a compartment to itself, allowing you to withdraw any bottle without jogging the others. Screw-top bottles should be stored upright. Maintain an even temperature. A few degrees

difference between summer and winter won't do harm, provided the change occurs slowly and steadily. What damages wine is rapid and frequent heating and cooling.

Non-Dysphoric Distractor Script N-4

From the time that young children watch older siblings and adults around them pick up books and become absorbed, they want to learn to read. To them this is a skill which provides the entrance ticket to the grown-up world. Because of their spontaneous interest, learning to read, while not accomplished in one day, can become a challenging and enjoyable adventure. There is general agreement that reading is the single most important skill a child can possess. It is the one that is taught earliest and continued longest. What is often overlooked is the fact that teaching children to read is fascinating for the teacher as well.

Target stimuli. These scripts are approximately ten words longer than the distractor scripts, and the specific contents differ. All other general characteristics are identical to the non-dysphoric distractor scripts. All target scripts are presented in Appendix D.

Script validation and selection. Of central importance to the logic of this experiment are thematic differences between dysphoric and non-dysphoric stimuli. It is quite clear

on reading the two sets of scripts that they are fundamentally different, with only the dysphoric scripts containing depressive thematic material. However, as a precaution, the important characteristics of the distractor stimuli were validated in the following manner.

Twenty dysphoric and twenty non-dysphoric scripts were written as described above. The scripts were then recorded on audio cassette tapes by E in the following manner. Five scripts were randomly selected from the total forty and recorded in random order on one cassette. Five more were randomly selected from the remaining 35 scripts and recorded in random order on a second cassette. This procedure was carried out until all forty scripts had been recorded, five per cassette, on eight cassettes. All scripts were recorded at approximately 100 words per minute, with 1-minute interstimulus intervals.

Seven naive individuals were asked to serve as judges. The seven judges ranged in age from 19 to 32, and were chosen from a variety of occupations. All had completed at least one year of university study, four were university graduates. There were four males and three females. All were personal acquaintances of E and understood that the task was part of a research project in psychology, but none knew the nature or purposes of the research. All were judged by E to be non-depressed; this judgment was supported by administering the BDI to each judge within two days after completing the ratings. All BDI scores were less than 6.

Each judge was given the eight cassettes and instructed

to listen to them in a predetermined order. The order was varied between judges. They were given rating forms, and instructed to listen to each stimulus, fill out a rating form for that stimulus, then listen to the next stimulus, fill out a rating form for that stimulus, and so on until they had completed ratings forms for all forty stimuli. They were instructed to take breaks whenever they felt they needed to.

The rating forms required two groups of judgments: the extent to which each script deals with ten different depressive themes, and the mood or affective quality of each script. Thematic content was assessed by instructing the judge to, "Please rate the extent to which this script deals with the following themes or subjects". Ten themes were listed, each with a 7-point rating scale anchored at the ends and middle with the words, "not at all", "moderately", and "extremely". The themes were: helplessness, rejection, loss, a negative view of the world, hopelessness, escape, personal deficiency, failure, deprivation, and loneliness. Mood or affective quality was assessed by instructing the judge to, "please rate the extent to which this script is described by each of the following words". Eleven adjectives were listed, of which eight were dysphoric mood adjectives. Three positive mood adjectives were included to guard against response bias on the part of any judge. Each adjective was rated on a 7-point scale identical to those described above. The dysphoric mood adjectives were: pessimistic, hopeless, sad, distressing, discouraging, gloomy, unhappy, and dysphoric, the latter defined on the rating sheet as, "something that tends to arouse generally negative feelings".

The positive mood adjectives were, pleasant, cheerful, and good-natured. A sample rating sheet is appended (Appendix E). Ten dysphoric scripts were selected to become dysphoric distractor stimuli. The primary selection criterion was that each script selected obtain mean judges' ratings of at least 5 on the extent to which it deals with each of at least three depressive themes. For each script so selected, the mean judges' rating on the extent to which it is described by the eight dysphoric mood adjectives was greater than 4.75, whereas the mean rating of the three positive mood adjectives was less than 2.

Thirteen non-dysphoric scripts were selected to become non-dysphoric distractor stimuli.[4] The primary selection criterion was that no script receive a mean judges' rating higher than 2 for any depressive theme. Each script so selected received a mean judges' rating of the extent to which it is described by the eight dysphoric mood adjectives of less than 2. Mean judges' ratings of the three positive mood adjectives ranged from 2.6 to 4.8 for the thirteen stimuli. Means and ranges of ratings in all categories for all distractor stimuli are presented in Table 1. Scripts selected for dysphoric distractor stimuli may be found in Appendix B; scripts selected for non-dysphoric distractor stimuli in Appendix C.

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[4]Thirteen non-dysphoric distractor stimuli were required whereas only ten dysphoric distractor stimuli were needed. The three additional non-dysphoric distractors were used for two practice and one baseline trial.

Table 1

Ratings of Dysphoric and Non-Dysphoric Distractor Stimuli

By Seven Judges on a 7-Point Rating Scale[1]

Distractor Type	Depressive Themes (N = 10 themes)	Dysphoric Mood Adjectives (N = 8 adjectives)	Positive Mood Adjectives (N = 3 adjectives)
Dysphoric (N = 10 stimuli)	mean[a] = 4.3 range[b] = 1.7-6.8	mean[c] = 5.3 range[d] = 4.8-6.2	mean[c] = 1.2 range[d] = 1.0-1.9
Non-Dysphoric (N = 13 stimuli)	mean[a] = 1.2 range[b] = 1.0-2.0	mean[c] = 1.2 range[d] = 1.0-1.9	mean[c] = 3.9 range[d] = 2.6-4.8

[1]Scale from 1 to 7, anchored at the ends and middle with the words, "not at all", "moderately", and "extremely".

[a]Mean of 7 judges' ratings across all stimuli and depressive themes.

[b]Range of mean judges' ratings for each stimulus on each theme.

[c]Mean of judges' ratings of all stimuli across all adjectives.

[d]Range of mean judges' ratings across all adjectives for each stimulus.

Preparation of stimulus tapes. All target and distractor scripts were initially recorded in the following manner. The experimenter read each script while seated in a shielded, sound attenuated room, with a unidirectional microphone worn around his neck to minimize amplitude changes which might otherwise result from head movement. The microphone cord was plugged into a wall outlet in the room.

All scripts were recorded on one track of an open reel tape[5], using a stereo tape recorder[6] situated outside the sound attenuated room with its mic input connected to a wall outlet outside the room. A research assistant operated the tape recorder and communicated with E verbally via microphone and earphones, and visually through a window.

The research assistant adjusted the recording level such that when E read at a comfortable amplitude, the VU meter registered input at approximately the optimum recording level, with amplitude peaks registering between -5 and +1 on the VU meter. The experimenter attempted to read all scripts at the same amplitude. The research assistant monitored input levels during recording and, when E's amplitude deviated from this standard, signalled him and the stimulus was re-recorded. Approximately equal amplitudes of all stimuli were obtained on this initial recording in this manner.

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[5]All open reel tapes used in this and subsequent procedures were BASF LH Super Hi Fi, DP-26.

[6]Sony 4-track tape recorder, model TC-788. Tape speed set at 7½ inches/second.

All scripts were read at approximately 120 words per minute. This rate was monitored by the research assistant who timed a previously counted 100-word segment in the middle of each script. When necessary, scripts were re-recorded until they achieved the desired rate of presentation. This first tape is designated Tape 1.

The stimuli recorded on Tape 1 were then dubbed onto a second tape, designated Tape 2. This was accomplished by directly connecting the output jack of the Sony to the channel 1 input jack of a Revox Type A77 stereo tape recorder set at 7½ inches/second, with the Dolby system engaged. A 10-second, 1000 cps calibration tone was first recorded at the beginning of the tape. In addition, a 1-second 1000 cps tone was recorded at the onset and offset of each target stimulus, to signal the beginning and end of each stimulus.

Remaining amplitude variations between stimuli on Tape 1 were removed as the stimuli were dubbed onto Tape 2. This was accomplished by adjusting the playback level of the Sony and the recording level of the Revox so that the VU meter of the Revox registered optimum recording amplitude, with peaks registering between -5 and +1. After the first script was recorded in this way the playback level of the Sony was adjusted for each subsequent stimulus to achieve the same VU meter readings on the Revox. After completing Tape 2, the success of these procedures in achieving approximately equal stimulus amplitudes was verified by playing the tape through headphones[7]

[7]Yamaha HP-1 stereo headphones.

into a sound level meter, and monitoring the amplitude peaks.

The result of these procedures was an open reel tape (Tape 2) consisting of a 10-second 1000 CPS calibration tone, and all target and distractor stimuli recorded on one channel, at approximately equal amplitudes, with 1-second signal tones at the beginning and end of each target stimulus.

The stimuli on Tape 2 were then dubbed onto a third tape, designated Tape 3, in the following manner. The channel 1 output jack of the Revox was connected directly to the input jack on a second Revox Type A77 stereo tape recorder, with both machines set at 7½ inches/second and Dolby systems engaged. Playback and record levels of the machines were set so that the calibration tone was recorded onto Tape 3 with the VU meter of the recording machine registering +1. All target stimuli, with their signal tones, were then recorded onto channel one of Tape 3, with 10-second interstimulus intervals.

The machines were then set up, and calibrated in the same manner, to record <u>distractor</u> stimuli onto channel 2 of Tape 3 at the same amplitude as the target stimuli were recorded on channel 1. The specific target-distractor combinations were arranged in the following manner: target stimuli which were designated to be practice and baseline trials were paired with non-dysphoric distractor stimuli; thereafter pairings were made such that non-dysphoric distraction trials alternated with dysphoric distraction trials, i.e., every second target stimulus was paired with a dysphoric distractor stimulus.

Coordination of channel 1 with channel 2 (target stimulus

with distractor stimulus) was accomplished in the following manner for each pair of stimuli. The tape recorder containing the distractor stimulus (Tape 2) was stopped with the "pause" lever[8] just before the first word of the stimulus. The tape recorder containing the target stimulus (channel 1 of Tape 3) was started, with E monitoring the playback via earphones. On the 10th word of the target stimulus, the "pause" lever of the first machine was released, allowing the distractor to begin being recorded onto channel 2 of Tape 3. Thus, for each stimulus, the target began first and after 10 words was joined by the distractor on the other channel. Since each target stimulus was approximately 120 words long, this left about 110 words on the target stimulus, the last 10 of which would not be scored. That is, the segment of each target stimulus that will be scored for shadowing errors is the 100 words which immediately follow the onset of distraction. For this reason, each distractor must be long enough to cover that 100 word segment of target stimulus, and then terminate during the target's next 10 words. These segments had all been timed prior to this taping, and each distractor could be ended in several places. The end point was chosen so that the distractor covered the critical 100 word target segment, and then terminated before the target did. The distractor stimulus was terminated by stopping Tape 2 with the "pause" lever of its tape recorder.

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[8]The use of the "pause" lever to stop and start Tape 2 prevented onset or offset noise on Tape 3.

Thus, for each stimulus pair, the target stimulus on channel 1 began first, preceded by its signal tone. The distractor stimulus on channel 2 began 10 words after the target's onset. The two stimuli continued simultaneously for at least the next 100 words of the target. The distractor then terminated sometime during the next 10 words of the target, followed by termination of the target stimulus, followed by the signal tone indicating the end of that trial. This procedure was followed for each stimulus pair, with 10-second intervals between trials.

The result of these procedures, Tape 3, consisted of 2 practice, 1 baseline, and 20 experimental trials, the latter with alternating dysphoric and non-dysphoric distraction. All target and distraction stimuli were recorded at approximately equal amplitudes and rates of presentation. The twenty pairs of experimental stimuli recorded on Tape 3, as described above, are designated Series X.

The procedures used to make Tape 3, above, were repeated in the identical manner to make another tape, Tape 4. This tape contains Series Y, which differs from Series X in the following ways. Each target stimulus which is paired with a dysphoric distractor in Series X is paired with a non-dysphoric distractor in Series Y. Similarly, each target stimulus which is paired with a non-dysphoric distractor in Series X is paired with a dysphoric distractor in Series Y. In addition, the order in which targets and distractors occur were altered so that the order of presentation of stimuli on Series X differs from that

of Series Y. Finally, although both series contain alternating dysphoric with non-dysphoric distraction trials, Series X begins with a non-dysphoric distraction trial and Series Y begins with a dysphoric distraction trial.

The final step in the production of the stimulus tapes was to dub the stimuli on Tapes 3 and 4 onto cassette tapes.[9] The open reel tapes were played on the Revox A-77 stereo tape recorder, with the output jacks of each channel connected directly to the input jacks of the corresponding channels of a stereo cassette tape recorder.[10] Both channels were recorded at equal amplitudes, with the VU meters of each of the cassette recorder's channels registering between -5 and +1 at the amplitude peaks.

For each series, the calibration tone and half the trials were recorded onto one cassette, and the calibration tone and remaining trials recorded onto a second cassette. That is, for each series, X and Y, two cassettes were created, each with ten target-distraction pairs. Each cassette, containing half the stimuli of a series, is designated A and B. Thus, four cassettes were created, each containing ten pairs of stimuli: Series X, parts A and B; Series Y, parts A and B.[11] In

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[9]Maxwell Low Noise C90 cassette tapes.

[10]Yamaha 800 GL stereo tape recorder. Set at 7½ inches/second with Dolby systems engaged.

[11]Note that XA contains the same target and distractor stimuli as YA, but in different target-distractor combinations and orders. Similarly, XB contains the same stimuli as YB in different combinations and orders.

addition, a cassette was made which contained the two practice and one baseline trial.[12]

To summarize, the final stimulus tapes consisted of four experimental cassettes, XA, XB, YA, and YB. Equal numbers of Ss in each group were later randomly assigned to Series X or Series Y. As described above, these two series contained the same target and distractor stimuli, but in different combinations and orders. The purpose of constructing two different stimulus series in this manner is to determine the effects on shadowing performance of type of distraction, unconfounded by target characteristics. Shadowing performance can be effected both by characteristics of the distraction and by characteristics of the target, and it is reasonable to expect some targets to be unintentionally more difficult to shadow than others. Although it would be most unlikely for undetected systematic differences to occur by chance between the group of targets paired with dysphoric distraction and those paired with non-dysphoric distraction, this is at least a logical possibility. The result of constructing and using two different stimulus series as described is that each target stimulus was shadowed with dysphoric distraction by half the Ss in each group, while the other half shadowed that target with non-dysphoric distraction. Thus, group comparisons of mean shadowing errors committed with dysphoric vs. non-dysphoric distraction are not affected by characteristics of the target stimuli since each

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[12]Three copies of each cassette were made as insurance against breakage or malfunction.

target stimulus is paired with both dysphoric and non-dysphoric distraction. As well, any order effects which might affect the data were ameliorated by recording targets and distractors in different orders on Series X and Y.

The sequence of stimuli on each tape was as follows: Each tape begins with a 10-second, 1000 cps calibration tone, which is never played for Ss. The first stimulus heard by Ss is a one-second signal tone on channel 1, indicating that the stimulus is about to begin. The target stimulus then begins on channel 1. After the first 10 words, it is joined by the distractor stimulus on channel 2, and the two continue simultaneously for at least 100 words of the target. The distractor then terminates, followed by the termination of the target and another signal tone, indicating the end of that trial. After a 10-second silent interstimulus interval, the sequence is repeated with the next stimulus, and so on until all ten stimuli have been presented, half with dysphoric distraction and half with non-dysphoric distraction. All targets and distractors are presented at the same amplitude and rate of presentation, in the same male voice.

Each series, X and Y, consists of two tapes, A and B, with ten stimulus pairs per tape. Each S will perform two shadowing tasks, Task 1 and Task 2, separated by a feedback manipulation. Half the Ss in each group were randomly assigned Tape A for Task 1 and Tape B for Task 2, whereas the other half were assigned Tape B for Task 1 and Tape A for Task 2.

Testing Procedures

When Ss arrived at E's office in the Psychology Department for their appointments, they found E seated at a desk. On the desk was a pair of headphones with its cord quite visibly plugged into a wall outlet with a standard Sony jack, various papers, file folders, pens, pencils, and an electronic calculator.

The subjects were greeted quickly by E, told that the tasks would be administered next door, and immediately taken to the testing room, which was adjacent to E's office, and separated from it by the wall into which the earphones were plugged.[13] The testing room was bare except for a table in the center, a chair on which the research assistant was seated, and a chair on the opposite side of the table on which S was instructed to sit. The following items were on the table: one microphone on a stand facing S's chair, with its cord quite visibly plugged into a standard Sony wall outlet in the wall separating the testing room from E's adjacent office (the earphones on E's desk were plugged into the other side of this wall); two cassette tape recorders with their microphones facing S's chair; and one stereo cassette tape recorder[14]

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[13]Subjects who had taken the screening battery more than 3 days earlier were first readministered the BDI and TAS, with instructions to "....answer the questions in whatever way seems appropriate now, regardless of how you answered the questions in the previous questionnaires." Cf, S selection procedures, above.

[14]Yamaha 800 GL stereo cassette tape recorder. This machine is very impressive in appearance, with numerous controls and two integral VU meters.

with earphones.

Immediately upon entering the testing room, E introduced S to a research assistant[15] who was waiting there, and handed the research assistant a file folder which contained the following information:

1. S's name.
2. Target ear. Half the Ss in each group received the target stimuli at the right ear and the distractors at the left; this was reversed for the remaining Ss in each group.[16] Ear of presentation was controlled by the research assistant simply by the placement of the earphones on each S.
3. The stimulus series, X or Y, and order, A-B or B-A, designated for that S. Assignment to one of the four possible stimulus arrangements was predetermined by E by simple alternation of Ss as each group was

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[15]A total of seven research assistants were employed, four males and three females. All were junior college or university students who were paid for their work and were completely naive about the nature and purpose of the study until after completing their employ.

[16]Ear of target presentation was counterbalanced to control for the well documented right ear effect, i.e., for most people, shadowing performance for verbal material presented to the right ear tends to be better than for similar material presented to the left ear (Neisser, 1976). However, this control may have been unnecessary for this experiment. The important data collected from each S in this study is the difference between shadowing performance with dysphoric distraction and shadowing performance with non-dysphoric distraction. Since ear of target presentation does not change for any individual S, this data should not be affected. Ear of target presentation should affect only overall shadowing performance, which is irrelevant to the hypotheses under study here.

filled. This achieved both equal numbers of Ss assigned to each stimulus arrangement, and also random assignment of Ss within each group.

The experimenter then told S that the research assistant would explain the task, and immediately left, saying that he would be in the next office and would see S a little later.

Before giving S the task instructions, the research assistant inquired whether S had any known hearing problem.[17] If not, the following instructions were given:

> "Let me explain what the task is. When you put these earphones on, I'll play some tapes. The tapes contain short passages of about 1 minute each. There are different passages coming through the left and right ears, so you'll hear 2 different passages at the same time. What I'd like you to do is pay attention to the right[18] ear. Your task is to repeat what you hear in the right ear while you're hearing it, so you're listening and repeating at the same time.

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[17] Three Ss reported higher thresholds in one ear. For these Ss, E was called into the room, and he raised the volume of the channel being presented to the high threshold ear until S reported hearing both channels at equal amplitudes. One of the practice stimuli was used for this purpose. For these 3 Ss then, target and distraction stimuli were presented at approximately equal subjective intensities, but unequal stimulus amplitudes. For all other Ss, stimulus amplitude at the earphone averaged approximately 60 db for each channel.

