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Motivational Differences Between Depressed and Nondepressed Students in Detecting Noncontingency

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Abstract

MOTIVATIONAL DIFFERENCES BETWEEN DEPRESSED AND NONDEPRESSED STUDENTS IN DETECTING NONCONTINGENCY

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The concept of learned helplessness assigns a mediating role to the recognition that events may be unrelated. However, current representation of individuals as "intuitive statisticians" unveils a lack of these information-processing abilities. This is particularly apparent in the skill required to recognize noncontingent events. Similarly, in a series of experiments on the detection of contingent and noncontingent events, Alloy and Abramson (1979) demonstrated that this "illusion of control" could discriminate between depressed and nondepressed students.

In extending their research, the concept of "contrast effects," on animal learning phenomenon, was introduced as a competing motivational framework to account for differences between depressed and nondepressed populations in judging relationships. Within this context, a paradigm was established which hypothesized that noncontingent exposure to two levels of reinforcement density would provide enough of a subjective transition to reject any notion of a controllable task. The present research, in proposing this paradigm, offered the opportunity

to examine several interactive systems in response to subjective vs. objective judgments of noncontingent reinforcement. The component responses included: perceptual, cognitive, affective, behavioral, and motivational.

The most convincing demonstration of this experiment was the failure of the participants' subjective representations of noncontingency to reflect the objective experimental relationship. Another salient aspect of the data was the observation of enhanced judgments of control or "facilitation effect" by the nondepressed, low-reinforcement control group. These findings from the main dependent measures combined with supplementary discoveries portraying the nondepressed groups as being more actively involved in the experiment added credence to the position that the "illusion of control" is a persistent phenomenon, especially in nondepressed students, and that individuals suffer a motivational deficit.

CHAPTER 1

INTRODUCTION

CONTINGENCY LEARNING

A salient aspect of both animal and human knowledge concerning the physical and social environment is awareness of the distinction between events. This distinction can either be merely concomitant or contingent. Contingency has broad implications and refers to the degree of relationship between any two environmental events. Only when an event is contingent upon some antecedent does the possibility arise of controlling it through that condition. By contrast concomitance carries no such implication. The importance of learning contingencies between events and the subsequent control it provides has even been demonstrated in infant (8 week old) behavior (Watson & Ramey, 1972).

A conceptualization of contingency as a conditioning process has been advocated by several contemporary proponents of classical learning theory (e.g., Mackintosh, 1975; Rescorla & Wagner, 1972). As a theoretical framework, the phenomena of contingency focuses both on the relationship between the conditioned stimulus (CS) and the unconditional stimulus (UCS), as well as the association between the absence or independence of the CS ($C\bar{S}$) and UCS. This latter process makes it distinctive from learning by continguity (Premack, 1965), and offers the advantage of viewing this negative relationship between events as an active inhibitory process. According to the contingency view, CS establishes itself as a conditioned inhibitor (CS-) whenever there is a greater occurrence

of the US in its absence than in its presence (negative contingency). In this regard, studies have demonstrated that random presentations of CS and UCS combinations eventually hinder the possibility of a connection between the two stimuli (Mackintosh, 1973).

During an equivalent time frame, the understanding of contingency has also been actively pursued in theoretical explanations of instrumental learning (e.g., Seligman, Maier, & Soloman, 1971). In this instance, Seligman et. al. (1971) contended that organisms can detect concurrent fluctuations in two response-consequence possibilities, i.e., the conditional probability of an outcome provided the response has occurred, P(O/R), and the conditional probability of the consequence provided the response has not occurred, $P(O/\overline{R})$. Seligman and his subsequent coresearchers have thoroughly investigated the phenomenon whereby two response-outcome probabilities are equivalent, resulting in a convincing demonstration of a "helpless" condition (for a review, see Maier & Seligman, 1976).

PHENOMENON OF LEARNED HELPLESSNESS

An instrumental-learning experiment to demonstrate this phenomenon was performed by Seligman and Maier (1967) in which three groups of dogs were exposed to a Pavlovian hammock condition. In the "escape" condition, dogs received 64 unsignaled shocks where release was made possible by pressing a panel located proximally to their heads. A group "yoked" to the escape group received shocks identical in number, duration, and pattern without the opportunity provided to terminate the aversive experience. To

complete this triadic paradigm, a naive "control" group was not given shocks in the hammock. A day later, each of the three groups received 10 trials in two-way shuttlebox escape/avoidance training where the contingent response was jumping over a barrier.

Results showing the median latency of barrier jumping demonstrated that dogs in the yoked group were significantly slower to escape than dogs from the other two groups, who did not differ from each other. Behaviorally, the yoked group dogs were both qualitatively and quantitatively different in comparison to the other groups. Six of the eight yoked dogs failed in efforts to escape on every trial. Descriptively, the yoked group reacted in a similar manner as the others when first introduced into the shuttlebox (i.e., running frantically, urinating, defecating and howling). However, with the continuation of shock, they ceased running and preferred to lay down "passively" and whimpered. During subsequent trials, no escape motions were detected from these animals. Although a few yoked dogs actually escaped shock by jumping the barrier, these same dogs returned to passively receiving the shocks over the next trials. In distinct contrast, dogs from both of the other groups hurdled over the barrier as soon as shock was initiated, and continually hastened their escape over the remaining trials. A conclusion from these findings is that exposure to uncontrollable shocks, and not shocks per se, was the precipitating factor in inducing a "helpless state."

An analogous representative experiment performed with humans was one completed by Hiroto (1974). Using a triadic design typical

of the previous animal paradigms, Hiroto contrasted three groups of college students in the following fashion: an "escape" group who received training with an experimenter-induced contingency between button pressing responses and noises; an "inescapable" group experiencing no relationship between noises and button pressing; and a control or "no noise" group. Results suggesting a strong similarity between humans and other species were discovered in the test situation consisting of a shuttlebox for escape/avoidance from noise. The evidence, which has been repeatedly replicated, showed reduced performance by persons who had received prior exposure to uncontrollable noise, as compared to the other two groups.

A SUMMARY OF THE MODEL

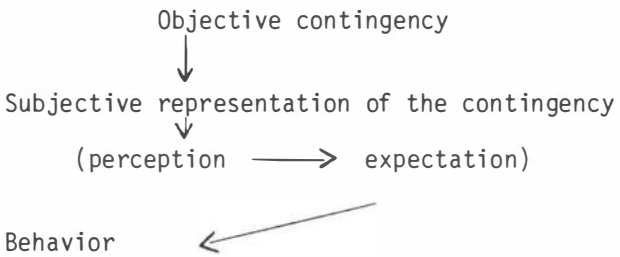
The argument that these researchers propose indicates that prior exposure to aversive events which terminate noncontingently of any voluntary response result in an active learning process that these events are truly uncontrollable. Furthermore, an expectation is formed that future events will also result in response-outcome independence. The deficits of "learned" helplessness have been observed in countless experimental situations across a wide variety of species including: mice (Braud, Wepman, & Russo, 1969); rats (Baker, 1976); fish (Padilla, Padilla, Detterer, & Giacalone, 1970); cats (Seward & Humphrey, 1967); dogs (e.g. Seligman & Groves, 1970); and humans (e.g., Roth & Kubal, 1975). According to this model, debilitating effects in the motivational, cognitive, and emotional areas of behavior are the final product.

The motivational decrement is expressed via a retardation in initiating voluntary responses relative to contingent and control groups and is the result of anticipating noncontingent events. In this context, if a response produces an unsatisfactory state of affairs (i.e., a desirable outcome is not forthcoming), the probability of emiting that response in the future decreases (Bolles, 1972). Consequently, the above result in the representative experiment by Seligman and Maier (1967) in which the yoked dogs refused to produce an escape response when shocked could be explained by a previous acquisition of a belief system that their responses could not eliminate the aversive outcome.

The cognitive dimension is composed of an obstruction in obtaining the knowledge that future action will reliably produce desirable consequences and is also a product of evidencing response and outcome independence. According to the helplessness model, learning that an event is noncontingent proactively interferes with later knowledge that future events may be contingent. Therefore, both the yoked dogs and Hiroto's (1974) inescapable noise group faltered in following successive escape responses due to their difficulty in acquiring the necessary knowledge needed for termination.

The emotional or affective dimension of learned helplessness has also been investigated by two exemplary studies. It was demonstrated that nondepressed college students exposed to noncontingent noises actually became more depressed in relation to either a group receiving controllable noises (Gatchel, Paulus, & Maples, 1975) or another group receiving no noises (Miller & Seligman, 1975).

A main emphasis of the model is that three stages are included, with the intervening one being cognitive, i.e.,



(Adapted from "On the Cognitive Component of Learned Helpless and Depression" by L. B. Alloy and M. E. P. Seligman, The Psychology of Learning and Motivation, Vol. 13, 1979)

In everyday interaction with the environment, a certain quantity of information is received by the organism regarding the actual or objective degree of response-outcome relationships. This raw data is then registered and converted into a personal or subjective description of the amount of contingency.

This subjective experience of controllability includes, at minimum, two steps: one being the perception of present or past experience with contingency, followed by acquiring an expectation concerning future associations. Biases, however, can enter at either or both steps and can further be separated into two additional components: First, if the subjective judgment of the current relationship is neutral, but expectation of future associations is prejudiced by prior exposure to noncontingency, a biased belief of noncontingency will result; secondly, the

expectational process may not have been previously influenced, but the perceptual step may have been unduly biased toward discovering noncontingency when an objective relationship has been established. The most apparent cause of this kind of perceptual inclination toward unrelated events is attentional. If either the importance of reinforcement from responding (Mackintosh, 1975) decreased after response-outcome independence or the salience of the relationship between outcomes and responding decreases, viewing response-outcome contingencies will diminish.

While the majority of evidence concerning the cognitive deficit has never differentiated among the above possibilities, there does seem to be at least one animal study (Maier & Testa, 1975) and two human studies (Alloy & Abramson, 1979; Abramson, Alloy, & Rosoff, 1979) that have addressed this issue. However, the mainstream of the helplessness literature has been ambiguous regarding the mechanisms that result in a cognitive decrement (Alloy & Seligman, 1979). Occasionally, confronting a noncontingent situation produced a perceptual cognitive loss which obstructed the viewing that present or past responses and outcomes were related; while other studies reported expectational interference of future contingencies. Therefore, simply exposing an organism to an event which is actually uncontrollable will not create a helpless condition; instead, an expectation of future uncontrollability must be formed before helplessness will be exhibited. Alternatively, the symptoms of helplessness can be exhibited without

experiencing response-outcome independence through falsely anticipating a noncontingent situation. Thus, it is this subjective experience of uncontrollability which can readily modify an organism's behavior and display the components of helplessness.

Moreover, the step between perception and expectation can also be influenced by several moderator variables including preexisting biases or knowledge, or perhaps most importantly, attributions.

ATTRIBUTIONAL ANALYSIS

Since the inception of the original model, revisions had to be proposed in order to incorporate all the burgeoning literature regarding "helpless" individuals (Abramson, Seligman, & Teasdale, 1978). This reformulated model focused on the part that attributional states and attributional styles contributed in helplessness as mediators in the anticipation of future noncontingency. In general, attributions refer to a perceiver's effort at comprehending the underlying stabilities in the environment (Heider, 1958). More specifically, it can be viewed as the process of searching for a sufficient cause for others' behavior or one's own actions. The main characteristic of the revised model is that it offers a pervasive attributional style which modifies the perception of failure by producing the aforementioned deficits in a broad manner, lasting a long time, and directed toward the self. Also, an exhibited deficit of lowering self-esteem has been incorporated as an additional symptom of

encountering uncontrollable events. Finally, Abramson, et. al. (1978) suggested a distinction between instances where an individual lacks the requisite controlling responses available to others, and situations where both the individual and everyone else do not possess the controlling responses. Thus, an outcome may be uncontrollable with respect to (a) all possible responses in one's own repertoire (personal helplessness) or (b) all possible responses in the repertoire of everyone (universal helplessness).

In sum, an attributional analysis of the concept of helplessness suggests that when persons confront or perceive themselves as being in a helpless (failure) situation, they question their ability to remove themselves from that aversive event. The personal etiology assigned for failure will, subsequently, determine in what novel situations and across what timespan the anticipation of future failure (the four deficits) will most likely result. Three pertinent attributional components that an individual must consider have been mentioned: 1) Stability - attributions toward stable factors result in chronic shortcomings, whereas unstable reasons produce transient deficits; 2) Globality - attributions toward global factors cause deficits to occur in a wide variety of situations, as opposed to feelings that the failure was situation-specific; and 3) Internality - attributions made to personal factor (lack of ability) create loss of self-esteem, whereas external attributions will not hinder esteem.

Three key predictions of the attributional reformulation have recently been enunciated (Miller & Seligman, 1980): 1) stable attributions for failure (and unstable attributions for success) anticipate decrements even after an interval of time has elapsed from the original confrontation; 2) global attributions toward failure (and specific attributions for success) project lapses occurring across events; and 3) internal attributions made in conjunction with failure (and external attributions for success) predict losses in self-esteem.

A culmination of the reformulated model provides degrees in severity of the decrements in helplessness. That is, the intensity of the cognitive and motivational decrements is regulated by the strength and probability of the anticipation of independence between events. The intensity of the other two dimensions (i.e., self-esteem and affective deficits) is ascertained concomitantly by both the conviction of noncontingency and the importance of the situation.

HELPLESSNESS DEPRESSION

Perhaps the broadest appeal of the helplessness model, though, has come from its use as a model for human depression (Miller, Rosellini, & Seligman, 1977; Seligman, 1975). The symptoms of both learned helplessness and clinical depression seem to share several commonalities: passivity or lowered response initiation, emotional distress, negative cognitive set, loss of appetite, and an assumed role in norepinephrine depletion. In sum, the model contends that depressed individuals, like helpless humans and animals, can be viewed as anticipating that salient outcomes

result from noncontingent responding. Further, it is this expectation that is hypothesized as causing the main motivational, cognitive and emotional symptoms of depression.

In the clinical literature, the term depression refers to a syndrome which encompasses a broad set of symptoms with diverse behavioral manifestations (cf. Beck, 1972; Levitt, 1972). Particularly notable is the diversity among cognitive symptoms. Besides apparent subjective sadness, depressed individuals display clinical symptoms such as guilt, pessimism, reduced self-esteem, self-derogation, and reported feelings of hopelessness and helplessness.

