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LABELING AROUSAL AS DEPRESSION
ACCORDING TO INTERNAL AND SITUATIONAL CUES

by
Paula Owens

A Thesis Submitted to the Faculty of the Graduate School
of Loyola University of Chicago in Partial Fulfillment
of the Requirements for the Degree of
Master of Arts

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LIFE

The author, Letitia Paula Owens, is the daughter of Hubert Lee Bailey and Sara (Ligon) Bailey. She was born July 9, 1950, in Greenville, South Carolina.

Her secondary education was obtained at Harrisonburg High School in Harrisonburg, Virginia, where she was graduated in 1967. In September, 1967, she entered Longwood College, Farmville, Virginia and later transferred to Virginia Polytechnic Institute, the University of Kansas, and the University of Illinois at Urbana, Illinois, where she received the degree of Bachelor of Science with a major in psychology in June, 1973.

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INTRODUCTION

The relationship between arousal and depression has received more attention and elaboration in theoretical works than in research studies. Aaron Beck (1967) theorized that one's cognitive schema result in one constructing the experience, the self, and the future as negative and thereby causing the affective state of depression. Albert Ellis (1975) postulated similar cognitive functions in feelings of anxiety and depression. Stanley Schachter and others have demonstrated the labeling of arousal that goes on in euphoria and anger in their research, but their work did not extend to sadness and depression. Extending the theoretical implications of Schachter's work to depression, his idea that labeling a situation as depressing triggers arousal, corresponds to Beck's idea that the negative structuring of experience triggers depressive emotions. Schachter proposes the converse to be true also: the label of depression may be applied to arousal states on the basis of situational cues. Schachter's theory applied to depression may provide a somewhat broader explanation of the origins and chronicity of depression than Beck's theory and a rationale for many of the symptoms Beck describes but does not explain.

CHARACTERISTICS OF DEPRESSION

Beck (1967, 1974) classified depressive symptoms in four categories: emotional, cognitive, motivational, and physical or vegetative.

Emotional signs are painful dejection, loss of interest, loss of feelings of affection, self-dislike, crying spells, lack of enjoyment, and loss of sense of humor (Beck, 1974; Freud, 1917; Ullmann and Krasner, 1969; Weiss, 1944). Most severely depressed psychiatric patients report some degree of sadness or dejection, generally using such terms as "miserable," "blue," or "down-hearted." The dysphoric emotions can result from feelings of self-dislike, uselessness, or disappointment in the self. Depressed individuals fail to enjoy activities that they enjoyed previously, whether social, productive, or biological, and curtail their activities. Feelings of affection or enjoyment may be replaced by resentment, apathy, or boredom. Depressed individuals may not feel like laughing even though they perceive the punchline in jokes.

Cognitive signs are loss of self-esteem, negative expectations, exaggerated view of problems, and attribution of blame to the self (Beck, 1974; Freud, 1917; Reese, 1971; Ullmann and Krasner, 1969). Cognitive signs represent distorted views of the self and world, so that the depressed individual feels inadequate and worthless and sees no possibility of future improvement. He may be unable to make

decisions because he anticipates making the wrong choice. He tends in general to blame adverse experiences on his own deficiencies.

Motivational signs are increased dependency, loss of motivation, avoidance, indecisiveness, and suicidal wishes (Beck, 1974; Ullmann and Krasner, 1969). A depressed person wishes to escape demands on his energy, perhaps to the point of suicide. Increased dependency is manifested by a desire for help.

Physical and vegetative signs are loss of appetite, sleep disturbance, fatigability, loss of sexual interest, and inhibition of activity (Beck, 1974; Ullmann and Krasner, 1969; Weiss, 1944). Sad facial expressions, slow movement, less speech or, conversely, incessant activity and restlessness may characterize the depressed individual. He may lose interest in food or sex or be unable to sleep and tire easily.

The pattern of symptoms varies from person to person, and people who are not clinically depressed but merely experiencing mood swings may exhibit some of them. Those signs most often mentioned in the literature seem to be the emotional signs which describe affect.

MODELS OF DEPRESSION

Psychodynamic Model

Psychodynamic theories attribute depression to the loss of a loved object or the loss of self-esteem (Wilkins, 1971). Freud (1917) saw it as an imaginary, feared, or vaguely perceived loss that deprived the ego. The loss in depression was that part of the loved object which was incorporated into the ego. Freud compared depression to grief because he thought that both involve loss of a loved object but differentiated them in that the loss was obvious and external in grief but in depression was an ego function and, therefore, unobservable. A more concrete description of the process of feared loss of the loved object comes from Hill (1947). He traced the onset of depression as follows: the individual with a depression-prone personality unconsciously charms another until it seems that a healthy, affectionate, reciprocal relationship has developed. The depression-prone personality then escalates his demands insatiably and expresses increasing disapproval as they are frustrated. The resultant rage is inhibited to prevent losing the loved object completely or provoking the superego. The inhibited rage arouses the anxiety (fear) of losing the loved object and guilt (punishment by the superego for becoming enraged).

Others considered the loss more real than imagined. Rado (1928) believed that the loss of a loved object resulted in a loss of self-esteem in persons with a precarious self-concept and narcissistic need for approval. Depression and self-vilification were punishment of the

ego by the superego and attempts at expiation undertaken in order to win back love. Bibring (1953) also theorized that the loss of self-esteem causing depression could result from frustrated needs for love and affection but added that it could result from frustration of other needs as well. He saw depression as the expression of the awareness of the ego of its helplessness or powerlessness. Jacobson (1953, 1954) and Klein (1948) also theorized that loss of self-esteem and depression resulted from frustration and lack of gratification.