[18] "Right" and "left" were reversed for Ss receiving the target stimuli to the left ear.

On each passage, the right ear starts first, and the left ear comes on a few seconds later. There's a short tone just before each passage starts, so you know when it's coming, and another one at the end, so you know when it's over. After each passage, there's about a 10-second pause before the next one begins.

These two tape recorders will record your responses. Also, this microphone is connected to the next office[19] where Mr. Shenker will listen to your responses through earphones and score them.

After the first half of the passages, which will take about 15 minutes, we'll take a short break, and Mr. Shenker will explain about the pay for participating in the study. Then we'll do the second half.

Do you have any questions? Is it clear what you're supposed to do?

OK. Before we begin, I'd like you to fill out this short check-list. Please read the instructions, and then fill out the other side."

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[19]The research assistant pointed to the microphone and its cord plugged into the wall outlet. Although in acuality the outlets were fake, it appeared as though S's responses were being transmitted via microphone to the next office where E was listening through earphones. During debriefing, all Ss, without exception, said that they had never considered that this might not be true.

The subjects then filled out the MAACL - Today Form (Zuckerman & Lubin, 1965), after which the following instructions were given:

> "We'll start out with a couple of practice passages so you can get used to the task. These won't be scored. Remember, repeat what you hear in the right ear while you're hearing it."

The earphones were placed on S's head and adjusted for comfort. The first cassette, containing the practice and baseline stimuli, was begun.

The subjects performed two practice trials, with the research assistant answering questions and providing additional instructions as necessary. Although two practice trials were sufficient for most Ss, the research assistant was instructed to repeat the practice trials if necessary, until S could do the task adequately. This was defined as correctly shadowing at least half the words, this judgment made informally by the research assistant. This informal criterion seemed adequate, as, in general, it was quite clear when S needed additional practice trials to perform the task.

Following the practice trials, the research assistant said, "Now, if you're ready, we'll begin the task. I'll tell Mr. Shenker that we're ready to begin". He then went next door to inform E, returned to the testing room, and played the next stimulus pair, followed by the cassette constaining that S's Task 1 stimuli. The subjects performed these 11 trials with-

out interruption.

When Task 1 was completed, the research assistant stopped the tape recorders and delivered the following instructions:

> "That's the end of the first half. We'll take a five minute break now. If you'll go next door, Mr. Shenker will explain about the pay for participating in the study."

The subject went to the adjacent office and found E working at the desk with the earphones, still plugged into the wall outlet, around his neck. When S entered the room, E stopped working on what appeared to be two score sheets.[20] One was titled, "Scoring Work Sheet", and contained numerous rows and columns labelled Target 1 to Target 11, and six types of errors. The cells, which were large, contained various numbers of "tick" marks of the sort one would make if one were quickly counting errors while listening to the S's shadowing performance. When S entered the room, E was summing the numbers of ticks in each cell, and transferring this information to what appeared to be a summary score sheet, also containing numerous rows and columns, each labelled in an unintelligible code. Some of the cells were already filled; some were empty.

In addition, the following items were on the desk: a

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[20]Although E had not actually been listening to or scoring S's performance, he was ready for S's entrance at this time because he had been signalled by the research assistant when S was about to begin the experimental trials, and knew the playing time of the stimulus tape.

stack of typewritten texts of the target stimuli which S had been shadowing, a small electronic calculator, and a computer print-out containing several blocks of numerous columns of numbers. In addition, alone and quite prominent on one side of the desk was that S's packet of screening questionnaires, with the cover sheet containing S's name, address, phone number, age and sex on top. On top of it, but without obscuring the above information, were three one-dollar bills.

Upon entering the room, S was greeted by E and asked to sit on the chair opposite the desk. The experimenter explained that he had been listening to S through the earphones, comparing S's shadowing responses to the written scripts of the target stimuli, and counting S's errors, described as "not repeating exactly what is on the tape". He further explained that he had been keeping separate tallies of different types of errors, did not elaborate on this, but simply indicated the bogus score sheet.

The experimenter then said he would explain "how Ss are paid for participating in this study". He explained that although all Ss are paid, the amount each S earns varies according to his or her shadowing performance. Indicating the three dollar bills on that S's questionnaires, E explained that when he had summed the numbers of different categories of errors, he would compare these totals to "norms", which were described as the average numbers of different types of errors committed by a large number of people who had previously performed this task. This information was intended to make it impossible for

Ss to evaluate their own performance, since that would be determined in terms of comparisons of one individual's performance with the performances of other people "in the same category". While explaining this, E indicated the computer print-out, as if these were the norms referred to.

The experimenter then indicated the three one-dollar bills on top of S's questionnaires, and explained that all Ss begin the task with three dollars to their credit. Ss with average performances on Task 1, which had just been completed, would keep the three dollars. The subjects whose performances were well below the norms would lose one of the three dollars, and Ss with exceptionally good performances would gain an additional bonus dollar. Performance on Task 2 would be similarly evaluated, resulting in the gain or loss of an additional dollar, or no change in the S's pay. In summary, Ss were led to believe that their performance would determine the amount they earned, ranging from one dollar to five dollars for both tasks.

At that point, Ss who had previously been assigned to receive either positive or negative feedback were told to "take a break" and "relax for a few minutes" while E completed the scoring. Then, while S watched, E added 11 columns of numbers, using an electronic calculator. The experimenter then appeared to compare each column total with the numbers on the computer print-out, and entered a + or - below each total. For Ss who were to receive positive feedback, nine +'s and two -'s were entered. For negative feedback, nine -'s and two +'s were entered.

Subjects designated to receive positive feedback were then told that they had done very well, better than most people, and had earned an extra bonus dollar. The experimenter took a dollar from his pocket and added it to the pile of dollar bills on the desk.

Subjects selected to receive negative feedback were told that they had done very badly, performing worse than most people, and had lost one of their dollars. The experimenter took a dollar from the pile of dollar bills on the desk and put it into his pocket.

Subjects were then instructed to return to the lab to complete the task.

One-third of the Ss in each group had been randomly assigned to a no-feedback control condition. All instructions were the same for these Ss up to the point at which E summed the bogus error scores. These Ss were told that E would sum the errors and compare the sums to the norms after completion of Task 9. No information was provided about Ss' performances on Task 1. Subjects who asked were told that E would not know how they had done until he had summed the different types of errors for each of the stimuli and compared these scores to the norms appropriate for that S. Subjects were instructed to "take a break" and "relax" for a few minutes while E appeared to do some other paper work, and then were returned to the lab to complete the task.

All Ss then returned to the experimental room. The research assistant replaced the earphones, turned on the tape

recorders, and administered Task 2. When the task was completed, Ss were asked to complete a brief questionnaire consisting of the question, "In order to evaluate the results of this study, it is important for us to know what you had heard about this study prior to this session. Please summarize below anything you had heard about this study." No S indicated any prior knowledge of the feedback deception or of the true purposes of the study. Subjects were then returned to E's office where they were completely debriefed about the deceptive aspects of the experiment, and partially debriefed about the purposes of the study. As part of the debriefing, E attempted to determine again whether S had any prior information which might have rendered the deception ineffective; for no S was this the case. Six Ss indicated during this discussion that they had not believed the feedback, and four of these said that they had not believed that they would actually be paid according to performance. Some test anxious and some depressed Ss were given information about obtaining psychological services, and in some instances this was discussed at length.

Subjects were asked to not reveal to anyone what they had experienced during the study nor what they had learned about the experiment, and the importance of this was explained quite emphatically.

Scoring Shadowing Performances

The data of initial interest in this study were the number of shadowing errors each S committed for each 100-word target stimulus. A shadowing error is simply a stimulus word

which is not correctly spoken. The experimenter initially compiled a preliminary list which described ten different types of errors committed by Ss. Three junior college students were then recruited to be trained to score the tapes which contained Ss' shadowing responses. Working with all three raters in a group, E trained the raters to count shadowing errors in accordance with the criteria for the ten types of errors. The training was carried out by having the three raters and E score tapes together, stopping the tape every time one or more raters detected an error, until three tapes could be scored with unanimity on all error decisions. During this process, the scoring key which E had developed was revised to eliminate ambiguities and to include situations which had been unforeseen. The final scoring key, which was used as the criteria for scoring all Ss, consisted of descriptions of eleven discriminable types of shadowing errors (Appendix F). Once the scoring key was finalized, additional junior college students were recruited to score tapes[21], and trained in groups of three in the manner described above. When three Ss could be scored by the training group with unanimity among the three raters and E, then each trained rater was given several Ss' tapes, scripts of the 21 target stimuli, the scoring key, a number of scoring worksheets on which to note errors while scoring, and a summary scoresheet

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[21]Raters were recruited from among E's own students at the junior college in which he was teaching. All were completely naive about the nature and purposes of the research until after all tapes had been scored.

on which to enter the total number of errors committed by each S on each target stimulus. Raters were paid $2 per tape. Each S's tape was scored by two raters independently, and each rater was given approximately equal numbers of Ss from each group of Ss to score. Pairs of raters were rotated so that each rater scored Ss in common with many different raters. Inter-rater reliability coefficients are reported in the next chapter.

When E received each S's error scores from two raters, he took the means of the two raters' scores for each target stimulus. He then converted each mean target error score into a mean error score for each distractor. It should be remembered that different Ss received different target-distractor combinations, and in different orders, as described above. The data to be analyzed in this study are the numbers of errors made with different distractors; the actual target stimuli are, at this point, irrelevant. Thus, for each S, E transcribed the numbers of errors (mean of 2 raters) committed in response to each of the dysphoric and non-dysphoric distractors of Task 1, Task 2, and also, the number of errors committed on the baseline task, which was always the first stimulus scored.

RESULTS

Interrater Reliability

The interrater reliability coefficient was calculated for each S's pair of raters from the 21 separate error scores, one score for each target stimulus, submitted by each rater. Interrater reliability was quite high in almost all instances, with correlation coefficients greater than .8 for 60 of the 88 Ss, and greater than .7 for an additional 11 Ss. Correlation coefficients were significant for 83 of the 88 Ss; 73 of these with p's < .001, 6 with p's < .01, and 4 with p's < .05. Non-significant correlation coefficients were calculated for only 5 Ss; of those five, two approached significance, with p's < .1. These five Ss were not removed from the sample. The very small number of Ss involved and their distribution across all three groups makes it unlikely that the larger errors of measurement associated with low interrater reliability would substantially reduce the reliability of the subsequent statistical analyses. In addition, the use of mean scores for the analyses tends to reduce measurement error; sets of mean scores are likely to contain smaller measurement errors than sets of scores reported by individual raters. Interrater reliability coefficients and significance levels for all Ss can be found in Appendix G.

Multiple Affect Adjective Check List (MAACL)

The Depression- and Anxiety-Scale scores obtained at the beginning of each experimental session were analyzed to

insure that the three groups differed in depressive affect and state anxiety at the time of testing. Although the MAACL does not measure precisely the same characteristics as the Beck Depression Inventory and the Test Anxiety Scale, the MAACL scores are used here as a rough validation of the subject selection procedures. Means and standard deviations of MAACL Depression- and Anxiety-Scale socres for 3 groups are shown in Table 2.

A one-way ANOVA performed on the Depression-Scale scores of the three groups yielded a main effect for group, $F(2,85) = 16.2$, $p << .001$ (Appendix H), which was further analyzed by the Tukey Honestly Significant Difference Test (Tukey, 1956). As predicted, scores of the depressed group were significantly higher than those of both the test-anxious group, $Q = 5.37$ ($k = 3$, $df = 85$), $p < .01$, and the healthy control group, $Q = 7,87$ ($k = 3$, $df = 85$), $p < .01$, whereas the test-anxious and healthy control groups did not differ from each other, $Q = 2.5$ ($k = 3$, $df = 85$).

A one-way ANOVA performed on the Anxiety-Scale scores yielded the predicted main effect for group, $F(2,85) = 26.8$, $p << .001$ (Appendix I). As expected, further analysis by the Tukey Honestly Significant Difference Test revealed that anxiety scores of the test-anxious group were significantly higher than those of the healthy control group, $Q = 3.69$ ($k = 3$, $df = 85$), $p < .05$. In addition, anxiety scores of the depressed group were significantly higher than those of both the test-anxious, $Q = 6.52$ ($k = 3$, $df = 85$), $p < .01$, and healthy control

Table 2

MAACL Depression-Scale and Anxiety-Scale Mean Scores and Standard Deviations of Depressed, Test-Anxious and Healthy Control Subjects

Groups	MAACL D-Scale	MAACL A-Scale
Depressed	M = 17.517 SD = 6.52	M = 10.931 SD = 3.75
Test-Anxious	M = 12.138 SD = 4.86	M = 7.034 SD = 3.10
Healthy Control	M = 9.633 SD = 4.73	M = 4.833 SD = 2.79

groups, $Q = 10.21$ ($k = 3$, $df = 85$), $p < .01$.

These data indicate that the subject selection procedures did achieve the intended group differences with respect to depressive affect and state anxiety; the depressed group manifested higher depressive affect than both comparison groups, and the test-anxious group manifested higher state anxiety than the healthy control group. It is also noteworthy that the depressed group scored higher on the Anxiety-Scale than the test-anxious group.

Baseline Shadowing Errors

To determine that the three groups did not begin the task with pre-experimental differences in ability to shadow under the experimental conditions, numbers of errors made during the baseline task were subject to a one way ANOVA. As expected, no significant group differences were found, $F(2,85) = 2.02$ (Appendix J).

Task 1 Shadowing Errors Associated with Dysphoric and Non-Dysphoric Distractor Stimuli

Task 1 required Ss to shadow five target stimuli in the presence of dysphoric distractor stimuli, and five target stimuli in the presence of non-dysphoric distractor stimuli. For each S, the number of target shadowing errors made with dysphoric distraction stimuli, regardless of order or sequence, was computed. Numbers of shadowing errors made in the presence of non-dysphoric distractor stimuli were similarly computed. Unless otherwise specified, all the following analyses compare mean shadowing errors made in the presence of dysphoric dis-

tractor stimuli (hereafter termed D-errors) to mean shadowing errors made in the presence of non-dysphoric distractor stimuli (hereafter termed N-errors).

A 3 x 2 ANOVA was performed on the mean numbers of shadowing errors committed by each of the three groups with dysphoric and non-dysphoric distraction (Appendix K). Significant main effects were obtained for Group, $F(2,85) = 3.19$, $p < .05$; and type of distraction, $F(1,85) = 9.20$, $p < .01$. The Group x Distraction interaction was not significant, $F(2,85) = 2.30$, $p < .11$. These data are represented in Figure 1.

The primary hypothesis stated that dysphoric stimuli are more distracting than non-dysphoric stimuli for depressed Ss but not for nondepressed Ss. The specific statistical hypothesis to be tested is that depressed Ss make more D-errors than N-errors, whereas nondepressed Ss make equal D- and N-errors. To test this hypothesis directly, planned comparisons of within-group differences between D-errors and N-errors were analyzed by tests of simple effects (Appendix K). These analyses reveal that the depressed group committed significantly more D- than N-errors, $F(1,85) = 12.05$, $p < .01$; whereas no significant differences between D- and N-errors were found for either the test anxious, $F(1,85) = 0.19$, or healthy control group, $F(1,85) = 0.79$ (Figure 1).

Subsequent to the primary analyses described above, several analyses were performed for the purpose of obtaining additional information about the experimental effects. Since differences between D-errors and N-errors could derive both

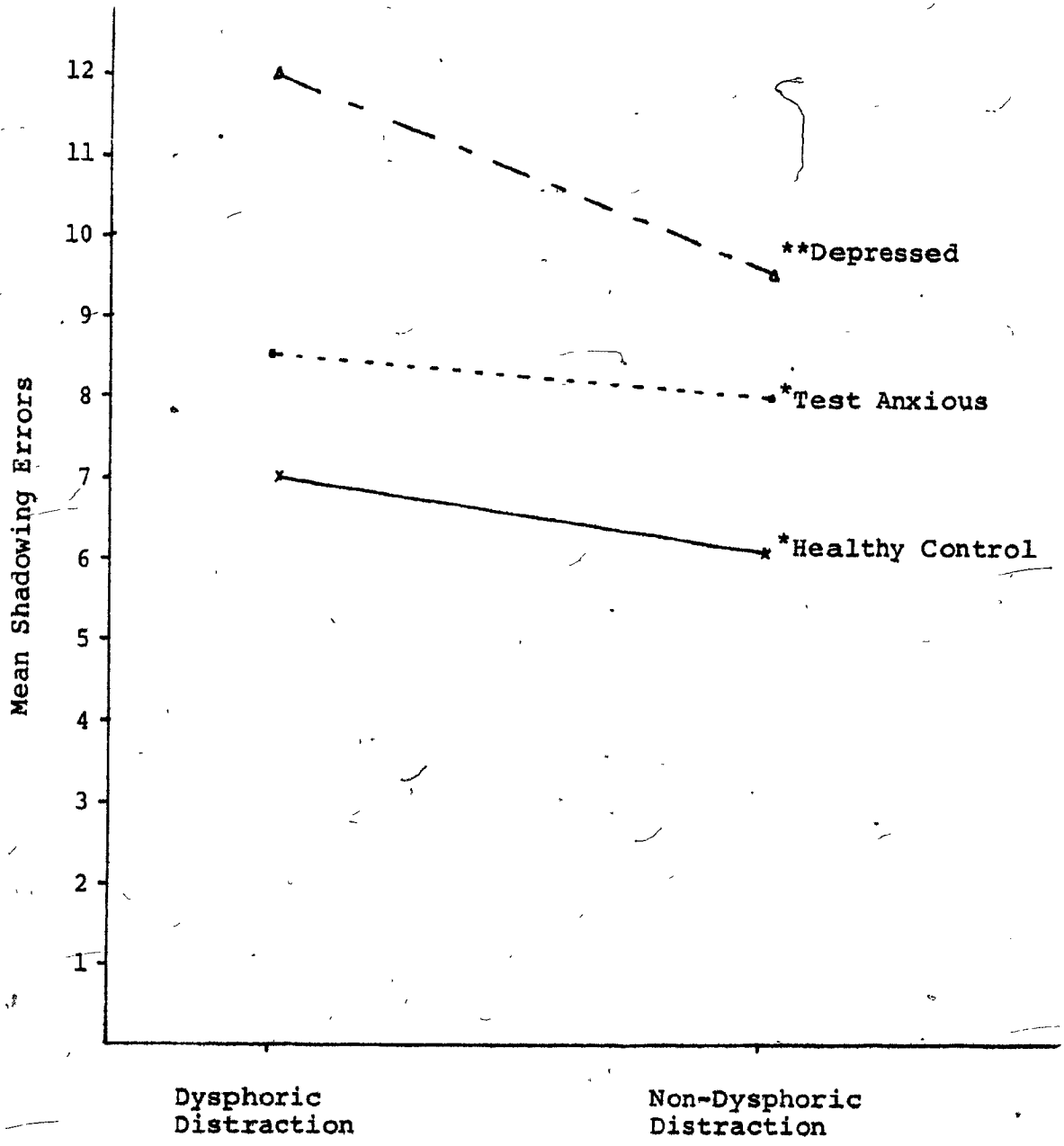

Figure 1. Mean shadowing errors committed with dysphoric and non-dysphoric distraction by depressed, test anxious and healthy control subjects.

*Comparison of D-Errors with N-Errors: NS.