Beck (1967; 1976) has provided the most comprehensive elucidation of the cognitive view of depression. According to this model, the depressed person's thinking and preoccupation represent erroneous and exaggerated modes of personally scrutinizing self and events. In this way, the depressed individual becomes exceedingly sensitive to frustration (interpreting insignificant impediments as substantial), feels slighted by otherwise harmless statements by others, and simultaneously, devalues him/herself. Furthermore, the cognitions are oftentimes irrelevant and inappropriate to the actual event and reflect a consistent negative bias towards self. Beck terms this process "selective abstraction" which has been empirically demonstrated by Wener and Rehm (1975) who found that depressed persons underestimated the percentage of positive feedback they received.

An abundance of negative cognitions may inevitably lead to: dysforia; a reduction in desire to obtain rewards; passivity; and finally, to a helpless condition (Kovacs & Beck, 1978). Additionally, each specific cognitive content appears to be connected to a particular affect (Beck, 1970). Therefore, concern about an expected threat is associated with feelings of anxiety; while thoughts related to being unloved and abandoned are connected to sad feelings. As a consequence of such overgeneralized negative interpretations, the depressed person probably experiences enhanced feelings of dejection and discouragement.

In clinical types of depression, the perception, interpretation, and evaluation of the person are rarely, if ever, consensually validated; thus, the pervasive, negative bias directed toward the self remains exempt from usual attempts of corrective feedback. Moreover, the depressed individual projects into the future notions of real or imagined loss. This future orientation exacerbates the existing pessimistic feelings due to a belief that the present discomfort is unending and unalterable (stable attribution). Beck (1967) has assigned this content of depressive cognitions as the "negative cognitive triad," i.e., a negative, demeaning view of oneself, the world, and the future.

This cognitive set has emerged repeatedly in experiments with depressed individuals. Friedman (1964), for example, reported on patients who, while performing satisfactorily on a

test, would occasionally restate their initial position of "I can't do it" or "I don't know how." These types of negative biases have also been demonstrated in experiments with depressed college students.

Studies by Miller and Seligman (1973) and Miller, Seligman, and Kurlander (1975) found that depressed students actually viewed their skilled actions in the same manner as chance actions (i.e., relative to nondepressed students, depressives tended to perceive reinforcement in a skill task as independent of their responses). In addition, Miller, Seligman, and Kurlander (1975) discovered this perceptual style to be specific to depression as they differentiated between anxious and nonanxious students matched for degree of depression and found no difference in their perceptions of reinforcement contingencies.

Other researchers have more directly demonstrated the parallels between negative cognitions in learned helplessness and depression. While replicating previous findings, Miller and Seligman (1976) and Klein and Seligman (1976) found that nondepressed persons with prior experience with inescapable noise viewed rewards as less response contingent in comparison to nondepressives who had been exposed to either escapable or no noise during a test involving skill. No pretreatment effects were found for perception of reinforcement in chance tasks. These studies provide much support for the parallels between learned helplessness and depression on perception of reinforcement.

These same studies also demonstrated cognitive deficits by measuring the extent to which subjects were able to benefit from successful anagram solution or escapes from shuttlebox noise. Depressed individuals in their untreated groups displayed cognitive decrements in comparison to the nondepressed-untreated. In addition, nondepressives, who had been exposed to inescapable noise or unsolvable problems, exhibited deficits relative to nondepressed control groups. Therefore, a strong similarity exists between learned helplessness and depression on measures of cognitive functioning.

Regarding the revised version of the "helplessness" type of depression, an increased expectation is created whereby highly aversive consequences are thought to be forthcoming (also desirable outcomes are inprobable). Like the learned helpless organism, the depressed individual has increased the probable expectation that no escape or change in the situation is possible. Furthermore, an insidious depressive style of generating attributions has been proposed in which there is a general tendency to offer stable, global and internal attributions for failure, whereas offering unstable, specific and external attributions for success.

DEDUCTIONS FROM THE HELPLESSNESS MODEL

A prediction from the learned helplessness framework has previously been postulated--depressed persons many times will underestimate the degree of contingency between their behavioral actions and outcomes (Seligman, 1975). This has been discussed in terms of proactive interference produced by an expectation of

uncontrollability. Consequently, both a powerful and a lesser deduction can be derived from the helplessness model concerning the perception of actual contingent relationships. According to the more powerful prediction, depressed persons underestimate the absolute degree of objective response-outcome relationship, whereas the weaker prediction states that persons who are depressed just underestimate the probability of objective contingency relative to nondepressed. Though both deductions anticipate differences in subjective judgments of environmental contingencies between the two populations, only the powerful view specifies that depressives underestimate the degree of contingency in comparison to the actual relationship (Alloy & Abramson, 1979).

Alternatively, a prominent theme appears to stem from the results of the human contingency learning literature, i.e., people oftentimes regard noncontingent events as contingent (Langer, 1975). In this regard, superstitious mannerisms can be observed as individuals react as though one event can predict another where in actuality it cannot and fallaciously believe outcomes are response dependent when they are not. Similarly, representations of contingency in noncontingent situations should differ between depressed and nondepressed populations. Although prior proponents of the model (Klein & Seligman, 1976) would not support this conviction, Alloy and Abramson (1979) argued convincingly that nondepressed individuals are motivated to maintain or enhance self-esteem by creating an "illusion of control" when encountering uncontrollable problems. This position

of nondepressed distortion is based on the assumptions of the model regarding nondepressed individuals as possessing generalized expectations of control (i.e., desirable outcomes as dependent on personal responses) which proactively interfere with detecting independent relationships. This type of reasoning has also been used to explain the "immunization" phenomenon in helplessness experiments (Maier & Seligman, 1976). Thus, according to this argument, the helplessness model also provides both a powerful and weaker prediction regarding the subjective representation of contingency when responses and outcomes are actually unrelated. According to the powerful deduction, nondepressed individuals should tend to overestimate the degree of contingency when events are noncontingently associated. A statement of the lesser position would hypothesize just a net difference between the judgments of noncontingency of the two populations (i.e., nondepressed believing they had more control in relation to depressed).

EMPIRICAL EVIDENCE OF PREDICTIONS

In an investigation to test these predictions, Alloy and Abramson (1979) examined subjective judgments of contingency in depressed and nondepressed college students. In four separate experiments, groups of depressed and nondepressed individuals (dichotomized by scores on the Beck Depression Inventory (BDI) and Multiple Affect Adjective Check List (MAACL)) were presented with various combinations of problems differing in objective degree of contingency, frequency of reinforcement, and valence of outcome.

As opposed to the previous indirect attempts to assess the cognitive dimension of helplessness and depression, Alloy and Abramson (1979) required individuals to quantify the degree of contingency between their actions and outcome. The procedure consisted of 40 trials during which two responses were possible (pressing or not pressing a button) with one of two alternative consequences (green light onset or absence) occurring. After each series of trials, a scale (0 to 100) was provided for each person to gauge their subjective degree of contingency or control between button pressing and light onset. The concepts of complete, intermediate and no control were explained to each person before they estimated the existing relationship. Objective contingency was determined by a difference equation between green light onset/press and green light onset/no press.

According to Alloy and Abramson, the development of this judgment of contingency task offers an objective measure of the perceptual step of the cognitive deficit, unconfounded by the response initiation deficit. In this respect, failure to detect a relationship between button pressing and light onset cannot simply be a matter of a lesser tendency to emit the optimal response. Precautions to circumscribe this foreseeable problem were inserted by requiring an effortless task and instructing individuals to attempt both response choices (of which analysis of sampling patterns showed that this was carried out).

In the initial problem, subjective perceptions of objectively contingent response-outcome relationships were examined. Each

student was exposed to one of three possible conditions where the actual degree of control over green light onset varied between 25%, 50%, or 75%. Each condition was counterbalanced for whether either response alternative produced a greater percentage of reinforcement. In addition to varying objective degree of contingency, the three conditions were also designed to differ on overall frequency of green light onset, since prior research (Jenkins & Ward, 1965) suggested that this was a moderator variable which accounted for most of the variance between subjective and objective judgments in detecting contingencies. Specifically, a negative correlation was established between percentage of reinforcement and degree of contingency for each condition. The procedure for the second experiment was identical to the initial task with the exception that the relationship between responses and reinforcement were fixed in a noncontingent manner (0% control). Independence of green light onset was established at 25% and 75%, respectively, on each condition.

Results of judgment of control in Experiment 1 found no difference between groups with each group being highly accurate in detecting the objective relationship. In contrast, the groups significantly differed in the noncontingency tasks of Experiment 2. Nondepressed students overestimated their degree of control in the noncontingent high density (75%) reinforcement task. This "illusion" of control, however, was not discovered in the noncontingent (25%) reinforcement problem, with both groups able to gauge a lack of relationship.

In an attempt to examine more "real world" outcomes, Alloy and Abramson (1979) examined judgments of control involving "hedonically charged" outcomes. Students in these two experiments experienced one of two outcomes where reinforcement (green light onset) was associated with winning or losing money. These two experiments also differed in the objective relationship between responses and outcome. In Experiment 3, green light onset occurred on 50% of the trials in both alternative responses and was noncontingently associated with responding (0% control), whereas in the final experiment a contingent relationship was established and counterbalanced offering 50% control.

Results of the noncontingent tasks of Experiment 3 showed that once again an illusion of control was induced in the subjective opinion of nondepressed individuals--this time in comparing winning to losing money. In marked contrast, the depressed students were not influenced by the outcome valence, showing no significant judgment differences between the two conditions. Additionally, nondepressed in comparison to depressed students overestimated their judgment of control in the "win" situation, but not in the "lose" condition. Experiment 4 displayed similar findings whereby nondepressed students underestimated perceived control in the "lose" problem versus the "win" task, and assessed themselves as having less control than did depressed students in the "lose" condition.

The implications that these experiments present for the cognitive deficit in depression are thus: 1) according to

Experiment 1, the finding of no differences between groups in detecting contingency contraindicates support of a perceptual bias toward noncontingency in depressed individuals; 2) that Experiment 2 discovered support of a net difference between groups in detecting noncontingency, but in the opposite direction hypothesized (offers no support for the Beck model of depression); and c) Experiments 3 and 4 provided additional evidence for a lack of perceptual bias in depressives.

NONDEPRESSED ERRORS

The general trend of the results in the Alloy and Abramson (1979) study was the tendency for only the nondepressed individuals to yield to distortions in their judgments of degree of control. It was interesting to note that the false heuristics which influenced the nondepressed did not affect the depressed groups detection of contingency and noncontingency. As reported, they were able to accurately gauge controllability in every experimental situation. These results, therefore, contradict the helplessness model's hypothesized "associative deficit" in depressives. Further support for this position is offered from a study by Abramson, Alloy, and Rosoff (1979) which found only a response initiation deficit, but not a perceptual deficit among a group of depressed individuals. Thus, while many prior accounts of depression had focused on errors that depressed persons made in construing their world, more current evidence suggest that it is the nondepressed who actually produce "cognitive errors."

Recently, several studies have been published which add support to this "newer" discovery. For example, in a selective

recall experiment where individuals received both positive and negative feedback, Nelson and Craighead (1977) found that nondepressed students underestimated the frequency of negative feedback, relative to depressed students who could accurately gauge how often negative feedback was provided. In addition, Rozensky, Rehm, Pry, and Roth (1977) demonstrated that non-depressed control patients overrewarded themselves in comparison to what their objective performance should have warranted, while depressed patients were more accurate in self-reward. Moreover, research by Lewinsohn, Mischel, Chaplin, and Barton (1980) showed that nondepressed psychiatric and normal control subjects perceived themselves in a more positive manner than others viewed them, whereas depressed patients accurately judged their social competence.

What then can explain this novel phenomenon of nondepressed distortion? In the Alloy and Abramson experiments it was suggested that the nondepressed individuals may have relied on particular invalid organizational rules in justifying their perception of control instead of relying on the differential effectiveness of responses (gauging the probability of green light onset associated with pressing and not pressing) in arranging the probability data. This was supported by the fact that all subjects did possess the appropriate information with which to make an accurate judgment of control. By using these invalid heuristics, e.g., percentage of reinforcement or frequency of successes, the nondepressed group continually misrepresented the degree of control they believed they possessed in maximizing

rewards. Another crucial variable that appeared to have been interfering in accurate judgments in these experiments was valence of outcome, i.e., goodness of outcome, rather than solely frequency of reinforcement. In fact, differential degrees of control were demonstrated when desirable outcomes were manipulated, i.e., a stronger belief of control was obtained when outcomes were positive (winning money) in comparison to the underestimation of control for aversive results (losing money), when frequency was held constant. Together, these intuitive strategies seemed to override whatever objective evidence there was to learn in discovering contingent relationships.

Within the broad spectrum of social psychological research, it has been suggested that other powerful variables besides frequency and valence of outcome are pertinent to cognitive misrepresentations of estimating relationships. For instance, Langer (1975) demonstrated that when components similar to tasks involving skill (e.g., practice) were inserted into noncontingent situations, individuals often acted as though they had personal control. Wortman (1975) discovered that prior knowledge of the goal and individual participation in the task were also instrumental in inducing enhanced perceptions of control. Additionally, Langer and Roth (1975) found that initial and/or intermittent successes in a problem-solving task contributed more to feelings of control relative to successes which did not appear until the latter portions of the test. In sum, these studies add credence to the Alloy and Abramson finding

that when confronted with objective lack of contingency, persons begin to utilize various invalid strategies which result in erroneous subjective judgments of control.

Additionally, the above-mentioned variables which regulated cognitive illusions in humans seem to produce similar distortions in animals. For example, an analogous experimental procedure for demonstrating noncontingencies is Rescorla's (1967) truly random control (TRC) paradigm whereby CSs and UCSs are provided in an unsystematic fashion. In this context, a conditioned emotional response (CER) test usually is incorporated to measure conditioning of the CS, i.e., a reduction in the response rate during presentation of the CS (Annau & Kamin, 1961). The typical discovery after asymptote has been reached is that animals in the TRC group display no CER suppression, indicating the absence of both excitatory and inhibitory conditioning (Rescorla, 1972). However, prior to achieving asymptote, animals who had experienced the TRC procedure usually display excitatory conditioning (Ayres, Benedict, & Witcher, 1975).

It is at this stage (i.e., initial excitatory conditioning) where parallels can be observed between the variables intervening in the magnitude and duration of this conditioning process and the variables manipulated in the Alloy and Abramson procedures (frequency of reinforcement and outcome valence) that induced overestimations in judgments by nondepressed individuals. Research by Rescorla (1972) revealed that higher frequencies of UCS in random presentations of CS and USC will produce greater magnitudes

of preasymptotic conditioning. Also, Quinsey (1971) showed greater initial excitatory conditioning when the UCS is intensified in a TRC paradigm. This increased intensity can be viewed in a similar manner to variables which would contribute to differential valences of outcome.