Abraham (1911, 1916, 1924) saw depression as a real or feared loss of an object of gratification but concentrated less on the loss than the feelings of hostility toward the loved object which undermined the depressive individual's capacity for affection. The ambivalence of feelings about the object choice was also directed toward the part of the ego which represented the object; that is, the hostility directed against the ego in the form of self-accusation was another manifestation of the hostility toward the loved object.

In general, frustration of a need, whether for love or achievement, results in an ego loss and depression follows as a reaction. The feelings of hostility toward a loved object that has been lost are likely to alienate that object further and escalate the guilt that the depressive individual feels due to his hostility. Psychoanalytic interpretations of depression concentrate on internal factors and tend to ignore environmental influence.

Behavioral Model

Behaviorists attribute depression to a decrease in reinforcement (Wilkins, 1971). Ferster (1965) proposed that any change resulting in a relative inability to acquire positive reinforcers could produce a depression. He asserted that the loss of a "significant other" causes a sudden reduction in behavioral output and consequently a reduced rate of positive reinforcement. A depressive person seems to be especially vulnerable to the loss of a loved person or object because of the tendency Ferster observed to restrict the number of persons with whom they interact. Lazarus (1968) published case studies which supported the association of a depressed state with a lack of positive reinforcement. Removing reinforcers from an individual's environment brought on depression while increasing the individual's ability to acquire additional reinforcers alleviated depression. He proposed that depressions which could not be explained by learning theory are probably of organic origin.

Either personal characteristics or environmental factors may cause the low reinforcement rate (Lewinsohn, Shaffer, and Libet, 1969; Patterson and Rosenberry, cited in Beck, 1974). For example, depressive persons may lack social skills and, therefore, have fewer sources of available reinforcement, experience greater deprivation from loss of a source, or find it more difficult to replace a lost reinforcer. A change in the individual's role status, as in aging, may result in previously reinforced behavior no longer being reinforced and consequently in depression (Ullmann and Krasner, 1969). Kanfer (1971) proposed that self-reinforcement tends to match previous external

reinforcement serving to maintain behavior. Such a tendency would serve to perpetuate depressive moods.

In general terms, presentation of a reinforcer increases the strength of a response while the removal or loss of a reinforcer decreases its strength. Thus reduction in reinforcers could produce avoidance behavior and inactivity further reducing the possibility of reinforcement. Lewinsohn, et al (1969) asserted that depressive behavior alienates other people. This would further reduce the number of positive reinforcers and contribute to the continuation of the depressive cycle. Since behaviorists prefer to deal with external behaviors and avoid discussing internal and unobservable affective states, they neglect subjective components of depression such as feelings of sadness or hopelessness and suicidal wishes. Behavior theory has been applied only to limited aspects of depression.

Cognitive Model

Beck (1967, 1974) posits a set of three major cognitive patterns which cause the disturbances in depression.

The first component is the construction of experience in a negative way such that life seems to be filled with defeat, deprivation, and disparagement. This is a selective interpretation which transforms neutral or ambiguous situations into self-deflating ones through inaccuracies and misinterpretations which focus on the most negative aspects of the situation. The depressed person is likely to set high standards for himself and any falling short of these standards is perceived as total failure. He is likely to feel substantially deprived by relatively trivial events whether in terms of money, time,

or self-esteem, and to feel the loss most keenly in comparing himself with other people who seem more fortunate. He is also likely to interpret neutral or even favorable remarks by others as disparaging or to feel that other people have derogatory ideas about him.

The second component of depression is a negative view of the self as deficient, inadequate, and unworthy. Unpleasant experiences are attributed to defects in the self which leads to feelings of worthlessness and self-rejection. The depressed person tends to over-generalize from a particular behavior to a character trait, to interpret a minor variation in performance as a major shortcoming on which he bases his entire self-concept. He defines himself in terms of this deficiency and then rejects himself for it.

The third component is a negative view of the future such that current difficulties seem to continue indefinitely. The depressed person tends to be preoccupied with thoughts of the future, generally as an extension of his view of the present. Both long and short-range forecasts are of a similar negative nature--anticipation of failure accompanied by feelings of the impossibility of feeling better and the futility of trying.

The affective state is regarded as the consequence of the way the individual views himself or his environment. The depressed person perceives his behavior as involving failure or loss and consequently feels sad or apathetic. His reaction may be based on faulty interpretation of available data such that new information is distorted to fit the negative conceptualization rather than modifying the concept to fit the new information. Thus the affect remains negative.

Motivation is likewise seen as the consequence of cognition. Motivation to perform some action depends on cognitions about the likelihood of success and possible benefits. Motivational changes in depression such as paralysis of will, escapist and avoidance wishes, suicidal wishes, and intensified dependency wishes are responses to changes in cognitions about the self and the world as negative.

Briefly, the cognitive model states that the person first thinks he is bad and worthless and then feels depressed. The content of the person's cognitions is derived from the individual's past experiences, a generalization relating to the individual's goals, values, and attitudes.