**Comparison of D-Errors with N-Errors: $p < .01$.

from elevations of D-errors and suppression of N-errors, between group differences in shadowing errors were analyzed separately for each distraction condition. Tests of simple effects yielded a significant group effect in the dysphoric distraction condition, $F(2,100)^1 = 4.36$, $p < .05$; but no significant group differences in the nondysphoric distraction condition, $F(2,100)^2 = 1.8$ (Appendix K). To clarify the group differences with dysphoric distraction, those data were further analyzed with Newman-Keuls analyses. The depressed group committed significantly more errors with dysphoric distraction than either the test anxious, $Q = 2.91$ ($k = 3$, $df = 100$), $p < .05$; or healthy control group, $Q = 4.07$ ($k = 3$, $df = 100$), $p < .05$; whereas the latter two groups did not differ from each other, $Q = 1.16$ ($k = 3$, $df = 100$). These results are summarized in Table 3.

In summary, there were no significant between-group differences in shadowing performance when distraction was non-dysphoric. However, dysphoric distraction had a significantly more disruptive effect on the depressed group than on either of the two non-depressed groups. Finally, only for the depressed group was dysphoric distraction significantly more disrupting than non-dysphoric distraction.

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[1]Degrees of freedom estimated by the Satterthwaite approximation (Winer, 1971, pp. 375-384).

[2]Satterthwaite approximation (Op. cit.)

Table 3

Newman-Keuls Analysis of Between-Group Differences in Mean Shadowing Errors with Dysphoric Distraction (Df = 100[a])

Group	Group: Healthy Control (mean = 6.80)	Test Anxious (mean = 8.26)	Depressed (mean = 11.92)
Healthy Control		Q = 1.16 k = 2	Q = 4.07* k = 3
Test Anxious			Q = 2.91* k = 2

[a]Degrees of freedom estimated by the Satterthwaite approximation (Winer, 1971, pp. 375-384).

*$p < .05$

Severity of Depression

The second hypothesis concerns relationships between severity of depression and the magnitude of the proposed selective attention bias toward dysphoric stimuli. It predicts that moderately and severely depressed Ss will be more distracted by dysphoric stimuli, and consequently will manifest a larger difference between D-errors and N-errors, than will mildly depressed Ss.

To test this hypothesis, the data were reanalyzed after dividing the depressed group into two sub-groups, one consisting of mildly depressed Ss and the other consisting of moderately and severely depressed Ss. As previously discussed, BDI scores of 10 to 15 correspond to psychiatric ratings of "mildly depressed", 16 to 23 to "moderately depressed", and 24 to 63 to "severely depressed". Consequently, 15 depressed Ss with BDI scores of 10 to 15 constituted the mildly depressed sub-group, and 14 Ss with BDI scores ranging from 16 to 26 constituted the moderately-severely depressed sub-group.[3] Thus, four groups were created: mildly depressed, moderately-severely depressed, test-anxious nondepressed, and healthy control.

Baseline shadowing errors. To ensure pre-experimental comparability of the 4 groups in shadowing ability with non-dysphoric distraction, shadowing errors made during the baseline

[3]The moderately-severely depressed group consisted of 10 moderately depressed and 4 severely depressed Ss. These categories were combined because of the difficulty of locating large numbers of severely depressed but functioning college students.

task were subjected to a one way ANOVA (Appendix L). No significant group differences were found, $F(3,84) = 1.42$.

Shadowing errors associated with dysphoric and non-dysphoric distraction. As in the earlier analyses, mean shadowing errors for five target stimuli with dysphoric distraction were compared to mean shadowing errors for five target stimuli with non-dysphoric distraction.

A 4 x 2 ANOVA was performed on mean numbers of shadowing errors committed by 4 groups under two distraction conditions. Significant main effects were obtained for Group, $F(3,84) = 4.33$, $p < .01$; and type of Distraction, $F(1,84) = 13.65$, $p < .001$. The Group x Distraction interaction, which is most germane to the hypothesis being tested, was significant, $F(3,84) = 3.17$, $p < .03$ (Appendix M). These data are represented in Figure 2.

The significant Group x Distraction interaction was further analyzed in the following manner. Differences between D-errors and N-errors within each group were subjected to analyses by tests of simple effects (Appendix M). Only the moderately-severely depressed group committed significantly more D-errors than N-errors, $F(1,84) = 16.23$, $p < .01$. No other group, including the mildly depressed group, committed significantly different numbers of D-errors than N-errors[4].

The above analyses clearly support the second hypotheses,

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[4] F values for within-group comparisons of the mildly depressed, test anxious, and healthy control groups are 0.77, 0.20, and 0.82 respectively. Degrees of freedom for each comparison = 1,84. These analyses are summarized in Appendix M.

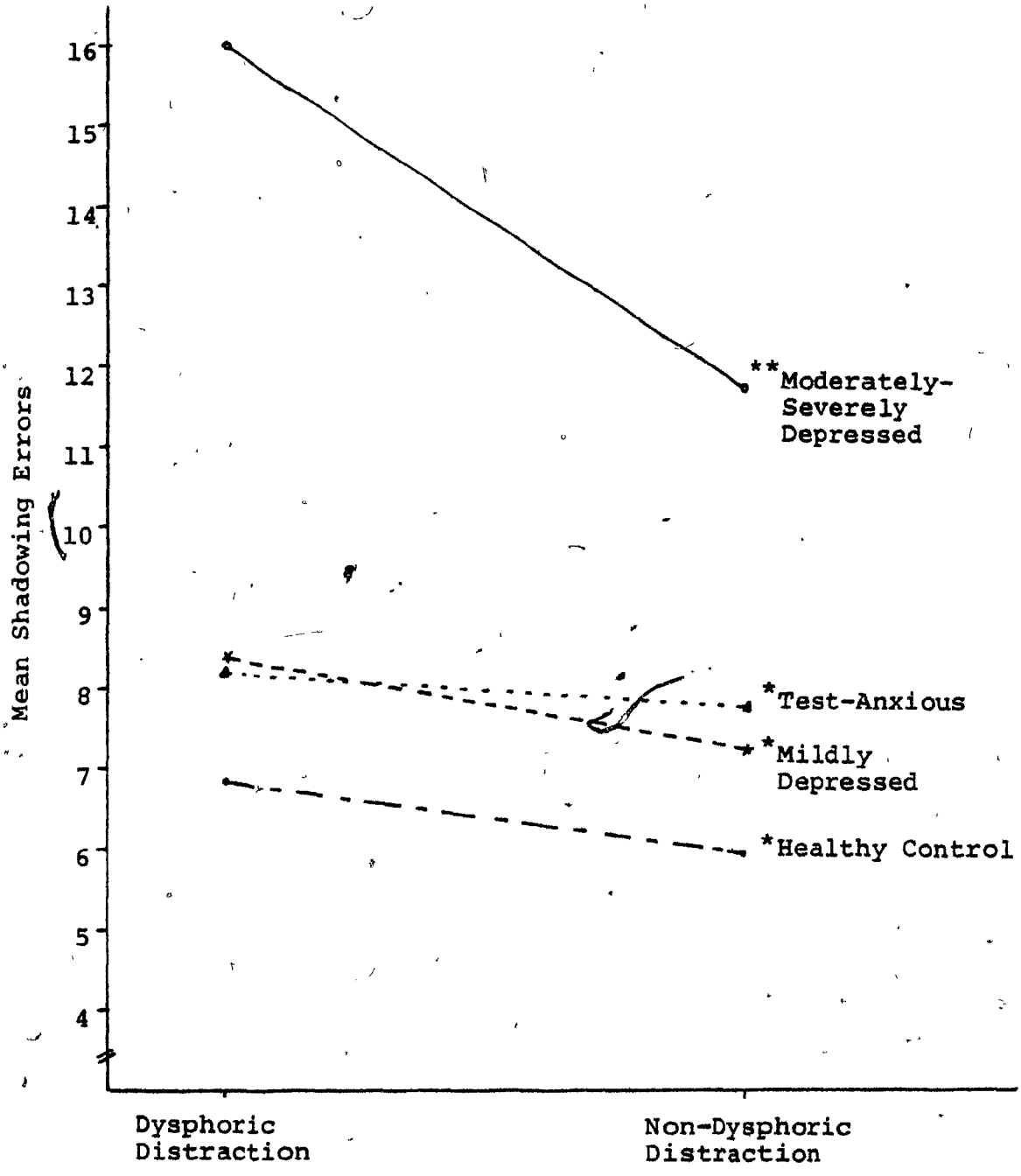

Figure 2. Mean shadowing errors committed by four groups of subjects with dysphoric and non-dysphoric distraction.

*Comparison of D-errors with N-errors: NS.

**Comparison of D-errors with N-errors: $p < .01$.

and strongly indicate that the differences between the depressed and nondepressed groups obtained in the three group analyses derived entirely from the more severely depressed Ss. As before, secondary analyses were undertaken to gain additional information about the experimental effects.

Between-group differences in D-errors were separated from between-group differences in N-errors by tests of simple effects (Appendix M). With non-dysphoric distraction, no significant between-group differences in shadowing errors were found, $F(3,99)$[5] = 2.31. There were, however, significant between-group differences in the dysphoric distraction condition, $F(3,99) = 6.12$, $p < .01$. These differences were further analyzed using the Newman-Keuls procedure. The moderately-severely depressed group made significantly more errors in the dysphoric distraction condition than any of the other groups (all p's < .01), whereas none of the other groups, including the mildly depressed group, differed from any other. These results are summarized in Table 4.

Although the tests of simple effects show no significant between-group differences with non-dysphoric distraction, inspection of Figure 2, above, shows some apparent elevation of errors committed by the moderately-severely depressed group in comparison with the other groups. Since there was no pre-experimental baseline group difference in shadowing per-

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[5]Degrees of freedom estimated by the Satterthwaite approximation (Winer, 1971, pp. 375-384).

Table 4

Newman-Keuls Analysis of Between-Group Differences in Mean Shadowing Errors with Dysphoric Distraction for Four Groups of Subjects (Df = 99[a])

Group	Healthy Control (Mean = 6.80)	Test Anxious (Mean = 8.26)	Mildly Depressed (Mean = 8.34)	Moderately-Severely Depressed (Mean = 15.76)
Healthy Control		Q = 0.97 k = 2	Q = 1.02 k = 3	Q = 5.96* k = 4
Test Anxious			Q = 0.05 k = 2	Q = 4.99* k = 3
Mildly Depressed				Q = 4.94* k = 2

[a]Degrees of freedom estimated by the Satterthwaite approximation (Winer, 1971, pp.375-384).

*$p < .01$

formance, this nonsignificant elevation suggests that some aspect or aspects of the experimental procedures interfered with this group's performance generally, with dysphoric distraction interfering significantly more than non-dysphoric distraction.

Since dysphoric distractor stimuli alternated with non-dysphoric distractor stimuli, and since stimuli and interstimulus intervals were short (approximately 1-minute stimuli with 10 second interstimulus intervals), it is reasonable to assume that the disrupting effects of dysphoric stimuli might "spill over" onto subsequent, non-dysphoric, trials. This would produce the pattern of errors found: elevated errors under both distraction conditions with considerably greater elevation in the dysphoric distraction condition.

The design of this study does not permit an unambiguous test of the above interpretation. Because no depressed group received only non-dysphoric distraction, any "spill over" effects are completely confounded with other aspects of the task, such as possible group differences in fatigue or practice effects. However, such uncertainty does not interfere with the testing of the hypotheses under study, since group differences in the non-dysphoric distraction condition were not significant, whereas in the dysphoric distraction condition they were, and since dysphoric stimuli were, in any case, more distracting than non-dysphoric stimuli only for the moderately-severely depressed group.

To summarize the results in this section, only the moderately-severely depressed group was significantly more

distracted by dysphoric than nondysphoric stimuli. No other group, including the mildly depressed group, committed different numbers of shadowing errors under the two different distraction conditions. In addition, there were no significant between-group differences in shadowing performance with non-dysphoric distraction. However, when distraction was dysphoric, the moderately-severely depressed group committed significantly more errors than any other group, whereas none of the three comparison groups differed significantly from each other.

Responses to Individual Dysphoric Stimuli

This study was designed primarily to test hypotheses about selective attending to two broad categories of stimuli, dysphoric and non-dysphoric. However, since each dysphoric distractor stimulus consisted of different content and emphasized different depressive themes, it is informative to examine the depressed group's responses to individual dysphoric distractors to determine if some are more potent distractors than others. Since only the moderately-severely depressed group demonstrated significant differences in response to dysphoric as compared to non-dysphoric stimuli, only this group's responses to individual dysphoric distractors are examined. Figure 3 depicts the mean numbers of shadowing errors made by this group with each of the ten dysphoric distractor stimuli during Task 1.[6,7]. It should be noted that the order in which the

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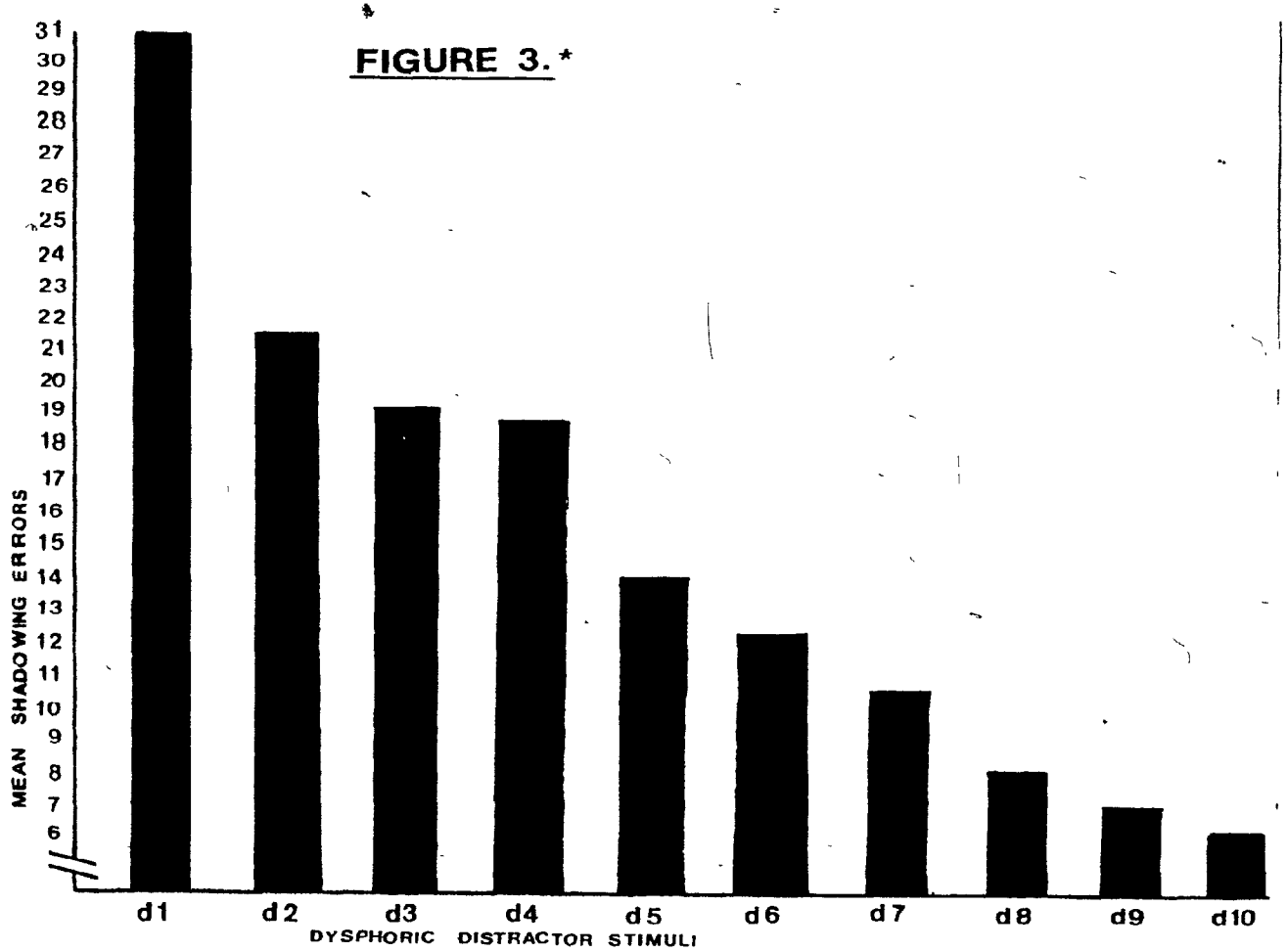
[6]These data are shown for all four groups in Appendix N.

[7]Task 2 data are not included because selective attention to different depressive themes is expected to be affected by the feedback manipulation which follows Task 1.

FIGURE 3.*



MEAN SHADOWING ERRORS MADE WITH EACH OF TEN DYSPHORIC DISTRACTOR STIMULI BY MODERATELY-SEVERELY DEPRESSED SUBJECTS

* The order of presentation on this figure does not represent experimental procedure See text for explanation

stimuli are represented in this figure, and the identifying numbers, from D-1 to D-10, do not reflect experimental procedures. Since the order of presentation was varied in several ways, both between Tasks 1 and 2 as well as within each task, different Ss received these stimuli in different orders, and no individual S received all ten stimuli during Task 1.

It is clear from visual inspection of Figure 3, that some dysphoric stimuli are more distracting for this group than others. D-1, the most distracting of the ten dysphoric stimuli, was written to exemplify the theme of personal helplessness, the inability of individuals to influence the course of their lives.[8] Judges' ratings of the extent to which this stimulus exemplifies each of ten depressive themes were highest for the theme of helplessness.[9] As well, this stimulus received the highest mean helplessness rating of the ten dysphoric stimuli. Ratings of all dysphoric stimuli on each depressive theme are shown in Table 5.

The most important question to be asked about these data is whether some quantitative analysis would yield information about the characteristics of different dysphoric stimuli which render them more or less distracting for moderately and severely depressed Ss. Each of the ten dysphoric stimuli is a unique combination of several depressive themes, specific content,

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[8]See Appendix B for the text of this stimulus.

[9]Mean judges' rating of the extent to which stimulus D-1 exemplifies the theme of helplessness is 6.86 on a 7-point rating scale.

Table 5

Thematic Content of Ten Dysphoric Distractor Stimuli. Mean Ratings[a] of the Extent to Which Each Dysphoric Distractor Stimulus Exemplifies Each of Ten Depressive Themes.

	Depressive Theme									
Distractor Stimulus	Helplessness	Rejection	Loss	Negative View of World	Hopelessness	Escape	Personal Deficiency	Failure	Deprivation	Loneliness
D-1	6.86	3.14	3.00	6.43	6.43	2.00	2.71	3.14	3.29	2.71
D-2	6.00	1.71	4.14	7.43	6.71	2.14	1.86	2.86	4.57	2.86
D-3	4.43	4.29	6.57	4.71	4.43	1.71	3.14	3.00	5.43	5.00
D-4	6.00	2.71	3.57	5.43	6.29	3.00	3.57	4.86	3.00	4.86
D-5	5.86	3.86	4.86	6.29	5.86	2.00	2.86	4.57	4.00	4.14
D-6	5.57	4.43	3.71	4.50	5.17	2.00	4.43	5.00	2.86	3.14
D-7	5.28	3.00	6.43	4.57	6.00	2.00	4.29	4.14	6.00	5.00
D-8	5.57	2.57	3.57	6.00	6.57	1.43	1.71	3.71	3.57	2.14
D-9	5.14	5.43	5.29	5.43	5.29	1.86	4.14	3.57	5.14	5.43
D-10	5.86	5.57	2.71	5.86	6.43	1.86	6.29	6.57	3.43	5.14

[a]Means of 7 judges using a 7-point rating scale, anchored at 1, 4 and 7 with the words, "not at all", "moderately", and "extremely".

and auditory characteristics. However, each stimulus has been rated by seven judges on the extent to which it exemplifies each of the ten depressive themes, and each stimulus can be assigned a score representing its distracting power for that group (i.e., the mean number of errors made by that group in the presence of that distractor stimulus). Therefore, a step-wise regression analysis can be performed, entering the ten depressive theme ratings for each dysphoric stimulus as predictor variables, and the numbers of errors associated with each dysphoric stimulus as the criterion. In this way, the relative distracting powers of different depressive themes can be examined.