An additional moderator variable which has been found to influence preasymptotic conditioning in the TRC procedure is the quantity of initial CS-UCS pairings. In this case, Benedict and Ayres (1972) found a correlation between number of initial pairings and increased excitatory conditioning. This finding approximates the aforementioned human study by Langer and Roth (1975) where biases toward control were induced by providing easy successes in the early portions of the test. Yet, still another influence on subjective judgment, i.e., outcome valence, is synonymous to previous research displaying "superstitious" conditioning (Skinner, 1948) in a noncontingent operant context. The bulk of the work on superstitious behavior in animals has been in appetitive, as opposed to aversive paradigms (Staddon & Simelhag, 1971). The majority of the helplessness research, however, has used this latter procedure in obtaining its experimental evidence.

The above parallels between animals and humans in detecting contingencies is suggestive of the possibility that specific basic processes in this task are common to all species. If this indeed is true, then other variables that have already been demonstrated in the animal literature as affecting the

magnitude and duration of preasymptotic conditioning in the TRC procedure should in a similar manner influence illusions of control in humans. Several of these which have been shown to affect animals, such as the salience of the CS (Kremer & Kamin, 1971), intertrial interval length (Quinsey, 1971), and number of unpaired UCSs (Rescorla, 1968) should share commonalities in human learning situations affecting the intensity of distortions in discovering degree of control.

Conversely, there is another phenomenon which has been observed in animal accounts of conditioning and is more relevant to the proposed investigation. Both Keller, Ayres, and Mahoney (1977) and Rescorla (1972) demonstrated that additional exposure to a TRC procedure subsequently results in a reduction of excitatory behavior. This finding is suggestive of a prediction hypothesized by Alloy and Abramson (1979) that given supplementary trials, the nondepressed individuals might have gained enough familiarity with the noncontingent relationship to diminish their overestimations of control. That is, the variables that bias accurate perception might be altered with additional information. Since Alloy and Abramson (1979) did not investigate this phenomenon, it should be considered in any future work in this area, and will be assessed in two of the conditions in this proposal.

MOTIVATIONAL EXPLANATIONS

By demonstrating the differential effectiveness in gauging contingencies between depressed and nondepressed, the Alloy and

Abramson paradigm (which presently is the most direct approach to measuring perceptions of response-outcome relationships) failed to confirm predictions by the learned helplessness model. However, a multitude of prior research (e.g., Willes & Blaney, 1978) has demonstrated poor performance by depressed groups on instrumental learning tasks which was explained, at least partially, to be mediated by this "associative deficit." In attempting to integrate this contradictory finding, Alloy and Abramson (1979) offered a revised hypothesis concerning depressives by characterizing them as possessing a generalized expectation of uncontrollability which only biases their initiation of responses (motivational deficit) and not their perception of response-outcome independence. Partial support for this view was offered in the results of their second experiment in which depressed individuals generated simpler hypotheses regarding patterns of responses in obtaining reinforcement. Although this revised position offers a testable prediction which has been supported (Abramson, Alloy, and Rosoff, 1980) concerning the inability of depressives to produce appropriate responses in events in which the controlling response is complex, it still does not explain the salient distortions by nondepressives in gauging contingencies.

By again examining the social psychological literature, a motivational account for this finding can be derived. In this regard, an abundance of investigators (e.g. Wortman, Constanzo, & Witt, 1973) have examined causal attributions of individuals

receiving false information after either succeeding or failing at a problem. Results from these experiments have consistently shown that subjects attribute personal causality when successful and offer external reasons for failing. These general findings are commensurate with the Alloy and Abramson (1979) results showing that nondepressed students perceive a relationship between responses where positive outcomes are forthcoming, but not in situations with undesirable outcomes. In attempting to explain these general findings, theorists have assumed that individuals are motivated to defend their self-esteem by offering a belief in control after winning and disavow control after losing (Wortman, et. al., 1973). The reasoning offered is that taking credit for positive results maintains or increases esteem, while perceiving outcomes as caused by extraneous factors is not damaging to self-esteem (Bradley, 1978).

Within the Alloy and Abramson experiments, as recalled, an enhanced illusion of control was obtained when money was won, in contrast to an underestimation of control when losing money. It could be suggested, then, that nondepressed distortions toward control in the presence of positive outcomes may have been a consequence of preserving or increasing self-esteem; while displaying underestimations of control in aversive situations may have been an intervening strategy to prevent loss of esteem. As noted previously in the attributional analysis section, a belief in lack of control can result either from internal variables such as personal incompetence, or from external factors, e.g., difficulties within the environment (Abramson, et. al., 1978). Thus, for such

a motivational explanation to exist, an attributional shift must have taken place within nondepressed individuals, who typically believe they have no control over bad outcomes, from an internal to an external direction. Although this consideration of attributional movement was not assessed in any of their experiments, their overall findings are compatible with a theoretical position which argues for a differential motivation between depressed and nondepressed populations in regulating self-esteem. Alternatively, since depressed individuals many times are described as possessing feelings of lowered self worth (e.g., Beck, 1967; Freud, 1917), they are not thought to be motivated to reestablish esteem due to a breakdown in self-deception (Bibring, 1953). If an assumption is made that this lack of motivation to preserve worth is correct, then the result of detecting contingencies without being influenced by outcome valence follows.

Another type of motivational explanation may exist, however, whereby an unfulfilled expectation of control (losing, instead of winning) could have resulted, leading to a heightened emotional state (e.g., sadness, disappointment, or frustration). Evidence to support this proposition comes from the finding in the Alloy and Abramson studies that nondepressed persons displayed greater mood changes in the dysforic direction when losing, as assessed by anxiety, hostility, and depression scores on the MAACL. Curiously, their studies also showed that depressed students manifested at least as large an intensified mood in the win

condition as the nondepressed on all three affect measures. This latter discovery is in agreement with a previous investigation by Beck (1974) in which he found an elevated mood swing in a group of depressives who had been monetarily rewarded for successful performance. This evidence, thus, is contrary to a prior description of depression which ascribed reinforcer ineffectiveness as its primary characteristic (Costello, 1972). Therefore, losing seems to have been much more intense for the nondepressed individuals; not because of the absolute value of the loss, rather due to the amount of subjective depreciation that was experienced. Again, this was not directly tested in their experiments, but it does provide partial support for the helplessness model's prediction of a generalized expectation of control for nondepressives. Due to the nature of their between-subjects paradigm, only an inference could be made regarding prior expectation of control.

A related phenomenon to this finding, known as "contrasts effects," has repeatedly been demonstrated in the animal literature (Pavlov, 1927; Skinner, 1938; Crespi, 1942). This procedure refers to having experience with one condition of reinforcement, before being shifted to continuous experience with a different condition. Crespi (1942), in fact, demonstrated that by switching incentive values he could either produce an "elation" effort for animals shifted from a low reinforcement value to a markedly higher value or a corresponding "depression" effect for animals shifted downward. Although there are several varieties of contrast effects (Mackintosh, 1974), the type most salient to the above explanation is termed

"negative successive contrast." Results of the procedure typically produce suppressed performance for a given reinforcer (i.e., lower than a control group continuously provided with the lesser reward) due to previous experience with a more preferred reward.

A comparable demonstration in a field setting involved a follow-up study to a control and predictability-enhancing intervention in a retirement home (Schulz and Hanusa, 1978). Data collected after 24, 30, and 42 months since termination of the intervention found that residents who had initially benefitted, exhibited significant declines on health and psychological status measures (scores even became lower than control groups whose status remained stable over time!). Again, evidence is strong for dramatic negative effects once an important reinforcer has been established and is anticipated, then is reduced or removed. Hence, in the Alloy and Abramson case, an expectation could have been constructed for a large reward (an expectation of winning) which was shifted downward in the lose problem, with a resulting powerful negative effect on mood and performance. However, this type of motivational account was not explicated by the authors in their discussion of results.

Thus, there are two hypothetical arguments that could possibly lead to a motivational account of differences between depressed and nondepressed individuals in judging contingencies. One being an attempt to increase or maintain self-esteem after experiencing positive or aversive events; the other being a

heightened sense of value or loss relative to a preexisting pattern of reinforcement. Although not mutually exclusive, neither explanation has been directly tested.

EXPECTATIONS OF CONTROL

At the basis of each explanation is a general difference between the two populations in the relationship between expectancy changes and beliefs regarding control. In earlier studies examining the locus of control concept (Phares, 1957; Rotter, Liverant, & Crowne, 1961), it was demonstrated that verbalized expectancies for future success are influenced by reinforcements on previous trials. Reinforcements on previous trials have a greater effect on expectancies for future success when a belief is constructed for rewards as response dependent (skill determined), than when it is subjectively regarded as response independent (chance determined). Thus, prior reinforcement would be a discriminative cue to future reward when an individual believes that skill produces the outcome. Later, Miller and Seligman (1973) argued that depressed individuals should believe reinforcement to be more noncontingent than nondepressed in skill (objectively contingent) problems, if indeed depressives' expectation of uncontrollability interferes with future perceptions of control. Therefore, a prediction was made that depressed students would exhibit smaller expectancy changes than nondepressed following success and failure in skill problems. This was substantiated in student populations (Klein & Seligman, 1976), and more recently in hospitalized, unipolar depressives (Abramson, Garber, Edwards, and Seligman, 1978).

Additionally, the prior attribution literature (e.g. Weiner, 1974) has suggested that quantity of expectancy change is an indicator of the dimension of stability, rather than perception of response-outcome relationships. According to these theorists, individuals provide enhanced expectancy changes when they attribute consequences to stable factors (consistency in the future) whereas reduced expectancy changes result when factors that are present are not anticipated for the future (an unstable attribution). The inference made, therefore, was that the depressed in the above skill/chance problems made more unstable attributions than the nondepressed groups.

The majority of this research supports an expectational bias in depressed populations rather than perceptual (Alloy & Abramson, 1979), in that the data are: 1) derived from opinions concerning future performance instead of perceived performance on the preceding trial; 2) suggestive that depressed persons perceive response-outcome dependence without necessarily anticipating its existence in the future, due to post-questionnaires indicating that depressives rate skill as affecting performance as much as nondepressed on skill problems (e.g., Klein & Seligman, 1976); and 3) suggestive of unstable attributions for success and failure (which relate to smaller expectancy changes in skill tasks). Unstable attributions for success are consistent with an expectational bias, rather than perceptual, in depression, and are related to common verbalizations in depressed subjects. However, since

attributions have not been directly measured in this research, the argument remains inferential.

There appears, however, a major inconsistency in the skill/chance data for a possible expectational bias. After failure, depressed persons expectancy for change is lessened. This, therefore, is indicative of an unstable attribution for failure (as well as success) (Alloy & Seligman, 1979). However, it is purported that an expectational bias toward noncontingency requires stable (and global) attributions for failure and unstable (and specific) attributions for success (Seligman, Abramson, Semmel, & Baeyer, 1979).

This latter study found support for an atrributional bias in depression, independent of the perceptual dimension. They asked depressed and nondepressed persons to imagine 12 usual success-failure events that might happen to them, then report the expected cause and quantify this reason along the six dimensions of the reformulated helplessness model. Results showed that for failure (helplessness) events, depressives provided more global, stable, and internal reasons, and more unstable and external reasons for success.

The implications of possessing this kind of attributional style are that individuals should be less likely to anticipate response-outcome relationships over time and across situations. As mentioned, the reformulation hypothesizes that attributions create a mediating step between perceptions and expectations in the subjective representation of contingency. Thus, the

attributional style probably serves to influence expectations of failure or of noncontingency in a direction toward chronicity and generality which increases the probability of expecting future failure.

In sum, while evidence from human experiments show helpless and depressed individuals as possessing deficits on instrumental problems, there has been no definitive demonstrations of whether this is due to cognitive, rather than motivational or emotional biases. The helplessness theory, in the past, designated a unitary cognitive deficit in trying to integrate the animal and human experimental results. The recent attempts at isolating the cognitive dimension into two separate components do not support the existence of a perceptual bias to see present relationships as noncontingent in depressed individuals. In fact, a reversal of what was hypothesized, i.e., depressives were extremely accurate in viewing that their responses control outcomes, occurred. By elimination, then, the difficulties in solving problems probably results from an expectational bias. Additionally, there is now some evidence for a relevant attributional bias. Further work, therefore, is needed to support these conclusions.

SUMMARY AND RATIONALE FOR PROPOSED INVESTIGATION

The learned helplessness model of depression previously hypothesized an associative deficit in depressives, i.e., a perceptual bias to consistently view relationships as independent. While many prior accounts of depression had focused on these

distortions that depressed persons made in construing their world, more current evidence suggest that it is the nondepressed who actually produce "cognitive errors" (e.g., Alloy & Abramson, 1979). In demonstrating these misrepresentations, it has been suggested that nondepressed individuals are more prone to invalid heuristics which interfere in their estimations of controllability. Added support for these mechanisms which interfere in accurate judgments of events have been shown in numerous social psychological studies and have parallels in the animal literature. One of these phenomenon, providing additional exposure to the task (Keller, et. al., 1977) which has been shown to reduce excitatory behavior in animals, could be a method for diminishing overestimations of control in nondepressed individuals. This has not been demonstrated in the human learning literature. Therefore, the initial purpose of this investigation would be to extend the number of trials from the Alloy and Abramson studies to assess whether this additional familiarity with the task will provide enough cues for a correct detection of controllability.

In addition, these studies also suggested that nondepressed individuals often overestimated their judgment of control and self-perception when positive outcomes were forthcoming, while underestimating their judgment of control in negative circumstances. The differential illusion of control would offer evidence for previous hypotheses that nondepressed individuals are motivated to defend their self-esteem by offering a belief in control after winning and disavowing control after losing (Bradley, 1978).

In the Alloy and Abramson (1979) experiments, it was also demonstrated that nondepressed persons displayed exaggerated mood changes in a dysforic direction when the outcome was negative as assessed by pre and post scores of anxiety, hostility, and depression on the Multiple Affect Adjective Check List (MAACL). This negative outcome did not alter the mood of the depressed group, however. Therefore, the sense of loss seems to have been much more intense for the nondepressed individuals; possibly not because of absolute value of the loss, rather due to the amount of subjective depreciation that was felt. Support for this assumption, which was not discussed as a reason for this finding, comes from a phenomenon termed "contrast effects" (Crespi, 1942) of which there are numerous examples in both the animal and human literature.

Thus, there are two hypothetical arguments that could possibly lead to a motivational account of differences between depressed and nondepressed individuals in judging contingencies. One being an attempt to increase or maintain self-esteem after experiencing positive or aversive events; the other being a heightened sense of value or loss relative to a preexisting pattern of reinforcement. At the basis of each explanation is a difference between the two populations in expectations of future change in reinforcement. It is the purpose of this study to establish a condition in which these motivational differences will be expressed.

