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THE EFFECT OF COVERT SELF-REINFORCEMENT VERSUS EXTERNAL REINFORCEMENT ON THE PERCEPTION OF SUCCESS BY DEPRESSED AND NONDEPRESSED SUBJECTS

By

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ABSTRACT

THE EFFECT OF COVERT SELF-REINFORCEMENT VERSUS EXTERNAL REINFORCEMENT ON THE PERCEPTION OF SUCCESS BY DEPRESSED AND NONDEPRESSED SUBJECTS

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The role of external reinforcement as a mediator of the relation between depression and the perception of success was examined employing three rates of monetary reinforcement for success with 72 college undergraduates. Depressed and nondepressed subjects estimated their chances for success on a series of trials with a skill task. Depressed subjects were more pessimistic regarding success prior to beginning the task, but no differences were found between groups on three trial expectancy measures. Expectancy variables were unaffected by rate of reinforcement with depressed subjects, while a positive correlation was found with nondepressed subjects. The results failed to support the learned helplessness model of depression which claims that a belief in independence between responding and reinforcement is central to the etiology and symptoms of depression in man. An alternative explanatory model for depressive behavior was suggested as an appropriate focus for future investigation.

To my wife, Doreen

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

This study investigates the effects of self-reinforcement and external secondary reinforcement as mediators of the relation between depression and perception of success. The main hypothesis underlying this study is that depressed individuals have a tendency to be "stimulus bound," relying on concrete evidence of positive performance from which to evaluate the relative success of their performance, while nondepressed indivduals are thought to have the capacity to accurately assess degree of success by employing veridical cognitive processes which are relatively unaffected by secondary external validation. The theoretical foundation for this study consists of two major theses. First, that the phenomenon of depression is inextricably linked to the availability of effective reinforcers in the individual's environment. Loss of either the source or means to rewards will lead to a depressive condition. Second, the effectiveness of an object or event to serve as a reinforcer is in part a function of the individual's capacity to correctly perceive its appearance as response-dependent and to correctly integrate this information with other contiguous perceptual input and existing expectancies. If the individual does not accurately attend to or symbollically mediate the reinforcing event, the value of the event as a reinforcer is severely diminished (Bandura, 1969).

This study attempts to clarify the role of operant behavior and reinforcement in depression within the framework of cognitive theory.

Upon inspection, cognitive and behavioral theories of depression are not mutually exclusive, but on the contrary, may be seen as complementary in the fullest sense. The union of these two schools of thought has recently become a major new area of psychological investigation (Mahoney, 1974; Meichenbaum, 1977), and may now be directly applied to examine the relationships between behavior, environmental feedback, and the construct of depression. While it is acknowledged that many and varied approaches to the phenomenon of depression are omitted in this study, that in no way diminishes contributions to the clinical understanding of depression made from these quarters. It is thought, however, that in dealing with a concept so broad and far reaching as depression, clear choices must be made in delineating both conceptual platforms and specific area of study, so as to provide a lucid and useful, if limited, investigation.

The issue of definition of the construct of depression must be dealt with before meaningful investigation can proceed. Everyone is familiar, at least casually, with depression. The pervasiveness of depression in our society is staggering. The National Institute of Mental Health has estimated that 4 to 8 million Americans may be in need of professional care for depressive disorders (cited in Leitenberg, 1976). Depression may well be the fastest growing form of psychopathology today (Becker, 1974). In addition, this disorder can be lethal, "one out of every 100 persons afflicted by a depressive illness will be a suicidal death" (Williams, Friedman, & Secudner, 1970, p. 168; cited in Leitenberg, 1976). In spite of the widespread occurrence of depression, there is considerable confusion concerning its classification and definition.

Depression has traditionally been classified as a primary mood disorder. The Diagnostic and Statistical Manual of the American Psychiatric Association (APA-DSM II) lists five categories of depressive disorder: manic-depressive reaction, psychotic-depressive reaction, schizo-affective reaction, psychoneurotic depressive reaction, and involutional psychotic reaction. A second widely used classification system involves the concept of endogenous versus reactive depression. This system, based upon etiological considerations, has caused widespread controversy in psychology and psychiatry (Leitenberg, 1976). A large number of factor-analytic attempts to determine whether depression is a unitary or binary phenomenon have resulted in highly consistent results (Mendels, 1970). Two independent symptom clusters were identified and associated with endogenous and reactive depressions. Of course, the existence of two independent symptom clusters does not necessarily support an etiological distinction. A third classificatory scheme has recently been introduced by Winoker (1973), based on studies of family constellations of affective disorder. This system is quite comprehensive and overlaps with both the APA (DSM-II) and endogenous-reactive systems. The reader is referred to Beck (1972, pp. 64-67), Becker (1974, pp. 11-13, 37-48), and Seligman, et al. (1976, pp. 169-171) for more extensive discussion of the issues involved in classification of depression.

Ultimately, the value of any diagnostic or classificatory system must be assessed by its ability to predict, especially in the area of treatment efficacy. No evidence has been generated as yet which demonstrates systematic relationships between effectiveness of either psychotherapy in general or type of therapy in particular, and the

various hypothesized types of depression (Seligman, et al., 1976). The view in this study is that by virtue of the fact that all of the above diagnostic categories are considered as some form of construct of depression, an element of continuity among their manifestations is implied. Therefore, this study will not attempt to deal with classificatory or etiological schema, but will simply focus on behavioral, affective, and cognitive elements which are believed to exist as manifestations of the construct. This investigation will, however, restrict itself to instances of depression which are of neurotic, as opposed to psychotic, intensity. It is recognized that the employment of specific diagnostic categories, and the endogenous-reactive dichotomy in particular, may eventually be both useful and necessary to successfully isolate treatment variables in dealing with depression clinically, but at this point it is thought that neither basic research nor the classificatory schemata have progressed to such a sufficiently sophisticated point. As Becker (1974) has noted, experimental findings on depression are as yet tentative, fragmentary, unreplicated, and unsynthesized.

A Description of Depression

The condition of depression has been well described as constituting a major breakdown in the functional interaction between the individual's behavior and environmental reinforcement (McNitt, 1976). In a very real sense, the individual becomes isolated from and dissonant with his environment. Beck (1972) obtained the symptoms considered relevant to depression in 966 psychiatric patients who were assigned to four groups on the basis of psychiatric ratings of the severity of the depression, regardless of primary diagnosis. Four

classes of symptoms were identified: affective, cognitive, motivational, and physical. Recent research (Coyne, 1976a, 1976b; Lewinsohn, 1974; Liberman & Raskin, 1971) has identified behavioral and social skill variables associated with depression. The smallest and least well-defined of these categories of manifestations of depression is the motivational group, which includes only two elements. Since the distinction between cognitive and motivational constructs is fuzzy at best, it does not seem unreasonable to consider them as one under the heading of cognitive manifestations, for reasons of simplicity, if not parsimony. Similarly, behavior occurs in a social setting. From this point of view the state of being alone is seen as a special case of the social condition. It seems useful, then, to address the issue of behavioral manifestations within the broader context of their social setting, and therefore to speak of social-behavioral manifestations. These consolidations result in four groups, affective, cognitive, physical, and social-behavioral, and the construct of depression might usefully be described in terms of these four categories.

Affective Manifestations

The emotional concomitants of depression are the most widely observed and agreed upon. Typically, the depressed individual displays a more or less pervasive mood of sadness, loneliness, apathy, and general irritability (Becker, 1974). As the intensity of the depression increases, weeping is more frequent (Lazarus, 1968), and the individual becomes progressively more isolated from vital contact with his environment. There is a loss of meaningful attachments to and gratifications from the surrounding environment (Beck, 1972). The

person seems to completely lose his "joie de vivre" and recedes into a joyless, negativistic condition. Interpersonal as well as object relationships seem to lose importance, increasing the isolation of the depressed person. The depressed person is unresponsive to his environment, often feeling helpless, hopeless, and frightened in the face of what he perceives to be an overwhelming and hostile environment (Melges and Bowlby, 1969).

Cognitive Manifestations

The cognitive manifestations of depression are equally widespread and have been studied in detail. Beck (1976) has argued that the principle cognitive manifestation of depression is systematic misinterpretation and distortion by the depressed person of his experiences. Specifically, a negative triad of distortions exists, with a pervasiveness and degree relative to the severity of the depression (Beck, 1976). These distortions are a negative view of the world, a negative concept of self, and a negative appraisal of the future. The particular elements of these distortions are well known. The depressed individual typically is indecisive and self-blaming (Beck, 1972). There are many verbal statements of unworthiness and guilt (Liberman & Raskin, 1971). The individual torments himself with innumerable self-commands and injunctions taking the form of "shoulds" and "musts" (Beck, 1963; Ellis, 1975) while simultaneously experiencing overwhelming thoughts of hopelessness and helplessness (Beck, 1971; Becker, 1974; Melges and Bowlby, 1969; Seligman, 1975). Problems and responsibilities are thus magnified out of reasonable proportion (Beck, 1967), and a pall of pessimism engulfs the individual. The depressed person believes he cannot achieve even simple tasks which confront him (Seligman, 1975).

Beck (1963, 1972) reported a general loss of motivation and frequent suicidal ideation among depressed psychiatric patients. The depressed individual lives in a world in which he thinks he cannot cope, becomes disinterested in developing instrumental responses to his environment, and instead ruminates over wishes for "magical" escapes from the overpowering and hopeless situation in which he perceives himself (Beck, 1963; Becker, 1974).

Beck (1976) has attempted to simplify the plethora of manifest cognitive elements of depression. He posits the nucleus of these manifestations to be that the depressed person regards himself as lacking some element or attribute that he considers essential for his happiness. It is presently unclear whether this theme of loss always operates as an active cognitive theme or if it is present as a form of preconscious assumption or automatic thought, resulting in the observed parataxic cognitions described above.

Physical Manifestations

The physical manifestations of depression are widespread and easily quantifiable, but correlate poorly with ratings of depression (Beck, 1972). Whereas cognitive manifestations, as described above, were clearly common to the vast majority of clinically depressed individuals, and discriminate for depressed and nondepressed groups, physical manifestations exhibit a much greater variability, both between and within depressed and nondepressed groups (Beck, 1972). The concrete nature of physical symptoms compensate in part for this variability, in that the validity of measurement is more assured. The most common physical manifestations of depression are loss of appetite, fatigue,

disturbances of the atuonomic nervous system, and lessening of sexual arousal (Beck, 1972; Becker, 1974; Lazarus, 1968). Loss of appetite is often accompanied by constipation. Sleep disturbances are also common, and Beck (1972) has presented evidence that the quality of sleep of depressed individuals may be inferior to that of nondepressed individuals.

Depressed people often complain of aches, weakness, and fatigue, although such complaints apparently bear no systematic relationship to the actual physical activities of the individual. Indeed, Beck (1972) reported a correlation of only .28 between reported sleep disturbance and fatigability, the latter demonstrating characteristics of a diurnal cycle. Other paradoxes are evident in the physical manifestations of depression. Overt withdrawal and physical deceleration exists simultaneously with overactive autonomic functioning, neither of which may be congruent with cognitive or affective elements of behavior. The depressed person is thus seen as being physically out of synchronization with both his environment and his overt behavior and cognitions.