Contributions of each of ten depressive themes to the distracting power of ten dysphoric stimuli. A step-wise multiple regression analysis was performed, entering the mean judges' ratings for each dysphoric distractor stimulus on each of the ten depressive themes as predictor variables, and the mean number of shadowing errors made by the moderately-severely depressed group in the presence of each stimulus as criterion. Predictor variables were entered into the regression equation according to their partial correlations with shadowing errors, i.e., the variable which is most highly correlated with errors is entered first; the remaining variable with the highest partial correlation with errors is entered next; and so on until all ten predictor variables are entered. Thus, the order in which variables are entered into the equation reflects the extent to which they increase the power of the regression

equation to predict shadowing errors. The sign of the correlation between predictor and criterion does not affect this procedure, since negative correlations predict as well as positive correlations. The sign of the correlation does, however, determine the interpretation of the results of the analysis. In this analysis, the most reasonable interpretation of a negative correlation is that the predictor variable is not very distracting relative to the other predictors. A negative correlation of a depressive theme with shadowing errors derives from the association of relatively low error scores on stimuli with high ratings for that theme, and relatively high errors scores on stimuli with low ratings for that theme but high ratings for other themes. The assumption of the shadowing task is that lower error scores reflect less distraction, that is, derive from the relative absence of distraction which would increase errors. Therefore, a theme which negatively correlates with errors is assumed to be less distracting than themes which are positively correlated with errors. Hence, in this analysis, the higher the negative correlation, the less distracting is the theme. It should be noted that this interpretation is appropriate only to comparisons of the distracting powers among the depressive themes. This analysis does not compare the distracting powers of depressive with non-depressive themes.

Results of the multiple regression analysis. The first two predictor variables entered into the regression equation were the themes of Failure, with a negative correlation of

-0.53, and Helplessness, with a positive partial correlation of 0.67. These two variables together yield a significant multiple correlation coefficient (Multiple R) of 0.78, $F(2,7) = 5.39$, $p < .05$; and account for 61% of the shadowing error variance. Each of these two themes individually, significantly increases the predictive power of the equation (Failure: $F(1,7) = 6.33$, $p < .05$; Helplessness: $F(1,7) = 6.83$, $p < .05$). The addition of no other individual theme significantly adds to the predictive power of the equation. The first two steps of this analysis are summarized in Table 6.

The results of this analysis suggest that Failure is the least distracting of the depressive themes for moderately-severely depressed Ss. It is negatively correlated with shadowing errors, and is the single best predictor variable.

Helplessness, the second variable to be entered into the regression equation, achieves the highest positive correlation with shadowing errors, and is the only other variable to significantly add to the predictive power of the regression equation. Therefore, the theme of Helplessness is the most distracting of the depressive themes for this group. This finding is consistent with the visual inspection of Figure 3, which had indicated that stimulus D-1 was the most potent distractor for the moderately-severely depressed Ss, and supports the tentative conclusion made at that time that the Helplessness theme was the salient characteristic of that stimulus for that group.

The previous analyses clearly showed that the dysphoric stimuli, as a group, were more distracting for the moderately-

Table 6

Summary of First Two Steps of Step-Wise Multiple Regression Analysis for Shadowing Errors by Moderately-Severely Depressed Group.

Variable	Multiple R	Simple r	R^2	R^2 Change	b	F(1,7)
Failure	0.528	-0.528	0.279	0.279	-4.01	6.33*
Helplessness	0.779	0.501	0.607	0.328	6.876	5.83*
(constant)					(-7.380)	

*p < .05

Analysis of Variance	df	SS	MS	F Value
Regression	2	317.957	158.978	5.39*
Residual	7	206.340	29.477	

*p < .05

severely depressed Ss than the non-dysphoric stimuli. The present analyses provide information about the different distracting potencies of ten different depressive themes relative to each other. It should be understood that the stimuli and the experimental procedures were constructed in such a way as to optimize the ability to detect differences in each group's responses to the two general categories of distractor stimuli, not to optimize the ability to quantify differences in responses to the characteristics of individual stimuli within those classes. Consequently, the analysis of individual distractor stimuli and individual depressive themes is imperfect. For example, each S received five, not ten, stimuli. The specific five stimuli received by a S was determined by random assignment to one of four order conditions. Since Ss were randomly selected from the same sample, they are treated in these analyses as one group, so the shadowing errors associated with different stimuli were made by different combinations of individual Ss. In addition, the range and variability of ratings for all the ten depressive themes are not identical across the ten stimuli. These differences between themes affects the correlations between themes and errors.

For these reasons, the results of the regression analysis should be considered as providing a first approximation of the relative salience of different depressive themes for depressed subjects.

Effects of Feedback: Within-Group Comparisons Between Tasks 1 and 2

The hypothesis to be tested in this section is that depressed Ss respond to negative feedback with heightened attention to dysphoric stimuli, thereby increasing the difference between D-errors and N-errors. The specific statistical hypotheses to be tested are as follows:

Depressed Ss who receive negative feedback will manifest a larger difference between D-errors and N-errors on Task 2 than Task 1.

The increase in the difference between D-errors and N-errors from Task 1 to Task 2 will be greater for depressed Ss who receive negative feedback than for any other group of Ss.

No specific predictions were made about the effects of either positive or no feedback on any of the groups.

To test these hypotheses, each group was divided into three feedback conditions, yielding a total of 9 groups. Table 7 shows means and standard deviations of shadowing errors committed by each of nine groups with 2 kinds of distraction on Tasks 1 and 2.

An ANOVA for repeated measures was performed on shadowing errors for 3 groups x 3 feedback conditions x 2 tasks x 2 distraction conditons.[10] The hypothesis being tested predicts

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[10] To reduce large violations of the homogeneity of variance assumption of analysis of variance which occurs when the sample is divided into 9 small groups, all analyses reported in this section were performed on transformed data. Following Winer (1971, Pp. 397-402), each S's data were transformed such that $x = \log (x + 1)$.

Table 7

Means and Standard Deviations of D-Errors and N-Errors for all Groups and Feedback Conditions for Tasks 1 and 2.

Groups	Feedback Condition	Task 1		Task 2	
		D-Errors	N-Errors	D-Errors	N-Errors
Depressed	Negative Feedback	M = 17.26 SD = 9.61	M = 13.63 SD = 6.78	M = 11.34 SD = 7.19	M = 10.43 SD = 5.06
	Positive Feedback	M = 8.85 SD = 6.80	M = 6.72 SD = 4.48	M = 7.28 SD = 5.63	M = 5.36 SD = 3.86
	No Feedback	M = 10.34 SD = 6.57	M = 8.46 SD = 6.18	M = 8.07 SD = 5.28	M = 7.06 SD = 5.08
Test Anxious	Negative Feedback	M = 13.82 SD = 9.80	M = 13.06 SD = 6.54	M = 11.91 SD = 10.06	M = 13.34 SD = 10.29
	Positive Feedback	M = 6.30 SD = 4.88	M = 5.34 SD = 3.42	M = 4.76 SD = 2.56	M = 4.27 SD = 2.83
	No Feedback	M = 5.22 SD = 2.30	M = 5.51 SD = 2.69	M = 3.65 SD = 1.86	M = 3.17 SD = 2.21
Healthy Control	Negative Feedback	M = 6.49 SD = 6.26	M = 5.90 SD = 4.78	M = 7.41 SD = 11.44	M = 5.36 SD = 6.14
	Positive Feedback	M = 7.90 SD = 4.25	M = 6.63 SD = 3.86	M = 5.00 SD = 3.69	M = 3.97 SD = 1.94
	No Feedback	M = 6.18 SD = 2.48	M = 5.55 SD = 2.07	M = 3.72 SD = 1.63	M = 4.26 SD = 1.33

a 4-way interaction: Group x Feedback x Task x Distraction. This interaction is not significant, $F(4,79) = 0.67$, $p > .4$ (Appendix O).

To test the hypotheses more directly, Single Degree of Freedom Contrasts were performed on the specific comparisons involved. Each of these within-group analyses compares the difference between D-errors and N-errors on Task 2 with the difference between D- and N-errors on Task 1 for one of the nine groups of Ss; these comparisons were made for each of the 9 groups (Appendix O). All comparisons were nonsignificant; that is, no significant changes were found in the difference between D- and N-errors following any feedback manipulation for any group. (For the depressed-negative feedback group, $F(1,79) = 1.07$.

Tests of simple interactions were then performed to reduce the 4-way interaction into smaller components (Appendix O). First, the Group x Feedback Condition x Task interaction was analyzed for each distraction condition separately. This interaction was not significant either for the dysphoric distraction condition, $F(4,152) = 1.02$, or for the non-dysphoric distraction condition, $F(4,152) = 1.27$.

Subsequently, the Feedback Condition x Task interaction was analyzed separately for each group within each distraction condition. All six simple interactions were nonsignificant[11].

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[11] F values for the depressed, test anxious and healthy control groups in the dysphoric distraction condition are 1.47, 0.55, and 1.08, respectively. Similar F values for the non-dysphoric distraction condition are 0.53, 0.94, and 9.48. Degrees of freedom for all analyses are 2, 152, the latter estimated by the Satterthwaite approximation (Op. Cit.).

To summarize, all the procedures described above failed to find differential effects of different feedback manipulations on the performances of any group of Ss under either distraction condition.

In an attempt to understand these results, the mean numbers of errors committed by the three depressed sub-groups during Task 1 were examined (Table 7, above). Depressed Ss assigned to negative feedback appear to make considerably more errors under both distraction conditions, and appear to be more affected by the type of distraction, than either of the other two depressed sub-groups. Since the three sub-groups were treated identically until the completion of Task 1, it may be that the composition of the depressed-negative feedback group differed from the start from that of the depressed groups assigned to positive and no feedback conditions.

To investigate the possibility of such an artifact, an ANOVA was performed on mean shadowing errors for Task 1 only, with feedback condition entered as an independent variable in addition to group and distraction.[12] In addition to the expected main effects for Group, $F(2,79) = 3.20$, $p < .05$, and Distraction, $F(1,79) = 4.96$, $p < .03$, a significant main effect was obtained for Feedback, $F(2,79) = 4.26$, $p < .02$ (Appendix P). Since the feedback condition for Task 1 refers only to Ss' assignments to one of three manipulations, but no manipulation had occurred yet, no differences attributable to Feedback were

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[12] Analyses are performed on data which has been transformed such that $x = \log(x + 1)$, as explained above.

expected at this point.

To gain a more complete understanding of these unexpected Task 1 differences, additional comparisons were performed using the Tukey Test of Honestly Significant Differences (Tukey, 1956) on all the means of the Group x Feedback x Distraction interaction. These comparisons yielded the following results (Appendix Q).

Within the depressed group, Ss assigned to negative feedback made significantly more D-errors than Ss assigned to either positive feedback, $Q = 7.87$ ($k = 18$, $df = 79$), $p < .01$, or no feedback, $Q = 6.22$ ($k = 18$, $df = 79$), $p < .01$. They also made significantly more N-errors than Ss assigned either positive feedback, $Q = 7.73$ ($k = 18$, $df = 79$), $p < .01$, or no feedback, $Q = 5.98$ ($k = 18$, $df = 79$), $p < .01$. There were no significant differences in D- or N-errors between Ss assigned positive and no feedback.

Within the test-anxious group, the negative feedback sub-group made significantly more D-errors than both the positive feedback sub-group, $Q = 9.58$ ($k = 18$, $df = 79$), $p < .01$, and the no feedback sub-group, $Q = 10.76$ ($k = 18$, $df = 79$), $p < .01$. They also made significantly more N-errors than both the positive feedback, $Q = 11.46$ ($k = 18$, $df = 79$), $p < .01$, and no feedback groups, $Q = 11.30$ ($k = 18$, $df = 79$), $p < .01$. There were no significant differences between Ss assigned positive and those assigned no feedback.

No differences between the three feedback conditions were obtained for the healthy control group.

To summarize these data, Ss from each diagnostic group were randomly assigned to one of three feedback conditions, but were treated identically until the completion of Task 1. This procedure was expected to create three equivalent sub-groups within each diagnostic group; consequently no differences in performance are expected between the sub-groups within each diagnostic group during Task 1. However, it appears that, due to artifact, Ss in the depressed group who were assigned to receive negative feedback were significantly more reactive to the experimental manipulations than were the depressed Ss assigned to either the positive feedback or no feedback conditions. These differences do not derive from disproportionate assignments of more severely depressed Ss to the feedback conditions, as the numbers of moderately-severely depressed Ss in each feedback condition were approximately equal.[13] Since the sample of depressed Ss who received negative feedback appear to have been drawn from a different population than those in other feedback conditions, it is difficult to derive an unambiguous conclusion about the effects of different feedback manipulations from these data; the feedback variable is confounded with whatever variables differentiate these populations. A similar situation exists for the test-anxious group. In an attempt to separate the effects of feedback condition from artifactual differences in Task 1 performances, an analysis of

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[13] Of the 14 moderately-severely depressed Ss in the sample, 5 were assigned positive feedback, 5 were assigned negative feedback, and 4 were in the no feedback condition.

covariance for repeated measures was performed on Task 2 error scores for nine groups and two distraction conditions. Task 1 D-errors were entered as covariates for Task 2 D-errors, and Task 1 N-errors were entered as covariates for Task 2 N-errors.[14] No significant main effects or interactions were obtained (Appendix R). Within-group differences between D-errors and N-errors were further analyzed for each of nine groups using the Tukey Test of Honestly Significant Differences (Tukey, 1956). All comparisons were nonsignificant (Appendix S).

To the extent that analysis of covariance is a valid procedure for removing the confounding effects of Task 1 differences, these analyses are consistent with the earlier analyses which found no significant effects of any feedback manipulation. These findings will be discussed more fully in the next chapter.

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[14]These analyses are performed on data transformed according to the formula $x = \log(x + 1)$, as explained above.

DISCUSSION

Summary of Findings

The main findings of the present investigation are that moderately and severely depressed subjects were significantly more distracted by descriptions of events and ideas which constitute instances of common depressive themes (dysphoric stimuli), than by stimuli which describe instances of nondepressive themes (nondysphoric stimuli). In contrast, neither the mildly depressed group, nor the two nondepressed groups were differentially distracted by dysphoric compared to nondysphoric stimuli.

In addition, all groups performed the shadowing task equally well with nondysphoric distraction. However, when the content of the distraction was dysphoric, the moderately-severely depressed group committed significantly more shadowing errors, i.e., were more distracted, than nondepressed and mildly depressed groups, whereas the two nondepressed, and the mildly depressed, groups did not differ from each other.

Regression analysis of the contributions to the distraction of moderately-severely depressed subjects of ten depressive ideational themes indicated that the theme of helplessness was the most distracting, and the theme of failure was the least distracting, for that group.

No effects were found of success-reward or failure-loss feedback on the relative distractive powers of dysphoric compared

to nondysphoric distraction stimuli for any group.

Given the assumptions of the task, outlined in the introductory chapter, these results are interpreted as demonstrating biases in the allocation-of-attention policies of moderately and severely depressed people. The main conclusions drawn are that moderately and severely depressed students, but not mildly depressed or nondepressed students, habitually and automatically selectively attend to events or aspects of events which constitute instances of depressive ideational themes. Hence, these become the most salient aspects of the environment for this group of people. It is suggested that biased attention is one of the mechanisms by which the immediate perceptions and subsequent conceptualizations of moderately and severely depressed people become saturated with events signifying loss, helplessness, deprivation, hopelessness, etc. Further, of the ten depressive themes studied, events which signify helplessness are the most salient to this group, whereas events which signify failure are the least salient to this group.

Specificity of findings to depression. The design of the present study provides strong evidence that the selective attention bias demonstrated is attributable to depression. However, there are some considerations which limit confidence in this conclusion. In this study, high test anxiety was used to control for the variables most likely to be confounded with depression: anxiety and general distress. Selective attention bias is ascribed to depression because it was manifested by depressed subjects but not by highly test anxious nondepressed

nor by low test anxious nondepressed subjects. The logic of this comparison rests on the assumption that highly test anxious students would become distressingly anxious during the testing procedures employed in the study and therefore, would be highly anxious while performing the experimental task. This is a reasonable assumption derived from test anxiety theory, given the evaluative cues placed in the experimental procedures.

The MAACL-Anxiety Scale, which measures state anxiety (Zuckerman & Lubin, 1965), was given just prior to the shadowing task to verify that the test anxious subjects were, in fact, highly anxious during the experimental procedures. This was accomplished; the test anxious group scored significantly higher on the MAACL-Anxiety Scale than did the normal control group. However, the depressed group scored significantly higher on the MAACL-Anxiety Scale than both the highly test anxious and the normal control groups. Since the test anxious group was not as anxious as the depressed group, it remains possible that the selective attention bias manifested by the depressed group derived from the higher state anxiety of that group.

However, this interpretation does not seem likely. If high state anxiety causes a selective attention bias to the dysphoric material used in this study, then one would expect that bias to be evident in the test anxious group when compared to the healthy control group, since those groups differed significantly in levels of state anxiety during the experimental procedures. That is, assuming continuity across levels of anxiety, one would expect to see the selective attention bias

in the test anxious group when compared to the healthy control group, and still higher levels of the bias among the depressed subjects when compared to the test anxious group. This was not the case. No performance differences of any kind were evident between the test anxious and healthy control groups, suggesting that state anxiety does not affect selective attention biases for the types of stimulus material presented in this study.

Hence, although it is reasonable to attribute the selective attention bias to depression, a better control would have been achieved had levels of state anxiety manifested by depressed subjects at the beginning of the experimental task been matched by highly test anxious subjects who manifested equivalent levels of state anxiety in the testing situation. This procedure is suggested in future research on student populations.

It should also be noted that the design of the present study does not permit investigations of depression-anxiety interactions. Such interactions may be important, considering the confluence of depression and anxiety in student populations, and need to be investigated. Such an investigation would require, in addition to the three groups used in the present study, the addition of a depressed-low test anxiety group. As discussed in the introductory chapter, such a cell would be expected to be very difficult to fill, and may not be representative of depressed college students generally.

Implications for Beck's Cognitive Model of Depression

The results of the present investigation clearly support

Beck's model of depression.

Unlike previous research, the present study directly demonstrates a disturbance in the active processing of information from the environment by depressed individuals. Depressed people are shown to do something differently than nondepressed people in the manner in which they apprehend external reality.

The methodology employed permits isolation of a specific stage of information processing at which biasing occurs, i.e., the stage of figural synthesis, or selective attention. Selective attention to dysphoric phenomena is part of Beck's descriptions of depressive cognitive processes, and would also be predicted by Beck's proposals of prepotent depressive schemata and a cognitive set for events which reflect negatively upon the self, the world, and the future. As well, Rehm's (1977) model, which incorporates this aspect of Beck's model into a self-control formulation is similarly supported.