The present investigation proposes to demonstrate the differential influences of contrasting reinforcement frequencies on depressed

and nondepressed populations in noncontingent situations. By switching from a noncontingent, high density, to a noncontingent, low density reward situation and vice versa, a facsimile of the "Crespi shift" should result. Noncontingency, in this context, refers to a number of trials (e.g., 40) in which an objective lack of control (0% control) is established so that a balance between receiving reinforcements for alternative responses is created. For instance, in the Alloy and Abramson studies, a noncontingent condition was constructed whereby pressing a button would provide light onset 50% of the time, while not pressing would also produce a light 50% of the time. Noncontingent situations would be preferred since it offered the optimal level of susceptibility to erroneous judgments by nondepressives in their paradigms. As recalled, manipulations of reinforcement frequencies in the contingent cases usually failed to produce distortions.

In this manner, an extension of the Alloy and Abramson paradigm to a between and within-subjects design is proposed. By incorporating marked transitions between two sessions or noncontingent positive events, the investigation would be measuring responses from depressed and nondepressed individuals to: 1) subjective vs. objective judgment of controllability; 2) heuristic influences on judgment; 3) mood changes; 4) expectations of future reinforcement; and 5) attributions. This will not only offer the proposed investigation the opportunity to explore a particular motivational explanation of the results in their experiments, but it also provides the chance to directly measure

expectancy changes and obtain some measures of attributions between sessions. These latter questions could not be assessed in their paradigm due to the limitations of having a single session. Thus, an argument for a bias in the attributional-expectational segment in the cognitive dimension of the helplessness model could be strengthened.

HYPOTHESIS 1: Differences in Initial Expectations of Control

An assumption of the learned helplessness model regards nondepressed individuals as possessing generalized expectations of control which proactively interfere with detecting independent relationships. Conversely, a paramount feature of the model suggests that a helpless or depressed person has formed the generalized expectation that events will be uncontrollable. Therefore, a prediction can be postulated, i.e., there will be significant differences between nondepressed and depressed individuals' initial expectation of control. Furthermore, a stronger prediction would hypothesize that the nondepressed group will offer a greater initial expectation of control than the depressed group.

HYPOTHESIS 2: Differences in Expectancy Changes Across Conditions

Previous research (e.g., James & Rotter, 1958) demonstrated that expectancies for future success are related to reinforcements on prior trials. If a belief is formulated that reinforcement is based on personal responses (skill determined), then these previous rewards will have a greater effect on expectancies for future success. Alternatively, if these reinforcements are

perceived as chance determined or noncontingent, then they will have little effect over expectations of control in the future. Thus, differences should be discovered between the two subject populations in expectations of control when the individuals have been offered high levels of reinforcement. This prediction is based on the assumption that overestimations of control by nondepressed groups will be forthcoming in these high reinforcements situations which will lead to an assessment of the task as skill determined with subsequent expectations of future success. If the hypothesis is formed that both populations will judge the low reinforcement conditions as noncontingent or chance determined, then no differences should be detected when these sessions are compared.

HYPOTHESIS 3: Differences in Judgment of Control in Noncontingent Situations

According to the Alloy and Abramson (1979) studies, net differences should be produced in estimations of controllability between depressed and nondepressed individuals when high levels of reinforcement are offered, i.e., nondepressed will overestimate the actual degree of control. Conversely, when frequency of reinforcement is low (e.g., 30%) no differences in detecting controllability should be discovered. Thus, only in the high density reinforcement conditions should differences be discovered between the two mood groups, as the nondepressed should tend to overestimate the objective degree of control (subjective

control > objective control), while the depressed groups should be accurate in their assessment of the noncontingent situations.

HYPOTHESIS 4: Judgment of Control When Extending Identical Sessions

One of the phenomenon which has been shown to reduce excitatory behavior in animals, providing additional exposure to the task (Keller, et. al., 1977), could be a method for diminishing overestimations of control. Hence, a reduced estimation of control as assessed by the judgment of control scales should be observed in the second session when compared to an introductory one of identical value. This difference is anticipated to be greater in the high density sessions as compared to the low density sessions. Again, since the nondepressed are expected to provide higher overestimations of control, this group should display a greater reduction in judging objective control when additional trials are provided.

HYPOTHESIS 5: Judgment of Control When Switching Reinforcement Levels

Switching from a high density reinforcement level to a markedly lower level should result in differential estimations of control between the mood populations. After initially experiencing a high level of reinforcement, a situation should be created where an inducement of perceived control is experienced by only the nondepressed individuals. An event would thus be established whereby the nondepressives should misconstrue this task as response dependent, thereby expecting greater success and controllability in the subsequent session. By switching from a

noncontingent, high density to a noncontingent low density reward situation, a facsimile of the "Crespi shift" should result with the nondepressed group underestimating the degree of control relative to a nondepressed control group.

The opposite contrast condition, switching from low to high reinforcement between sessions, should result in the nondepressed group offering the highest overestimation of control after the second session in comparison to all other sessions if the "shift" model is accurate. The reasoning behind this prediction stems from the assumption that an excitable "feeling" should result when switched from a low to a high reward which would induce a judgment of solving the "perceived contingency" with a subsequent enhanced estimation of possessing control. Once again, the depressed groups should not be influenced by the inducement of different reinforcers in judging noncontingencies.

HYPOTHESIS 6: Differences in Mood Swings

As measured by the depression, anxiety, and hostility scores on the MAACL, significant differences in mood swings should be discovered in all four conditions, but in varying degrees. These differences should not be as apparent in the high density control groups according to the results in the Alloy and Abramson (1979) studies, which showed an enhancement of mood in both groups after winning money. Differences in the other three conditions are based on the assumption that violations in expectations

of control in the nondepressed groups should produce heightened emotional responses in comparison to the depressed groups. In view of the learning literature regarding contrast effects, the switch from a high to a low frequency of reward should create a greater swing in mood (from a euphoric to dysforic state) in comparison to all other groups.

HYPOTHESIS 7: Differences in Attributional Styles

Based on the research by Seligman, et. al. (1979), a pervasive attributional style difference between the population groups should be discovered when questions are asked regarding factors which influenced reinforcement. Net differences in viewing the causes as internal or external, stable or unstable, global or specific, should be observed. In addition, an assumption was made that an attributional shift from internal to external causation would be made when faced with an aversive situation (in reference to differential motivation to protect self-esteem). Therefore, there should be differences within the nondepressed group when comparing the high to low contrast group to the other three conditions (which should be viewed as "bad" outcomes).

CHAPTER 2

METHOD

OVERVIEW

In this study, sixty-four undergraduate females were employed as paid volunteers in a 2 x 4 x 3 repeated measure analysis of variance design in which eight groups were defined by the factorial combinations of Mood (depressed vs. nondepressed), Condition (established by altering the predetermined percentage of reinforcement (70% or 30%) across sessions) and Task (repeated dependent measure). Reinforcement was provided via a one-second light onset associated with winning 5¢ which was delivered noncontingently of response. Students were informed of the nature of the experiment with specific directions regarding the definitions of degree of control prior to their actual participation. Before each of the two sessions, they were required to complete scales and inventories concerning mood, and judgment and expectation of control and reinforcement. After the final session, students were also provided a scale with reference to attributional style, importance of task, and salience of reinforcer. All students were then debriefed as to the purpose of the experiment and paid $3 for their participation regardless of their winnings.

SUBJECTS

One hundred and seventy-eight undergraduate females from the summer sessions at Virginia Commonwealth University in Richmond, Virginia were screened during their classes on two depression inventories (Beck Depression Inventory (BDI) Beck, 1967; and the Multiple Affect Adjective Check List (MAACL),

General Form, Zuckerman, Lubin, Vogel, and Valerius, 1964) in order to qualify as paid volunteers for the experiment. Of this group, sixty-four individuals participated in the study on the basis of their scores and assigned to either of two mood groups. Persons with BDI scores of at least nine and/or MAACL scores of fourteen or higher (minimum total cutoff score for both scales was 21) were assigned to the depressed group, while persons scoring lower than these cutoff points were assigned to the nondepressed group. The correlation between the BDI and the MAACL was .50 ($p < .0001$). Table 1 displays the mean BDI and MAACL scores for all experimental conditions. Table 2 represents the demographic information for the two mood groups including age, GPA, and the number of participants receiving extra credit. No significant correlations were discovered between these latter three variables and the main dependent measures. Students were randomly assigned to four experimental conditions with the restriction that each condition contain equal numbers of depressed and nondepressed, i.e., eight per cell. All participants were tested by the same female undergraduate experimenter.

APPARATUS

The experiment was conducted in the experimental psychology laboratory at Virginia Commonwealth University. A low wattage white light bulb, used as the stimulus presentation, was mounted into a small steel encasing with a plastic opening and placed

Table 1

Means and Standard Deviations of BDI and MAACL Scores by Condition and Mood and Totals

Condition and Test	Nondepressed		Depressed	
	M	SD	M	SD
1. 70 - 70				
BDI	2.63	2.39	13.00	6.16
MAACL	6.00	4.11	15.88	3.52
2. 70 - 30				
BDI	1.25	1.49	10.63	3.78
MAACL	6.75	3.73	16.38	2.88
3. 30 - 70				
BDI	4.00	2.39	9.88	6.03
MAACL	6.50	4.38	14.88	4.79
4. 30 - 30				
BDI	2.00	1.31	14.13	4.94
MAACL	6.88	2.23	14.63	4.78
Totals	2.47	2.12	11.91	5.35
	6.53	3.54	15.44	3.94

Table 2

Number of Subjects per Condition, Age, GPA, and Number Receiving Extra-Credit and Totals

		Nondepressed				Depressed			
	Condition	N	Age	GPA	X-Cred.	N	Age	GPA	X-Cred.
1.	70 - 70	8	22.88	3.03	4	8	22.86	3.27	4
2.	70 - 30	8	24.63	3.08	5	8	25.63	2.85	4
3.	30 - 70	8	22.00	3.05	2	8	25.00	2.85	3
4.	30 - 30	8	19.88	3.13	5	8	20.75	3.06	4
	Totals	32	22.34	3.07	16	32	23.58	2.99	15

on a wooden table between the participant and experimenter. Light onset was controlled by solid-state programmable circuitry which was situated behind the participant. In this experimental situation, light onset was presented noncontingently by either of two alternative responses made by the participant (i.e., pressing or not pressing a telegraph key which was also wired to the switching circuitry). Three seconds were allowed for a key press response after which the circuitry would count the trial as a no press response. Electrical counters were used to collect information on frequency and type of response and number of reinforcers delivered.

EXPERIMENTAL DESIGN

The study consisted of a 2 (Mood-depressed, nondepressed) x 4 (Condition-alternating high (70%) or low (30%) reinforcement density across sessions) x 3 (Task-dependent measures) factorial design with repeated measures on the Task factor. This design provided each of the 64 individuals the opportunity to participate in one of four conditions with each condition constituting one of two possible reinforcement sessions, creating eight placements or cells (See Table 3 for assignment of students). The four conditions differed in frequency of reinforcement (% of light onset) and outcome valence (winning money), but remained identical in degree of objective control (0%). As defined in the Alloy and Abramson (1979) paradigm, the degree of control was determined by the difference in % of reinforcement

Table 3
Experimental Design and Assignment of Students

	CONDITION Sessions	RESPONSE % of Light Onset	NONDEPRESSED Number	DEPRESSED Number
I.	N(HF)/N(HF)	70-70/70-70	8	8
II.	N(HF)/N(LF)	70-70/30-30	8	8
III.	N(LF)/N(HF)	30-30/70-70	8	8
IV.	N(LF)/N(LF)	30-30/30-30	8	8
		Total # of Subjects	32	32
		Subjects = Females		

N = Noncontingent relationship (between key press and light onset)

HF = High frequency of reinforcement

LF = Low frequency of reinforcement

70 - 70 = 0% objective degree of control (70 = key press with light onset set at 70%)

(70 = no key press with light onset set at 70%)

30 - 30 = 0% objective degree of control (30 = key press with light onset set at 30%)

30 = no key press with light onset set at 30%)

Conditions = 4

Sessions = 2 at 40 trials per session

between alternative responses, i.e., pressing or not pressing. Thus, each individual was exposed to a noncontingent session which offered the opportunity to receive an identical specified percentage of reinforcement (either 70-70% or 30-30%) by either pressing or not pressing a telegraph key. The first number of each session (either 70% or 30%) denoted the percentage of trials on which the outcome of interest (light onset) occurred when the key was pressed. The second number denoted the percentage of trials on which light onset occurred when the key was not pressed.

Two conditions consisting of the two possible levels of reinforcement (70% or 30%) remained the same across the initial and concluding sessions (control groups), while the other two switched levels of reinforcement between sessions. In Condition 1 (high density across sessions), 0% control was offered with 70% reinforcement (light onset associated with 5¢) being produced by pressing or not pressing a telegraph key. In Condition 2 (transition, high to low density), the sessions were switched from a noncontingent, 70% reinforcement situation to a noncontingent, 30% reinforcement event (light onset produced for alternative responses 30% of the time). Condition 3 contained the opposite of Condition 2 (i.e., transition low to high density), while Condition 4 had a low percentage of reinforcement across sessions.

DEPENDENT MEASURES

One Judgment of Control scale and three Judgment of Reinforcement scales were used as the main dependent measures in this paradigm (see Appendix A). On the Judgment of Control scale, students rated the subjective amount of control that their responses (pressing or not pressing) had over the manipulated consequence (light onset). On the second scale, Judgment of Total Reinforcement, students attempted to assess the overall percentage of light onset regardless of the alternative responses. The final scales, Judgment of Reinforcement If Press and Judgment of Reinforcement If Not Press, acknowledged whether the students obtained the information necessary to calculate the conditional probabilities that were required for designating a precise judgment of control. All four scales were provided to the students after each of the two reinforcement sessions. Each of the four judgment scales were marked off in units of five with extreme values of 0 and 100. For the judgment of control scale, the extreme values were labeled No Control and Complete Control. The reinforcement scales were labeled as percentages.

An additional measure was given to the students prior to, between, and after the sessions to assess the degree of control that the students expected to possess (see Appendix A). By providing students with this scale before the sessions began, the investigation measured differences between the two mood populations in initial expectations of control and assessed

subsequent expectancy changes after exposure to the first session. Also, after completing the task, questions were asked regarding the reasons students gave for receiving the reinforcements. These were measured on seven-point Likert-type rating forms relating the causes to the six attributional dimensions of the reformulated helplessness model (internal-external; stable-unstable; global-specific). Questions were also asked concerning the possible moderator variable of importance of task. In addition, questions measuring differences in reinforcer effectiveness were asked in the form of comparisons between receiving money vs. discovering the contingency. All questions were presented in the form of strongly agree-strongly disagree dichotomies (see Appendix B).