Social-Behavioral Manifestations

The salient social-behavioral manifestation of depression is a change in activity level. While such changes are most often observed as motor retardation, agitated depressions may also occur (Becker, 1974), although anxiety would appear to be a dominating factor in the latter condition. More typically, the state of depression is marked by a reduced activity level, the severity of the condition fluctuating as a function of the magnitude of the alteration of normal behavior frequencies, intensities, and durations. In addition to the well documented quantitative reduction in instrumental activity (Beck, 1976;

Becker, 1974; Ferster, 1974; Klinger, 1975), an equally notable deterioration takes place in terms of the quality of the responses emitted (Coyne, 1976a; Klinger, 1975; Lazarus, 1968; Libet and Lewinsohn, 1973). Severely depressed individuals may show such gross reductions of spontaneous social behavior as to appear stuporous, but in less extreme cases the differential quality and quantity of the depressed individual's responses is nonetheless unmistakable, and this change results in critical alterations of his social environment. Depressed people show reduced interpersonal responding and reduced voluntary nonverbal communication (Lewinsohn and Graf, 1973; Libet and Lewinsohn, 1973). The depressed person' verbal and motor behavior is ill-timed and is often construed by others as confusing or inappropriate (Lewinsohn, 1974). The cognitive and affective withdrawal of the individual from incentives manifests itself in a kind of aimless, drifting behavior pattern, which is often construced as aversive by nondepressed, goal-oriented individuals (Coyne, 1976a, 1976b). Social interaction with depressed individuals is likely to be evaluated negatively on the basis of its qualitative aspects rather than on the basis of more concrete interaction outcome criteria. While this statement seems anything but profound, it is important to note that depressed people are not necessarily in a constant state of motor and/or verbal retardation, but are decidedly proficient in their ability to arouse feelings of guilt in others while simultaneously inhibiting direct expression of annoyance or hostility from them (Coyne, 1976a). The social actions of the depressed person are perceived as aversive by others, and evidence has been generated suggesting depressed persons induce negative reactions and noncontingent punishment from nondepressed individuals (Coyne, 1976a).

Behaviorally, depressed individuals have been shown to be decidedly deficient on operational measures of social skill including activity level, interpersonal range, rate of positive reactions emitted, and action latency (Libet and Lewinsohn, 1973).

The depressed individual is seen in overview as being not simply behaviorally deficient, but broadly inappropriate in terms of adaptive interaction with the environment. He responds, if at all, in an attenuated or delayed fashion which often is subjectively aversive to others. A vicious circle ensues. Attempts by the depressed individual to engage in rewarding interaction with his environment by "toughing things out" or other such determined attempts to recover from his negative subjective mood are sabotaged not only by his distorted cognitions, but by his inability to execute interpersonal behaviors in a manner which is perceived as nonaversive by others.

Theories of Depression

There exist two main theoretical approaches to the concept of depression which are relevant to the present study. The first is the operant-behavioral approach as typified by Ferster (1974) Lazarus (1968), and Lewinsohn and his colleagues (1973, 1974). These theorists deal with the phenomenon of depression in traditional learning theory terms of environmental stimuli which elicit and maintain human behavior. The phenomenon we label as depression is seen as a particular condition or point on a continuous dimension of psychological states identified in terms of intensity, frequency, and duration of various behaviors. As shall be seen below, additional assumptions may be introduced to account for observed phenomena which upon casual inspection appear to

be contradictory or inconsistent with simple operant theory. As these assumptions dealing with constructs such as expectancy, reinforcement value, and incentive value are introduced, behavioral theories begin to appear in many respects not dissimilar to the second major theoretical approach, cognitive theory. Indeed, as will be seen, it is often difficult to clearly classify a given theoretical approach as exclusively a member of one or the other of these schools of thought. The major theoretical difference between the two systems is clear, however, and well stated by the major exponent of a cognitive theory of depression, Aaron T. Beck (1963, 1972, 1976). Depression is viewed by Beck as the product of a thought disorder, which serves to incorrectly mediate both internal and external stimuli, and is the causal agent of abnormal behavior.

It is clearly beyond the scope of the present study to attempt a resolution or comprehensive consolidation of the many variations of cognitive-behavioral theories of depression. A number of relevant theoretical approaches will be examined, however, in an effort to provide at least a rudimentary integrative framework which will support both the present and future research.

Behavioral Approaches

Ferster (1965) described pathological behavior as a direct result of an individual's interaction with his environment and his reinforcement history. At the time, Ferster called for both a topographic and functional analysis of behavior. It was soon noted by many, however, that the former type of analysis, which simply describes what has occurred without explanatory recourse to antecedents or consequences,

did not have the power to discriminate depressed from nondepressed individuals. It is obvious to even the casual observer of human behavior that the activity at any given time of a physically tired and lethargic individual, for instance, may be virtually identical to the behavior of a moderately depressed person. Ferster has acknowledged that there exist no behaviors which are specifically unique to the state of depression (Ferster, 1974). A functional analysis of behavior is thus seen as the critical evaluation. Ferster (1965, p. 24) contends that the core feature in an operant analysis of depression is ". . . a reduced frequency of emission of positively reinforced behavior." The depressed person is then distinguished from the nondepressed person by the relative frequency of occurance of specific behaviors in the framework of the total behavioral repertoire.

This position has been repeatedly reaffirmed by other behaviora researchers (Lazarus, 1968; Lewinsohn, 1974; Liberman and Raskin, 1971). Agreement upon this basic tenet does not serve to explain how the condition is produced and maintained, however, and at this point behavioral theories being to diverge and diversify.

Ferster cites the classical clinical example of two spinster sisters who live in virtual seclusion until one dies, and the other then becomes severely depressed. While it seems incontrovertable that extremely large portions of an individual's behavioral repertoire may be under the control of a very limited aspect of the environment, as in this example, the fact remains that not all such losses lead to severe depression.

Liberman and Raskin (1971, p. 522) have conceptualized loss as "an overa-l decrement of reinforcers" in an attempt to circumvent the

problem but concede that the significance of the loss is an important and complex factor which is necessarily symbolically mediated. Similarly, Lazarus (1968) speaks of the deterioration of either frequency or quality of response as a function of reduced reinforcement; and considers the depressed individual to be virtually on an extinction schedule.

Ferster (1974) notes that the particular reinforcement schedule which applies to a given behavior may greatly affect its frequency of occurrence and resistance to extinction. Laboratory research has clearly demonstrated the high frequency response patterns generated by variable ratio schedules, and the relative weakness of responses generated by stretched fixed ratio schedules, including the phenomenon of "ratio strain," in which the indivudal ceases to respond entirely for quite some time following reinforcement. Ferster (1972, 1974) relates fixed and variable ratio and interval schedules to various commonly observed instances of depression. He cites, for example, the well-known depressive phenomena of middle aged people as a result of the individual's entering upon a fixed interval schedule involving considerable work for a stable amount of reinforcement, this schedule change being seen as a concomitant of the end of the person's "upwardly mobile" vocational or professional development period.

Although Ferster's specific examples, such as those noted above, are quite compelling, they seem to leave the impression of bringing the behavior to the theory rather than providing a comprehensive theory which comfortably encompasses all observed behavior. Behaviorists have continually expanded their theoretical base in an attempt to provide a more adequate theory. The current behavioral definition of

depression includes: 1) specifying relevant motor, verbal and nonverbal behaviors which are viewed clinically as part of the depressive constellation, 2) recording the rate at which those behaviors occur, and 3) elucidating precipitating and maintaining factors in the environment, that is, functionally related variables (Liberman and Raskin, 1971). From this point of view, verbal and nonverbal communications of subjectively experienced unhappiness are seen as behaviorally specifiable components of depression, with the onset of such behaviors being seen respondent to environmental change and their maintenance seen as an outcome of operant conditioning in which attention, concern, and sympathy from significant others serve as reinforcement for the behavior.

In an effort to expand the operant approach to encompass what might be described as a richer or more uniquely human understanding of depressive behavior in terms of the complexities of social interaction, Lewinsohn and his colleagues (Lewinsohn, 1974; Lewinsohn and Graf, 1973; Libet and Lewinsohn, 1973; Lewinsohn, Weinstein, and Shaw, 1968) have pursued the operant approach to depression from the particular vantage point of social learning theory.

The focus of this group of researchers has been on the hypothesized causal relation between depression and various forms of social skill deficiencies (Lewinsohn, 1974). The fundamental operant hypothesis asserting that a low rate of response contingent positive reinforcement acts as a stimulus for depressive behaviors is retained intact, and is posited as a sufficient explanation for the emission of such typically depressive behaviors as sadness, reduced activity level and withdrawal or apathetic behavior (Lewinsoh, 1974; MacPhillamy and Lewinsohn, 1974). The constellation of behaviors recognized as

typical of depression are seen as contributing to a reduction of social skills, which is defined as the complex ability to both emit behaviors which are positively or negatively reinforced, and not to emit behaviors which are punished or extinguished by others (Libet and Lewinsohn, 1973). Interpersonal behaviors are therefore evaluated as socially skillful in terms of their social consequences, specifically whether or not they serve as discriminatory stimuli for responses from the environment which increase the probability of emitting the initial behavior. The depressed person is identified as one who is less skillful in eliciting the available reinforcers in his environment. A number of studies have been conducted to examine this notion. Libet and Lewinsohn (1973) found that depressed individuals scored lower on operational measures of social skill, including activity level, interpersonal range, rate of positive reactions emitted, and action latency. They generate less attention and interest than nondepressed people. MacPhillamy and Lewinsohn (1974) reported additional supportive data.

The research reported above has not resulted in widespread agreement among operant-behavioral theorists, and the results are not entirely consistent with other recent research. Lewinsohn and Graf (1973) reported mood to be directly related to the number of pleasant activities in which the subject engaged, and Lewinsohn and Libet (1973) found intensity of depression inversely proportional to the amount of positive reinforcement obtained. Liberman and Raskin (1971), however, contend on the basis of their own research that mood change is simply a function of amount of reinforcement and is independent of rate of motor behavior. While these results are not directly contradictory, the question is

raised as to which of the specific social skills posited by Lewinsohn, et al. are necessary and/or sufficient to modify depression.

An additional issue to be dealt with is the fact that depressive behaviors themselves may elicit either direct positive reinforcement such as changes in the family system which provide a form of "secondary gain," or other responses which serve to maintain the depressed behavior. Burgess (1968) and Lazarus (1968) have both held that depressive behaviors are reinforced by others in the environment, and that the depressed person's typical failure to complete task-oriented behaviors is a result of social reinforcement following interruption of a response chain. Liberman and Raskin (1971) provide evidence which supports this notion.

Coyne (1976a, 1976b) has recently argued against the traditional assumption made by Ferster and Lewinsohn, that the depressed person possesses a distorted view of the environment and a deficit of social skills. Coyne reported that depressed people elicited anxious, hostile, and rejecting responses from nondepressed individuals (Coyne, 1976). Although no significant differences were observed between either the depressed or nondepressed groups on measures of activity, approval responses, or hope statements, the negative affect alone of depressed subjects elicited aversive responses from nondepressed subjects. In addition, it was found that nondepressed people in the social environment attempt to reduce the aversive behavior of depressed individuals and reduce their thoughts of guilt by manipulating the depressed individuals with non-genuine reassurance and support while simultaneously rejecting and avoiding them. Depressed individuals, upon recognizing discrepancies between this verbal reassurance and the behavior of

others, become confirmed in their thoughts of inadequacy and attempt to gain control of others' behavior by intensification of depressive behaviors, which of course, results in a vicious circle.