In addition to resulting from a negative cognitive set, a selective bias at stimulus uptake could be expected to saturate the individual's perceptual experiences with depressive events, thereby producing the prepotent depressive schemata and conscious ideation of the cognitive triad.

The present investigation does not demonstrate that cognitive disturbances are etiologically primary in depression. As indicated in the introductory chapter of this thesis, that assertion remains to be unambiguously demonstrated. What is argued here is that allocation-of-attention policies which favor dysphoric events contribute to the maintenance of

depression, once a depressive episode has begun, and is one of the mechanisms of the downward spiral which depressed people often exhibit. In this respect, it is consistent with general information theories and also with clinical descriptions of depressive phenomena to suppose reciprocal causality between events at different stages of information processing. The demonstration of a selective attention bias for dysphoric events does not preclude other kinds of disturbances at other stages of information processing. Hence, selective attention biases may cause, and also be caused by, disturbances of later stages of information processing.

For example, Tversky and Kahneman (1974) have argued that people predict events on the basis of the ease with which relevant instances of the event to be predicted come to mind. Since the data on memory suggests that dysphoric events come to mind more easily during depression than pleasant events, depressed people would tend to predict (or expect) dysphoric events. Such a cognitive set would bias selective attention for dysphoric events; biased selective attention would contribute to increased frequency of perceptions of dysphoric events which would feed back to selective attention, and so on.

Hence, the present study demonstrates a specific disturbance of information processing described by Beck's model. In addition, the findings are consistent with Beck's proposals of pervasive disturbances at all stages of cognitive processing.

Finally, in contrast to previous attempts to subject aspects of Beck's model to empirical tests, the present findings

are unlikely to have resulted from the effects of confounding variables such as between-group differences in reactions to experimental demand characteristics, motivation, interpersonal coping styles, or self-presentation goals and strategies.

It is noteworthy that no pathology of attentional processes has been demonstrated. Although the allocation policies of depressed individuals may constitute a mechanism for the production and maintenance of depressive cognitions, no evidence was presented that the processes of attention or the laws which govern them are impaired or defective among depressed people.

Cognitive distortion vs. realism. Beck's model attributes the unpleasant cognitions of depressed people to distortions of reality. However, as argued in the introductory chapter, perception is inherently selective. Consistently emphasizing some aspects of the stimulus field to the relative exclusion of others is a normal mode of functioning. Indeed, the failure to function in this manner has often been linked to serious psychopathology, such as schizophrenia. However, it can fairly be argued that the unusual allocation-of-attention policies of depressed people will produce unusual perceptual experiences. But whether those perceptual experiences are distortions or veridical representations of reality may depend on the extent to which the information actually available in the environment is congruent or incongruent with the individual's cognitive set. Hence, in several studies, depressed subjects were more veridical in their understanding of situations than nondepressed subjects.

For example, depressed subjects were more accurate than non-depressed subjects in perceiving real noncontingency between their efforts and outcomes (Alloy & Abramson, 1979), less likely to develop an "illusion of control" (Golin et al., 1977, 1979), accurately recalled the frequency of negative feedback they had received whereas nondepressed subjects underestimated (Nelson & Craighead, 1977), and accurately assessed their poor social competence whereas nondepressed subjects overestimated theirs (Lewinsohn, Mischel, Chaplin & Barton, 1980). These are all instances in which the reality corresponded to the cognitive set held to characterize depressed people. Hence, because depressed people may be said to exhibit heightened awareness of (i.e., selectively attend to) those kinds of events, they could be expected to perceive them accurately when they actually appear. If the cognitive sets of nondepressed people do not include expectancies for noncontingency, failure, or personal inadequacy, then one would expect them to have more difficulty in perceiving those phenomena. In such situations, one might aptly employ Alloy and Abramson's (1979) phrase in describing depressed people as "sadder but wiser".

On the other hand, when the reality is incongruent with the major cognitive sets of depressed people, then they can be expected to distort, i.e., to construct perceptions that are at odds with the objective situation. For example, several studies reported that depressed, but not nondepressed, subjects underestimated the frequency of positive feedback received during a skill task (Wener & Rehm, 1975; Buchwald, 1977;

DeMonbreun & Craighead, 1977). In the latter two studies, the distortion on the part of depressed subjects occurred in conditions of high, but not low, rate of positive reinforcement, the reinforcement condition most incongruent with the depressed Ss' negative cognitive sets.

Hence, normal information processing mechanisms can be expected to produce distorted understandings of reality for depressed and nondepressed individuals when reality is incongruent with major cognitive sets, and heightened awareness of those aspects of reality which are congruent with it. It should be noted, however, that a judgment about whether a subject distorts or perceives reality veridically requires that the observer has some special access to reality. This is true only in the highly artificial experimental situation in which reality can be operationally defined, and the experimenter can ascertain whether a subject received positive or negative feedback, performed differently than another, does or does not control outcomes, etc. However, such an unambiguous reality does not describe the contexts in which people normally function. In this regard, it is well to repeat Mischel, Ebbesen and Zeiss' (1973) comment:

> "Almost limitless 'good' and 'bad' information.... is potentially available...An individual can.... usually find information to support his positive or negative attributes, his successes or failures, almost boundlessly..." (p.129).

It is important to understand the processes by which people achieve different perceptions and conceptualizations

from complex arrays of information. It is probably neither the case that depressed people are unhappy because they distort a generally benevolent reality, nor because they are uniquely realistic.

Implications for Seligman's Learned Helplessness Model

The results of the regression analysis of dysphoric themes on shadowing errors committed by the moderately-severely depressed group indicates that helplessness is the most salient of the dysphoric themes for this group. That is, moderately and severely depressed students appear to selectively attend to examples of the individual's helplessness and powerlessness to control important events which affect his or her life. The theme of failure was the least salient of the dysphoric themes for this group.

This finding is clearly supportive of Seligman's learned helplessness model of depression. A central feature of this model is the hypothesis that depression is characterized by a major cognitive set to perceive response-outcome noncontingency (i.e., helplessness), and that this set is pathogenic for the motivational, behavioral, and some of the cognitive deficits of depression. As argued in the introductory chapter, such a cognitive set would be expected to be manifested by a selective attention bias towards helplessness cues. Such a bias was demonstrated in this study.

In addition, the finding of a selective attention bias for helplessness cues suggests a possible mechanism by which the expectation of helplessness (the cognitive set) produces

the perception of current helplessness presumed to result in deficits in adaptive responding. It is suggested here that one such mechanism might be an allocation-of-attention policy that favors those aspects of situations which indicate helplessness. If one assumes that many situations contain both opportunities for personal influence as well as noncontingent components, then, whether an individual perceives himself as helpless or not in a situation may depend, in part, on which aspects of the situation are most salient to him. Presumably, selectively attending to those aspects of a situation which are unlikely to be controllable is a mechanism of perceiving oneself as helpless in that situation. That is, attentional mechanisms enter into the individual's assessment of situations, their subsequent problem-solving behavior with respect to that situation, and their conclusions and attributions about the results of their efforts. Thus, selective attention to noncontingent aspects of situations may be a mechanism whereby expectation of helplessness, a predisposition to helplessness depression, leads to continued perceptions of noncontingency. This would be predicted by information processing theories wherein expectation, or perceptual set, influences selective attention biases. As well, it is consistent with Alloy and Abramson's (1979) finding that depressed subjects are more likely than nondepressed subjects to perceive real noncontingency.

In addition, it is likely that habitual attention to cues indicating helplessness would produce chronically ineffectual coping or problem-solving behaviors. Hence, the result of

such an attentional style could be expected to be an individual who both tends to perceive that he or she is helpless, and who also really is relatively helpless, i.e., who lacks the coping skills to achieve goals. This may be a reciprocally causal relationship in which habitual perceptions of helplessness produce real incompetence, and chronic failure to achieve goals (incompetence) produces increased tendency to perceive situations as uncontrollable. Again, such a model would be expected to yield a downward spiral, and would predict both objective competence deficits as well as the tendency to perceive non-contingency.

It should be noted that the proposals outlined above derive from the finding that helplessness was the most salient of the dysphoric themes for the moderately-severely depressed group. However, that finding had not been predicted. No hypothesis had been offered with respect to the relative distracting potency of different themes within the dysphoric category, nor had the study been designed to test any such hypotheses. Hence, the foregoing proposal is in need of empirical support; a priori hypotheses need to be derived from it and subjected to empirical test.

Noncontingency vs. failure in learned helplessness. Several writers have questioned the research assumption that the critical feature of helplessness inductions is noncontingency. It is argued that noncontingency manipulations have almost always also involved failure experiences, and that the deficits which follow helplessness inductions might result from failure

rather than noncontingency (Sergent & Lambert, 1979; Lavelle, Metalsky & Coyne, 1979; Buchwald, Coyne & Cole, 1978; Tennen & Eller, 1977). Sergent and Lambert (1979) suggested that the phenomenon termed learned helplessness might better be characterized as "learned incompetence". Similarly, Altman and Wittenborn (1980), in their factor analytic study of depressives, were unable to decide whether their second factor should be identified with the attitude of helplessness or a preoccupation with failure.

The finding of the present study, that helplessness is the most salient, and failure the least salient, dysphoric theme for depressed subjects strongly suggests that depressed students are indeed set to perceive noncontingency, and that it is helplessness, not failure, that dominates their cognitive set. This finding is particularly noteworthy considering the population. One might intuitively have expected students, and particularly depressed students, to be preoccupied with failure.

Failure to Find Feedback Effects

No effects of any feedback manipulation on differential distraction by dysphoric compared to nondysphoric stimuli were found for any group. There are at least three possible explanations for this: The first involves the composition of the subgroups assigned to different feedback conditions. The second involves the potency of the feedback. The third is that the hypothesis should be rejected, that there are not, in fact, between-group differences of the sort proposed.

Group composition. As described in a previous chapter, depressed and test anxious subjects assigned to the negative

feedback condition appear to have been more reactive to the distraction conditions than subjects assigned to either positive or no feedback conditions. Given this sampling artifact, feedback condition is completely confounded with whatever unknown characteristics differentiate these subgroups from the others.

Analysis of covariance, which was performed in an attempt to adjust task 2 scores for the effects of differences in task 1 performances, also failed to detect feedback effects. However, analysis of covariance is a procedure of questionable validity for removing the effects of a covariate which is not independent of the treatment, in cases in which criterion scores may have a nonlinear regression on covariate scores, or in cases in which the slope of the regression interacts with treatment (Elashoff, 1969). These conditions very likely describe the present study. In this regard, Winer (1962) argued that "At best, covariance adjustments for initial biases on the covariate are poor substitutes for direct controls". In this study, equivalence of subgroups on task 1 performance would have avoided this methodological difficulty. This was reasonably expected to be achieved by random assignment of subjects to feedback condition, but was not. In future research, matching subjects on task performance before assignment to feedback condition would be helpful. Of course, that would require a task which could be scored immediately, or an experimental design in which feedback occurs in a second session, after initial performance has been scored.

Related to the above artifact were the small numbers of moderately and severely depressed subjects in each feedback

condition. Although the design called for 10 depressed subjects in each feedback condition, it should be recalled that only the moderately-severely depressed group proved reactive to the dysphoric distraction, with the mildly depressed group performing no differently than either comparison group. There were only 5 moderately-severely depressed subjects in the negative feedback condition, and this may have been an inadequate sample. However, a casual inspection of the data from these 5 subjects did not reveal any systematic feedback effect.

Feedback methodology. There were several ways in which the impact of the feedback manipulation may have been blunted. Feedback and reward/loss were delivered by the experimenter. Unlike the research assistants who administered the experimental tasks, the experimenter was not naive about the experimental design and its purposes, nor was he blind to the group membership of each subject and the manipulative nature of the feedback. It has long been known that the biases, attitudes and expectancies of the experimenter can influence the results of his or her research (Rosenthal, 1963; Rosenthal & Fode, 1963). Although care was taken to have all other aspects of the experimental procedures administered by naive research assistants, the delivery of feedback was not. This procedure was considered adequate, because the feedback procedures were brief and standardized, with E's behavior precisely specified. However, E's pre-experimental expectations were that depressed subjects would react in a relatively extreme fashion to negative feedback and loss, and that they would experience additional subjective

distress. The experimenter's subjective experience in delivering feedback reflected these expectancies; he was decidedly uncomfortable delivering negative feedback to depressed Ss. Hence, E may well have unintentionally behaved in a manner which may have blunted the effects of the feedback.

As well, the meanings of the feedback and the loss may have been too trivial to be effective. Subjects may not have had substantial self-esteem investments in their performance on the experimental task. That is, failure on the experimental task may have had little meaning with respect to important personal attributes. In describing failure as a precipitating event for depression, Beck (1976) specifies that it is failure to reach an important goal (p.108). Similarly, the loss of one dollar may have been perceived as too insignificant to have been effective. In discussing loss as a precipitating event, Beck (1976) asserts that "...to justify the label 'precipitating event', the experience of loss must have substantial significance to the patient" (p.108).

It is not clear that these difficulties can be easily yet ethically solved. In constructing the feedback manipulation for this study, E attempted to create a situation which would be potent enough to cause a shift in depressive functioning, but not so potent as to cause a significant exacerbation of depressive symptomatology among already depressed subjects. Although it may be the case that the hypotheses under study may require a failure or loss experience of sufficient meaningfulness to produce significant deepening of depression, it is not ethically permissable to do.

Finally, it may be the case that the effects of failure feedback were ameloirated by the opportunity for a second chance, i.e., to perform task 2. Golin, Jarrett, Stewart and Drayton (1980) found that depressed college students were significantly less stressed and reacted with less emotionality to a goal-related task when they expected to have a second chance to obtain the goal, i.e., a subsequent task, than when they expected only one chance. Golin et al. (1980) speculated that the expectation of a second chance reduces the perceived permanence and irreversibility of the failure.

The hypothesis. It may be that the hypothesis that failure/loss experiences exacerbate the selective attention bias of depressed people for dysphoric stimuli should be rejected. Several years ago, Becker (1974) summarized the research of the effects of failure on depression in the following manner:

> "....there is negligible experimental evidence that depressives' self-esteem is appreciably more vulnerable to failure than nondepressives', despite a widespread clinical impression to the contrary" (p.139).

At the time of this writing, little consistent empirical data has been added to the literature which would alter Becker's conclusion. Hence, it may be the case that failure experiences do not exacerbate depressive reactions. This possibility receives support from the finding, in the present study, that failure was the least salient of the depressive themes for the moderately-severely depressed group. Hence, clinical lore about the sensitivity of depressed people to failure may be incorrect. Clearly, additional research is required on this point.

A similar situation obtains with respect to loss. Since the writings of Abraham (1911/1960, 1916/1960) and Freud (1916/1957), loss has occupied a central position in most major theories of depression, including Beck's theory. It is therefore startling that this writer was unable to find a single empirical test of the proposition that experiences of loss are depressogenic for vulnerable individuals. There is some evidence that a greater than chance proportion of individuals who are prone to depression have suffered a major loss during childhood (Beck, 1967); this provides some support for the notion that traumatic loss during childhood predisposes individuals to later depression. But there appears to be no evidence that experiences of loss constitute immediately precipitating events specifically for depression. Clearly, this proposition needs to be directly investigated.

Finally, if failure and/or loss experiences precipitate or exacerbate depression, one needs to ask what are the mechanisms. This thesis proposed one mechanism; it was predicted that failure/loss experiences would increase the selective attention bias for dysphoric stimuli. However, it may be the case that failure and/or loss experiences increase other, perhaps non-cognitive, depressive symptoms directly. This possibility cannot be evaluated from the present data.

In general, it seems fair to conclude that the hypothesis in question has not yet been adequately tested. No support was found in the present study for the hypothesis that a failure/loss experience increases the selective attention bias of

depressed people. In addition, the empirical status of the ideas that failure and loss experiences are depressogenic has been questioned.

External Validity of the Present Investigation

Operationalizing depression: The BDI. In this study, depression was defined, and its severity measured, by scores on the BDI. Some caution should be exercised in characterizing groups selected in this manner as depressed. The BDI, like other self-rating scales for depression, was designed to measure the severity of depression. Several writers have questioned its use as a diagnostic instrument, i.e., as the sole criterion for identification of members of a class. Elevated BDI scores could result from numerous factors which would be apparent from a thorough diagnostic evaluation, but which could not be identified from BDI scores alone. For example, the recent loss of a loved object, temporary loneliness, temporary loss of self-esteem, or some other medical or psychiatric disorder could result in many of the signs and symptoms of depression (Depue & Monroe, 1978; Carroll, Fielding & Blashki, 1973). A thorough diagnostic evaluation accumulates varied information such as history, characteristics of onset, and social adjustment, in addition to present signs and symptoms, whereas self-rating scales provide information only about the individual's subjective estimates of the range and intensities of his or her symptoms (ibid.).

Furthermore, it is argued that the BDI is heavily weighted for subjective mood and cognitive components, and under-

represents objective behavioral and somatic information that would normally be considered by observer ratings (Depue & Monroe, 1978; Carroll, et al., 1973). There is some evidence that this distinction (subjective-cognitive vs. behavioral-somatic) may differentiate relatively mild neurotic depressions from relatively severe depressions requiring hospitalization, and that the BDI is not sensitive to these differences[1] (Depue & Monroe, 1978; Carroll, et al., 1973; Weissman, Prusoff & Pincus, 1975; Akiskall, et al., 1978).

However, although one certainly needs to exercise caution in generalizing from college students who score highly on the BDI to clinically depressed populations, it is reasonable to assign subjects to a general "depressed" category on the basis of these scores. The BDI has been shown to achieve high reliability and concurrent validity in studies with over 1,000 psychiatric in- and out-patients (Beck, 1967; Metcalfe & Goldman, 1965). In Beck's (1967) two studies, BDI scores and psychiatric ratings of severity of depression correlated .55 and .67; in Metcalfe and Goldman (1965), the correlation was .61. In addition, the BDI has been similarly found to validly measure severity of depression in a nonclinical, college student population, and Johnson and Heather (1974) found the BDI to be sensitive to changes in severity of depressive symptomatology

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[1] Note the confounding of severity with typology in this argument. As well, cf Chapter One for a discussion of the difficulties involved in identifying meaningful sub-types of depression in general, and the ambiguities of the "neurotic depression" classification in particular.

of psychiatric patients over time.

Although it is certainly the case that self-rating inventories sample only a limited range of information, the BDI has been shown to correlate highly with the most frequently used observer-rating scale, the Hamilton Rating Scale for Depression (HRS) (Hamilton, 1960). Williams, Barlow and Agras (1972) found a correlation of .82 between BDI and HRS scores.

Finally, although there is some question about the ability of all self-report inventories to discriminate depression from other psychopathology, especially anxiety (Carroll, et al., 1973), the BDI correlates less highly with measures of general psychopathology or anxiety than other self-report measures (Beck, 1967; Rizley, 1978). In addition, the inclusion in the present study of a highly anxious nondepressed group provides a measure of control of potential confounding by nondepressive psychopathology.

One problem does remain with respect to the use of the BDI in studies, such as the present one, which investigate a cognitive model of depression. As indicated above, the BDI is a cognitive instrument. That is, it measures the subject's evaluations and interpretations of his or her experiences. This is, of course, the nature of all self-report instruments. There is, however, something of a tautology involved in finding that subjects whose cognitions about themselves and their experiences are depressive, subsequently reveal depressive cognitions. This may be overstated, given the validity of the BDI with respect to nonsubjective, noncognitive criteria measures of depression,

but it would surely be desirable to investigate cognitive aspects of depression with noncognitive measures of the independent variable.