The MAACL Today form was used as pre-, between, and post measures to assess mood changes as a consequence of the experimental manipulations. The MAACL consists of 132 single word items and yields three scores - anxiety, depression, and hostility levels (see Appendix C). Selection of the anxiety scale items has been previously described by Zuckerman (1960). The method of item selection for the depression and hostility scales were described by Zuckerman, Lubin, Vogel, and Valerius (1964). General and state levels of each dimension may be measured by using the same set of items. The former levels are obtained by instructing individuals to check words which describe how they "feel generally." This form of the scale was used in the screening

of the students. The latter scores are derived by asking persons to check words on the list according to how they feel "today" or "now."

The MAACL has shown significant correlations with the Taylor Manifest Anxiety Scale on both the General and Today forms for normal males (Zuckerman, 1960). Comparisons of the General and Today forms and the MMPI yielded significant positive correlations on the depression scales for males and females. The MMPI scales for Depression and Psychasthenia, the classical anxiety scales for the original MMPI, show significant correlations with the Today anxiety and depression scales. The hostility scale of the MAACL is mainly associated with the MMPI Schizophrenic and Psychasthenic scales.

Originators of the MAACL suggest its use in testing the effects of psychotherapy, drugs, and stress. The MAACL Today form is recommended in the study of repeated measures of affect over time and will be employed as such in the present study.

The Beck Depression Inventory (BDI) was chosen as the other screening device for depression (see Appendix D). It has been reported to be a reliable and relatively well-validated assessment of depression. Beck (1967) found split-half reliability to be .93 (N=97) with a Spearman-Brown correction. In two validity studies involving approximately 1000 people, Beck (1967) demonstrated significant correlations of .65 and .67 between BDI scores and clinically rated severity of depression.

Metcalfe and Goldman (1965) reported similar findings in a cross-validation study. The correlations between the BDI and clinical ratings in this research were .65, .67, and .61. A correlational coefficient between the BDI and MMPI Depression Scale (Hathaway & McKinley, 1942) was also reported to be a significant .67 (Zuckerman & Lubin, 1965). Recently, Bumberry, Oliver, and McClure (1978) showed that BDI scores in a college population correlated highly with psychiatric interview ratings of depression.

PROCEDURE

Each student who entered the laboratory had previously been screened for depression and randomly assigned to one of the four experimental conditions. After being seated at the table, the experimenter delivered a brief introduction and general overview of the procedures. If the student agreed to participate, she then signed a consent form (see Appendix E). Before continuing, the student was asked to complete the Today form of the MAACL. The experimenter then read the following directions and verbally probed for understanding.

> Now, in this problem-solving experiment, it is your task to learn how to turn on this light. Each time you hear a tone, it will indicate the start of a new trial, the occasion to do something. For each trial, after the tone comes on, you have the option of either pressing this middle telegraph key or not pressing it. A key press response consists of pressing this key once and only once immediately after the tone comes on. Not making a key press response, of course, consists of doing nothing when the tone comes on. If you do intend to press the key on a given trial, you must press within 3 seconds after the tone comes on; otherwise the trial will be counted as a not press trial.

So, in this experiment there are only two possibilities as to what you can do on each of the trials; either press the key within 3 seconds after the tone comes on, or else, just sit back and do nothing. Any questions so far?

You may find that the light will go on, on some % of trials on which you do make a key press response. You may also find that the light will go on, on some % of trials when you do not make a key press response. Alternatively, you may find that the light will not go on, on some % of trials on which you do make a key press response. And, you may find that the light will not go on, on some % of trials when you do not make a key press response.

So, there are 4 possibilities as to what may happen on any given trial: 1) if you press and the light does come on; 2) you press and the light does not come on; 3) you don't press and the light does come on; 4) you don't press and the light does not come on. Since it is your job to learn how to turn on the light, it is to your advantage to press on some trials and no on others, so you know what happens when you don't press as well as when you do press.

Moreover, how often the light comes on in this problem will determine how much money you earn in the experiment. On each trial on which the light does go on, you will earn a nickel. Alternatively, on each trial on which the light does not go on, you will not earn any money. At the end of the problem, you will get to keep all of the money you have earned up to a maximum of $3. So, in general, the more successful you are in producing the light, the more money you will take away with you at the end of the experiment. During the problem, I will give you a nickel each time the light comes on. That way you will be able to see how much money you currently own.

Forty trials will constitute a session. There will be 3 sessions with a break between each session. After each session, you will be asked to indicate your judgment of control by putting an "X" someplace on this scale: at 100 if you have complete control over the onset of the light, at 0 if you have no control over the onset of the light, and somewhere between these extremes if you have some but not complete control over the onset of the light.

> Complete control means that the onset of the light on any given trial is determined by your choice of responses, either pressing or not pressing. In other words, whether or not the light goes on is totally determined by whether you choose to press or to just sit back and not press.
>
> No control means that you have found no way to make response choices so as to influence in any way the onset of the light. In other words, the onset of the light has nothing to do with what you do or don't do. Another way to look at having no control is that whether or not the light comes on, on any given trial, is totally determined by factors such as chance or luck, rather than by your choice of pressing or not pressing.
>
> Intermediate degrees of control means that your choice of responses, either pressing or not pressing, influences the onset of the light even though it does not completely determine whether the light goes on or not. In other words, what you do or don't do matters to some extent but not totally. Another way to look at having intermediate control is that one response, either pressing or not pressing, produces the light onset more often that does the other response.
>
> So, it may turn out that you will have no control, that is, your responses will not affect the onset of the light, or it may turn out that you will have some degree of control, either complete or intermediate, that is, one response produces light onset more often than does the other.
>
> Any questions before we begin?

Before the start of the experimental trials, the students were requested to place an "X" on the scale measuring expectation of control to demonstrate how much control they thought they would have during the first session. This assessment of expected control was also provided between the two reinforcement sessions and after the final session to measure the anticipation of control if the situation was extended an additional session.

Immediately preceding each of the two experimental sessions, the students completed the scales involving control and reinforcement. Then they were once again asked to fill out the Today portion of the MAACL. Upon ending the final reinforcement task, the students were provided with the post-task questions measuring attributional style, task importance, and reinforcer effectiveness. After completion of each scale, students inserted their responses into a box situated on the experimental table to insure anonymity. At the end of the experiment, students were debriefed as to the purpose of their participation and paid $3 regardless of winnings (see Appendix F).

CHAPTER 3

RESULTS

HYPOTHESIS I, II: EXPECTATION OF CONTROL

Pre-Experimental Group Differences

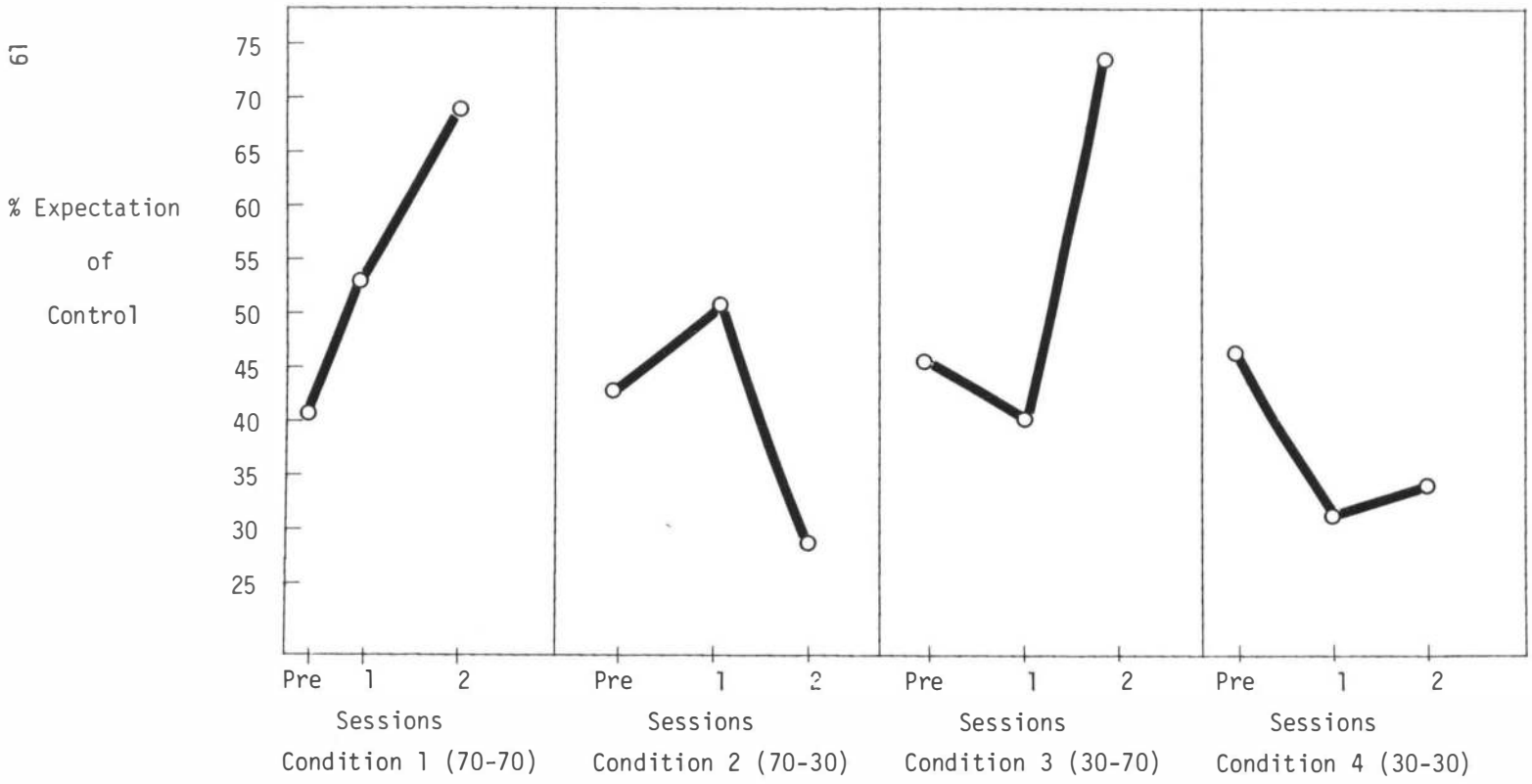
In order to compare expectancy changes between depressed and nondepressed groups by condition, it was necessary to determine whether differences existed on initial expectation of control. The first prediction offered was, that prior to treatment, nondepressed individuals would have a significantly higher control expectancy compared to depressed participants. A t-test for independent group means indicated no significant differences between nondepressed (M=47.56) and depressed (M=42.53) groups, ($t=-1.29$, $df=30$, $p > .05$). Thus, no correction was necessary on the following analyses for expectancy changes.

Experimental Differences

Mood by Condition interactions were hypothesized, and predicted overestimations of expected control by the nondepressed groups in the higher (70%) reinforcement problems. Additionally, greater rates of change across conditions were anticipated for the nondepressed groups creating a triple interaction. As illustrated in Figure 1, the expectation of control data confirmed only the influence of the experimental manipulations. No differences were discovered between mood groups by condition.

These observations were verified by a 2 (Mood) x 4 (Condition) x 3 (Tasks) analysis of variance (ANOVA) with repeated measurements on the Tasks factor for total expectancy change. This analysis revealed significant main effects for Mood ($F(1,56)=4.47$, $p < .04$), Condition ($F(3,56)=4.27$, $p < .009$), and Tasks ($F(2,112)=5.04$,

Figure 1
Condition by Tasks Plot of Expectation of Control



$p < .008$). A significant Tasks by Condition interaction was also produced ($F(6,112)=15.22$, $p < .00001$). No further main effects or higher-order interactions were observed. Table 4 contains results of the repeated measures ANOVA for total expectancy change.

Post-hoc comparison of means employing Tukey's HSD method (Tukey, 1949) indicated that only the groups exposed to continuous low reinforcement (Condition 4) significantly changed their expectation of control between pre-assessment and exposure to the first session of reinforcement ($p < .01$). This change was in a decreasing direction. During the second session, significant rates of increasing and decreasing change in expectation of control were displayed as a function of assignment to either of the two transitional conditions (Condition 2 or 3) ($p < .01$). After exposure to both sessions, the difference between groups by final reinforcement level became significant (M=70.60 vs. 33.19) ($p < .01$).

In sum the analyses support the effectiveness of the exposure to levels of reinforcement to influence changes in expectation of control. Because these findings applied to <u>both</u> the nondepressed and depressed groups, they did not provide support for either hypothesis which predicted differences between the mood classifications by conditions. It appeared, rather, that all participants were induced to make judgments in expected control based upon prior exposure to either a higher or lower frequency of reinforcement. Accordingly, exposure to the higher reinforcement density (70%) produced a higher expectation of control for the

Table 4

Repeated Analysis of Variance for Total Expectancy Change

Source of Variation	SS	df	MS	F	p
Between subjects	49800.96	59			
A (Condition)	9263.08	3	3087.69	4.27	$<.0001$
Subjects within groups	40537.88	56	723.88		
Within subjects	45477.63	120			
B (Task)	2149.82	2	1074.91	5.04	$<.0001$
AB	19460.39	6	3243.40	15.22	$<.00001$
B x subjects within groups	23867.42	112	213.10		

subsequent session. Conversely, lower reinforcement exposure (30%) culminated in lower estimations of control for upcoming sessions.

HYPOTHESIS III, IV, V: JUDGMENT OF CONTROL

The main dependent measure in the present study was the assessment of participants' judgments of control across the four reinforcement conditions. Hypothesis III, the first of three involving this measure, was concerned with a partial replication of the Alloy and Abramson (1979) experiments. Their findings, a mood by reinforcement interaction, was the basis for the prediction that only the nondepressed groups would overestimate the degree of control after the initial introduction of a high frequency of noncontingent reinforcement. Hypothesis IV and V involved change in estimations of control across sessions after exposure to either identical or contrasting reinforcement frequencies. Hypothesis IV anticipated a reduction in judgments of control by the nondepressed high reinforcement control group (Condition 1) after extending the initial session for another identical reinforcement session. Hypothesis V considered differential estimations of control between the two mood populations in Conditions 2 and 3. By switching from a high to low (Condition 2) or low to high (Condition 3) reinforcement density, a situation was created for the prediction of a triple interaction. The nondepressed group in Condition 2 was anticipated to change their judgments of control between the first and second

reinforcement sessions in a decreasing direction. Their judgments after the second session was also expected to be lower than the judgments of the nondepressed, low reinforcement control group (Condition 4) which would create a "negative contrast effect." Conversely, the nondepressed group in Condition 3 was predicted to change their estimations in an increasing direction. Their final point of measurement was anticipated to be significantly higher than all other judgments creating a "positive contrast effect."