Environmental response is seen from this point of view as part of an emergent system of depressive behavior and response which results in a unique situation requiring not simply common social skills, but special skills, unknown to the depressed person, with which to cope with a condition of induced noncontingent punishment and unfavorable contingencies. This interpretation does serve to avoid a major problem with Lewinsohn's theory, which is the question of why depressed persons were not previously depressed if they have a skill deficit. Libet and Lewinsohn's (1973) suggestion that social skill deficits are maximized by conditions of strangeness and ambiguity would seem to be consistent with Coyne's theory.

Upon broadly reviewing the nature and direction of operant-behavioral theory and research on depression, a distinct pattern is evident. New conceptualizations have continually moved toward inclusion of increasing numbers of social and covert variables. The existence of covert experiential phenomena had never been denied (Ferster, 1974), but operant-behavioral theorists have only slowly begun to accept the necessity and efficacy of their inclusion in a meaningful and comprehensive theory of depression. Recently, learning theory literature has experienced a resurgence of interest in incentive and expectancy models of learning (Bolles, 1972; Klinger, 1975; Logan, 1971), and the critical importance of processes of symbolic mediation has been acknowledged (Bandura, 1969; Mahoney, 1974; Meichenbaum, 1977). Approaches

incorporating these notions have greatly broadened the behavioral approach to depression.

Klinger (1975) and Bolles (1972) have argued that operant reinforcement theories of depression are deficient in that reinforcement may not in fact directly affect overt responses, but rather influence covert cognitive processes such as selective attention, short and long term memory storage, decision making, and prospective outcome evaluation, which serve to mediate the individual's responses. Renewed interest in incentives, objects that attract or repel a person, is reflected by the conceptualizations of Logan (1971) and the resarch of Bolles (Bolles, 1972; Bolles and Moot, 1972, 1973). From this point of view, people are seen as learning to expect emotionally significant events following a response, and this expectancy then motivates the performance of that event response according to the value of the consequent events (Logan, 1971). A stimulus object is thus seen as acquiring an emotional-cognitive component which mediates the occurance of the response. The nature of reinforcement is seen as to provide for future potentiation of responses. Rewards, then, do not "stamp-in" habits, but "excite" habits that have produced them in the past.

Incentives are therefore conceptualized as having elements of both learning and motivation. This formulation allows a considerable expansion of the operant-behavioral view of the process of depression. Severity of the loss of reinforcement becomes a function of not only the quantitative aspects of the lost reinforcement in the individual's behavioral repertoire, but also the degree to which the lost incentive was capable of eliciting positive affect, and the proportion of the

response repertoire that was shaped specifically to obtain and enjoy the incentive (Klinger, 1975). Bolles and Moot (1972), working with rats, have attempted to demonstrate that two kinds of expectancies are learned, the first associating two or more stimulus events in a predictive fashion, the second acknowledging causal relationships between behavior and its consequences.

What is inherent in these notions is that reinforcement alone is not necessarily sufficient for given responses to occur. The processes of symbolic mediation arise as a useful, if not absolutely necessary key to understanding human behavior. Furthermore, with respect to the phenomenon of depression, it becomes apparent that there may well be significant cognitive variables which discriminate between depressed and nondepressed persons, which can serve as a useful model for explaining depressive behaviors which have continued to pose difficulties for operant-behavioral approaches. It seems unlikely that a satisfactory theory of depression will be able to neglect such cognitive variables if it is to be truly descriptive of depression as it is humanly experienced. The current drift of behavioral theory toward this area of investigation both betrays its limitations and offers new promise of a comprehensive yet parsimonious explanation of the phenomenon of depression.

Cognitive Approaches

The leading exponent of a cognitive theory of depression has been Aaron T. Beck (1963, 1970, 1971, 1972, 1973, 1976). According to Beck, all psychogenic disorders are primarily thought disorders (1963). He asserts that all types of abnormal behavior patterns share the same

kinds of formal and logical cognitive distortion. Beck's principal explanatory construct is the schema. Introduced by Miller, Galanter, and Pribram (1960), schemata are conceptualized as clusters of assumptions, attitudes, and beliefs concerning objects, events, or relations, and act as mediators between stimulus input and behavioral response. The reader is referred to Miller, et al. (1960) for a comprehensive review of this construct system. Of immediate relevance to this study, however, is the nuclear concept of cognitive processes as progeniters of affective and behavioral responses.

The assumptions for Beck's model are: 1) a person's reaction to a given situation depends on his conceptualization of the situation in terms of its personal connotations, meanings, and significance for him, 2) the cognitive content or meaning is chained to a particular affect congruent with the cognition, and 3) the significance of a particular event on the "domain" of the person is an important determinant of the affective response. A person's domain is defined as comprising the individual as a physical entity, his personal attributes, and various other animate and inanimate objects in which he has an investment (Beck, 1971).

Beck sees each particular category of abnormal behavior as reflecting a particular ideosyncratic ideational content which constitutes the characteristic schema of the disorder, and to which content appropriate affects are produced. In this paradigm incoming perceptual data are continuously matched against conceptual categories, beginning with broad supraordinate schemata, and progressing to more specific ones. This process, identical in both normal and abnormal individuals, is marked in depressives by the degree of distortion by internal processes

which distort the stimulus situation. Specifically, Beck sees the ideational content of depressed persons as centering on a theme of loss of some element or attribute that he considers essential for his happiness (Beck, 1976). Sadness results when a person's evaluation of his domain is reduced (Beck, 1971). Moreover, the depressed person dwells on thoughts of hypothetical losses, in an anticipatory "as if" form, and experiences pseudo-losses which are actually the result of mislabelling arising from the overmobilization of ideosyncratic schemata that disrupt appropriate matching of input data and cognitive categories (Beck, 1976, 1971). Beck (1972) reports clinical data that depressives even dream of loss, the cognitive schemata evidently shaping ideational content at various levels of consciousness. Whatever the actual stimulus situation, the individual must perceive an event as a loss and the object or attribute that has been lost or downgraded must have some positive value. The pervasiveness of the theme of loss in the thinking of depressed individuals is thus seen as reflecting a systematic ideosyncratic misconstruing of experience, in which depressives interpret experiences in terms of their notions of deficiency or deprivation. The depressed person lowers his self-esteem by attributing the "cause" of perceived loss to himself, often verbalizing self-criticisms, which have the effect of extinguishing any existing assets he may possess. The sadness felt because of his imagined lowered self-worth leads to further negative self-evaluations, resulting in a vicious circle feedback-loop of continual affective arousal, and a downward spiraling snowball effect ending in global, absolute pessimism (Beck, 1971, 1976). Successful experiences tend to be not integrated into self-image schemata, "screened out" by the intensity of this negative

process (Beck, 1976). We thus see, from Beck's point of view, the cognitive etiology of the depressive's frequently verbalized notions of helplessness and hopelessness, which are widely considered to be essential features of depression (Beck, 1971; Lazarus, 1968; Melges and Bowlby, 1969; Seligman, 1975).

The three supraordinate schemata held by the depressed person are a negative view of the world, a negative concept of self, and a negative appraisal of the future. Beck (1976, p. 105) refers to these schemata as the "negative triad," to which potent constellations of negative evaluative attitudes are associated. Cognitions are seen as the causative agent in depression. Depressed people experience the environment as overdemanding, blocking, and depreciating, and employ self-coercive injunctions of the form "should" and "must," all the while emersed in feelings of hopelessness and impotence.

Beck (1963) delineated three types of reality distortions in depressives. Paralogical distortions include errors of arbitrary inference, the process of drawing a conclusion in the absence of, or contrary to, available evidence necessary to arrive at a sound conclusion. Another common paralogical error is selective abstraction, conceptualizing an experience based upon a detail out of context, as opposed to the overall Gestalt. Such distortion is typically an overinterpretation in terms of loss. A third paralogical error is that of overgeneralization, in which a general conclusion is reached on the basis of a single event. The second major category of cognitive distortion in depression is stylistic in nature, in which grossly distorted exaggeration or minimization occurs. The third type of distortion is semantic, the depressed person using inexact labelling

to relate external events to himself when there is in fact no basis for such a connection.

Depressive cognitions are viewed by Beck (1971) as being experienced as "automatic" responses with no antecedent reflection, and possessing an involuntary quality, intruding on the person's thoughts. Furthermore, these distorted cognitions seem plausable to the individual, and he typically perseverates in interpreting a wide range of varied situations in terms of a few stereotyped ideas.

Affective, motivational, and physical manifestations of depression are regarded as secondary derivatives of distorted cognition. Alterations in subjective feeling states are said to follow from variations in cognitive emphasis, and Beck has received some theoretical and clinical support for this notion (Ellis, 1973).

Physical symptoms such as fatigue, motor retardation, and agitation are also posited as functional outcomes of prevailing cognitions. Support for this position has come from Friedman (1964, cited in Friedman and Katz, 1974) who found that hospitalized depressives performed adequately in varied standardized test situations despite common feelings of exhaustion, suggesting that even physical symptoms of depression are more subjectively, rather than physiologically valid. Similarly, the frequently observed indecisiveness and "paralysis of the will" (McNitt, 1976) exhibited by depressives are linked to specific negative cognitions, as are heightened dependency and escape-avoidance tendencies.

Several researchers, as well as Beck, have offered theoretical and empirical data which is congruent with Beck's theory. Melges and Bowlby (1969 have held that attitude toward the future plays a central

role in many pathological conditions. Their approach also has had its structural roots in the work of Miller, Galanter, and Pribram (1960). They too, report hopelessness to be directly proportional to intensity of depression, as assessed by self-report and clinical ratings. Helplessness and hopelessness are conceptualized as reflecting an estimate by the individual of the probability of achieving certain goals. Goals are pursued through the use of plans, hierarchically ordered sequences of intended action. Depressed people are seen as characterized by beliefs and expectations that their skills and plans are ineffective in reaching their goals, that failures are due to their own incompetence, and that previous goal-directed behaviors have met with numerous frustrations and failures. They reported depressed subjects were neglectful of present outcomes as determinants of behavior, preoccupied with a dogmatic focus on long-range goals. The normal process of plan/goal interaction, in which event outcome results in subsequent modification of plans and goals is subverted. Affective signals, which normally function as cues for plan modification following outcomes, are uniformly negative, but the depressed person, in spite of his hopelessness that his plans will achieve their goals, perseverates in his stereotyped activity (Melges and Bowlby, 1969; Pribram and Melges, 1969). Although the emphasis of Melges et al.'s theory is structural in nature, its congruency with Beck's theory is striking. Schacter and Singer (1962) have held that the labelling of a physiological state of arousal may be determined by cognitive mediation. They found that a cognitive set of self-statements which a person emits while experiencing somatic arousal had a major effect on emotional behavior. Meichenbaum (1973) has reported similar findings. Emotional states are seen here as a

function of cognitive statements and physiological arousal. The major implication for Beck's theory is that the depressed person, emersed in negative cognitions, will tend to mislable virtually all states of arousal in the direction of negative affect. This provides an additional supportive explanatory concept for Beck's vicious circle feedback-loop.