Severity of depression. In the present study, the performance of the mildly depressed group did not differ from those of the nondepressed groups. There are at least three explanations for that finding. It may be that mildly depressed people selectively attend to dysphoric stimuli, but that the phenomenon is too slight to have been detected with the methodology employed. Second, it may be the case that mild depression is discontinuous with more severe depression, such that the cognitive disturbances proposed by Beck, and demonstrated in this study, do not characterize students who score in the mildly depressed range of the BDI. A third possibility is that the BDI is not a valid measure of depression in the low range, and that students in this category may have been sad, lethargic, disappointed, or unhappy, but not clinically depressed. In this regard, Beck (1967) advocates the use of scores of 13 or 14 as the cutting scores with clinical populations, since "....there is considerable overlap of clinically depressed and nondepressed patients" in the lower ranges (p.203). He does, however, recommend cutting scores of 10 with nonclinical populations (ibid.), and scores of 9 or 10 are commonly used as criterion scores with student populations. Further, this cutting score has demonstrated validity for a college student population (Bumbery, et al., 1978).

The findings of the present study suggest that generaliza-

tions from subject samples scoring in the 9-15 range are hazardous, and that the validity of designating such subjects as depressed, with the assumption of continuity with more severe depression, requires further investigation.

Others have cautioned against using subjects scoring in this range as representative of depressed populations, noting that such usage would place the incidence of clinically significant depression among college students at roughly 50%, a most unlikely proposal (Depue & Monroe, 1978). This is an important point, given the frequency with which research on depression is carried out on subjects who have been identified as depressed on the basis of BDI scores above 9 or 10 as the criterion.

Continuity of depressive disorders. In a related issue, the continuity of depressive disorders in nonclinical and clinical populations is not clear. There is evidence that the relatively mild depressions of functioning individuals may be qualitively different than the depressive disorders of clinical populations. For example, factor analytic studies of the BDI in a psychiatric hospital population (Weckowicz, Muir & Cropley, 1967), and in a depressed college student population (Golin & Hartz, 1979), have yielded different factors. Among hospitalized depressives, three clearly defined factors were found: guilty depression, retardation, and somatic disturbance. In contrast, depression among college students was characterized by a single factor containing feelings of sadness and a sense of hopelessness. Guilt and the sense of being or deserving to be punished, which characterized the hospitalized depressives

had "essentially a zero loading" on the one factor found to characterize depressed students (Golin & Hartz, 1979). As well, the factor, "somatic disturbance", which characterized the clinical group, was not found to characterize the student group. Hence, the syndromes displayed by clinical and non-clinical depressed groups appear to differ. These differences appear also to be similar to differences in symptom clusters found to differentiate neurotic from endogenous depressives (e.g., Akiskal, et al., 1978), but the confusion surrounding the use of these terms, discussed in the first chapter, obviates any clear conclusion about this.

Given questions raised with regard to generalizability from depressed college students to other clinical depressed populations, the present study clearly needs to be replicated with samples of depressed and nondepressed people drawn from clinical populations. In the absence of such a replication, it would be prudent to restrict generalizations from these data to depressed college students. This may be more important with respect to the support this study provides for the learned helplessness model than for Beck's. As discussed earlier, much of the research on which Beck's model was based was conducted with clinical populations. In contrast, the vast majority of research supporting the learned helplessness model was conducted with mildly depressed college students. There is not yet adequate empirical justification for concluding that cues signifying noncontingency are especially salient for populations other than depressed college students.

In addition, the present study provides information about cognitive functioning of depressed individuals generally. It is not known whether the phenomena reported here characterize some depressive subtypes more than others. Given the possibility of important differences between unipolar and bipolar depressions, and perhaps, between endogenous and neurotic depressions, it would be useful to try to delimit the range of depressive disorders described by the cognitive model in general, and the present findings in particular. In this regard, Braf & Beck (1974) have argued for the utility of characterizing the "cognitive profiles" of depressive disorders across nosological and severity dimensions. Similarly, it would be informative to collect data which might reveal relationships between individual characteristics of depressed people and specific attentional biases to specific kinds of material.

Finally, the generalizability of the present study must be limited by the demographic characteristics of the sample studied. It is likely that manifestations of depression are related to cultural, religious, economic, and educational factors (Rizley, 1978; Fernando, 1975; Teja, Narang & Aggarwal, 1971). Hence, generalizations from Canadian students to general North American populations must be tentative, and generalizations to non-Western cultures would not be justified.

Concluding Remarks

Cognitive theories conceptualize human beings as active processors of information from the environment. In this perspective, people are understood to respond not to objective

reality, but to their perceptions and conceptualizations of reality. Given considerable variability in the realities which different people construct, understanding human reactions requires understanding the nature of their mediated versions of the world.

This would appear to be particularly the case when human reactions are bewildering and seem inappropriate, as the emotional reactions of depressed people often do. Beck has proposed that such reactions are to be understood as appropriate to the depressed indiviudal's perceived world.

To the extent that Beck's model has stimulated empirical investigations of the phenomenology of depression, it has made a major contribution to the understanding of depression.

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APPENDICES

APPENDIX A

SCREENING QUESTIONNAIRES

NAME: _____

ADDRESS: _____

_____

PHONE NUMBER: _____

AGE: _____

SEX: _____ MALE _____ FEMALE

Personal Inventory - I

On this questionnaire are groups of statements. Please pick out the one statement in each group which best describes the way you feel today, that is, right now! Be sure to read all statements in the group before making your choice for that group. Then, place a check (✓) to the left of the statement which best describes the way you feel right now. If none of the statements in a group fits exactly the way you feel, then select the one which is closest. Do not skip any groups.

Group A.

_____ I do not feel sad.
_____ I feel blue or sad.
_____ I am blue or sad all the time and I can't snap out of it.
_____ I am so sad or unhappy that it is quite painful.
_____ I am so sad or unhappy that I can't stand it.

Group B.

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

Group C.

_____ I do not feel like a failure.
_____ I feel I have failed more than the average person.
_____ I feel I have accomplished very little that is worthwhile or that means anything.
_____ As I look back on my life all I can see is a lot of failures.
_____ I feel I am a complete failure as a person (parent, husband, wife).

Group D.

_____ I am not particularly dissatisfied.
_____ I feel bored most of the time.
_____ I don't enjoy things the way I used to.
_____ I don't get satisfaction out of anything any more.
_____ I am dissatisfied with everything.

Group E.

_____ I don't feel particularly guilty.
_____ I feel bad or unworthy a good part of the time.
_____ I feel quite guilty.
_____ I feel bad or unworthy practically all the time now.
_____ I feel as though I am very bad or worthless.

Group F.

_____ I don't feel I am being punished.
_____ I have a feeling that something bad may happen to me.
_____ I feel I am being punished or will be punished.
_____ I feel I deserve to be punished.
_____ I want to be punished.

Group G.

_____ I don't feel disappointed in myself.
_____ I am disappointed in myself.
_____ I don't like myself.
_____ I am disgusted with myself.
_____ I hate myself.

Group H.

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

Group I.

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

Group J.

_____ I don't cry any more than usual.
_____ I cry more now than I used to.
_____ I cry all the time now. I can't stop it.
_____ I used to be able to cry but now I can't cry at all even though I want to.

Group K.

_____ I am no more irritated now than I ever am.
_____ I get annoyed or irritated more easily than I used to.
_____ I feel irritated all the time.
_____ I don't get irritated at all at the things that used to irritate me.

Group L.

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

Group M.

_____ I make decisions about as well as ever.
_____ I try to put off making decisions.
_____ I have great difficulty in making decisions.
_____ I can't make any decisions at all any more.

Group N.

_____ I don't feel I look any worse than I used to.
_____ I am worried that I am looking old or unattractive.
_____ I feel that there are permanent changes in my appearance and they make me look unattractive.
_____ I feel that I am ugly or repulsive looking.

Group O.

_____ I can work about as well as before.
_____ It takes extra effort to get started at doing something.
_____ I don't work as well as I used to.
_____ I have to push myself very hard to do anything.
_____ I can't do any work at all.

Group P.

_____ I can sleep as well as usual.
_____ I wake up more tired in the morning than I used to.
_____ I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
_____ I wake up early every day and can't get more than 5 hours sleep.

Group Q.

_____ I don't get any more tired than usual.
_____ I get tired more easily than I used to.
_____ I get tired from doing anything.
_____ I get too tired to do anything.

Group R.

_____ My appetite is no worse than usual.
_____ My appetite is not as good as it used to be.
_____ My appetite is much worse now.
_____ I have no appetite at all any more.

Group S.

_____ I haven't lost much weight, if any, lately.
_____ I have lost more than 5 pounds.
_____ I have lost more than 10 pounds.
_____ I have lost more than 15 pounds.

Group T.

_____ I am no more concerned about my health than usual.
_____ I am concerned about aches and pains or upset stomach or constipation.
_____ I am so concerned with how I feel or what I feel that it's hard to think of much else.
_____ I am completely absorbed in what I feel.

Group U.

_____ I have not noticed any recent change in my interest in sex.
_____ I am less interested in sex than I used to be.
_____ I am much less interested in sex now.
_____ I have lost interest in sex completely.

go on to next page ....

Personal Inventory - II

For each of the following statements, check either True or False to indicate whether the statement describes you. Do not skip any statements.

True	False		
___	___	1.	While taking an important exam I find myself thinking of how much brighter the other students are than I am.
___	___	2.	If I were to take an intelligence test, I would worry a great deal before taking it.
___	___	3.	If I knew I was going to take an intelligence test, I would feel confident and relaxed, beforehand.
___	___	4.	While taking an important examination I perspire a great deal.
___	___	5.	During course examinations I find myself thinking of things unrelated to the actual course material.
___	___	6.	I get to feel very panicky when I have to take a surprise exam.
___	___	7.	During tests I find myself thinking of the consequences of failing.
___	___	8.	After important tests I am frequently so tense than my stomach gets upset.
___	___	9.	I freeze up on things like intelligence tests and final exams.
___	___	10.	Getting a good grade on one test doesn't seem to increase my confidence on the second.
___	___	11.	I sometimes feel my heart beating very fast during important tests.
___	___	12.	After taking a test I always feel I could have done better than I actually did.
___	___	13.	I usually get depressed after taking a test.
___	___	14.	I have an uneasy, upset feeling before taking a final examination.
___	___	15.	When taking a test my emotional feelings do not interfere with my performance.
___	___	16.	During a course examination I frequently get so nervous that I forget facts I really know.
___	___	17.	I seem to defeat myself while working on important tests.
___	___	18.	The harder I work at taking a test or studying for one, the more confused I get.
___	___	19.	As soon as an exam is over I try to stop worrying about it, but I just can't.

True	False		
____	____	20.	During exams I sometimes wonder if I'll ever get through college.
____	____	21.	I would rather write a paper than take an examination for my grade in a course.
____	____	22.	I wish examinations did not bother me so much.
____	____	23.	I think I could do much better on tests if I could take them alone and not feel pressured by a time limit.
____	____	24.	Thinking about the grade I may get in a course interferes with my studying and my performance on tests.
____	____	25.	If examinations could be done away with I think I would actually learn more.
____	____	26.	On exams I take the attitude, "If I don't know it now there's no point worrying about it."
____	____	27.	I really don't see why some people get so upset about tests.
____	____	28.	Thoughts of doing poorly interfere with my performance on tests.
____	____	29.	I don't study any harder for final exams than for the rest of my course work.
____	____	30.	Even when I'm well prepared for a test, I feel very anxious about it.
____	____	31.	I don't enjoy eating before an important test.
____	____	32.	Before an important examination I find my hands or arms trembling.
____	____	33.	I seldom feel the need for "cramming" before an exam.
____	____	34.	The University ought to recognize that some students are more nervous than others about tests and that this affects their performance.
____	____	35.	It seems to me that examination periods ought not to be made the tense situations which they are.
____	____	36.	I start feeling very uneasy just before getting a test paper back.
____	____	37.	I dread courses where the professor has the habit of giving "pop" quizzes.

What is your mother tongue, i.e., the language you spoke most often as a child?

French _____

English _____

Other _____

If your mother tongue is not English, please answer the next two questions.

How well do you speak English?

(Circle one)

1	2	3	4	5	6	7
not at all			moderate-ly well			excellently

How many years of school were done in English as the language of instruction?

(Check one)

_____ less than 1 year

_____ 1 year

_____ 2 years

_____ 3 or more years

APPENDIX B

DYSPHORIC DISTRACTOR STIMULUS D-1

A dominant characteristic of modern societies is the helplessness and impotence of the individual. In simpler societies, people could direct their own lives, their efforts could make a difference. Now, individuals are helpless. Like passive blades of grass, they are blown this way and that, powerless to influence the forces that determine their lives. In many respects, people's lives are governed by faceless bureaucracies, important decisions about them made by computers. A terrible sense of impotence pervades modern life, as people bow to the sure knowledge that they are powerless to effect their own lives, much less make an impression on the society around them.

DYSPHORIC DISTRACTOR STIMULUS D-2

It is no longer possible to be optimistic about the future. There was a time when people could plan for a bright future; now such bright hopes are naive illusions, for the future is bleak. Our once-promising technologies now poison the environment with deadly pollutants. Overpopulation will, in the next 50 years, deplete the earth's food supplies, natural resources, and even room to breathe. We face a world which will be teeming with starving, diseased people killing each other just for space to lie down. Young people can look forward only to destruction by a world which they did not make.

DYSPHORIC DISTRACTOR STIMULUS D-3

People often come to grief because they lose something on which their entire life was based. It can happen when someone very close is lost, either through death, illness, unfaithfulness, or loss of affection. It may be a parent who dies or becomes old and unable to protect and care for you. It may be a lover, without whom the world is empty, life is barren, and there is no joy. One can also lose important personal attributes, without which life holds only despair. This can happen when one becomes less attractive, less energetic, or less intellectually capable.

DYSPHORIC DISTRACTOR STIMULUS D-4

Some emotions are so strong and pervasive that they just overpower us and cannot be controlled. Depressed, despondent, melancholy moods can be like that, uncontrollable. When life feels bleak, empty, without meaning; when every day brings only sadness, despair and sorrow, then it is futile to fight it. Such feelings are overwhelming; efforts to banish such black misery invariably fail. In the grip of such melancholy feelings, it is useless to even get out of bed in the morning, for the day can only be bleak and empty, as yesterday was and as tomorrow will inevitably be. Such a suffering person does not have the energy to banish such overwhelming gloom.

DYSPHORIC DISTRACTOR STIMULUS D-5

Happiness is always precarious. The things that are essential for one's happiness could be lost in an instant. Only then, after disaster strikes, do people realize how fragile their happiness is, how vulnerable they are, how much they are at the mercy of forces which they cannot control. People may think that they control their lives, that every achievement makes their happiness more secure. This is a dangerous delusion which may be disproven with one cruel blow which causes all their cherished dreams to crumble around them. Poverty, loneliness, sickness, grief, despair and ruin are always possible.

DYSPHORIC DISTRACTOR STIMULUS D-6

The life of a parent can be full of joy or tragedy, depending on the child. Fortunate parents have children who grow to be happy, loving and successful. For these lucky parents, children fill their lives with joy and pride. But some unfortunate parents have children who bring them only grief and disappointment. Despite the nurturance and concern of their parents, such children are incapable of responding with love, and consistently fail to meet society's standards. Some become lazy, cruel, unloving, inept and unlovable, causing their parents undeserved grief. It seems that these pathetic parents have only discouragement, despair, and frustration to look forward to.

DYSPHORIC DISTRACTOR STIMULUS D-7

Losing something important to you is one of life's saddest experiences. Lives can be ruined by losing a good friend or lover. That is often a loss from which one never recovers. Throughout life, the memory of the lost loved one can cause pain, sadness, and an aching loneliness. To have to go through life with such emptiness is a terrible deprivation. Other kinds of loss can be equally devastating. Sometimes a person loses some powers, abilities or skills that they once had. For example, someone's intellectual abilities may decline, or their physical appearance might deteriorate. In such cases, the individual is tragically aware of the loss and may be grief-stricken.

DYSPHORIC DISTRACTOR STIMULUS D-8

The future holds nothing but famine, disease, anarchy, poisoning, and destruction. Environmental and social decay are already irreversible; conditions can only get steadily and rapidly worse until this planet will no longer support life. Three-and-a-half billion people now inhabit this over-populated Earth, and every year this number increases by 70 million. Yet most of us have no appreciation of the dimensions of the world food shortage. This mass of humanity will eventually destroy life on this planet. In most industrial nations the air grows more foul and the water more undrinkable each year. Rates of drug usage, crime and civil disorder continue to rise.

DYSPHORIC DISTRACTOR STIMULUS D-9

A series of grievous losses, one after another, can leave someone desolate. Such a run of tragedies often begins with illness or disability. Any healthy young person might be stricken with a crippling disease causing sudden disability or gradual physical deterioration. To suddenly become crippled or to have one's body deteriorate is itself devastating. However, the sad fact is that other people are repulsed by tragedy, sickness, unhappiness and deprivation. People who are stricken soon find themselves abandoned by their loved ones, who find their physical disabilities burdensome. Little by little, friends also desert them. Until, finally, such unfortunate people find themselves having lost all the important people in their lives, alone and desolate.

DYSPHORIC DISTRACTOR STIMULUS D-10

Failure is usually the result of personal deficiency. Inadequate people, being less capable, are likely to fail to achieve their goals. This is often tragic, because the frustrated person might desperately want to achieve some important goal, but simply be inadequate, and no amount of trying will help. This is true whether the goals are intellectual, interpersonal, monetary, academic, or whatever. For example, a mediocre student might desperately try to achieve high grades, but lack the intellectual ability. Such an unhappy person might spend the rest of their life regretting their failure, never understanding why they weren't good enough.

APPENDIX C

NON-DYSPHORIC DISTRACTOR STIMULUS N-1

Many people use plants as background in their home aquariums, and it is possible to make them almost as interesting as the fish themselves. Underwater plants come in many beautiful varieties and colors, and some of them even have flowers. Also, many experts maintain that the plants which consume carbon dioxide and give off oxygen can actually help keep the fish healthier.

Underwater plants, available at most aquarium shops, fall into several basic categories. The most popular are the long, stringy grasses that grow in clumps and drift upward in the water. These come in assorted shapes and in varying shades of green. Also popular are the floating plants.

NON-DYSPHORIC DISTRACTOR STIMULUS N-2

Wine must be stored properly to avoid spoiling. There are several general principles for storage of wines. Corked bottles should lay on their sides. The wine keeps the cork moist and prevents it from shrinking and admitting air. The safest storage is in a rack that gives each bottle a compartment to itself, allowing you to withdraw any bottle without jogging the others. Screw-top bottles should be stored upright.

Maintain an even temperature. A few degrees difference between summer and winter won't do harm, provided the change occurs slowly and steadily. What damages wine is rapid and frequent heating and cooling.

NON-DYSPHORIC DISTRACTOR STIMULUS N-3

Seafood provides a whole world of interesting protein foods. Seafood contains about the same amount of protein as does meat and poultry, but is relatively low in both saturated fat and calories. The fat that fish does contain is primarily valuable unsaturated fatty acids which are desirable in your diet. If the fish is not washed excessively or soaked, it is rich in phosphorous, iodine and the B vitamins. Raw clams and oysters are particularly rich in iron. Fresh oysters, clams and mussels should have tightly closed shells when purchased or should close when touched.