SCHACHTER'S THEORY OF EMOTION

Stanley Schachter has developed a theory of emotion stressing the interaction of two components--physiological arousal and cognitions about the situation. In initial research he assumed that emotion is an interaction of arousal of the sympathetic nervous system and the cognitions explaining the arousal. Schachter and Singer (1962) found that euphoric or angry behavior and emotions were adopted by a subject from a stooge showing such behaviors provided that the subject was injected with epinephrine rather than a placebo and provided that he was not informed about the possible physiological effects of the drug. Subjects who were ignorant of the drug's effects were more likely to attribute their arousal to the situation and participate in the stooge's unusual actions. A problem with the method was that placebos do not block ordinary arousal, so that a subject could become angry or euphoric from the situation alone. Use of epinephrine, chlorpromazine (a tranquilizer), and a placebo in an amusing situation overcame this difficulty (Schachter and Wheeler, 1962). The tranquilizer served to prevent normal arousal and the epinephrine to produce more than normal arousal. Once again the subject's behavioral response and ratings of the funniness of the movie depended on both the drug he received and the type of information he had as to its possible effects. Those who failed to associate arousal symptoms with the drug acted and described themselves as more emotional in the staged situations. Nisbett and Schachter (1966) used shock instead of drugs to produce arousal and used a placebo

described as arousal-producing as the contrived situation. In this case, subjects who associated arousal symptoms with the drug rather than the shock tolerated higher levels of shock than those who associated arousal symptoms with the shock itself. In all these cases, arousal was attributed to whatever element of the total situation seemed most salient: a drug, a movie, or another person's behavior.

According to Kelley's theory of attribution (1967), attribution is the process of attaining cognitive mastery of the causal structure of the environment, or, more simply, the process of deciding why events occur either in the environment or in oneself. In the basic case in which the person is trying to disentangle the effects of the stable features of his surrounding environment, the choice is between external and internal attribution. External attribution is the decision that the effect is a result of the surrounding environment, and internal attribution is the decision that the effect results from the self. Attribution to the external stimulus rather than to the self requires that the subject responds differentially to the stimulus, consistently, and in consensus with other people's responses. The subject in Schachter's research, however, is involved in a unique, one-shot situation, and his information is limited to that which the experimenter and stooge give him and what he can figure out on his own. The more consistent the information is, the more stable the attribution should be. The subject's basic information is that he is aroused in this situation, whereas he is not aroused all the time, and if he believes the injection to be vitamins, there is no internal event, so that he attributes his arousal to an external source rather than himself. If the experimenter

informs him that the injection he has received will produce arousal symptoms, he is likely to accept this explanation because it is consistent and look upon the stooge's actions as unusual but discount the effect of those actions on himself. If, however, the subject is misinformed or ignorant about the drug's effects, he will seek information that is consistent with his feelings, information which the stooge handily provides. Another element which comes into play is the trustworthiness of the informant. The subject may decide that the drug has caused his arousal, despite the fact that the experimenter has failed to inform him or has misinformed him of the drug's effects. This did occur in the Schachter and Singer study and was called a "self-informing tendency" on the part of some subjects. Additionally the subject might have suspected the stooge of some ulterior motive and, therefore, refused to accept his definition of the situation as euphoric or angry. Attribution in Schachter's studies consisted of the subjects looking at the total information they had about the situation, cognitively deciding which element seemed most consistent with his subjective feeling of arousal, and labeling that element as the cause.

Schachter discussed his own research and that of others about arousal and emotion in terms of labeling (1964). Verbal descriptions by those experiencing emotional situations without arousal (because of spinal cord lesions) and drug-induced arousal in a non-emotional situation both contain an "as if" quality. Persons with spinal cord lesions report that they act "as if" they are upset but do not truly feel emotional in situations which were emotion-arousing before their injury. Persons injected with adrenalin described themselves as

feeling "as if" they were emotional but that they really were not. Furthermore, pot smokers had to learn that the sensations associated with pot-smoking highs were pleasurable before they began to enjoy smoking, and children learned from their mothers to confuse the sympathetic arousal of intense emotional situations with hunger. All these situations involve labeling sensations appropriate to the specific situation.

Schachter and Latané (1964) studied the effects of arousal on avoidance learning in two groups--normal persons and sociopathic ones. Earlier research on animals showed poor avoidance learning for both very high and very low levels of arousal. The best avoidance learning occurred at moderate levels of arousal (Latané and Schachter, 1962; Wynne and Solomon, 1955). Singer (1963) found that the amount of emotional behavior displayed by both rats and humans was a direct function of the degree of arousal. This may explain the results of the animal studies; too little arousal probably means the subject is not paying attention to the task while too much arousal seems to produce emotional behavior that interferes with the task. Schachter and Latané chose sociopaths for research because, as a group, they show little guilt (arousal) and fail to profit from unpleasant experience (avoidance learning). On a four-choice maze with one correct and one shocked alternative, normal and sociopathic subjects learned equally well the positively reinforced task. However, the normal subjects learned the avoidance task much better than the sociopaths. When adrenalin was administered to both groups, the results were reversed. Presumably, the high arousal produced in normal subjects interfered with

learning the avoidance task. One would also presume that since the sociopaths learned more easily, the adrenalin must have increased their ordinarily low levels of arousal to a moderate level which facilitated learning. Furthermore, high autonomic reactivity is associated with either very low anxiety and emotionality, as in the case of sociopaths, or very high anxiety and emotionality, as in the case of anxiety neurotics. Schachter emphasizes the importance of cognitive labeling of high autonomic reactivity. He feels that sociopaths exhibit indiscriminant reactivity to all events, so that they fail to apply a cognitive label of emotion while anxiety neurotics label all events emotional and therefore trigger autonomic activity.

If Schachter's theory of emotion is applied to depression, it corresponds somewhat to Beck's cognitive theory of depression. Beck proposes cognitive schema which construct the experience, the self, and the future as negative and cause the affective state of depression (1967, 1974). This appears to correspond to Schachter's proposal that a person may label events as depressing and trigger autonomic activity. However, Schachter's theory might further propose that a person may experience arousal and define it as depression because the situation contains cues for depression. Research has not explored this aspect. This interaction allows more flexibility in explaining the origins of depressive states as well as providing a rationale for chronic depression. One who is chronically depressed may have learned to label most arousal states as depression, just as the children mentioned previously learned to label intense emotions a hunger. Additionally such a person may learn to label himself negatively, and this stable negative

self-image may trigger a more or less permanent state of arousal.