Working from a biologically linked incentive theory of depression, Klinger (Klinger, 1971, 1975; Klinger et al., 1974) too has noted the distortions of selective abstraction, overgeneralization, and exageration. He has identified hopelessness and helplessness as cognitive overgeneralizations from specific losses. Grossly exagerated incentive values, with self-worth predicated on effectiveness in obtaining incentives, lead to devastatingly extensive and intensive feelings of loss in the depressed person. Klinger (1975) also noted the obsession-like cognitive commitment of depressed individuals to a narrow band of current concerns, and their resultant selective attention and response to concern related cues. The sum effect of this distortion again appears to be remarkably similar to Beck's conceptualization of a cognitive-behavioral spiral.

Beck himself has generated considerable clinical data, from which he has evolved the bulk of his cognitive theory (Beck, 1972, 1976). He provides multiple illustrative clinical examples for virtually all of his theoretical concepts, and the reader is referred to Beck (1972) for an extensive review of such data.

Identifying the specific distortions of depressive thinking does not, in itself, provide a solution to the problem of treating depression clinically. Although direct methods of cognitive restructuring have been employed with some success (Ellis, 1973), depressive cognitions

appear to be pervasive and seemingly involuntary (Beck, 1972). While cognitive theory is based on hypothetical constructs, and much of the primary data has been largely subjective, it is a compelling approach. Cognitive treatment approaches have been typically used in conjunction with behavior modification techniques to obtain positive results, again illustrating the limitations of either cognitive or operant theories alone, and the power of their integrated application.

Becker (1974) has clearly and repeatedly lamented the lack of replication in research on depression, and the problems associated with "closed," or ambiguous untestable theoretical systems. The behavioral and cognitive theories described above are exceptional in that they are well tied to clinical data, and are indeed capable of generating many testable hypotheses. As has been stated earlier, the view of this author is that a comprehensive theory of depression will need to incorporate cognitive as well as operant constructs. Research which serves to further the formation of a synthesized cognitive-behavioral theory of depression has begun, and is the foundation for the present study.

Integrative Theory and Research

The preceding review of theoretical issues illustrates the indispensable role of organismic variables in a comprehensive theory of depression. Ferster (1974) has acknowledged the intuitively obvious fact that one's ability to be rewarded by the environment depends on one's accurate perception of the consequences of one's actions. The logical question then arises as to what differences in sources of reinforcement exist between depressed and nondepressed people (Liberman and Raskin, 1971). Normally reinforcing events may be rendered impotent as such by the depressed person's distorted cognitive processes.

An interesting approach to the issue of perception of reinforcement has been used by researchers of the phenomenon of "learned helplessness," an animal laboratory based analogue of depressive behavior which does not "fit" into any existing nosological category (Klein and Seligman, 1976). Seligman (Seligman, 1972; Seligman and Maier, 1967, 1968) working with shuttle-boxes in which dogs were first treated with inescapable and unpredictable shock, found that the animals subsequently reduced their rate of initiation of behavior, and were relatively unable to learn response dependent contingencies of negative reinforcement. Seligman identified a number of symptoms of learned-helplessness which appear to be parallel to manifestations of depression. In addition to passivity and retarded response-relief learning, aggressive behavior was reduced, as were food, social, and sexual behaviors, and all these effects were found to dissipate over time (Seligman, 1976). A third operation to produce learning was subsequently proposed, in addition to explicit-contiguity and explicit noncontiguity, this operation being the learning of independence between events (Seligman and Maier, 1967). It alledgedly results not simply from the loss of reinforcement, but from the loss of control of both positive and negative reinforcers.

The outcome of this type of learning is what Seligman has called a negative cognitive set, which mirrors the negativistic belief systems of depressed persons as reported by Beck (1972) and Friedman (1964). The person believes that no matter what response he makes, he will be ineffective in positively influencing his environment. This attitude is common in depressed people, and recent research does in fact suggest parallels between learned helplessness and depression, and perception

of response-contingent reinforcement.

Miller and Seligman (1973), in attempting to assess the nature of the depressed individual's perception of reinforcement, employed a paradigm which drew upon the previous research of Phares (1957), Blackman (1960, cited in Rotter, et al., 1961) and Rotter, Liverant, and Crowne, 1961). Phares (1957) found that whether or not subjects saw the experimental task as being determined or controlled by chance, randomness, other factors outside their control, or saw reinforcement as an outcome of their own characteristics or skills, had a systematic effect on changes in expectations for future reinforcements. Blackman (1960, cited in Rotter et al., 1961) showed that nonobvious patterning of reinforcement apparently affected the perception of a task as chance or skill. Rotter, Liverant, and Crowne (1961) extended that research and found that past reinforcement was perceived as a more clear clue to future outcomes on skill, as opposed to chance tasks. They reported that verbalized expectancies of future successes on a task was a function of subjects' perception of past outcomes as response contingent, and subjects resultantly modified trial by trial expectancies significantly more on a skill task than on a chance task.

According to Seligman's (1975) theory, depressed people fail to perceive response contingent rewards as consequences of their own actions. Miller and Seligman (1973), employing a 50% rate of reinforcement, reported that depressed college students showed significantly smaller changes in expectancy on a skill task, as measured by trial by trial estimates, than did nondepressed subjects. Furthermore, nondepressed subjects' expectancies showed greater change on the skill

task than on the chance task, while depressed subjects showed no differences in response patterns across the two task conditions. They concluded that depressed individuals perceive all reinforcements as response dependent, whether or not that is in fact the case. Miller, Seligman, and Kurlander (1976), Klein and Seligman (1976), and Miller and Seligman (1976) have replicated these original findings of task x depression interaction. Klein and Seligman (1976) were also able to first induce, and then reverse, the perceptual and performance deficits associated with learned helplessness by providing "therapeutic" experience with solvable discrimination problems. These last results, however, would seem to indicate that depressed individuals can indeed perceive response contingent rewards as such. Kelin and Seligman (1976) noted, however, that subjects receiving four, as opposed to 12 problems, did not show greater skill-task expectancy changes than did control group subjects.

These findings of Klein and Seligman (1976) create a problem for Seligman's thesis, that the depressed person is insensitive to the efficacy of his skilled actions. Evidence generated by Beck and his colleagues (Loeb, Beck, Feshbach, and Wolf, 1964; Loeb, Beck and Diggory, 1971) similarly suggests the presence of sensitivity to response dependent outcomes in depressed subjects. Loeb, et al. (1964, 1971) found that depressed subjects actually showed greater positive changes in expectancy of success than nondepressed subjects in the same reinforcement condition, although depressed subjects were initially more pessimistic and were slower to respond to their successes.

Although major methodological differences make it difficult to

compare the results of Loeb et al. directly with those of Miller and his colleagues, their results were clearly contradictory when viewed from the perspective of their respective initial theoretical positions. The notion that they are incompatible does not necessarily follow, however, and recently research has been initiated in an attempt to develop a theoretical network which is viable in terms of all of the above reported results.

McNitt (1976) hypothesized that the foregoing research suggested that depressed individuals could perceive response contingent rewards, but only if the reinforcement was frequent and unambiguous. She further posited that the higher threshold held by depressed individuals for perception of reinforcement accrued from abnormally stringent and perfectionistic self-standards, such self-imposed criteria having been noted by Beck (1972) as characteristic of depressed individuals. McNitt (1976) replicated the procedure of Miller and Seligman (1973), also using college student subjects, but not monetary reinforcers, and extended the design such that both 50% and 75% reinforcement schedules were employed for both skill and chance tasks. Surprisingly, McNitt's results were in large part contradictory to those of Seligman and his colleagues, and were confusing in that they defied explanation in terms of the basic theoretical premises of the study (McNitt and Thornton, 1978). No differences were found between depressed and nondepressed subjects in their modification of skill task expectancies in either reinforcement condition. Furthermore, in the chance task, 75% reinforcement condition depressed subjects reacted as if it was a skill situation by significantly altering their expectancies during the task

trials and producing larger final expectancies than nondepressed subjects. While the first finding would seem to simply refute the notion of depression based on perceptual distortion or deficit, the latter finding was inexplicable in terms of the existing conceptual formulazation. Parenthetically, it should be noted that nondepressed subjects altered their expectancies on the chance task more than could be reasonably expected assuming a proper understanding of chance probability. This raises a question of validity concerning the chance task, and the possibility of chance task outcomes as being at least in part experimental artifacts.

McNitt (1976) advanced the idea that a more useful and parsimonious explanatory construct embracing the cumulative experimental findings was Beck's (1972) notion of overgeneralization. From this point of view, McNitt interpreted her results as supportive of the idea that depressed individuals are guided primarily by prior successes and failures on the task at hand, rather than incorporating, as do normally functioning people, more broad and abstract data such as information regarding the nature of the task and prior expectancies. Depressed subjects were conceptualized as being perceptually blind to the response independent nature of the chance task, simply focusing on trial by trial outcome, and overgeneralizing from these results to expectancies of future success.

The relatively conservative position taken in this study is that theory building based on the experimental data thus far generated, may be advancing at the expense of careful examination of the specific variables involved in depressive behavior. A key question that has

remained unanswered is that of what is actually reinforcing for depressed versus nondepressed individuals. The recent studies cited in this review have failed to clarify this issue, and in fact may have introduced methodological and theoretical confounds which threaten the validity of the reported results.

Phares (1957) and Miller and Seligman (1973) considered knowledge of results to be the primary reinforcing stimulus, but in addition employed small monetary reinforcers to supplement both the success and failure experience. Miller and Seligman (1973) called this "positive and negative reinforcement," but in fact the latter process was punishment for failure. It is interesting that McNitt (1976), in failing to replicate Miller and Seligman (1973), did not use such a supplement. McNitt (1976) also altered Miller and Seligman's (1973) procedure in that on failure trials subjects were allowed to nearly succeed in the task, introducing further problems involving possible interference by motivational, expectancy, and success criterion factors, creating proglems in interpreting precisely what was construed as success by the subjects.

In the Klein and Seligman (1976) study, the "therapy" task that was used to reverse performance and perceptual deficits was a pure skill task, leaving virtually no room for cognitive distortion of the contingencies of reinforcement. The point to be made here is not that of questioning the experimental results, but to note that both the induction of learned helplessness in nondepressed people and the "therapy" treatment given both depressed and nondepressed groups are highly artificial in nature, and generalizations to extra-laboratory

situations must be made only with great caution. Similarly, McNitt (1976) noted that the procedure both she and Miller and Seligman (1973) employed was quite artificial, the chance task in particular presenting a number of methodological and interpretational problems. Indeed, the question can be legitimately raised as to what extent the experimental results may be artifacts of the procedure. McNitt (1976) has suggested that chance and skill elements be combined to better approximate reinforcement contingencies as they exist outside of the laboratory. This would seem to be a useful and needed modification of the experimental paradigm, and will be attempted in this study. Similar problems exist with Loeb et al.'s (1971) study, in which following each task the subject was explicitly instructed as to the positive or negative outcome of the task, effectively confounding the issues of perception of success and reinforcement.