The 2 (Mood) x 4 (Condition) x 2 (Tasks) repeated measures ANOVA for judgment of control, revealed main effects for Condition ($f(3,56)=7.90$, $p < .0002$) and Tasks ($F(1,56)=4.88$, $p < .03$). A significant Condition by Tasks interaction also resulted from this analysis ($f(3,56)=9.25$, $p < .00001$). Table 5 presents the analysis of variance for total judgment of control.

Post-hoc Tukey comparisons of means indicated a difference in subjective control estimates after the initial session only in regard to reinforcement exposure. The collapsed judgment of control scores for groups in the higher reinforcement levels during the first set of trials was 53.09%, while the estimate for groups in the lower reinforcement density was 28.42%. Thus, the results did not support the position of the prior research which displayed both condition and mood differences (Hypothesis III).

Figures 2 and 3 graphically portray the extended sessions by comparing the two transitional conditions to their respective control groups. Tukey comparisons did not find any control groups

Table 5

Repeated Analysis of Variance for Total Judgment of Control

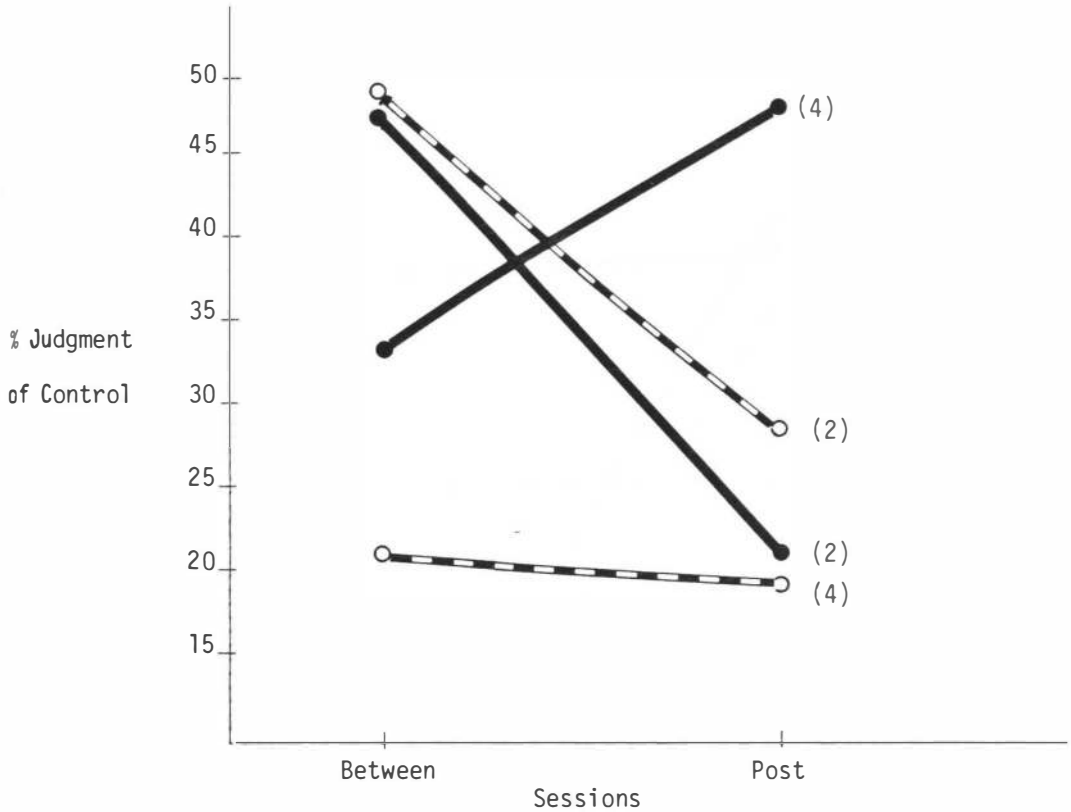
Source of Variation	SS	df	MS	F	p
Between subjects	53865.18	59			
A (Condition)	16014.56	3	5338.19	7.90	$<.0002$
Subjects within groups	37850.62	56	675.90		
Within subjects	29201.43	60			
B (Task)	1200.50	1	1200.50	4.88	$<.03$
AB	14217.06	3	4739.02	19.25	$<.00001$
B x subjects within groups	13783.87	56	246.14		

significantly decreasing their judgments of control over time. The prediction posited in Hypothesis IV, therefore, was not supported. Unexpectedly, the nondepressed, low reinforcement control group increased their feelings of control after the second session to an equivalent level of the groups exposed to higher frequencies of reinforcement. This groups' estimate of control actually became significantly higher than the means of the depressed, low reinforcement control group and nondepressed, high to low transition group at the final point of measurement ($p < .01$). This "facilitation effect" is displayed in Figure 2.

Regarding the significant Condition by Change interaction, both mood groups in Condition 3 (low to high reinforcement) changed their judgments of control in increasing directions($p < .01$). This was only true of one of the groups in Condition 2 (nondepressed, high to low reinforcement) which changed its judgments in a decreasing direction ($p < .01$). The depressed, negative transition group in Condition 2 decreased its estimate, but not at a significant rate. Additionally, Tukey comparisons assessing differences in the final judgments of control between the transition groups and their respective control groups did not attain significance. However, as illustrated in Figure 3, both positive transition groups provided judgments slightly higher than their respective control groups after the second session. Hence, the judgment of control data failed to confirm the predictions in Hypothesis V.

Figure 2

Illustration of Facilitation Effects



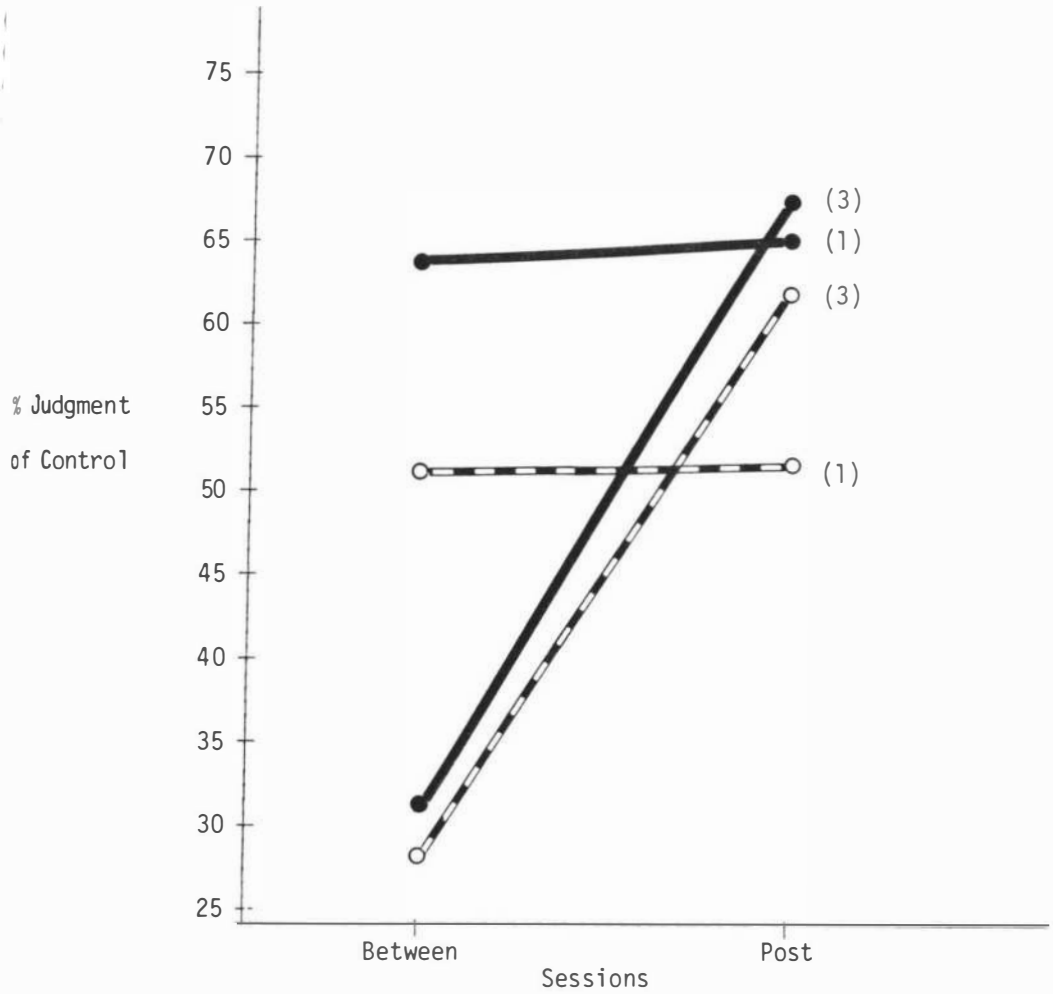
_____ Nondepressed

---------- Depressed

Condition 2 = 70%-30% (2)

Condition 4 = 30%-30% (4)

Figure 3
Positive Contrast Effect



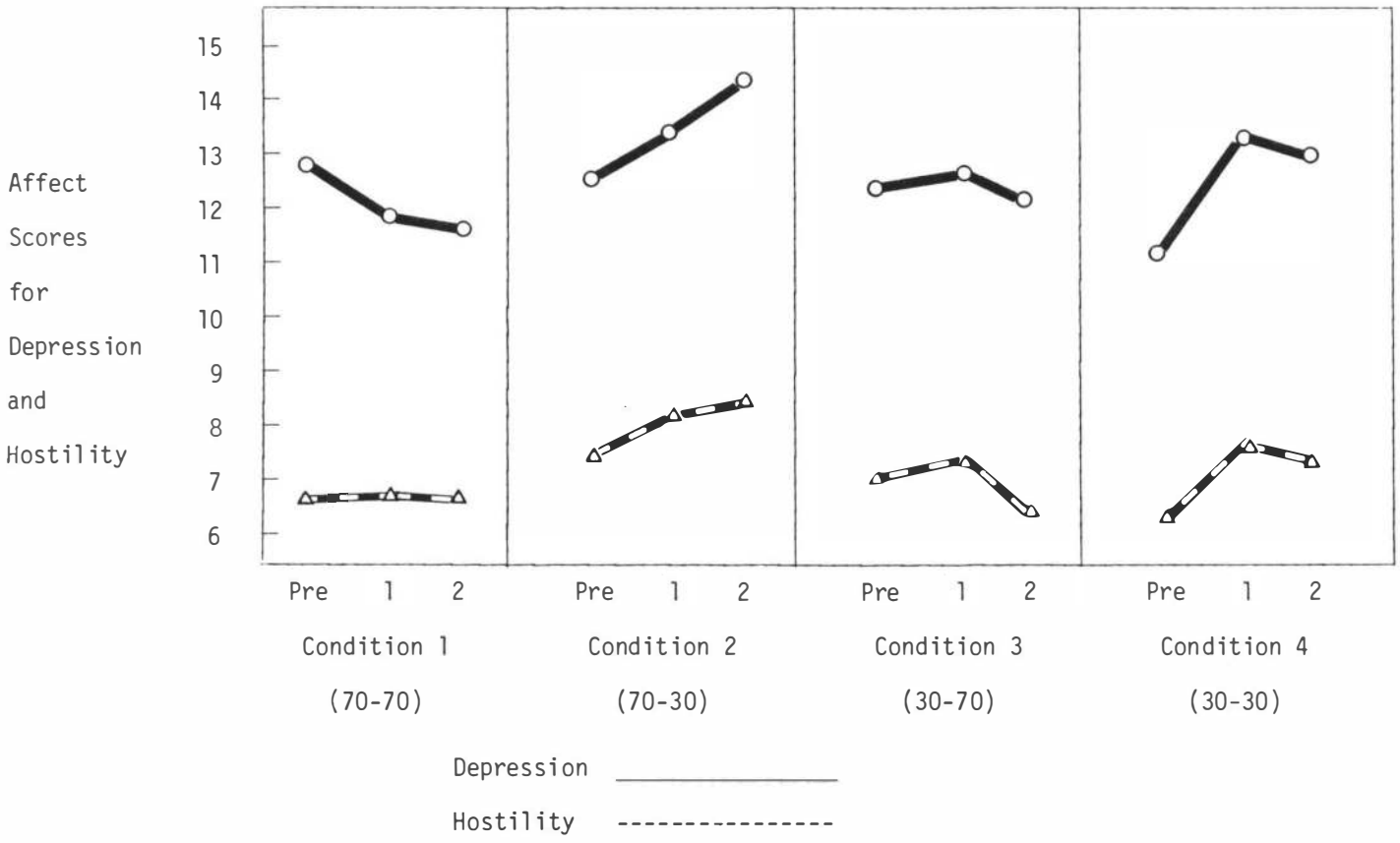
HYPOTHESIS VI: MOOD CHANGES

Since the MAACL is subdivided into three affective subscales (depression, hostility, anxiety), separate 2 (Mood) x 4 (Condition) x 3 (Tasks) repeated measures ANOVAs were performed for each category. A triple interaction regarding differences in mood swings were hypothesized. This consisted of expecting heightened emotional responses to occur in the nondepressed groups relative to the depressed individuals, particularly in the transition from high to low reinforcement (Condition 2).

Figure 4 shows change in affect scores from pretreatment to the end of the judgment of noncontingency task as a function of the noncontingency condition to which individuals were assigned. The upper portion of the figure shows change over time for the depression component, while the lower figures detail the change in hostility scores across sessions. The anxiety scores did not demonstrate significant changes over time; thus were excluded from the graph. Examination of the final points of measurement indicates that all participants exposed to 30% noncontingent reinforcement (Conditions 2 and 4) in the last session were more depressed and hostile than individuals provided with higher levels of reinforcement (Conditions 1 and 3). Additionally, significant rates of change (dysforic reactions) were produced by the groups in Condition 4 from pretreatment to the first session for the depression and hostility scores ($p < .01$).

Figure 4

Condition by Tasks Plot of Depression and Hostility Portion of MAACL



Although all three MAACL calculations provided main effects for Mood ($f(1,56)=10.64$, $p < .002$ for depression; $F(1,56)=11.22$, $p < .002$ for hostility; $F(1,56)=6.56$, $p < .02$ for anxiety), none generated significant interactions concerning mood. Therefore, the predictions of differential reactions between mood groups were disconfirmed. However, significant two-way interactions resulted from the ANOVAs on the depression and hostility segments of the MAACL involving the experimental manipulation. For the depression scores, a Tasks by Condition ($F(6,12)=2.24$, $p < .04$) interaction was produced. The hostility component analysis also generated a main effect for Tasks ($F(2,112)=3.29$, $p < .04$) and a Tasks by Condition ($F(6,112)=2.16$, $p < .05$) interaction. Post-hoc Tukey tests yielded the disparity between the collapsed means of the participants given different levels of noncontingent reinforcement in the final measurement ($p < .01$).