Good methods of preparing seafood include broiling, baking, steaming and poaching.

NON-DYSPHORIC DISTRACTOR STIMULUS N-4

From the time that young children watch older siblings and adults around them pick up books and become absorbed, they want to learn to read. To them this is a skill which provides the entrance ticket to the grown-up world. Because of their spontaneous interest, learning to read, while not accomplished in one day, can become a challenging and enjoyable adventure.

There is general agreement that reading is the single most important still a child can possess. It is the one that is taught earliest and continued longest. What is often overlooked is the fact that teaching children to read is fascinating for the teacher as well.

NON-DYSPHORIC DISTRACTOR STIMULUS N-5

The object of any piece of writing is to make the reader understand exactly what you have to say - and understand it as quickly and as effectively as possible. To make your reader do this you must lay out your article, report, story - whatever it may be - like a carefully surveyed road. Otherwise, it will never get anywhere in particular; it will merely stop short after a certain number of pages. Think of a piece of writing as a trip from a definite starting point to a definite destination. At the very start we look for a sign-post pointing the way and naming the place we are headed for.

NON-DYSPHORIC DISTRACTOR STIMULUS N-6

Most bicycle campers these days will find that they need a stove at least some of the time. Except for use by large groups, a small backpacker's stove is generally best suited to the cyclist's needs, since it takes only a little space in the corner of one of the panniers, and it is light enough so that it will not drag too much on the long hills. There are many good stoves, but the main choice is between those fueled by white gasoline and those using small pressurized cannisters of propane or butane. White gasoline is more widely available on the road, is less expensive, and produces more heat.

NON-DYSPHORIC DISTRACTOR STIMULUS N-7

Cotton has been used as a textile fiber for so long and in such widely separated parts of the world that no one can be sure where the plant originated or who used it first.

Beautiful cotton prints were produced in India long before Alexander's conquests, and in the Americas the wearing of cotton was an ancient art in Mexico and Peru before the Europeans came. Ready made for spinning, cotton is produced today in every country where it will grow and is far and away the world's leading textile fiber. It can be dyed and printed easily in endless variety. Cotton clothing is absorbent and comfortable to wear.

NON-DYSPHORIC DISTRACTOR STIMULUS N-8

Good nursery schools range all the way from lavish model institutions to temporary arrangements to simple home situations. What they have in common is an atmosphere that children find both comfortable and stimulating. Sometimes children spend the first weeks at school wanting to explore the equipment and investigate the child-sized world before they go on to relate to teachers or other children. For a comfortable environment planned to nursery scale, the child first strengthens his feelings that he is a whole, normal, and belonging person. If the staff has chosen supplies with care and ingenuity, the child will then be drawn into the imaginative exploration of his surroundings.

NON-DYSPHORIC DISTRACTOR STIMULUS N-9

Swallows are small birds with long, pointed wings, and are widely distributed in North America. They rely on flying insects for their food, although one or two species can survive on berries when cold weather prevents insects from flying. Their search for food is constant, and swallows are in the air for most of the day, resting occasionally on wires or trees. When the young are in the nest or learning to hunt, the parents seldom rest. By midsummer, the young birds have begun to form large flocks of their own.

In the early spring and late summer, great numbers of swallows can be seen feeding together.

NON-DYSPHORIC DISTRACTOR STIMULUS N-10

If your house is showing its age, one of the best ways to rejuvenate it is to replace the outer walls with new siding. This will not only improve its appearance, but greatly reduce future maintenance work. And it will give you an opportunity to add more insulation to the walls, a benefit that will partly offset the cost of siding.

A number of old and new siding materials are available. Wood siding is still preferred by many. Western red cedar is best, but other soft woods are also used. For a rustic, natural appearance, rough cedar siding is still very popular, particularly on the west coast.

NON-DYSPHORIC DISTRACTOR STIMULUS N-11

The infant has to learn at least three different things about objects. She has to learn that objects remain the same even when they appear to be different. She must learn that objects continue to exist even when she can't see or feel them any longer. Finally, the infant has to learn that individual objects retain their identity from one encounter to another. For example, the crib is the same object each time she is placed in it, and so on.

These understandings about objects and people may seem so basic that you may not be able to imagine the child's not having them, but she does not.

NON-DYSPHORIC DISTRACTOR STIMULUS N-12

A magazine is an instrument of communication. With the aid of ink and paper it carries messages in the form of articles, stories, editorials, advertising, pictures, drawings, and paintings. Before manufacturing begins, articles and stories are chosen for publication, editorial text and advertising copy are prepared, photographs are taken and paintings produced. These are combined by the magazine's art department into a preliminary layout of the magazine.

Photo-engraving and typesetting are the first steps in the manufacturing process. Photographs, drawings and paintings are sent to a photo-engraver, who produces their images on copper or zinc plates, known in the trade as "originals".

NON-DYSPHORIC DISTRACTOR STIMULI N-13

Wine has been used for thousands of years as a beverage. Certain kinds of wine have come to be favored for certain uses. There are no hard-and-fast rules, but some combinations of wine and food have proved to be pleasing to the average palate. The generally accepted uses of wine are as follows:

The aperitif is a slightly sweet, fortified wine meant to be drunk as an appetizer before dinner.

Table wine is dry, and is meant to be drunk with the meal. Its dryness complements the flavour of the food. White table wine goes well with light, bland foods such as fish and fowl.

APPENDIX D

TARGET STIMULUS T-1

A natural food diet is a realistic way to achieve one's proper weight and to maintain it. It isn't very unpleasant, because natural foods taste good and tend to automatically help regulate the appetite after a while. It is slower than fad or crash diets, but healthier in the long run.

Natural food diets consist of all natural, nutritional foods - those not processes, refined, nor full of additives. They don't have to be organic to be natural. Most natural foods from the supermarket will keep one very healthy. A natural food diet will help one to discriminate from among the vast choices available at the supermarket while one is developing a taste for the natural foods that are nutritionally best.

TARGET STIMULUS T-2

Rainmaking is an ancient hope, a 19th century fake, and a modern scientific fact. Every primitive tribe has tried one way or another to make it rain. Primitive magic, rain dances, and sacrifices have all been used to induce rain. By coincidence, rain has followed these efforts often enough to keep alive the belief in the efficiency of the methods. Quite a boom in rainmaking developed in the nineteenth century. Drums were beaten, cannons shot, and explosives were set off, producing great quantities of smoke, but not rain. Modern rainmaking techniques are based on known facts of coalescence and genuinely influence rainfall. Modern techniques depend upon the seeding of rain clouds, usually with silver iodide crystals.

TARGET STIMULUS T-3

The earth has five motions in space. It rotates on its axis once each twenty-four hours, with a slow wobble, like that of a top, which takes twenty-six thousand years to complete. It revolves around the sun at 18½ miles per second, making the circuit in three hundred and sixty-five and ¼ days. It speeds with the rest of our solar system at 12 miles per second toward the star Vega. Finally, our entire galaxy, with its billions of stars, is rotating in space - our part of it at a speed of a hundred and seventy miles per second.

Only two of these motions affect the weather. But their effect is profound. Earth's annual trip around the sun gives us our seasons and their typical weather. Earth's daily rotation results in night and days.

TARGET STIMULUS T-4

The wide variations in rainfall over different parts of the country produce important effects on the quality of the soil. We might expect soil fertility to increase with abundant rainfall. But actually it often deteriorates. Some of the most fertile soil in the United States, for example, is in the Arizona desert. With irrigation, a desert may become fabulously productive. But with too much irrigation, the soil is given more water than it can hold and its dissolved minerals are washed away. They are carried out of reach of the plant roots. The ability of soil to absorb water and to hold it depends on the help of plants and animals which bring to the soil qualities not possessed by the original particles.

TARGET STIMULUS T-5

Blankets made of wool or wool blends can be washed or dry-cleaned, according to personal preferance. If you send them to the laundry be sure you have selected a reliable one and that the blankets are tagged for special attention.

If you are washing blankets at home, choose a fine warm day with a light breeze blowing. Wash one blanket at a time. First shake it out lightly to remove loose dust, then pay special attention to spots. Using a soft brush and lukewarm water, work a detergent into especially soiled portions.

For washing the blanket use the same mild detergent and lukewarm water. Water that is too hot shrinks wool. After washing, dry in the shade on a line.

TARGET STIMULUS T-6

For good appearance and better wear, carpets and rugs should be kept free of the surface dust that dims their colors. Areas of heavy traffic and random spills can be cleaned up easily if you keep a small carpet sweeper handy. Once a week, rugs should be vacuum-cleaned and spots and stains should be attended to when they occur to avoid setting.

Periodically, at least once a year, carpets and rugs should be shampooed by a professional or at home with one of the new applicances designed for the task. Small rugs can be shampooed by hand with special shampoos. But hand-cleaning a large rug is a usually difficult business and the results are often not at all satisfactory.

TARGET STIMULUS T-7

Ever since the days of cave man, an open fire has been a comfort and pleasure to the human race. The fireplace in your room is the focus of attention and deserves special care so that it may be attractive in appearance. While it is an almost irresistable impulse, probably also dating to cave man days, to toss scraps of paper and other waste objects into it, do try to resist that urge.

The ashes from last night's fire need not be removed. The next day's fire is much easier to light and burns better if the ashes stay there. Let the flames burn down before you retire and cover the embers with ashes as a fire precaution.

TARGET STIMULUS T-8

If England has produced a single artistic genius among her many painters of talent and originality, that painter is Joseph Turner. Only he, among English painters, had such exceptional natural capacity for creative and original ideas. Turner's originality was so great that it has been revealed only gradually over the last hundred years. His personal history as an artist is also the history of modern art. The impressionists were the first painters to discern that Turner had anticipated them. Since then, the abstract painters of the '50s and the new colorists of the '60s have claimed him not only as an ancestor, but even more enthusiastically as a colleague. But Turner's art had little influence on his contemporaries.

TARGET STIMULUS T-9

Birds are the most readily observable form of wildlife. They are present in almost every habitat, forests and fields as well as in every town and city in North America. Some species are seen only briefly, as migrants in the spring and fall. Others arrive in the spring from their wintering areas to nest, and are seen through the summers. And then there are still others, such as some sparrows and owls, which migrate into an area from the north, and are seen only in winter. A few species are with us for all seasons of the year. Nature groups involved in bird watching exist in almost every town and city in North America. They are especially active during the migration period.

TARGET STIMULUS T-10

The robin is surely the most familiar bird in North America. There is not a part of the continent which they do not visit at some time of the year, with the exception of northern Alaska and the treeless eastern Arctic. They breed everywhere except in the extreme southern United States. In wild areas they prefer open patches near the edge of a forest, along streams and lake shores and in other natural openings. Civilization has provided ideal habitat with shade trees for nesting and lawns and berry trees for feeding.

Pairs nest twice each season and lay about four blue eggs with each nest. The nest is usually placed in a branch of a tree, from five to fifteen feet above the ground.

TARGET STIMULUS T-11

A baby back carrier with a light metal frame is a wonderful way for a parent and baby to be together. The big advantage, and the best proof of its worth, is that babies and toddlers are so happy in them. You can tell two ways. In the first place, they smile and laugh all the time they are awake, and second, they fall asleep there very easily when they are sleepy. For some families the use of the back carrier simply brings order back into their lives. When the baby is too tired to play, but not ready for sleep, you can quickly put him in the carrier and go about your business. When you are finished, he will probably already be asleep.

TARGET STIMULUS T-12

Home siding made of vinyl was relatively expensive when it was introduced in Canada about ten years ago, and the early forms tended to get brittle in cold weather. But because vinyl takes less energy to produce than aluminum, the price comparison has changed in recent years and today the two materials are about equal in cost. Vinyl compounds have also improved to suit Canadian weather conditions, and brittleness seems no longer to be a problem.

The resiliency of vinyl is one of its main advantages, in fact, since blows merely bounce off it. Another advantage is that the color extends throughout the thickness of the siding and can't scratch or wear off. But colors are limited to white and pastel shades.

TARGET STIMULUS T-13

Today, more and more emphasis is being placed on a child's experiences with learning in his early years. These experiences are crucial in aiding or hindering his later growth in learning. One of his first learning experiences is reading. Success in learning to read gives the child a feeling of competence in one of his first intellectual endeavours, and develops in him confidence in his ability to learn and to think.

Children enjoy learning to read when the experience is a challenge to their minds, when they understand, not memorize, every step in the learning process. In this way the child's intellectual growth is significantly stimulated in the very process of learning to read. He also learns to enjoy reading.

TARGET STIMULUS T-14

Agatha Christie is the most durable, as well as the most celebrated English writer of the classic detective story; that is, the one involving a detective, a tightly-organized puzzle, and a surprise solution. Her pre-eminence in the field is the result not only of her steady productivity at a steady level of quality, but also of the craftsmanship which underlies the construction of her stories, and of the fertile imagination which has enabled her to create more ingenious plot devices than any other living novelist.

Miss Christie's style tends to be undistinguished, but efficient, and her characters tend to be slightly old-fashioned stereotypes. However, she has shown an exceptional ability to weave tightly-knit, captivating stories.

TARGET STIMULUS T-15

The key to Canada's progress has been the use of mechanical power. A hundred years ago, when men and animals did most of the work, the return was small, whether the produce was food, tools, clothing, or building materials. Now, men have more leisure than ever before, but their ability to produce has been increased many times by powered machines. The energy for the machines comes from water, coal, natural gas, and oil. Of these, oil is the greatest source of energy for power and heat in both Canada and the United States.

Oil meets the requirements of modern industry better than any other energy source. Approximately ninety per cent of oil is used for heat, light and power.

TARGET STIMULUS T-16

Today, it is more for enjoyment than for any practical use that most people care for the flowers, shrubs, and trees growing wild about us. Our ancestors enjoyed them too, but were also carefully taught from early childhood of their numerous other values, not only as medicinal plants, but as spices, grains and herbs, to mention only a few.

The employment of plant life by man dates far back in history to the most ancient times, when, having found that certain plants could be eaten as food, it was discovered that the stem fibres of some other kinds could be woven into garments, while their juices could be turned into dyes for applying to the hair and body.

TARGET STIMULUS T-17

The spirit of the tea hour seems to be associated with England, for in no other corner of the world is this simple function still preserved with such dignity and care. Tea was originally introduced to the English people from China. Although first considered to be expressly for medicinal purposes, it soon grew to be better known as a refreshment. It is recorded that tea found instant favor with the ladies and gentlemen of the court, and it was not long before it was imported in larger quantities. As it became available in large quantities, the price was lessened until, eventually, it reached a price level where it could be enjoyed by everyone. Many people then began drinking tea daily.

TARGET STIMULUS T-18

Forty or fifty years ago, most people believed that newborn babies couldn't hear, and many thought that the infant couldn't see much either, if at all. Today, although there are still many people who believe that newborn babies can't see and hear, research has shown conclusively that many visual and hearing abiliites are present from birth. It is completely clear that the newborn baby can hear a whole range of sounds. If you ring a bell, shake a rattle, or squeak a rubber toy near the baby's ear, she will react in one of several ways. For example, she may move or her heartbeat may speed up. The fact that the child shows some reaction indicates that she heard the sound.

TARGET STIMULUS T-19

The climate in which one lives exerts an enormous influence over one's life. The differences between living in a climate with severe winters and hot summers, compared to a single-season climate such as that of southern California are profound. One is affected by the changing seasons economically, psychologically, and physically. The changing seasons requires one to buy clothing for both hot and cold weather, as well as inbetween, to insulate one's houses and, of course, to buy fuel for heat. It is clearly economically advantageous to live in a constant, temperate climate. However, the changing seasons is more interesting; one's daily life changes with the season, adding variety to life. Many people find constant, unchanging temperate weather dull.

TARGET STIMULUS T-20

More and more people are planting their own vegetable gardens. Some people have small plots around their houses where they can plant a garden. Others plant in large pots or even buckets on porches and window sills in their houses. Some vegetables are very easy to grow, and can supply you with fresh garden vegetables for many months. For example, lettuce, tomatoes, cucumbers and radishes grow easily with little care required. And there is nothing like a garden salad with fresh vegetables from your garden, garnished with herbs and spices. During the last few years, many people have discovered the pleasures and savings of having their own gardens. One problem is how to control insects. There are many organic ways to do this.

TARGET STIMULUS T-21

Bicycle camping, though not a very new idea, has recently begun to provide an alternative to automobile camping for a great many Canadians. Like hiking, ski touring, mountaineering, and canoeing, it has been practiced by a few enthusiasts all along; but suddenly a large segment of the population is beginning to discover bicycle touring and camping. Though the equipment needed requires a significant investment, it is trifling compared to the outlay of the average car camper, to say nothing of the huge camping vehicles bought by so many people in their efforts to get outdoors.

By starting a bicycle trip early in the morning, one can combine the advantages of a camping trip without the disadvantages of automobile travel.

TARGET STIMULUS T-22

There is an increasing interest in and appreciation of Chinese food in this country. It would seem that nearly every week a new Chinese restaurant opens. The great difference between eating the Chinese way and the Western way is that the Chinese use chopsticks and we use knives and forks. This inevitably means that large pieces of fish, meat and poultry are not possible at the Chinese table. Most dishes, therefore, are made up of mouth-sized pieces which are taken up by chopsticks and transferred to the mouth. A morsel of the fish, meat or poultry is taken up with chopsticks, dipped in sauce and eaten. The use of chopsticks determines the size of the portions to be consumed.

TARGET STIMULUS T-23

Everybody talks about the weather from time to time, but most people know very little about what makes our weather. The fact that we are all so dependent upon the weather makes weather our most common topic of conversation, a factor in much of our agricultural, industrial, and civic planning, and a constant concern of everyone. The question is, what can be done about the weather? Today, the science of weather - meteorology - is used to make our lives safer and better. Some types of forecasts are ninety-eight per cent accurate. Clouds are seeded to cause rainfall where it is needed. A network of weather stations enables planes to fly safely. A continued program of research reveals more and more about the weather.

APPENDIX E

RATING FORM FOR VALIDATION OF DISTRACTOR STIMULI

Please rate the extent to which this script is described by each of the following words:

PESSIMISTIC:	1 not at all	2	3	4 moderately	5	6	7 extremely
HOPELESS:	1 not at all	2	3	4 moderately	5	6	7 extremely
SAD:	1 not at all	2	3	4 moderately	5	6	7 extremely
PLEASANT:	1 not at all	2	3	4 moderately	5	6	7 extremely
DISTRESSING:	1 not at all	2	3	4 moderately	5	6	7 extremely
CHEERFUL:	1 not at all	2	3	4 moderately	5	6	7 extremely
DISCOURAGING:	1 not at all	2	3	4 moderately	5	6	7 extremely
GLOOMY:	1 not at all	2	3	4 moderately	5	6	7 extremely
UNHAPPY:	1 not at all	2	3	4 moderately	5	6	7 extremely
GOOD-NATURED:	1 not at all	2	3	4 moderately	5	6	7 extremely

DYSPHORIC: (i.e., something that tends to arouse generally negative feelings):

1	2	3	4	5	6	7
not at all			moderately			extremely

****

Please rate the extent to which this script deals with the following themes or subjects:

	1	2	3	4	5	6	7
HELPLESSNESS:	not at all			moderately			extremely
REJECTION:	not at all			moderately			extremely
LOSS:	not at all			moderately			extremely
A NEGATIVE VIEW OF THE WORLD:	not at all			moderately			extremely
HOPELESSNESS:	not at all			moderately			extremely
ESCAPE:	not at all			moderately			extremely
PERSONAL DEFICIENCY:	not at all			moderately			extremely
FAILURE:	not at all			moderately			extremely
DEPRIVATION:	not at all			moderately			extremely
LONELINESS:	not at all			moderately			extremely

APPENDIX F

KEY FOR SCORING SHADOWING PERFORMANCES

1. Word omitted: 1 error per word.
   E.g.: Script reads, "...with a slow wobble like that of a top."
   Subject says, "...with a slow wobble like a top."
   - 2 errors for omitting "that" and "of".