The multiple differences and confounds in the existing research make it impossible to attempt a useful reinterpretation or integration of the experimental results. What appears to be sorely needed is a renewed focus not only on methodological clarity and consistency, but also on the credibility of the interpretive assumptions as they now stand. The learned helplessness oriented researchers have made the explicit assumption that depression entails a specific cognitive distortion of the consequences of skilled action (Miller and Seligman, 1973). However, the nature of this distortion is viewed as involving nonrecognition of the response-dependent nature of those consequences. The unstated assumption which has also been adopted is that the reinforcement potential of a given event remains unchanged for depressed

and nondepressed people. Yet there is no direct evidence that "success" equals reinforcement for depressed people within the experimental paradigm. The critical variable operating in the above cited research may not be perception of response dependency, but simply experience of reinforcement or punishment. By "experience of reinforcement" is meant the effective operation of a reinforcer as such, rather than simply the cognition that a reward has been presented as a consequence of one's actions. There must be a systematic relationship between presentation of the reinforcer and the individual's behavior. The presumed reward must fall into the category of reinforcer for the particular individual involved. The experience of success may not in itself be highly enough potentiated by depressed people to act as a reinforcer. Furthermore, nondepressed and depressed people may respond differently to the experience of failure or punishment. The use of money and verbal elucidation of results in the previous studies may be seen as additional reinforcement, extrinsic to the experience of success, potentially confounding the theoretical clarity of the reported results.

In order for a reinforcer to modify behavior, it must be correctly identified and symbolically mediated (Bandura, 1969; Ferster, 1974). Beck (1972) has noted severe deficiencies of veridical cognitive processing in depressed people. A more parsimonious speculation than that of Seligman et al. regarding perception of reinforcement by depressed individuals is that perception of response dependency is not a prime factor. Rather, it is submitted that depressed individuals simply focus on past success and failure on the task, as suggested by McNitt and Thornton (1978). Furthermore, it is proposed that cognitive

impairment of depressed individuals results in a tendency to experience environmental phenomena in a narrow, concrete way. Specifically, environmental stimuli requiring progressively more complex levels of abstract symbolic mediation are expected to show corresponding decreases in reinforcement value, due to the depressed individual's severely circumscribed cognitive functioning and inability to correctly mediate such stimuli. Within this theoretical framework, money, a well established generalized secondary reinforcer, would be expected to be a more effective reinforcer than the simple experience of success, assumed to entail a more abstract concomitant covert process of perception and self-reinforcement. The depressed person is seen as somewhat "stimulus bound," relying on tangible, concrete stimuli, to the exclusion of coexisting but possibly discordant higher level stimuli.

The present study tests this hypothesis using a modification of the paradigm used by Miller and Seligman (1973) and McNitt (1976). The Vertical Aspiration Board (Rotter, Liverant, and Crowne, 1961) was employed to provide a controlled skill task situation. The success rate for both depressed and nondepressed subjects was 50 percent. This rate of success provides an ambiguous performance outcome which is difficult to clearly lable as success or failure. Three levels of monetary reinforcement were utilized, zero percent, 50% or 100% of the successful trials being externally reinforced with money during the task. A 2 x 3 nonrepeated measures design was thereby established examining three levels of external reinforcement across depressed and nondepressed groups in a skill related task manipulated so as to have 50% of the total trial outcomes successful. The contingencies of external reinforcement in this design attempted to approximate "real

world" conditions, where varying amounts of successful task-oriented behavior may go unnoticed by others in the environment, leaving the individual with only self-reinforcement as a source of reward.

The relative effects of external reinforcement and covert self-reinforcement were investigated employing the following dependent measures: 1) preceding the first task trial, an estimate of expected success on the task, in terms of an 11 point scale, 2) evaluation of success following the final trial, in terms of an 11 point scale, 3) change in level of expectancy of success following the first, successful trial, assessed by an 11 point scale, 4) expectancy following the final, successful trial, 5) the sum of the absolute values of all trial by trial changes in expectancy level, and 6) following completion of the task, estimation of the amount of skill, as opposed to chance, that was involved in succeeding at the task. Six specific hypotheses were tested.

Hypothesis 1: Prior to the beginning of the task, nondepressed subjects will give significantly higher estimates of success on the task than will depressed subjects, as reflected by the first dependent measure.

Depressed subjects will be decidedly more pessimistic in evaluating their ability to deal with the presented task.

Hypothesis 2: Upon completion of the task, evaluation of success by nondepressed subjects will be significantly higher than evaluation of success by depressed subjects in the 0% and 50% reinforcement groups, but not significantly higher than depressed subjects in the 100% reinforcement group, as reflected by subjects' evaluations on the 11 point scale.

Depressed subjects in the 0% reinforcement group will underestimate their success, mainly as a function of their negativistic

cognitive set. Depressed subjects in the 50% reinforcement condition will attend primarily to the money reinforcers, which will erroneously suggest for them a 25% success rate, and they will subsequently consider their performance a failure. Depressed subjects in the 100% reinforecment condition, also attending to the monetary reinforcement, will perceive and reflect relatively accurate feedback regarding their performance.

Hypothesis 3: Depressed subjects in the 0% reinforcement group will estimate their success on the task significantly lower than will depressed subjects in the 50% reinforcement group, and depressed subjects in the 50% reinforcement group will estimate their success significantly lower than depressed subjects in the 100% reinforcement group, as reflected by subjects' evaluations on an 11 point scale. Furthermore, subjects in the 0% and 50% reinforcement groups will estimate their success on the task significantly lower than the actual 50% level of success attained.

For the depressed subjects in the 0% reinforcement group, the absence of concrete feedback reflecting the successful trials of the task will result in these successes not being properly integrated into the subjects' perception of their effectance on the environment. Consequently, they will conclude that they have been decidedly unsuccessful, reflecting their pervasive negativism. Depressed subjects in the 50% reinforcement group will assess their performance on the basis of their monetary rewards, fixating on the 25% total reinforcement received and erroneously basing their estimates on this figure. Both of these groups will thus not appropriately evaluate their level of success on the task. Depressed subjects in the 100% reinforcement group, by contrast, will also focus on the money to provide feedback, but in this case the feedback will accurately reflect their level of performance.

Hypothesis 4: Depressed and nondepressed subjects will differ significantly in their estimates of the amount of skill involved in succeeding at the task, as reflected by their estimates as measured by an 11 point scale.

Depressed subjects will tend to attribute their success to luck rather than skill, avoding the cognitive dissonance which would accrue if they were to admit to being effective in dealing with their environment. Attribution of success to nonskill factors leaves intact their attitudes of helplessness and hopelessness.

The design of this study also affords the opportunity to partially replicate the work of Miller and Seligman (1973) and McNitt (1976). The 100% reinforcement condition is somewhat analogous to the state of affairs in the former study, while the 0% reinforcement condition, involving no external rewards, is very similar to the latter study. Two additional hypotheses can thus be made, drawing on the somewhat contradictory findings of these two studies.

Hypothesis 5: When reinforced for 100% of their successes, nondepressed subjects will modify expectancy levels significantly more than depressed subjects, as reflected by change in level of expectancy of success following the first, successful trial, expectancy following the final, successful trial, and the sum of the absolute values of all trial in by trial changes in expectancy level.

Nondepressed subjects will accurately perceive reinforcement as response dependent. Miller and Seligman (1973) hold that depressed subjects will modify expectancies significantly less than nondepressed subjects, and they interpret this as a failure to perceive task outcome as response dependent. An alternative conceptualization, cast in the framework of the present study, would be that depressed subjects focus on the monetary reinforcement, amounting to a total of 50% of the

total trials, and respond in a way which appears to ignore the response dependent nature of the task. They incorrectly deduce from the 50% success outcome in a dichotomous outcome situation, that it is a simple random success situation, and avoid the notion that they can be effective in obtaining desired rewards, which is incongruent with the cognitive schemata common to depression.

Hypothesis 6: When reinforced on 0% of their successes, depressed and nondepressed subjects will significantly differ in modifying expectancies as reflected by expectancy following the final, successful trial, and in the sum of the absolute values of all trial by trial changes in expectancy level.

Rejection of this hypothesis would support McNitt's (1976) results. If supported, it would cast doubt on those results, suggesting the possible operation of methodological confounds in the prior study which resulted in failure to replicate the results of Miller and Seligman (1973).

CHAPTER II

METHOD

Subjects

Seventy-two undergraduates at Michigan State University were recruited from a pool of students attending introductory psychology classes. The subject pool was restricted to students between the ages of 17 and 25. No systematic effects of gender have been found in previous relevant experiments, and sex differences were recorded but not controlled. A total of twelve subjects were assigned to each cell of the six group design. Students volunteering for the experiment were contacted to arrange a time to come to the laboratory. All students received course credit for their participation. Subjects scoring 8 or below on the Beck Depression Inventory (Beck, 1972) were chosen to participate in the skill task portion of the study, and were randomly assigned to one of the three external reinforcement conditions in the nondepressed category. Similarly, subjects scoring 9 or above on the BDI were randomly assigned to one of the three reinforcement conditions in the depressed category. The cutting score employed in this experiment is consistent with the mean BDI score of college students, as found by Miller (Miller and Seligman, 1973). Subjects were randomly assigned to cells until a minimum of twelve subjects were obtained for each cell. In order to obtain equal numbers of subjects in each cell, excess cell size was reduced by randomly discarding data. Discarded data was inspected for systematic differences with regard to the retained

data. Inclusion of the discarded data would not have significantly altered the results of the study. Table 1 presents the mean BDI scores and standard deviations for each of the six cells.

TABLE 1

Beck Depression Inventory Score Means and Standard Deviations of the Experimental Groups

Group	Reinforcement							
	0%		50%		100%		Overall	
	M	SD	M	SD	M	SD	M	SD
Nondepressed	3.42	2.91	2.91	1.98	3.92	2.64	3.42	2.50
Depressed	14.08	5.40	14.58	5.43	12.41	3.00	13.69	4.71

Note: Each cell contains 12 subjects.

Instruments

The Beck Depression Inventory is a self-report instrument which measures depth of depression. The individual items of the BDI were clinically derived and represent 21 categories of symptoms and attitudes, each category descriptive of a specific behavioral manifestation of depression (Beck, 1972). Four or five self-evaluative statements which comprise a graded series reflecting symptom severity are included for each category. The inventory items do not reflect any theoretical constructs of etiology or psychological processes in depression, but are based solely on their relationship to overt behavioral manifestations of depression. Each graded item is assigned a weighted value of from 0 to 3 according to its degree of intensity. Total test scores,

which range from 0 to 63, are therefore a function of both the diversity and intensity of manifestations of depression reported.