Prolonged sympathetic activity could account for many of the symptoms of depression such as work inhibition, sleep disturbance, fatigue, irritability, and somatic preoccupation that represent interference with normal behavior patterns. Schachter's theory of emotion is able to account for the origins, maintenance, and a number of symptom patterns of depression.

MEASUREMENTS OF DEPRESSION

In measuring depression, it was necessary to find separate instruments directed toward state and trait depression. The trait depression measure is needed for determining long-term, stable tendencies toward depressed affect, the basis for dividing subjects into groups of high and low trait depression. The state depression measure should be capable of discriminating temporary changes in mood before and after treatment conditions. Beck's Depression Inventory (1967) and the MMPI-D scale (1960) are examples of trait depression measures, and Lubin's Depression Adjective Check Lists (1967) is a state depression measure.

The MMPI-D scale is one of ten scales developed by Hathaway and McKinley (1967) from a pool of 1000 purposely vague statements. The items were administered to groups of normal adults, college students, and psychiatric patients with instructions to indicate which items applied to them and which did not. Data analysis reduced the number of items to 566, and ten scales were derived from the subjects' patterns of responses to these items. Most of the 60 items in the D scale were selected through comparison of normals and a group of depressed psychiatric patients. A number of items were introduced to minimize elevations on the D scale for psychiatric cases whose primary diagnosis was not depression (Dahlstrom, Welsh, and Dahlstrom, 1972). Test-retest reliability of the D scale is 0.80 for male psychiatric cases. Validity in terms of agreement with ratings of depression by staff members ranges

between 0.51 and 0.61. The D scale does have drawbacks in that it is not a pure measure of depression. Several studies have indicated that there are approximately five clusters in the D scale including hostility and anxiety, though the difficulty in differentiation seems to be a function of paper-and-pencil measures in general. D scores measure not only depressive feelings but associated physical feelings as well (Costello and Comrey, 1967).

Beck's method of scale construction began with the symptoms integral to depression and the construction of categories including a series of statements reflecting varying degrees of severity (1967). Scores represented a combination of the number of symptoms endorsed and their severity. The items do not reflect any theory of etiology or underlying psychological process. Beck observed and recorded characteristic attitudes and symptoms which appeared to be specific to depressed patients and which were consistent with descriptions of depression contained in the psychiatric literature. From these possibilities, he used 21 categories, each describing a specific behavioral manifestation of depression and consisting of a graded series of four or five evaluative statements. The statements are ranked on a continuum from neutral to maximum severity and assigned a numerical value to indicate severity. In some categories, two of the statements are equivalent and receive the same numerical weight. The categories were:

- | | |
|-------------------------|------------------------------|
| 1. Mood | 9. Suicidal wishes |
| 2. Pessimism | 10. Crying spells |
| 3. Sense of failure | 11. Irritability |
| 4. Lack of satisfaction | 12. Social withdrawal |
| 5. Guilty feelings | 13. Indecisiveness |
| 6. Sense of punishment | 14. Distortion of body image |
| 7. Self-dislike | 15. Work inhibition |
| 8. Self-accusations | 16. Sleep disturbance |

- | | |
|----------------------|---------------------------|
| 17. Fatigability | 20. Somatic preoccupation |
| 18. Loss of appetite | 21. Loss of libido |
| 19. Weight loss | |

The inventory was administered to new inpatient and outpatient psychiatric hospital admissions, either directly before or directly after an interview with a psychiatrist. The psychiatrists rated each patient globally for depth of depression as well as on specific indices representing the pooled experience of the clinicians. These ratings agreed within one degree on the four point scale in 97% of the cases. Split-half reliability was 0.93 for 97 cases. Correlations between inventory scores and clinical ratings ranged between 0.61 and 0.67 for several studies of validity.

Lubin (1967) culled a pool of adjectives connoting varying degrees of depression and elation from dictionaries, books of synonyms, etc. The items were administered to groups of normal women and severely depressed psychiatric patients. Item analysis identified 171 items that discriminated among the two groups and that were subsequently divided into four lists of similar differentiating power. The same process was carried out with groups of normal and depressed males yielding a smaller number of discriminating items divided into three lists. Lubin felt that these differences reflected culturally conditioned differences in self-reporting (1965). Split-half reliability on the lists ranged between 0.82 and 0.93 for normals and 0.86 and 0.93 for patients. Correlations between lists range from 0.80 to 0.93, so that the lists may be considered equivalent. Cross-validation on new groups found significant differences in scores for groups of normals, non-depressed patients, and depressed patients. Correlations with MMPI-D and Beck

Inventory scores ranged between 0.25 and 0.66, all of which are significant. The final lists have 22 positively scored adjectives and 10 negatively scored adjectives on the female lists and 22 positively and 12 negatively scored adjectives on the male lists. A major criticism is that the DACL measures other affective states than depression including fatigue, lack of vigor, bewilderment, and unfriendliness (McNair, 1972). This criticism is similar to that of the MMPI-D.