To conclude, the anticipation that the nondepressed groups would be affected to a greater extent by the experimental manipulation was not supported. It would appear, then, that the depressed groups experienced the manipulations to an equivalent extent of the nondepressed groups. This was apparent even though the overall scores between the two mood groups were significantly different from each other; thus providing evidence for similar reactions to occur from two distinct populations. It was noteworthy that the most aversive experimental situation (Condition 2) produced

the highest score at the conclusion. Curiously, though, the groups in the lower reinforcement control group (Condition 4) offered the greatest reaction to the noncontingent problems.

HYPOTHESIS VII: ATTRIBUTIONAL STYLE

Separate 2 (Mood) x 4 (Condition) analyses of variance were calculated for each of the six post-attributional questions. A pervasive attributional style difference between mood was anticipated with the nondepressed groups offering internal, stable, global reasons for successes with the depressed groups providing external, unstable, specific attributions for receiving reinforcement. Furthermore the nondepressed, high to low reinforcement group (Condition 2) was expected to offer less internal and more external responses in comparison to the nondepressed groups in the other three conditions.

A single main effect for Mood in the first question ($F(1,55)= 4.80$, $p < .03$) was the only significant finding from these eight separate analyses. In this instance, the nondepressed group attributed greater responsibility toward themselves for all consequences relative to the depressed participants. Although means in the other five questions were in the predicted direction of a disparate attributional style between the two mood populations, these did not reach a significant level (see Table 6). Additionally, since no significant interactions were discovered, no support was offered for a differential motivation to exist for protecting self-esteem. Of course, it is possible that the measurement instrument was not sensitive enough to detect any attributional shift. Therefore, only partial evidence was found for the predictions in Hypothesis VII.

Table 6

Results of ANOVA to Attributional Style Questionnaire

1=Strongly Agree
7=Strongly Disagree

1. The onset of the light and winning money was caused by personal factors (ability, personality, behaviors performed).

   $F=4.87$ $p < .03$

   $\bar{X}$ nondepressed=4.06 $\bar{X}$ depressed=5.16

2. The onset of the light and winning money was caused by factors created by other persons or circumstances (experimental situation, experimenter's behavior, difficulty of the problem).

   $F=1.79$ $p < .19$

   $\bar{X}$ nondepressed=4.13 $\bar{X}$ depressed=3.44

3. The causes that influenced turning on the light and winning money will always be present (at other times in the future).

   $F=1.38$ $p < .24$

   $\bar{X}$ nondepressed=3.19 $\bar{X}$ depressed=3.69

4. The causes that influenced turning on the light and winning money will never again be present (not be there in the future).

   $F=1.54$ $p < .22$

   $\bar{X}$ nondepressed=6.0 $\bar{X}$ depressed=5.5

5. The causes that influenced turning on the light and winning money influences all situations in my life (school or dating, everyday events).

   $F=.03$ $p < .86$

   $\bar{X}$ nondepressed=4.86 $\bar{X}$ depressed 4.75

6. The causes that influenced turning on the light and winning money only influences this particular situation.

   $F=.40 \qquad p < .53$

   $\overline{X}$ nondepressed=4.00 $\overline{X}$ depressed=3.69

BEHAVIORAL MEASURE

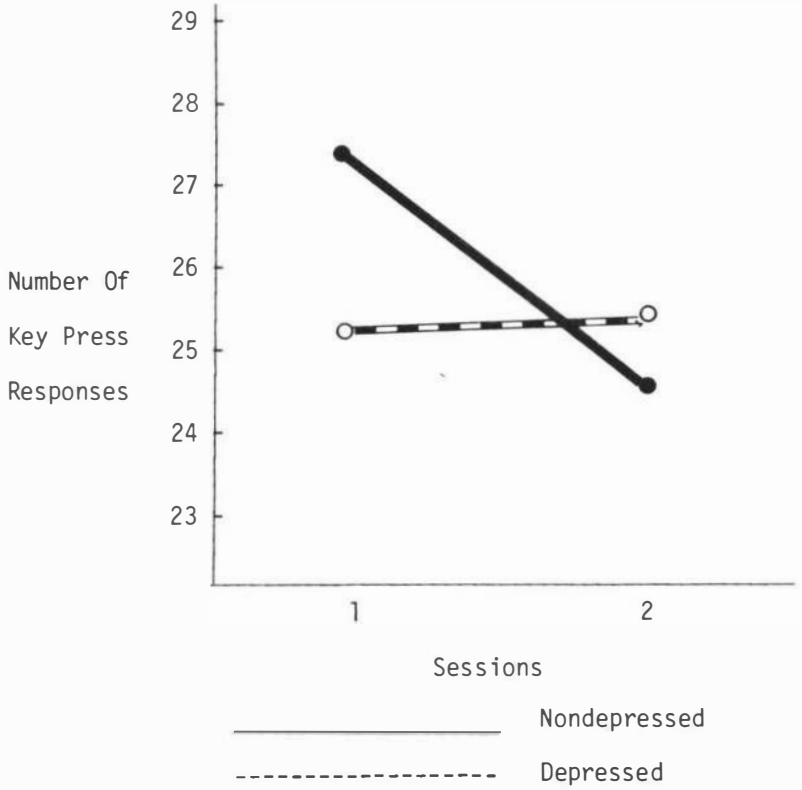
During the sessions, key press responses were recorded to provide a behavioral measure for detecting changes in ongoing strategies in obtaining reinforcement. The 2 (Mood) x 4 (Condition) x 2 (Tasks) repeated measures ANOVA for change in pressing yielded only a Tasks by Mood interaction ($F(1,55)=6.71$, $p < .01$). No other main effects or interactions were discovered. Post-hoc Tukey analyses demonstrated that during the first session, the nondepressed participants pressed the telegraph key more often than the depressed individuals ($p < .05$). More importantly, these analyses found that the nondepressed group changed their press responses at a significantly lower rate across sessions (p .05). As can be seen in Figure 5, the depressed groups did not switch responding style over time. It is possible, of course, that the change in pressing by the nondepressed group could be attributed to regression toward the mean.

TASK IMPORTANCE AND REINFORCER EFFECTIVENESS

After the final reinforcement session, students were also provided with questions in reference to importance of task and salience of reinforcer. This consisted of four statements counterbalanced for response bias to ascertain whether mood differences would result (see Table 7). A 2 (Mood) x 4 (Condition) ANOVA performed for the two questions pertaining to the importance attached to the task did not reveal any significant main effects or interactions. However, the 2 (Mood) x 4 (Condition) ANOVA for

Figure 5

Mood By Tasks Plot of Key Press Responses



both post scales concerned with whether discovering the contingency of the problem or winning money had more personal valence found significant main effects for Mood on both questions ($F(1,63)=4.93$; 3.86, $p < .03$). These results produced the consistent finding that the nondepressed group viewed that discovering the relationship of light onset was more important than winning money. Although the depressed groups also tended to admit that uncovering the contingency problem had intrinsic value, the strength of their conviction was of a significantly lesser degree relative to the nondepressed groups.

JUDGMENT SCALES

The discovery that all participants, but especially the nondepressed groups, were inaccurate in gauging the degree of control between responses and light onset suggests that they were either unaware of the relevant conditional probabilities aligned with pressing and not pressing, or organized these probabilities in an inappropriate manner. In this regard, if they could accurately estimate the probability of reinforcement given the response ($p(S\ R/R)$ relative to the probability of reinforcement given no response ($p(S\ R/\overline{R})$, then by definition they would have realized the actual degree of control was in fact zero (70-70 or 30-30). A discrepancy calculation between estimated or subjective reinforcement associated with pressing and the actual reinforcement percentage (70% or 30%) provided a measure of the group's knowledge of conditional probabilities.

Table 7

ANOVA Table for Task Importance and Reinforcer Effectiveness

1. Discovering how to turn on the light and winning money was extremely important to me.

   $F=1.49$ $p < .22$

   $\bar{X}$ nondepressed=4.41 $\bar{X}$ depressed=3.81

2. Discovering how to turn on the light and winning money was not at all important to me.

   $F=.06$ $p < .80$

   $\bar{X}$ nondepressed=4.50 $\bar{X}$ depressed=4.63

3. Winning money was more important than discovering how to turn on the light.

   $F=4.92$ $p < .03$

   $\bar{X}$ nondepressed=6.28 $\bar{X}$ depressed=5.50

4. Finding out the relationship between pressing or not pressing the key and onset of the light was more important than winning money.

   $F=3.86$ $p < .05$

   $\bar{X}$ nondepressed=1.72 $\bar{X}$ depressed=2.38

This derived score (judged %-actual %) was also used to assess the knowledge of reinforcement percentage when not pressing.

Figures 6 and 7 illustrate these discrepancy scores (from zero or complete accuracy) for judging reinforcement percentage by pressing and not pressing. Each panel displays the accuracy of the participants during each of the four conditions. In general, there was greater confusion among the participants judging reinforcement frequency when not pressing relative to judgments made when pressing. Further, within the judgment scores, when not pressing the depressed groups were more variable in their estimates over time. These observations were justified by the 2 (Mood) x 4 (Condition) x 2 (Tasks) repeated measures ANOVA for judgment of reinforcement when not pressing. Main effects for Condition ($F(3,56)=9.62$, $p < .0001$) and Tasks ($F(1,56)=4.82$, $p < .04$) were produced. These main effects, however, were qualified by higher-order interactions including significant Tasks by Mood ($F(1,56)=3.96$, $p < .05$) and Tasks by Condition ($F(3,56)=20.93$, $p < .00001$) two-way interactions, and a Tasks by Mood by Condition ($F(3,56)$, $p < .04$) three-way interaction. For the judgments associated with pressing, the repeated measures ANOVA yielded only a main effect for Condition ($F(3,56)=3.91$, $p < .02$) and a Tasks by Condition ($F(3,56)=4.14$, $p < .01$) interaction.

This misperception of the conditional probabilities could be the main reason for distortion of the main dependent measure (judgment of control). If indeed, the participants were using

Figure 6

Condition by Tasks Plot of Depressed Discrepancy Scores

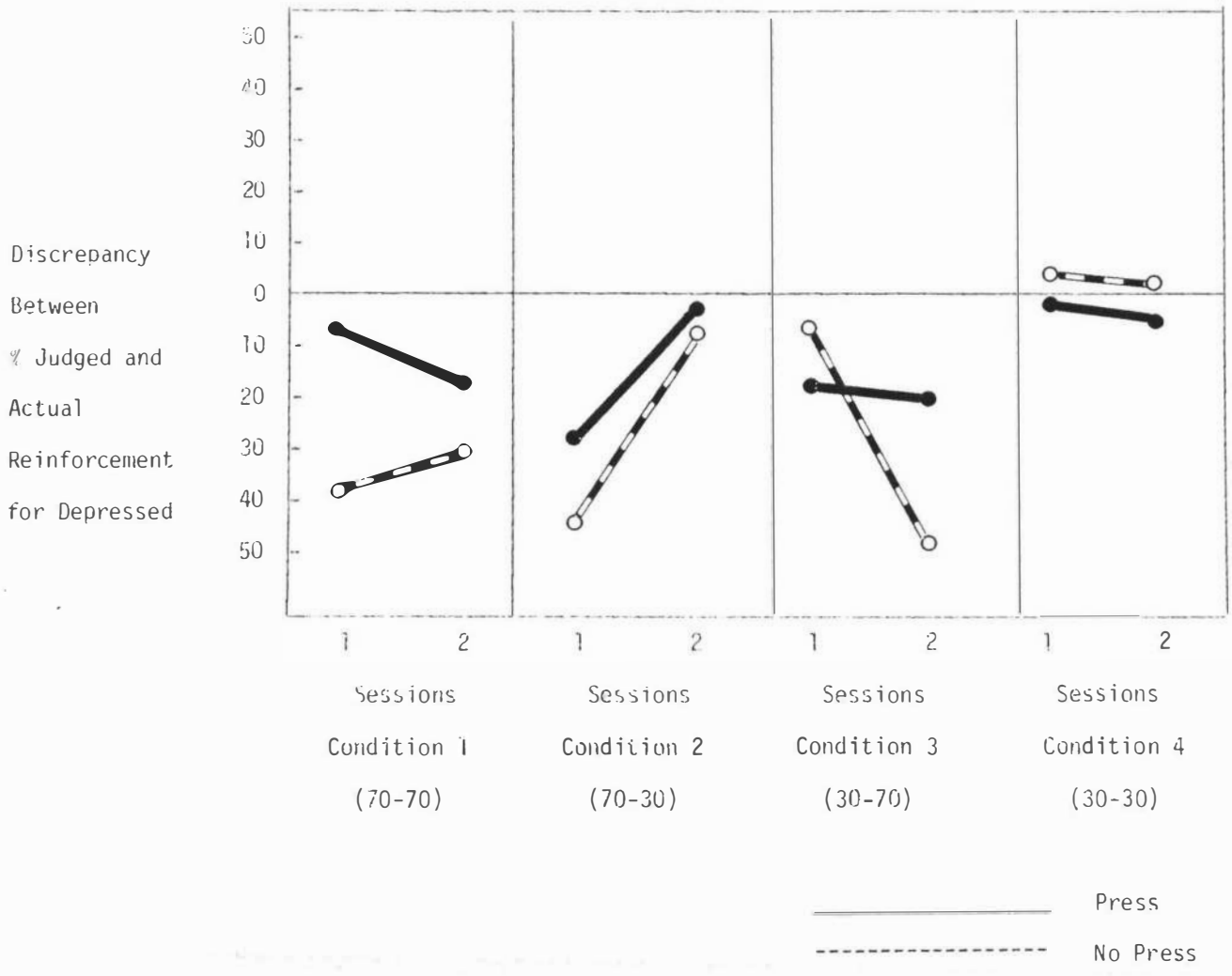
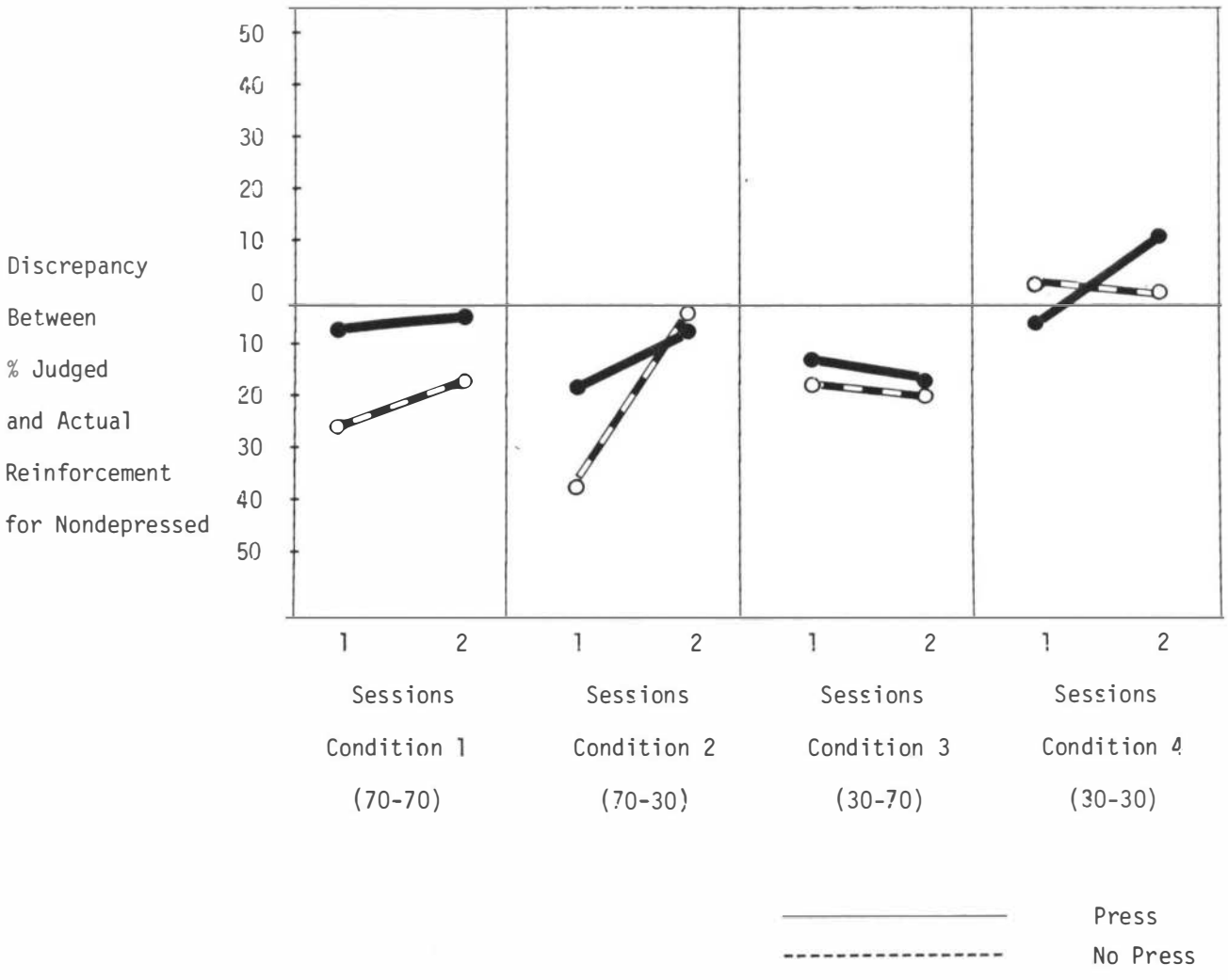