Beck and his colleagues (Beck, 1972) have devoted considerable work to developing this instrument. Internal consistency has been established for the BDI, all categories correlating positively with total score (range .31 - .68, $p < .001$). Split-half reliability was found to be .86, with a Spearman-Brown correction yielding a coefficient of .93. Indirect assessment of test stability showed parallel changes in the BDI and clinical ratings of depth of depression. Validation attempts were similarly comprehensive. Beck (1972) reports biserial correlation coefficients between BDI scores and clinical ratings of depth of depression of from .65 to .75. Similarly, the BDI was reported to correlate with Lubin's Depression Adjective Check-List ($r = .66$) and the MMPI D-scale ($r = .75$), these correlations being higher than these latter instruments correlated with each other. In addition, the BDI has been shown to be discriminative between depression and anxiety, as well as predictive of changes in clinical ratings (Beck, 1972). In an examination of the effect of extraneous background variables on BDI scores, race, age, and vocabulary test scores were shown to be uncorrelated with BDI scores (Beck, 1972). A small negative correlation ($r = -.163$) was found between educational level and BDI score, principally generated by scores of white male subjects. While statistically significant ($p < .01$), this correlation accounts for only 2.5 percent of the total score variance and appears to be trivial in terms of psychological significance. Beck (1972) found a significant correlation ($r = .180$; $p < .01$) in his sample population

between sex and BDI score, with women in the group tending to be more depressed. While this data cannot be overlooked, it accounts for only 3.6 percent of the total variance, while it is consistent with a similar correlation between sex and clinical ratings of depth of depression, thereby providing additional informal validation evidence. Construct validity of the BDI has been supported by confirmation of theoretically based hypotheses concerning the construct of depression as presented by Beck (Beck, 1972). These hypotheses include the notions that depressed people are more likely to report dreams with themes of deprivation and failure, they are likely to identify with "losers" on projective tests, to have a history of deprivation during the developmental period, and typically react to experimentally induced failure with an abnormally large drop in self-esteem.

Based on the above data, the Beck Depression Inventory (BDI) appears to be a reasonably reliable and valid self-report measure of depression, well suited for use in this type of experimental paradigm.

Apparatus

The Vertical Aspiration Board employed in the present study was similar to that used by Rotter, et al. (1961), Miller and Seligman (1973), and McNitt (1976). It consists of a movable wooden platform contained within a vertical frame. An eight foot long string is attached to the top of the platform and runs through a pulley, by which the subject can raise or lower the platform from a distance of about two feet away. A 1/2-inch steel bearing is held in place on top of the platform by an electromagnet concealed in a 3/4-inch hole in the back of the platform. Concealed brass strips running from the

electromagnet to concealed wires connected to a similarly hidden 6-volt dry cell and silent switch provide covert experimenter control of success and failure on the experimental task. The top of the platform is tilted slightly forward, such that the steel bearing will roll off the moving platform whenever the electromagnet is turned off by the silent switch.

Procedure

When each subject reported to the experimenter, he was administered the Beck Depression Inventory and the Internal-External Scale (Rotter, 1966). The latter instrument was employed as a filler, and order of presentation of the instruments was counterbalanced. The BDI was then scored, the subject was not informed of his scores, and was assigned to one of the three reinforcement conditions associated with his depression category, according to a prespecified random order. The experimenter then briefly explained the nature of the experimental task and read the following instructions:

> This experiment is to see how well you can succeed in raising this platform without the ball on top falling off (experimenter demonstrates), and also to see how accurate you are in estimating your success.
>
> The object of this task is for you to try by pulling this string to raise the ball on the platform as high as possible before the ball drops off. You will be given a number of trials. The apparatus is built with a very slight tilt forward so that the ball is likely to fall off the platform if it is shaken in any way. Of course, if you raise the platform very quickly, the ball will not drop off the platform because of its momentum. Therefore, the platform must be raised slowly. In order to be clearly successful you must score 80 or better on a given trial. Do you have any questions at this point?
>
> Before we begin I would like you to estimate how successful you will be on this task. You are to estimate your success on a scale going from 0 to 10. For example,

> if you feel you will be quite successful, you may rate yourself with a 9 or a 10. If you feel you will be moderately successful you may rate yourself with a number near the middle of the scale. If you feel pretty sure you will not be successful, you may rate yourself with a low number, such as a 0 or 1. You may use any number on the scale from 0 to 10 inclusive. It is important that you select your estimate carefully and that it corresponds closely with how you really feel. It should be an accurate description of the degree to which you really feel how you will or will not succeed.

The subject estimated his success on the task and this estimate was recorded, following which the instructions below were given before each trial.

> Now, make an estimate on the 0 to 10 scale as to what you think your likelihood of success is on the first (next) trial.

Each subject was administered 12 trials. The experimenter controlled trial by trial outcomes by using the switch turning off the electromagnet holding the steel ball. The subject was asked to stand about two feet in front of the apparatus table, and was given the free end of the string. Before each trial the experimenter recorded the subject's expectancy of success and placed the ball on the platform. On failure trials, the silent switch was used immediately after the subject began to raise the platform. The ball then rolled off the platform as a result of either actual variations in the subject's movement of the platform or the increasing forward slope of the platform as it was raised. On success trials the ball was not released until the platform reached the maximum height.

Following reinforced success trials, the experimenter simply said "good" and placed 10 cents on the table in front of the subject. If the subject questioned this action, he was told that it was a reward he could keep. No remarks were made by the experimenter to

emphasize or clarify the success or failure of the subject on any trial.

The order of success/reinforced and failure trials was as follows:

Reinforcement Condition	Trial 1	2	3	4	5	6	7	8	9	10	11	12
0%	+	-	-	+	-	+	+	-	-	+	-	+
50%	R	-	-	+	-	+	R	-	-	+	-	R
100%	R	-	-	R	-	R	R	-	-	R	-	R

- = Failure + = Success R = Reinforced Success

Following the twelth, final trial, the subject was given the instructions below:

> You have now completed the entire task. I would like you to estimate, again on the 10 point scale of from 0 to 10, how well you did on the task on the whole. If you feel you did quite well, you may rate yourself with a 9 or a 10. Similarly, if you feel you were moderately successful, you may rate yourself with a number near the middle of the scale. If you think you were not very successful very successful you may rate yourself with a low number such as a 0 or a 1. You may use any number on the scale from 0 to 10 inclusive. It is important that you select your estimate carefully, and that it corresponds with how you really feel. It should be an accurate description of the degree to which you feel you have or have not succeeded.

The subject made his estimate, and the final instructions were given as follows:

> Many tasks involve both an element of skill and an element of luck. Again on a scale from 0 to 10, rate the percentage of skill that was involved in this task. For example, a rating of 0 would indicate only chance effected the success or failure of the trial outcomes, while a rating of 10 would indicate that only skill was involved. Your rating should reflect the amount of skill involved in the task.

Subjects were then debriefed and thanked for their participation.

During debriefing care was taken to ascertain whether or not the subject recognized that the experimenter controlled task outcome. Data from subjects reporting they specifically suspected or understood the control mechanism were discarded from the data analysis, and were replaced by data from additional randomly assigned subjects. Similarly, data from subjects who improperly manipulated the apparatus was discarded.

Dependent Measures

Six dependent measures were employed to examine the effect of external reinforcement on the perception of success with depressed and nondepressed subjects. The first dependent measure assessed the subject's expectancy of success on the task prior to starting the task, employing an eleven point scale. The second dependent measure assessed the subject's evaluation of his degree of success, also on an eleven point scale, following completion of the task. The third, fourth, and fifth dependent measures assessed the cumulative effects of reinforced success, success, and failure. Specifically, these were (3) change in expectancy following the first, successful trial, (4) expectancy following the final, successful trial, and (5) the sum of the absolute values of all increases following success and decreases following failure. The sixth and final dependent measure assessed, employing and eleven point scale, the extent to which the subject attributed his performance on the completed task to factors of skill or chance.

CHAPTER III

RESULTS

The specifically hypothesized differences between depressed and nondepressed subjects on estimation of success on the task prior to the first trial, and estimation of the amount of skill involved in the task following the final trial, were evaluated by F-tests. The means, standard deviations, and F-test results are presented in Table 2.

Hypothesized differences between depressed and nondepressed subjects, and between depressed subjects across levels of reinforcement in terms of evaluation of success following completion of the task were initially examined by computation of a 2 x 3 nonrepeated measures analysis of variance and appropriate t-tests. The results are presented in Table 3. Comparison of depressed subjects' evaluation of success with their actual 50% level of success was made by t-test, as presented in Table 3.

In order to assess the effects of both level of depression and reinforcement on changes of expectancy level over task trials, three depression x reinforcement nonrepeated measures analyses of variance were computed for: 1) change in expectancy following the first, successful trial, 2) expectancy following the final, successful trial, and 3) the sum of the absolute values of all increases following success trials and decreases following failure trials. Tables 4, 5, and 6 present the means, standard deviations and results of overall F-tests computed for each of the dependent measures.

TABLE 2

Means and Standard Deviations of Expectancy of Success on the Task Prior to Beginning the Task and Estimation of Skill Involved Following Competion of the Task

Group	Expectancy of Success		Estimate of Skill	
	M	SD	M	SD
Nondepressed	7.19	1.01	6.67	1.35
Depressed	6.31	1.05	6.78	1.93

Note: N = 36 for each group
Range = 0 to 29

Analysis of Variance of Expectancy of Success Prior to Beginning of Task

Source	SS	df	MS	F
Depression	14.22	1	14.22	7.81**
Reinforcement	5.33	2	2.67	1.47
D X R	5.78	2	2.89	1.59
Error	120.17	66	1.82	

**$p < .01$

Analysis of Variance of Estimation of Skill Involved in the Task

Source	SS	df	MS	F
Depression	.22	1	.22	<1
Reinforcement	4.53	2	2.26	<1
D X R	8.36	2	4.18	<1
Error	194.44	71	2.74	

Prior to the data analysis proper, a thorough examination of the data was made to investigate the possibility of differential experimenter effects operating in the study. Four experimenters (two male, two female) were employed, and the data were analyzed across all independent variable levels and dependent measures with respect to inter-experimenter differences. No significant relationships were found for either individual or gender variables.

Since a between groups comparison of changes in level is unambiguous only if the groups are equivalent on initial expectancy level, a preliminary depression X reinforcement ANOVA was computed for expectancy of success on the first trial of the task. This analysis yielded no significant main effects or interaction effect, indicating inter-group equivalency at the start of the task.

In all cases where the data indicated a need for further statistical analysis to clarify either statistical or psychological trends suggested by the initial data analysis, appropriate tests were performed as described below. The results of this experiment support the first hypothesis that prior to beginning the task, nondepressed subjects will give higher expectancies of success on the task than will depressed subjects (Table 2, $F = 7.81$, $df = 1$, $p < .01$). Increasing depth of depression, as measured by the Beck Depression Inventory, was significantly correlated with decreasing expectancy of success on the task ($r = -.27$, $p < .02$).

The second hypothesis, that upon completion of the task, evaluation of success by nondepressed subjects will be higher than evaluation of success by depressed subjects in the 0% and 50% reinforcement

TABLE 3

Means and Standard Deviations of Evaluation of Success for All Experimental Conditions

Group	Reinforcement							
	0%		50%		100%		Overall	
	M	SD	M	SD	M	SD	M	SD
Nondepressed	7.08	1.73	7.33	1.23	7.42	.90	7.27	1.30
Depressed	6.58	1.56	7.17	2.33	7.75	1.22	7.17	1.78

Note: Each cell contains 12 subjects.

t - tests

	df	t
A. Nondepressed vs. Depressed		
0% Reinforcement	22	<1
50% Reinforcement	22	<1
100% Reinforcement	22	<1
B. Depressed		
0% vs. 50%	22	<1
50% vs. 100%	22	<1
0% vs. 100%	22	2.04*

*p < .05

Analysis of Variance of Evaluation of Success Following Completion of Task

Source	SS	df	MS	F
Depression	.22	1	.22	<1
Reinforcement	6.78	2	3.39	1.39
D X R	2.11	2	1.06	<1
Error	161.33	66	2.44	

Note: N = 72.