METHODS OF PRODUCING AROUSAL

A common method of inducing arousal is by injection of drugs such as adrenalin and epinephrine. For example, Schachter and Singer (1962), Schachter and Wheeler (1962), and Singer (1963) used drugs, which produced arousal, and placebos, which controlled for any effects of the actual injection. Frankenhaeuser, Jarpe, Svan, and Wrangsjo (1963) used placebos alone to produce arousal symptoms. Frankenhaeuser, Post, Hagdahl, and Wrangsjo (1964) used placebos in producing depressive symptoms also. Schachter and Latané (1964) used drugs and electric shock. The threat of shock produced arousal which facilitated avoidance learning in normal subjects; whereas drugs were necessary to produce the same effects in sociopaths. Shock was also used by Nisbett and Schachter (1966) to produce pain and arousal while a placebo was perceived by subjects as a source of some of their arousal symptoms.

Ego threats are a third method of producing arousal. Valins and Ray (1967) used subjects who were afraid of snakes, a natural threat, to illustrate that cognitions about internal states are important to systematic desensitization procedures. Subjects given false feedback that indicated that they were not internally aroused by snake stimuli showed more approach behavior when confronted by a live snake. Dienstbier and Munter (1971) and Schachter and Ono (cited in Schachter and Latané, 1964) took a different tack with students, implying that the results of the test they took as part of the experiment were vital to their success in school. Dienstbier and Munter used placebo drugs,

saying that they were responsible for arousal symptoms. Schachter and Ono used chlorpromazine to reduce arousal symptoms. In both cases subjects who were drugged, or who believed they were, cheated more on the tests because they felt less aroused by the test or attributed more of their arousal to the drug.

Drugs may be a more common method of inducing arousal because they are more certain of producing arousal than ego threats and less obviously noxious than shock. Some subjects may be so afraid of either shock or injection that they may refuse to participate in the experiment. Ego threats are better from this standpoint, but they are more difficult to control--what is threatening to some subjects may not be to others. The best results are likely to be obtained with a preselected group such as Valins and Ray, whose group was college freshmen who can be expected to be concerned with success in college. Placebos are not used directly in producing arousal to any great extent but are often used in conjunction with other methods, either as control or as fake treatment. Selection of a means of producing arousal depends on the group on which it is to be used and the context of its use.

HYPOTHESES

In order to look at the relationship between arousal and depression, the present experimental study was designed to explore the following hypotheses:

1) Individuals with high levels of trait depression will exhibit higher scores on the state measure of depression than those with low levels of trait depression.

2) Levels of depression will interact with the type of instructions given for the drug's effects, so that a) individuals with high levels of trait depression will show increases on the state measure when given stimulant instructions, b) individuals with low levels of trait depression will show no change on this measure, and c) neither group will show changes in state depression when given quiescent instructions.

3) Individuals with high levels of trait depression will be less persistent in attempting additional mazes than those with low levels of trait depression.

4) Levels of trait depression will interact with the type of instructions given for the drug's effects, so that a) individuals with high levels of trait depression and stimulant instructions will attempt fewer mazes than those with low levels of trait depression and stimulant instructions, b) individuals with high or low levels of trait depression and quiescent instructions will show no difference in the number of mazes attempted, and c) individuals with high trait depression and stimulant instructions will attempt fewer mazes than those with high

levels of trait depression given quiescent instructions.

5) Individuals who receive stimulant instructions will admit to more arousal than those who receive quiescent instructions.

METHODS

Subjects

Subjects were 40 students from introductory psychology classes at Loyola University. Students participate in research as partial fulfillment of course requirements. Half the subjects were male, half female.

Subjects were pretested with the MMPI-D and the Beck scales. They were divided into groups on the basis of high or low scores on both tests, using a median split for the MMPI-D. D scale means were 69.4 for depressed subjects and 44.2 for non-depressed subjects. No subject in either the depressed or non-depressed groups reached the standard cutoff on the Beck scale, but the mean score of the depressed group was 2.6 while the mean score of the non-depressed group was 0.6. Half the males and half the females were classified as having high levels of trait depression and the other half as having low levels of trait depression.

Tests

Three paper-and-pencil measures of depression were used. The first, Beck's Depression Inventory, is a 13 item questionnaire in which the subject is instructed to select the response of four alternatives that best describes his present attitudes. This measure is thought to measure both state and trait aspects of depression.

The second measure, the MMPI-D scale, consists of 60 items which the subject is instructed to answer either true or false as they apply to him. This test is primarily a measure of trait depression.

The Depression Adjective Check Lists (DACL) consist of 32 or 34 self-descriptive adjectives depending on the form used. Subjects are instructed to check off each adjective which the respondent regards as descriptive of "how you feel now--today."

Apparatus

The apparatus was simple, consisting of a sophisticated-looking EEG machine with two electrodes. The machine emitted a pre-recorded audible beep.

Procedures

Subjects were pretested with the MMPI-D and the Beck scales. In a placebo "drug" and biofeedback technique, subjects were given a pill to take and told that the "drug" was being tested for its effects on concentration. Possible side effects of the placebo were described. Half the subjects then received a description of arousal side effects such as faster heart rate, sweating palms, butterflies in the stomach, and increased galvanic skin response. The other half received a description of side effects of boredom or quiescence such as relaxed muscles, sleepiness, slower heart rate, and decreased GSR. Subjects were then connected to a "biofeedback" machine by fake electrodes attached to the back of the neck and the forehead and instructed to concentrate on a complex visual pattern in front of them. After the

electrodes were attached, all subjects heard an audible beep signal that had been pre-recorded on tape but appeared to come from the "biofeedback" machine. They were told the signal indicated that the electrodes attached were picking up changes in the neural activity associated with the effects of the drug and transmitting them to the biofeedback machine. This was purported to demonstrate the drug's effects on the subject's concentration.