2. Word added: 1 error per word.
   E.g.: Script says, "...earth's daily rotation results in night and day."
   Subject says, "...earth's daily rotation results in our night and day." - one error for adding "our".

3. Substitute one word for another: one error.
   E.g.: Script says, "...It rotates on its axis once each 24 hours."
   Subject says, "It rotates on its axis once every 24 hours." - 1 error for substituting "every" for "each".

4. Substitute 2 incorrect words for one word: 2 errors.
   E.g.: Script says, "It rotates on its axis once each 24 hours."
   Subject says, "It rotates on its axis one time each 24 hours." - 2 errors.
   Note that this is really the same as scoring 1 error for substituting "one" for "once" and a second error for adding "time".

5. Jargon (These are sounds which are not intelligible as an attempt to say the correct word): 1 error per word not correctly spoken.

6. Incorrect order: 1 error for each word out of place.
   E.g.: Script says, "...is therefore..."
   Subject says, "...therefore is..."
   - 1 error, since only once of those words is out of place.

7. Repeats words: 1 error for each word repeated. It doesn't matter whether the word was correct or incorrect the first time.

8. Distortions which are intelligible as attempts to say the correct word, but the word is not correctly or fully enunciated, is somewhat garbled, or is spoken too fast to be fully enunciated in an attempt to catch up. This category differs from jargon in that the subject's response is recognizable as the correct word. - 1 error per word distorted.

9. Partial addition. Subject gets most of the word right, but adds something. 1 error.
   E.g.: Subject says "affects" instead of "affect", "increasing" instead of "increase", "blankets" instead of "blanket", etc.

10. Partial omission. Subject gets most of the word, but omits some part of it. 1 error.
   E.g.: Subject says "motion" instead of "motions", "rotate" instead of "rotating", "carry" instead of "carried", "easy instead of "easier", etc.

11. Partial substitution. Subject gets most of the word, but changes some part of it. 1 error.
   E.g.: Subject says "polisher" instead of "polishing", "carried" instead of "carrying", etc.

APPENDIX G

INTERRATER RELIABILITY

Pearson Product-Moment Coefficients Calculated Between 21 Pairs of Ratings of Shadowing Errors Committed by Each Subject

Group	Subject Number	Correlation Coefficient	$p <$
Depressed	1	.97	.001
	2	.89	.001
	3	.85	.001
	4	.97	.001
	5	.91	.001
	6	.98	.001
	7	.83	.001
	8	.84	.001
	9	.81	.001
	10	.24	.13
	11	.85	.001
	12	1.00	.001
	13	.99	.001
	14	.89	.001
	15	.80	.001
	16	.82	.001
	17	.84	.001
	18	.90	.001
	19	.51	.01
	20	.89	.001
	21	.74	.001
	22	.57	.01
	23	.31	.07
	24	1.00	.001
	25	.34	.05
	26	.03	.001
	27	.83	.001
	28	.85	.001
	29	.81	.001
Test Anxious	30	.99	.001
	31	.67	.001
	32	.84	.001
	33	1.00	.001
	34	.44	.05
	35	.93	.001
	36	.95	.001
	37	.95	.001
	38	.78	.001
	39	.51	.01
	40	.39	.05

Group	Subject Number	Correlation Coefficient	p <
Test Anxious (cont'd.)	41	.77	.001
	42	.94	.001
	43	.80	.001
	44	.84	.001
	45	.77	.001
	46	.93	.001
	47	.73	.001
	48	.94	.001
	49	.89	.001
	50	.92	.001
	51	.53	.01
	52	.92	.001
	53	.76	.001
	54	.97	.001
	55	.84	.001
	56	.85	.001
	57	.24	.13
	58	1.00	.001
Health Control	59	.99	.001
	60	.61	.01
	61	.79	.001
	62	.81	.001
	63	.78	.001
	64	.95	.001
	65	.98	.001
	66	.83	.001
	67	.97	.001
	68	.89	.001
	69	.14	.26
	70	.31	.07
	71	.95	.001
	72	.68	.001
	73	.91	.001
	74	.88	.001
	75	.94	.001
	76	.98	.001
	77	.92	.001
	78	.43	.05
	79	.92	.001
	80	.75	.001
	81	.97	.001
	82	.56	.01
	83	.73	.001
	84	.75	.001
	85	.92	.001
	86	.93	.001
	87	.96	.001
	88	.92	.001

APPENDIX H

Analysis of Variance of MAACL Depression-Scale Scores of Three Groups of Ss

Source	Ss	df	MS	F
Group	953.06	2	476.53	16.2*
S(G)	2499.66	85	29.41	

*$p << .001$

APPENDIX I

Analysis of Variance of MAACL Anxiety-Scale Scores of Three Groups of Ss

Source	Ss	df	MS	F
Group	560.60	2	280.30	26.8*
S(G)	889.00	85	10.46	

*$p << .001$

APPENDIX J

Analysis of Variance of Baseline Shadowing Errors Committed by Three Groups of Ss

Source	Ss	df	MS	F
Group	470.78	2	235.39	2.02*
S(G)	9892.97	85	116.39	

*NS

APPENDIX K

Analysis of Variance of Task 1 Mean Shadowing Errors.

3-Groups x 2 Distraction Conditions.

Source	SS	df	MS	F	p
Group	544.99	2	272.49	3.19	< .05
S(G)	7253.32	85	85.33		
Distraction	70.31	1	70.31	9.20	< .01
Distraction x Group	35.08	2	17.54	2.30	< .11
D x S(G)	649.66	85	7.64		
<u>Tests of Simple Effects</u>:					
Distraction (Depressed Group)	92.08	1	92.08	12.05	< .01
Distraction (Test Anxious Group)	1.45	1	1.45	0.19	NS
Distraction (Healthy Control Group)	6.03	1	6.03	0.79	NS
D x S(G)	649.66	85	7.64		
Group (Dysphoric Distraction)	405.75	2	202.88	4.36	< .05
Group (Non-Dysphoric Distraction)	167.60	2	83.80	1.80	NS
Error		100[a]	46.49		

[a]Degrees of freedom estimated by the Satterthwaite approximation (Winer, 1971, Pp. 375-384).

APPENDIX L

Analysis of Variance of Mean Baseline Shadowing Errors Committed by Four Groups of Ss.

Source	SS	df	MS	F
Group	500.51	3	166.84	1.42*
S(G)	9863.24	84	117.42	

*NS

APPENDIX M

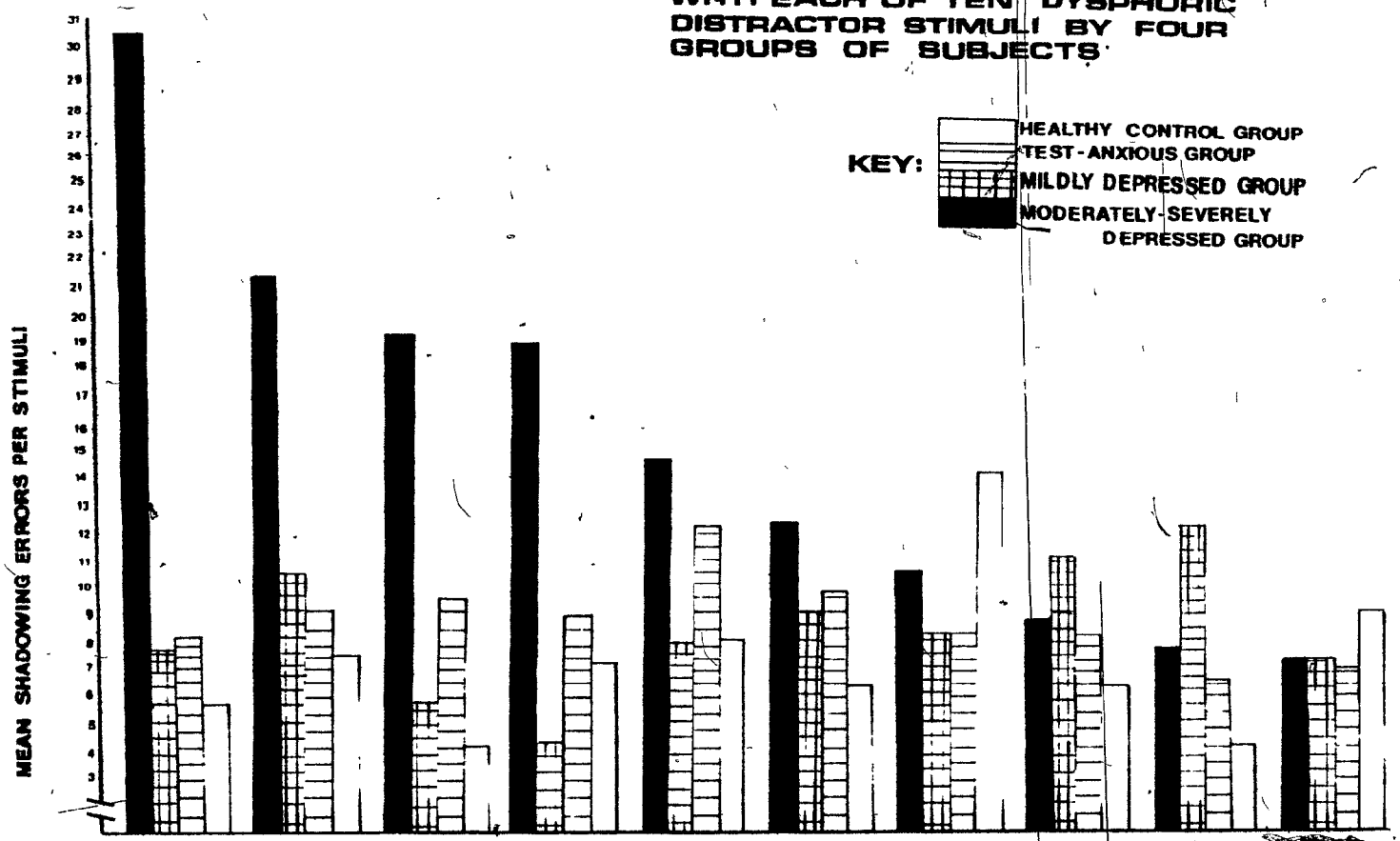
Analysis of Variance of Task 1 Mean Shadowing Errors.

4 Groups x 2 Distraction Conditions.

Source	SS	df	MS	F	p
Group	1044.59	3	348.20	4.33	<.01
S(G)	6753.72	84	80.40		
Distraction	99.98	1	99.98	13.66	<.001
Distraction x Group	69.59	3	23.20	3.17	<.03
D x S(G)	615.14	84	7.32		
Tests of Simple Effects:					
Distraction:					
Moderately-Severely Depressed Group	118.82	1	118.82	16.23	<.01
Mildly Depressed Group	5.61	1	5.61	0.77	NS
Test Anxious Group	1.45	1	1.45	0.20	NS
Healthy Control Group	6.00	1	6.00	0.82	NS
D x S(G)	615.14	84	7.32		
Group (Dysphoric Distraction)	805.86	3	268.82	6.12	<.01
Group (Non-Dysphoric Distraction)	303.56	3	101.18	2.31	NS
Error		99[a]	43.86		

[a]Degrees of freedom estimated by the Satterthwaite approximation (Winer, 1971, Pp. 375-384).

APPENDIX N: TASK 1 SHADOWING ERRORS MADE WITH EACH OF TEN DYSPHORIC DISTRACTOR STIMULI BY FOUR GROUPS OF SUBJECTS



*THE ORDER IN WHICH INDIVIDUAL STIMULI ARE SHOWN IN THIS FIGURE, AND THE NUMERICAL DESIGNATIONS, FROM D-1 TO D-10, ARE ARBITRARY AND DO NOT REPRESENT THE ORDER OF PRESENTATION TO SUBJECTS.

APPENDIX O

Analysis of Variance for Repeated Measures of Task 1 and Task 2 Shadowing Errors.[a] 3 Groups x 3 Feedback Conditions x 2 Distractions Conditions x 2 Tasks.

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p
Group	5.902	2	2.951	3.61	<.05
Feedback	6.391	2	3.195	3.91	<.05
Group x Feedback	5.067	4	1.267	1.55	NS
S(GF)	64.629	79	0.818		
Task	2.042	1	2.042	53.74	<.001
Task x Group	0.027	2	0.014	0.37	NS
Task x Feedback	0.031	2	0.015	0.40	NS
Task x Group x Feedback	0.189	4	0.047	1.24	NS
T x S(GF)	3.029	79	0.038		
Distraction	0.215	1	0.215	6.52	<.05
Distraction x Group	0.187	2	0.093	2.82	<.07
Distraction x Feedback	0.040	2	0.020	0.61	NS
D x F x G	0.034	4	0.009	0.27	NS
D x S(GF)	2.571	79	0.033		
Distraction x Task	0.004	1	0.004	0.15	NS
Distraction x Task x Group	0.027	2	0.014	0.54	NS
D x T x F	0.038	2	0.019	0.73	NS
D x T x F x G	0.093	4	0.023	0.88	NS
T x D x S(GF)	2.077	79	0.026		

Source	Degrees of Freedom	Mean Square	F(1,79)	p
Single Degree of Freedom Contrasts (Task 2 D-Errors - N-Errors) - (Task 1 D-Errors - N-Errors)				
Distraction x Task (Depressed Group, Pos. Feedback)		.0008	0.03	NS
Distraction x Task (Depressed Group, Neg. Feedback)		.0281	1.08	NS
Distraction x Task (Depressed Group, No Feedback)		.0008	0.03	NS
Distraction x Task (Test-Anxious, Pos. Feedback)		.0005	0.02	NS
Distraction x Task (Test-Anxious, Neg. Feedback		.0000	0.00	NS
Distraction x Task (Test-Anxious, No Feedback)		.0189	0.73	NS
Distraction x Task (Healthy Control, Pos. Feedback)		.0234	0.90	NS
Distraction x Task (Healthy Control, Neg. Feedback)		.0037	0.14	NS
Distraction x Task (Healthy Control, No Feedback)		.0897	3.45	NS
T x D x S(GF)	79	.0263		
Tests of Simple Interactions				
Group x Feedback x Task:				
(Dysphoric Distraction)	4	0.0329	1.02	NS
(Non-Dysphoric Distraction)	4	0.0410	1.27	NS
Feedback x Task (Dysphoric Distraction):				
Depressed Group	2	0.0474	1.47	NS
Test Anxious Group	2	0.0178	0.55	NS
Healthy Control Group	2	0.0350	1.08	NS

Source	Degrees of Freedom	Mean Square	F	p
Feedback x Task (Non-Dysphoric Distraction):				
Depressed Group	2	0.0171	0.53	NS
Test Anxious Group	2	0.0305	0.94	NS
Healthy Control Group	2	0.0156	0.48	NS
Error	152[b]	0.0323		

[a]Raw error scores transformed such that $\chi = \log(\chi + 1)$.

[b]Degrees of freedom estimated by the Satterthwaite approximation. (Op. cit.).

APPENDIX P

Analysis of Variance for Repeated Measures of Task 1 Shadowing Errors.[a] 3 Groups x 2 Distraction Conditions x 3 Feedback Conditions

Source	SS	df	MS	F	p
Group	2.654	2	1.327	3.20	<.05
Feedback	3.528	2	1.764	4.26	<.02
Group x Feedback	2.532	4	0.633	1.53	NS
S(GF)	32.724	79	0.414		
Distraction	0.139	1	0.139	4.96	<.03
Distraction x Group	0.137	2	0.068	2.43	<.1
Distraction x Feedback	0.003	2	0.002	0.07	NS
Distraction x Group x Feedback	0.057	4	0.014	0.50	NS
D x S(GF)	2.177	79	0.028		

[a]Analysis performed on data which has been transformed such that $\chi = \log(\chi + 1)$.

APPENDIX Q

Comparisons of Task 1 Mean Shadowing Errors Using Tukey H.S.D. Tests on the Group x Feedback x Distraction Interaction[a,b]

Dysphoric Distraction

Depressed Group

	Negative Feedback	No Feedback
Positive Feedback	Q = 7.87 p < .01	Q = 1.66 NS
Negative Feedback		Q = 6.22 p < .01

Test-Anxious Group

	Negative Feedback	No Feedback
Positive Feedback	Q = 9.58 p < .01	Q = 1.18 NS
Negative Feedback		Q = 10.76 p < .01

Healthy Control Group

	Negative Feedback	No Feedback
Positive Feedback	Q = 0.04 NS	Q = 1.01 NS
Negative Feedback		Q = 0.97 NS

Non-Dysphoric Distraction

Depressed Group

	Negative Feedback	No Feedback
Positive Feedback	Q = 7.73 p < .01	Q = 1.75 NS
Negative Feedback		Q = 5.98 p < .01

Test-Anxious Group

	Negative Feedback	No Feedback
Positive Feedback	Q = 11.46 p < .01	Q = 0.16 NS
Negative Feedback		Q = 11.30 p < .01

Healthy Control Group

	Negative Feedback	No Feedback
Positive Feedback	Q = 1.33 NS	Q = 1.19 NS
Negative Feedback		Q = 0.14 NS

[a]Analyses performed on data which has been transformed such that $\chi = \log(\chi + 1)$.

[b]For all analyses, k = 18, df = 79.

APPENDIX R

Analysis of Covariance for Task 2 Shadowing Errors With Task 1 Shadowing Errors as Covariates.[a] 3 Groups x 3 Feedback Conditions x 2 Distraction Conditions.

Source	SS	df	MS	F	p
Groups	22.52	2	11.26	0.65	NS
Feedback	22.20	2	11.10	0.64	NS
Groups x Feedback	155.25	4	38.81	2.23	.08
Covariate	4322.17	1	4322.17	248.12	.0001
S(GF)	1358.73	78	17.42		
Distraction	0.213	1	0.213	0.03	NS
Distraction x Groups	3.79	2	1.90	0.30	NS
Distraction x Feedback	5.45	2	2.73	0.44	NS
Distraction x Groups x Feedback	35.35	4	8.84	1.41	NS
Covariate	101.60	1	101.60	16.26	.001
D x S(GF)	487.61	78	6.25		

[a]Task 1 D-errors are covariates for Task 2 D-errors; Task N-errors are covariates for Task 2 N-errors.

APPENDIX S

Task 2 Within-Group Comparisons of D-Errors With N-Errors for Each of Nine Groups; Means are Adjusted With Task 1 D-Errors as Covariates for Task 2 D-Errors, and Task 1 N-Errors as Covariates for Task 2 N-Errors.

Groups	Q	p (k = 18, df = 78)
Depressed - Positive Feedback	0.39	NS
Depressed - Negative Feedback	2.26	NS
Depressed - No Feedback	0.52	NS
Test-Anxious - Positive Feedback	0.29	NS
Test-Anxious - Negative Feedback	2.51	NS
Test-Anxious - No Feedback	0.87	NS
Healthy Control - Positive Feedback	0.10	NS
Healthy Control - Negative Feedback	1.71	NS
Healthy Control - No Feedback	1.76	NS