TABLE 4

Means and Standard Deviations of Changes
Expectancy Following Trial 1

Group	Reinforcement							
	0%		50%		100%		Overall	
	M	SD	M	SD	M	SD	M	SD
Nondepressed	2.92	1.83	3.17	2.44	3.67	1.44	3.25	1.92
Depressed	3.17	2.48	4.17	1.53	3.25	1.82	3.53	1.98

Note: Each cell contains 12 subjects.

t - tests

Nondepressed vs. depressed	df	t
0% Reinforcement	22	<1
50% Reinforcement	22	1.20
100% Reinforcement	22	<1

Analysis of Variance of Change in
Expectancy Following Trial 1

Source	SS	df	MS	F
Depression	1.39	1	1.39	<1
Reinforcement	4.86	2	2.43	<1
D X R	6.03	2	3.01	<1
Error	254.83	66	3.86	

Note: N = 72

TABLE 5

Means and Standard Deviations of
Expectancies Following the Final Task Trial

Group	Reinforcement							
	0%		50%		100%		Overall	
	M	SD	M	SD	M	SD	M	SD
Nondepressed	8.42	1.51	8.75	1.54	8.41	1.56	8.53	1.50
Depressed	8.08	1.83	8.58	1.78	8.58	1.31	8.42	1.63

Note: Each cell contains 12 subjects

t - tests

Nondepressed vs. Depressed	df	t
0% Reinforcement	22	<1
50% Reinforcement	22	<1
100% Reinforcement	22	<1

Analysis of Variance of
Expectancy Following the Final Trial

Source	S	df	MS	F
Depression	.22	1	.22	<1
Reinforcement	2.11	2	1.06	<1
D X R	.78	2	.39	<1
Error	168.83	66	.62	

Note: N = 72

TABLE 6

Means and Standard Deviation of
the Total Amount of Expectancy Change

Group	Reinforcement							
	0%		50%		100%		Overall	
	M	SD	M	SD	M	SD	M	SD
Nondepressed	8.33	6.14	10.92	5.84	13.92	6.04	11.05	6.27
Depressed	12.50	6.37	12.58	4.56	9.75	6.82	11.61	5.97

Note: Each cell contains 12 subjects

t - tests

Nondepressed vs. Depressed	df	t
0% Reinforcement	22	1.63
50% Reinforcement	22	1
100% Reinforcement	22	1.59

Analysis of Variance of Total
Amount of Expectancy Change

Source	SS	df	MS	F
Depression	5.56	1	5.56	<1
Reinforcement	30.33	2	15.17	<1
D X R	219.44	2	109.72	3.05*
Error	2376.67	66	37.07	

*$p < .05$

Note: N = 72

conditions, but not higher than depressed subjects in the 100% reinforced condition, was not supported by the data. As can be seen in Table 3, nondepressed and depressed subjects did not differ overall in their evaluation of their success ($F < 1$, $p > .05$). Furthermore, the hypothesized differences between these groups in the 0% and 50% reinforcement conditions were also not supported by the data (both $t < 1$, $df = 22$, $p > .05$). Beck Depression Inventory scores were found to be uncorrelated with evaluation of success ($p > .95$).

Depressed subjects in the 100% reinforcement condition assessed their success on the task significantly higher ($t = 2.04$, $df = 22$, $p < .05$) than did depressed subjects in the 0% reinforcement condition, thereby partially supporting the third hypothesis (see Table 3). Although the mean success estimate of the 50% reinforcement group did not differ significantly from that of either the 0% or 100% reinforcement groups, their rating fell precisely at the mean of the ratings of depressed subjects taken as a whole, and further analysis revealed a small positive correlation between reinforcement and estimate of success by depressed subjects that approached statistical significance ($r = .27$, $p < .10$). Contrary to Hypothesis 3, all depressed groups overestimated their success relative to their actual 50% success rate, and this overestimation reached significance for the 100% reinforcement group ($t = 4.99$, $df = 11$, $p < .001$). The rate of reinforcement had no effect on estimates of success by nondepressed subjects.

Depressed and nondepressed subjects did not differ, as posited in Hypothesis 4, in their estimates of skill involved in the task (see Table 2). Both groups rated the task as made up equally of skill and chance factors, accurately reflecting the apparent nature of the

task as it was presented to them. There was a moderate correlation between skill/chance estimates and evaluation of success on the task ($r = .52$, $p < .001$) for both depressed and nondepressed subjects.

The results of this experiment do not support the fifth hypothesis that when reinforced for 100% of their successes, nondepressed subjects will modify their expectancy more than will depressed subjects. As shown in Table 4, mean changes in expectancy following the first trial show that these groups did not differ on this measure. Similarly, depressed and nondepressed groups did not differ in mean final expectancy (see Table 5), nor in total amount of expectancy change, as presented in Table 6. A reinforcement X depression interaction (see Table 6) was found, however, with depressed subjects exhibiting no alteration of total expectancy change across reinforcement conditions, while nondepressed subjects showed a trend of increasing total expectancy change as external reinforcement increased. For nondepressed subjects, a significant correlation was found ($r = .37$, $p < .05$) between amount of reinforcement and total expectancy change scores. No significant correlations were found between Beck Depression Inventory scores and expectancy change following trial 1, expectancy following the final trial, or the total amount of expectancy change over the twelve trials.

The final hypothesis, that nondepressed and depressed subjects in the 0% reinforcement condition will differ in modifying expectancies as reflected by mean expectancy following the final, successful trial, and the total amount of expectancy change across trials, was not supported by the data, as shown in Tables 5 and 6.

The lack of support provided by the data for Hypotheses 5 and 6, which encompassed partial replication of previous research by McNitt

TABLE 7

Means and Standard Deviations of Total Amount of Increase in Expectancy Following Success and Decrease Following Failure

Group	Reinforcement			
	0%	50%	100%	Overall
Nondepressed				
Increase Following Success	5.66 (3.68)	6.66 (3.39)	8.66 (3.63)	7.00 (3.69)
Decrease Following Failure	2.66 (2.71)	4.17 (2.95)	5.42 (2.64)	4.08 (2.92)
Depressed				
Increase Following Success	8.08 (3.87)	7.50 (2.54)	6.33 (2.57)	7.31 (3.05)
Decrease Following Failure	4.75 (3.22)	5.00 (2.34)	3.83 (2.54)	4.53 (2.69)

Note: Standard deviations in parentheses. Each cell contains 12 subjects.

(1976) and Miller and Seligman (1973), prompted a further analysis of the data.

Means and standard deviations for total amounts of increase in expectancy following success and decrease following failure were computed and compared for all six experimental groups (see Table 7). No significant differences were found between nondepressed and depressed groups for either increases following success or decreases following failure in any of the three reinforcement conditions (all ps > .10). Similarly, neither nondepressed nor depressed subjects' expectancy changes for either success or failure trials were differentially affected by reinforcement condition (all ps > .05). A comparison of

mean increase in expectancy following success trials with mean decrease following failure trials revealed a significant difference in amount of change for both nondepressed and depressed groups ($t = 3.74$, $df = 70$, $p < .001$ for the nondepressed group; $t = 4.08$, $df = 70$, $p < .001$ for the depressed group). Both groups exhibited significantly greater increases following success than decreases following failure, and this difference was constant across reinforcement conditions.

CHAPTER IV

DISCUSSION

The results of this study suggest that external secondary reinforcement has a differential effect on nondepressed and depressed subjects. Furthermore, the present results refute the argument of Miller and Seligman (1973) that depressed individuals are unaware of the relation between their actions and the consequences of those actions. Finally, the results of this study, when considered in concert with the data developed by McNitt (1976), Miller and Seligman (1973), Loeb et al. (1971), and Beck (1972), bring into serious question a basic assumption underlying learned helplessness theory, that depressed individuals do not correctly perceive response-dependent relationships, and suggests a more parsimonious integrative theory which in large part accomodates the observable data developed by a diverse group of cognitively and behaviorally oriented researchers in the field of depression.

The fact that depressed subjects were clearly more pessimistic regarding their prospective success on the task than were nondepressed subjects strongly supports Beck's (1972) assertion of the existence of a dominating negativism by depressed people, and is supportive of previous research on this phenomenon (Beck, 1972; Loeb, Beck, and Diggory, 1971).

The effect of external reinforcement versus covert self-reinforcement was found to be considerably more complex than the relationship originally hypothesized. Not only did nondepressed subjects maintain

an accurate perception of their success on the task regardless of the amount of external reinforcement, but depressed subjects were also able to correctly ascertain their level of performance even in the absence of external validation of their trial outcomes. This data argues strongly that depressed individuals do in fact correctly perceive the response dependent nature of task outcomes, contrary to the thesis of Miller and Seligman (1973, 1975).

Both nondepressed and depressed subjects exhibited the same tendency to attribute greater skill factors to the nature of the task when they thought they had been more successful than when they thought they had not done so well. This suggests that both groups employed similar cognitive schemata in making these evaluations.

The notion that depressed individuals may be somewhat "stimulus bound," inordinately affected the recent concrete external feedback of situation outcomes is also supported by the present data, although not as originally formulated. The data suggest that depressed individuals maintain a relatively rigid and stereotyped attitude toward environmental stimuli, being largely unresponsive behaviorally to mild, ongoing feedback cues. Seligman (1975) has argued that depressed individuals are peculiarly unresponsive to response dependent outcomes, and the data supports this notion to a point. Although on the whole neither depressed nor nondepressed subjects in the present study altered their evaluation of success on the task as a function of external reinforcement, nondepressed individuals altered their trial by trial expectancies to a degree directly related to the amount of external reinforcement recieved. Depressed subjects showed no change in the magnitude of total expectancy changes as a function of reinforcement

rate. To this extent then, nondepressed subjects were responding appropriately to external outcome cues, while depressed subjects seemingly ignored this feedback. Additionally, as can be seen in Table 6, the range of mean total amount of expectancy change across reinforcement conditions of nondepressed subjects squarely brackets the constant mean total changes of the depressed group. This pattern seems to suggest the possibility of a certain cognitive "set" operating with the depressed subjects, manifested by the odd "modal," rigid, and unresponsive behavior of the latter group. Consideration of the results of the task success evaluation measure, however, adds an additional dimension to a formulation of an explanation of the depressed subjects' behavior. With 100% reinforcement, the depressed subjects seemingly over-reacted to the reinforcement, by overestimating their success. This outcome suggests that the depressed subjects in the 100% reinforcement condition were, in fact, "stimulus bound" in that they attended primarily to the money rather than the actual task outcomes, and based their rating of success on their perception of the relative amount of money they received. The fact that six dimes were responded to as representing more than a 50% success rate is explainable in terms of psychological scaling theory (Moyer and Bayer, 1976; Rule, 1972), which asserts that in a range of numbers such as the scale employed in this study, running from zero to twelve, six will be perceived as being significantly closer to twelve than to zero. While all of the experimental groups tended to overestimate their success, this particular group's estimate was significantly higher, suggesting just such a stimulus bound response, while the other groups, including the 100% reinforced nondepressed subjects, were able to accurately appraise their task

related behavior independent of the amount of external reinforcement.