The experimental task consisted of a series of complex mazes administered to all subjects. The subjects were told to solve the mazes as quickly as possible and were given a very short time limit within which to do this. The first three demonstration mazes were relatively less complex than later mazes and they were easily solvable. The experimenter demonstrated the proper solution to any subject who was unable to solve it alone. Later mazes were unsolvable, however, and the time limit was intended to prevent subjects from discovering this fact. The mazes were administered in quick succession and were intended to produce a failure experience. In the intertrial interval on later mazes subjects received verbal feedback which became increasingly negative, beginning with "Let's try another since you couldn't solve that one" after the fourth maze to "You haven't done well at all so far" after the seventh maze with a final statement of the number of mazes the subject solved with the remark that the score is rather low.

The DACL was given three times: once as pretest, immediately after the biofeedback, and after administration of the mazes. Subjects were also asked to rate their subjective level of arousal at these times and once again at the end of the testing.

After the last administration of the DACL, a second series of 12 mazes was made available, the total number of which attempts was to be a measure of persistence. Subjects were told that they would be given a chance to work more mazes of the same type with the same time limit in order to try to develop a better strategy of solving the mazes. Subjects were told that the experimenter would like their cooperation but that they did not have to if they did not want to work further mazes.

Finally the subjects were thoroughly debriefed as to the nature and purpose of the experiment and the deceptions involved. They were cautioned not to reveal this knowledge to others.

Design

The DACL was analyzed by a $2 \times 2 \times 2 \times 3$ ANOVA with repeated measures on the fourth variable. The variables of interest are high and low levels of trait depression, arousal and non-arousal instructions, sex, and the three administrations of the DACL. There were 10 males with high trait depression, 10 males with low trait depression, 10 females with high trait depression, and 10 females with low trait depression. Persistence was operationalized as the number of mazes attempted. This data was analyzed by a $2 \times 2 \times 2$ ANOVA with high and low levels of depression, arousal and non-arousal instructions, and sex as the variables. Subjective arousal as indicated by self-report was analyzed by a $2 \times 2 \times 2 \times 4$ ANOVA with repeated measures on the fourth variable. The variables of interest are high and low levels of trait depression, arousal and non-arousal instructions, sex, and the four administrations of self-report of arousal.

RESULTS

Depression Adjective Check Lists

The first dependent variable was the number of dysphoric adjectives endorsed by each subject on the Depression Adjective Check Lists at pretest (Time 1), after the feedback (Time 2), and after the first set of mazes (Time 3). Scores on the DACL were subjected to a $2 \times 2 \times 2 \times 3$ ANOVA with repeated measures on the fourth variable. The variables of interest were sex, high and low trait depression, stimulant and quiescent drug effect instructions, and time. The mean number of dysphoric adjectives endorsed by subjects on the DACL is presented in Table 1.

High trait-depressed individuals were hypothesized to exhibit higher scores on state depression measures than low trait-depressed individuals. A main effect for trait depression was found, $F(1, 96) = 5.53$, $p < .02$, reflecting a mean of 2.08 for the high depression group and 1.21 for the low depression group. The interaction of Depression X Time was not significant, $F(2, 96) = 0.32$, $p = \text{N.S.}$

A Depression X Instruction X Time interaction was hypothesized in which stimulant instructions would produce increasing DACL scores for high trait-depressed subjects but no change for low trait-depressed subjects. Quiescent instructions would result in no change for either group. The Depression X Instruction X Time interaction effect was not significant, $F(2, 96) = 0.45$, $p = \text{N.S.}$ Although means for the stimulant instructions were in the direction predicted, 1.40, 1.70, and 2.90,

Table 1

Mean Number of Dysphoric Adjectives Endorsed by Subjects on DACL

		Time 1	Time 2	Time 3
Stimulant Instructions	Depressed Males	1.80	1.80	2.60
	Depressed Females	1.00	1.60	3.20
	Non-depressed Males	0.40	0.60	1.40
	Non-depressed Females	<u>1.00</u>	<u>0.80</u>	<u>0.80</u>
	Totals	1.05	1.20	2.00
Quiescent Instructions	Depressed Males	0.40	2.40	3.00
	Depressed Females	3.20	2.60	1.40
	Non-depressed Males	0.80	1.00	2.40
	Non-depressed Females	<u>2.40</u>	<u>1.60</u>	<u>1.40</u>
	Totals	1.70	1.90	2.05
Overall Totals		1.38	1.55	2.03

respectively, for depressed subjects and 0.70, 0.70, and 1.10 for non-depressed subjects, with quiescent instructions DACL scores fluctuated unevenly in opposite directions for the high and low trait-depressed groups. Means for high trait-depressed groups were 0.80, 2.50, and 2.20 under quiescent instructions, and means for low trait-depressed groups were 1.60, 1.30, and 1.90. Other interactions in the analysis did not reach significance.

Persistence

The second dependent variable was the number of the second set of mazes attempted. Scores were subjected to a 2x2x2 ANOVA. The variables of interest were sex, depression, and instructions. The mean number of extra mazes attempted by subjects is presented in Table 2.

Subjects with high trait-depression were hypothesized to attempt fewer mazes than those with low trait-depression. Depressed subjects attempted slightly more mazes ($\bar{X}=4.95$) than non-depressed subjects ($\bar{X}=4.80$), but the main effect of depression was non-significant, $F(1, 32)=0.02$, $p=N.S.$

A Depression X Instruction interaction was hypothesized such that under stimulant instructions, depressed subjects would attempt fewer mazes than non-depressed subjects and under quiescent instructions, the depressed and non-depressed groups would not differ in the number of mazes attempted. The Depression X Instruction effect was non-significant, $F(1, 32)=1.99$, $p=N.S.$, and only partly in the expected direction. Under stimulant instructions, depressed subjects attempted fewer mazes ($\bar{X}=3.80$) than non-depressed subjects ($\bar{X}=5.30$) as predicted, but under

Table 2

Mean Number of Extra Mazes Attempted by Subjects

	Stimulant	Quiescent
	Instructions	Instructions
Depressed Males	3.60	5.80
Depressed Females	4.00	6.40
Non-depressed Males	5.00	4.40
Non-depressed Females	<u>5.60</u>	<u>4.20</u>
Totals	4.55	5.20

quiescent instructions, rather than doing an equal number of mazes, depressed subjects did more mazes ($\bar{X}=6.10$) than non-depressed subjects ($\bar{X}=4.30$).