In sum, then, it appears that depressed individuals do indeed, to a point, behave as if they are unresponsive to environmental feedback. However, it appears that if the reinforcing stimulus exceeds a critical threshold frequency or intensity, depressed individuals will overreact, as asserted by Beck and his colleagues (Beck, 1972; Loeb, et al., 1971). Furthermore, the failure to confirm hypothesized differences between nondepressed and depressed subjects on the response dependency related measures of expectancy change indicates that depressed subjects did in fact perceive the response dependent nature of the task, contrary to the notion of Seligman and his colleagues (Klein and Seligman, 1976; Miller and Seligman, 1973, 1975). There was, therefore, a discrepancy between the behavior of the depressed subjects, being rigid and stereotyped, and their accurate perception of the contingencies of success. Nondepressed subjects appeared to be more sensitive than depressed subjects to external reinforcement in terms of appropriate behavioral response.

The most impactful and wide-ranging implications of the results of the current research are to be found when the data in this study are compared with previous research on depression and learned helplessness. The methodology of this study replicated nearly identically the parallel aspects of McNitt's (1976) and Miller and Seligman's (1973) research. Comparative inspection of the data of these studies pinpoints a remarkable series of similarities and differences (see Table 8). The data for all three studies are remarkably similar with one critical exception. Miller and Seligman (1973) reported a much smaller mean increase in expectancy level following success for

TABLE 8

Means and Standard Deviations of Expectancy Variables for Depressed and Nondepressed Subjects Across Three Studies

Variable	Experiment							
	VanderJagt (1977)				McNitt (1976)		Miller & Seligman (1973)	
	0%		100%					
	N	D	N	D	N	D	N	D
Change in Expectancy From Trial 1 to Trial 2	2.91 (1.83)	3.17 (2.48)	3.67 (1.44)	3.25 (1.82)	4.20 (NA)	4.30 (NA)	3.75 (2.44)	2.75 (.93)
Expectancy Following Final Trial	8.42 (1.51)	8.08 (1.83)	8.75 (1.54)	8.58 (1.78)	9.30 (NA)	8.50 (NA)	7.57 (1.27)	5.00 (1.56)
Total Amount of Expectancy Change	8.33 (6.14)	12.50 (6.37)	13.92 (6.04)	9.75 (6.81)	9.60 (NA)	11.40 (NA)	10.07 (4.26)	7.69 (3.93)

Note: D = Depressed, N = Nondepressed, NA = Not Available.
Standard Deviations are in parentheses.

Table 8. Continued.

Means and Standard Deviations for Total Amount of Increase in Expectancy Following Success and Decrease Following Failure for Depressed and Nondepressed Groups in Two studies

Group	Experiment	
	VanderJagt (1977)	Miller & Seligman (1973)
Nondepressed		
Increase Following Success	7.00 (3.69)	7.12 (2.71)
Decrease Following Failure	4.08 (2.92)	2.94 (1.75)
Depressed		
Increase Following Success	7.31 (3.05)	4.75 (1.95)
Decrease Following Failure	4.53 (2.69)	3.87 (2.26)

depressed subjects than was found in the present research. This substantially smaller magnitude of response by depressed subjects resulted in a considerably smaller sample variance for depressed subjects on the dependent measure for depressed subjects in Miller and Seligman's (1973) study. This very small variance in their sample led directly to the confirmation of hypothesized differences between nondepressed and depressed subjects, as posited in Hypotheses 5 and 6 of the present study, by Miller and Seligman (1973). Their confirmation of a greater change in expectancy from trial 1 to trial 2 for nondepressed subjects relative to depressed subjects was achieved directly as a result of the depressed subjects' small increases in expectancy following success trials relative to the increases made by nondepressed subjects. This systematic bias in response to success versus failure led to a decidedly lower final expectancy for depressed subjects, confirming their second hypothesis regarding expectancy following the final trial. Finally the total amount of expectancy change for depressed subjects was so reduced by this phenomenon that a nondepressed versus depressed subjects comparison nearly yielded a statistically significant difference (Miller and Seligman, 1973). McNitt's study, as well as the current study, did not observe a response bias such as this for depressed subjects, and the increased variance and lack of cumulative depression of expectancy scores led to rejection of the hypotheses confirmed by Miller and Seligman (1973). Similarly, the correlations noted by Miller and Seligman (1973) between the Beck Depression Inventory and the dependent measures were not replicated in either the present research or that of McNitt (1976).

There appear to be at least three possible explanations for the systematic differences in the data cited above. The first is that an experimenter variable was operating in one or more of the studies. As noted previously, four experimenters participated in the present research, and no significant experimenter effects were detected following a rigorous analysis. McNitt's data was also compared to the current data as far as was possible, and no significant inter-experimenter effects were uncovered. This leaves the possibility that some sort of experimenter demand characteristic may have been operating in the Miller and Seligman (1973) study, but this is impossible to determine at this time.

A second possibility to explain the systematic differences is that the two sample populations from Michigan State University were actually different from the sample employed by Miller and Seligman (1973). The means and standard deviations of Beck Depression Inventory scores for all three populations were very similar, however, and it is not obvious why such demographically and psychologically similar groups should manifest this one particular and peculiar difference.

The third possible source of the disagreement between the results of this and McNitt's (1976) study, and that of Miller and Seligman (1973), is a methodological one of serious consequence. Specifically, the current study, as well as McNitt (1976), employed a positive reinforcement paradigm to provide trial outcome feedback to the subjects. Miller and Seligman (1973) employed a punishment-positive reinforcement paradigm. Whereas in the former studies failure trial outcomes were ignored by the experimenter, who made no discriminative comment or action, Miller and Seligman (1973) fined the subject 10 cents

for each failure immediately following the trial outcome. The obvious reformulation of the experimental process then asserts differential effects of reinforcement and punishment across nondepressed and depressed subjects as the critical variable affecting outcome as assessed by the dependent measures. As noted above, nondepressed subjects were found to be more sensitive to positive reinforcement than depressed subjects, the latter showing little response until a sufficient threshold frequency or intensity was reached, which then resulted in a "stimulus bound" overreaction. Conversely, depressed subjects appear to be more sensitive to punishment than nondepressed subjects.

An analysis of the results of these previous studies from the point of view of competing-response theory (Guthrie, 1935, cited in Bandura, 1969) or elicitation theory (Denny, 1976; Denny and Ratner, 1970) provides a powerful reconceptualization of the role of external reinforcement and punishment as a mediator of the behavior of depressed individuals. Using this analysis, Miller and Seligman's (1973) results can be explained as follows: The depressed subjects were initially in a relatively rigid, negative cognitive set, as described by Beck (1972). At the beginning of the experiment, instructions were given which had the effect of "setting-up" the depressed subjects by presenting them with the threat of punishment (Miller and Seligman, 1973). This perceived threat of punishment elicited an anxiety response by the depressed subjects, being differentially sensitive to aversive stimuli, which interferred with adequate and appropriate mediation and assimilation of the success feedback on the first trial, resulting in little change in reported expectancy. The pattern followed during subsequent trials is thus seen as one of failure/punishment outcomes confirming

and reinforcing the negative set of the depressed individual, while eliciting powerful anxiety-frustration responses causing proactive interference with appropriate responses to success trials. The behavior which Miller and Seligman (1973) labeled as reflecting lack of perception of reinforcement and response dependent relationships is thus easily reconceptualized as reflecting anxiety or frustration motivated competing responses which inhibit behavior which reflects recognition of these correctly perceived relationships.

The present study may also be profitably reexamined from this approach. With no threat or acts of punishment to contend with, the depressed subjects were able to respond similarly to both success and failure feedback, although in a rigid, stereotyped mode, in the absence of competing anxiety-frustration responses. The fact that depressed subjects in the 0% and 50% reinforcement conditions were able to accurately assess their level of success on the task upon completion of the task, contrary to the results reported by Loeb et al. (1971), is explained by the fact that in the current study subjects were first told "you have now completed the task.", presumably leading to an internal response of relief and relaxation, which generalized backward to compete with any residual anxiety-motivated responses (Denny, 1976), freeing them to make an accurate appraisal of their performance. The subjects in the Loeb, Beck, and Diggory (1971) study, on the other hand, were still under the influence of the stress of the task and the punishing verbal elucidation of failure trials by the experimenter, and presumably continued to experience interfering competing responses of anxiety and frustration. The overreaction of the depressed subjects in the 100% reinforcement condition of the present study is then

explained as a function of both the absence of such competing responses and the subjects' stimulus bound reaction to the prominent concrete external reinforcement.

Seligman's (1975) learned helplessness model of depression may have to be considerably revised to accomodate the current data and its analysis. The experimental method typically employed with this model has been to induce helplessness via the presentation of inescapable aversive stimuli (Klein and Seligman, 1976; Miller and Seligman, 1975) and/or employ punishing verbal or nonverbal stimuli to elucidate subject failures (Klein, Morse, and Seligman, 1976; Miller and Seligman, 1973). Since the learned helplessness model has been proposed as a laboratory analogue of depression, it seems unnecessary and erroneous to posit a deficit in perception of response dependent relationships as a major factor in depression, when the occurance of intense unavoidable punishment is sufficient to produce behavior similar to that of depressed individuals, who based on the above data, can and do perceive the existence of such relationships. The name "learned helplessness" itself becomes descriptively misleading. The phenomenon appears to reflect a case of inhibited or disrupted adaptive instrumental behavior.

Coyne's (1976a, 1976b) observations of the behavior of depressed subjects and the nondepressed people with whom they interact are easily encompassed by the model of depressed behavior currently proposed, as is the conceptualization of depression as manifest by a reduction in ability to emit behaviors which will be reinforced and not to emit behaviors which will be punished (Libet and Lewinsohn, 1973). The negative cognitive set of depressed individuals (Beck, 1972) can be

viewed as including the generation of punishing self-stimuli which inhibit appropriate reinforcable responses in social settings. The lack of such responses or their poor timing is perceived as aversive by nondepressed others (Coyne, 1976b), setting in motion a cycle of noncontingent punishment, further competing response interference, and so on. In light of the data developed and examined in this study, the appropriate point of therapeutic intervention with depressed individuals might most usefully be the modification of punishing self-statements (Meichenbaum, 1977) rather than simply attempting to increase environmental reinforcement, to which the depressed person may be relatively insensitive.

Much of the latter part of the above discussion is at present still a matter of informed speculation. Further study is indicated to more closely examine the relationship between both overt and covert reinforcement, punishment, and the behavior of depressed individuals. In addition to the study of the effects of modification of punishing self-statements, the effects of punishment on adaptive responses over multiple trial intervals and various schedules of both external and covert self-reinforcement might usefully be examined to clarify the parameters of intensity and duration of the maladaptive response pattern common to the phenomenon of depression.

APPENDIX

APPENDIX

BECK D. I.

Instructions: Please read each set of statements completely, then circle the I of the one which most represents how you feel right now. For example, read all the statements in Category "A." reflect for a minute, then choose one of them and circle it. Then continue to the next set until you have chosen one statement for every letter through "U."

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

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

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)

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

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

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

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

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

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

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

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

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

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

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

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 sued to
I have to push myself very hard to do anything
I can't do any work at all

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

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

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

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

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

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

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