Subjective Feelings of Arousal

The third dependent variable was the subject's estimate of his own arousal based on a scale "from one to ten, in which one is so relaxed that you're about to fall asleep and ten is so nervous that you're about to jump out of your skin." Scores were subjected to a $2 \times 2 \times 2 \times 4$ ANOVA with repeated measures on the fourth variable. Times 1, 2, and 3 for this measure are the same as for the DACL. Time 4 was after the second set of mazes. Variables of interest were sex, depression, instructions, and time.

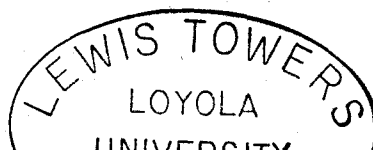
It was hypothesized that subjects receiving stimulant instructions would admit to more arousal than subjects receiving quiescent instructions. The main effect for instructions was non-significant though in the expected direction, $F(1, 121)=1.59$, $p=N.S.$ The mean for stimulant instructions was 5.18 and for quiescent instructions was 4.81.

Another effect approaching significance was the Depression X Instruction interaction, $F(1, 121)=3.21$, $p<.08$. Under quiescent instructions depressed subjects reported more arousal ($\bar{X}=5.03$) than non-depressed subjects ($\bar{X}=4.58$), and under stimulant instructions depressed subjects reported less arousal ($\bar{X}=4.88$) than non-depressed subjects ($\bar{X}=5.48$).

DISCUSSION

The only hypothesis which was unequivocally supported is the one proposing that subjects with high levels of trait depression will exhibit higher scores on the state measure of depression than those with low levels of trait depression. The MMPI-D scale was used to measure trait depression or long-term, stable tendencies toward depressed affect. The DACL was used to measure state depression, that is, temporary changes in mood. Subjects classified as trait-depressed by relatively higher scores on the MMPI-D claimed more depressed feelings on the three administrations of the DACL as well, although the changes over time in DACL scores were less pronounced than expected. The DACL may be a less responsive measure than anticipated in terms of discriminating temporary changes in depressed affect among the subjects used in this study. Both these measures have drawbacks in that neither is a pure measure of depression. The MMPI-D taps anxiety, hostility, and physical factors as well as depression while the DACL includes fatigue, lack of vigor, bewilderment, and unfriendliness in its score. Despite these difficulties, the relationship between scores was significant.

Data failed to support the other hypotheses which were derived from the combination of Beck's theory of depression and Schachter's theory of emotion applied to depression. Beck describes the affective state of depression as the consequence of an individual's negative interpretation of behavioral or situational cues. Extending Beck's theory to Schachter's theory applied to depression, one would conclude



that a person may experience arousal and define it as depression because of characteristic cognitive sets. Non-significance of results in this area can, perhaps, be attributed to the fact that few of the subjects in the so-called "depressed" group were clinically depressed according to scores on the pretest measure. Of the depressed male subjects, eight scores were only one standard deviation above the mean (i.e., T score of 50) and two scores were two standard deviations above the mean. Of the depressed female subjects, only three scored one standard deviation above the mean, the rest scoring less than one standard deviation above the mean. This indicates that for the most part, the subjects classified as trait-depressed experienced relatively low levels of depression. Indeed only three subjects reported that they felt depressed enough to seek counseling. The DACL scores contributed to this problem as well in that more than 60% of the scores were three or less of a possible 12. The DACL does not provide sufficiently fine discrimination at such low levels of depression as these subjects generally experienced. Future research might more profitably use truly depressed subjects in investigations.

A number of methodological improvements could be made in the present study. One possibility is use of other measures. Neither the MMPI-D nor the DACL is a factorially pure measure of depression and the other factors may be obscuring changes in depressed affect. Additionally, the DACL scores were highly skewed with a modal score of zero. Either a more sensitive measure should be used or care should be taken to insure that depressed groups are truly depressed and easily discriminated from non-depressed groups in terms of trait test scores.

Another serious problem is found in the biofeedback procedure in that it did not produce the desired result of significantly stimulated or quiescent feelings. The measure may have been insensitive since it produced a single global subjective rating of arousal. A more extensive measure tapping various physiological symptoms such as heart rate, respiration, etc. separately could be more useful in determining levels of arousal. The instructions may not have been convincing enough. In future, the examiner might insist, for example, that the subject not eat or smoke for several hours before the experiment and be prepared not to drive or study for several hours afterward. Such instructions would be more likely to impress the subject with the efficacy of the "drug" he/she is to ingest. An additional problem was that the biofeedback procedure was intrinsically soporific and the mazes intrinsically stimulating, thereby obscuring effects of the instructions. This difficulty might be overcome by shortening the biofeedback session to reduce boredom. (The feedback session became shorter over the course of this study as the examiner became bored with it and as a response to complaints from earlier subjects that the audio signal was quite annoying.) Another alternative might be to eliminate the biofeedback procedure altogether and simply administer the placebo with appropriate instructions and monitor the subjective level of arousal. An alternative to the mazes for producing depression might be a less intrinsically stimulating task such as reading sad stories or rating depressing pictures.

SUMMARY

This investigation of the relationship between arousal and depression attempts to combine Beck's theory of depression and Schachter's theory of emotion as it is applied to depression. Beck theorized that one's cognitive schema result in one constructing the experience of the self, the world, and the future as negative and thereby causing the affective state of depression. Extending Beck's theory to Schachter's theory of emotion applied to depression leads to the hypothesis that arousal states may be labeled depression on the basis of characteristic cognitive sets.

Measurements of both state and trait depression were used. The state depression measure, Lubin's Depression Adjective Check Lists, was intended to discriminate temporary changes in mood before and after treatment conditions. Beck's Depression Inventory and the MMPI-D scale were trait depression measures intended to determine long-term, stable tendencies toward depressed affect. The MMPI-D is well known as one of ten scales developed by administering 1000 purposely vague items to groups of normal persons and psychiatric patients and eliminating those items which were not statistically significant. Reliability and validity are reasonably high but the MMPI-D does measure other factors besides depression. Beck constructed his scale from a series of statements reflecting symptoms integral to depression and tested them on new inpatient and outpatient psychiatric cases. Reliability and validity

are sufficiently high. Lubin gathered a pool of adjectives connoting degrees of elation and depression and administered them to groups of normal persons and psychiatric patients. Item analysis was employed to divide the statistically significant adjectives into lists. Reliability and validity are sufficiently high, but the DACL is not a pure measure of depression. All three tests correlate significantly.

Subjects were 20 males and 20 females from introductory psychology classes. They were pretested with the MMPI-D and Beck scales and half were classified trait-depressed and half non-trait-depressed. They were administered a placebo described as having stimulant or quiescent effects and a faked biofeedback procedure intended to convince subjects that they were indeed feeling stimulated or sedated. Subjects then attempted a series of insoluble mazes intended to produce a failure experience. The DACL was administered as a pretest, after the feedback session, and after the mazes. After the last measure, subjects were asked to attempt more mazes as a measure of persistence. Subjects rated their arousal four times during the experiment. Data from the DACL, persistence, and arousal measures were analyzed by ANOVA with levels of depression, type of instructions, and sex as the variables of interest.

It was expected that scores on trait and state measures would be related. Trait-depressed individuals were hypothesized to show increased state depression under stimulant instructions but non-depressed individuals would not, nor would either group under quiescent instructions. Trait-depressed individuals were hypothesized to be less persistent than non-trait-depressed individuals. Trait-depressed subjects under stimulant instructions were hypothesized to be less persistent

than non-depressed subjects under stimulant instructions or either group under quiescent instructions. Subjects under stimulant instructions were hypothesized to admit more arousal than those under quiescent instructions.

The first dependent variable was the number of dysphoric adjectives endorsed by each subject on the DACL at each of three administrations. High trait-depressed individuals were hypothesized to exhibit higher scores on state depression measures than low trait-depressed individuals. This hypothesis was supported by a significant main effect. High trait-depressed subjects were hypothesized to show increased DACL scores under stimulant instructions. Low trait-depressed subjects under stimulant instructions would show no change nor would either high or low trait-depressed subjects under quiescent instructions. This hypothesis was not supported; the interaction effect was non-significant though in the expected direction. No other main effects or interactions were found to be significant.

The second dependent variable was the number of the second set of mazes attempted. Subjects with high trait-depression were hypothesized to attempt fewer mazes than those with low trait-depression. This hypothesis was not supported by a significant main effect. Depressed subjects under stimulant instructions were hypothesized to attempt fewer mazes than non-depressed subjects, and under quiescent instructions, the depressed and non-depressed groups would not differ in the number of mazes attempted. This hypothesis was not supported; the interaction was non-significant and not entirely in the expected direction. Under stimulant instructions, depressed subjects attempted fewer mazes than

non-depressed subjects as predicted, but under quiescent instructions, depressed subjects attempted more mazes than non-depressed subjects. No other significant main effects or interactions were found.

The third dependent variable was the subject's own estimate of his arousal. Subjects receiving stimulant instructions were hypothesized to admit to more arousal than subjects receiving quiescent instructions. This hypothesis was not supported; the main effect was non-significant. Another effect approached significance. Under quiescent instructions, depressed subjects reported more arousal than non-depressed subjects, and under stimulant instructions, depressed subjects reported less arousal than non-depressed subjects.

Data demonstrated a strong relationship between scores on the state and trait measures of depression. The state depression measure, the DACL, appears to be less responsive to temporary mood changes than anticipated, a distinct drawback in this type of study. Neither the DACL nor the MMPI-D is a pure measure of depression, tapping other factors such as anxiety, hostility, and confusion, but this seems not to have affected this study significantly.

Data failed to support any hypotheses derived from the combination of Beck's theory of depression and Schachter's theory of emotion applied to depression. Non-significance of results in this area could be attributed to the fact that the depressed and non-depressed groups were not sufficiently differentiated in terms of MMPI-D and Beck pretest scores. For the most part, subjects classified as trait-depressed experienced minimal levels of depression. In addition, the DACL scores

were highly skewed with the modal score of zero. The DACL does not provide a fine enough discrimination at such low levels of depression.

A number of methodological improvements could be made in the present study. More sensitive measures for depression and subjective arousal would be appropriate. The use of more severely depressed groups would also be appropriate. The biofeedback procedure should be made less soporific and the task less arousing. Instructions accompanying the placebo could be more convincing. Use of improved procedures in a replication should be helpful in determining the strength of trends discovered in this study.

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APPROVAL SHEET

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The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

9/1/77
Date

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