Figure 7

Condition by Tasks of Nondepressed Discrepancy Scores

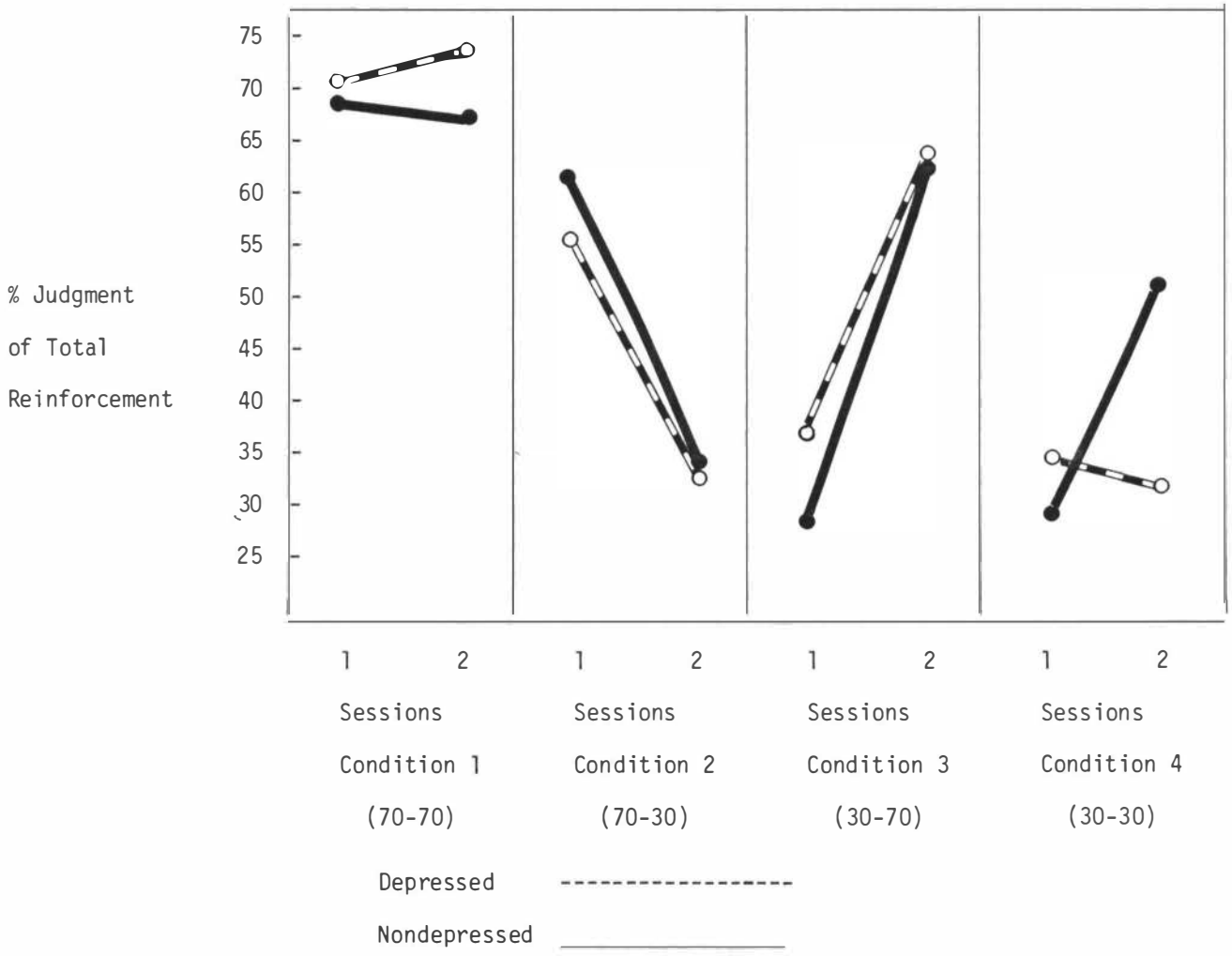


these estimates as aids in gauging the degree of control, it is little wonder why overestimations of control were provided. Although this rationale is plausible, dependence on the invalid heuristic of total reinforcement percentage could also offer an explanation for the inaccurate estimates of control.

Figure 8 graphically portrays the two mood groups' judgment of total reinforcement for each of the four conditions. The repeated measures ANOVA once again demonstrated changes in judgments across conditions by producing a main effect for Condition ($F(3,56)=3.91$, $p < .01$) and a significant Tasks by Condition ($F(3,56)=4.14$, $p < .01$) interaction. Additionally, it was noteworthy that these estimates of reinforcement were very similar to the judgment of control data. This was verified by correlational analyses which discovered significant relationships between total reinforcement estimates and judgments of control in both sessions for each mood group (Depressed, $r=.45$, $p < .01$; $r=.75$, $p < .0001$ - Nondepressed, $r=.68$, $p < .0001$; $r=.57$, $p < .0006$). Thus, there was evidence to suggest that all participants also relied on this false heuristic in their attempts at determining controllability of the experiment.

Figure 8

Mood by Condition by Tasks Plot of Perceived Total Reinforcement



CHAPTER 4

DISCUSSION AND CONCLUSION

REALIZATION OF NONCONTINGENT EVENTS

The concept of learned helplessness assigns a mediating role to the recognition that events may be unrelated. In fact, experiences with noncontingent situations has been presumed harmful and used as a model to explicate other such varied phenomena as coronary proneness (Krantz, Glass & Snyder, 1974); death of the institutionalized aged (Langer & Rodin, 1976); failure in school (Dweck, 1975); and sex differences in achievement (Dweck & Bush, 1976). Prevalent in these discussions was the formulation that individuals presented with noncontingent problems could accurately extrapolate the statistical elements of the situation and correctly recognize the presentation as disconnected (Peterson, 1980). However, current representation of individuals as "intuitive statisticians" unveils a lack of these information-processing abilities (e.g. Ross, 1977). This is particularly apparent in the skill required to recognize noncontingent events (Langer, 1977). Many investigators have also criticized the laboratory evidence for this characterization; claiming instead that this accurate detection of noncontingency was highly improbable and provided alternative viewpoints including superstitious sets, generalized failure, confusion or psychological reactance (Peterson, 1978; Levine, Rotkin, Jankovic, & Pitchford, 1977; Wortman & Brehm, 1975).

How perceptive are people in estimating the quantity of control they possess in a given situation? A survey of research

on the judgment of control discloses mixed results (e.g. Abramson & Alloy, 1980). The evidence suggested that although on occasions accurate judgments are made, many times participants incorrectly guess the impact they have on these events. The most consistent finding in these studies is that in certain situations individuals display an "illusion of control," i.e., reacting to objectively uncontrollable situations as if they were controllable (Langer, 1975). Similarly, in a series of experiments on the detection of contingent and noncontingent events, Alloy and Abramson (1979) demonstrated that this "illusion of control" could discriminate between depressed and nondepressed students (see also related findings between clinically depressed inpatients and nondepressed mostly schizophrenic inpatients (Golin, Terrell, Weitz, and Drost, 1979). That is, when confronted with noncontingent events which occurred with either high frequency or desirable outcomes, only the nondepressed groups overestimated their judgments of control to a significantly greater level relative to the objective relationship. Also, nondepressed participants were portrayed as making additional cognitive errors by relinquishing their belief in control when outcomes were unsatisfactory (i.e. losing money). Thus, nondepressed participants demonstrated both illusions of control and distortions of no control depending on the particular experimental situation. Contrary to the learned helplessness model, no evidence was found for the associative deficit in depressives. If anything, their results suggested the difficulties nondepressives had in assessing response-outcome relationships.

In attempting to explain their results, Alloy and Abramson (1979) offered a differential motivational hypothesis for maintaining self-esteem. Their discussion focused on the nondepressed taking undue credit for positive results which maintained or enhanced esteem, while not taking personal responsibility for losses which would damage self-confidence (Bradley, 1978). However, for such an occurrence to have happened, an attributional shift from an internal to external direction must have been facilitated. This was not directly assessed in their experiments.

CURRENT FINDINGS

In extending their research, the present investigation explored an alternative explanation for their "surprising" findings. While searching for a more parsimonious explanation, the concept of "contrast effects" (Crespi, 1942), an animal learning phenomenon, was introduced as another motivational framework to account for differences between depressed and nondepressed populations in judging relationships. Within this context, a paradigm was established which hypothesized that noncontingent exposure to two levels of reinforcement density would provide enough of a subjective transition to reject any notion of a controllable task. The present research, in proposing this paradigm, offered the opportunity to examine several interactive systems in response to subjective vs. objective judgments of noncontingent reinforcement. These component responses included: perceptual (detection of

noncontingent events including heuristic influences on these estimations); cognitive (expectations and attributions); affective (mood changes); behavioral (key press); and motivational (reinforcers).

ILLUSION OF CONTROL

The most convincing demonstration of this experiment was the failure of the participants' subjective representations of noncontingency to reflect the objective experimental relationship. These errors in judgments of control were not merely random; rather they appeared related to the participants' reliance on reinforcement frequency and the errors made in judging the conditional probabilities given responses. This suggests that these judgmental errors were in both the perception of the data and in the organizational process. Therefore, the present findings are in accord with the previous social psychological literature demonstrating the susceptibility in assuming controllable outcomes (e.g. Langer, 1975).

Another salient aspect of the data was the observation of enhanced judgments of control after the second set of trials by the nondepressed, low-reinforcement control group. This "facilitation" effect is somewhat congruent with prior research which proposed that exposure to a moderate degree of noncontingent reinforcement would most likely produce a greater rate of responding (Tennen & Eller, 1977; Roth & Kubal, 1975; Thornton & Jacobs, 1972). Roth & Kubal (1975) varied the number of tasks in which the subjects received random reinforcement. They reported that

subjects exposed to a single helplessness training task demonstrated facilitation effects, whereas individuals exposed to noncontingent reinforcement in two different training tasks displayed deficits on the same test task. It is probable that the lower frequency of reinforcement could have triggered this overreaction in the nondepressed group, who probably expected to maximize gain (money) or be able to solve the task from its inception. Evidence for this position stems from the change in mood to a dysforic direction and a lowering in expectation of future control which this group reported after experiencing the initial low reinforcement condition. Thus, the present research adds credence to this previous literature which did not support evidence for the generality of the helplessness phenomenon.

Why then is the "illusion of control" such as persistent phenomenon, especially in nondepressed populations? It is possible that the introduction of a noncontingent but positive outcome created a false belief of controllability. If this is true, it would have important implications for the experimental framework proposed by Maier & Seligman (1976) termed "appetitive helpless." This process refers to the procedure which exposes an organism to uncontrollable situations associated with positive outcomes. The organism is then tested for deficits in response rates. Of relevance to the learned helplessness model is the fact that the majority of experiments have only used aversive outcomes whereas the model states that conviction in an aversive or positive uncontrollable event will result in reduced behavior

(Alloy & Abramson, 1979). Therefore, the present results allude to the difficulty in empirically producing an appetitive helpless condition.

Another possibility of explaining students' insensitivity to noncontingency is the special characteristics attributed to the laboratory experiment. Some investigations(Rosenthal & Rosnow, 1969) have suggested that within these unique features is the prospect wherein the subject anticipates a meaningful venture. This is generally believed to be present on some global level (e.g. the experiment will further the knowledge of science) as well as in a more concrete form (the experiment is not a quirk). For example, if the procedure instructs participants to uncover sequences among events, then assuredly, the individuals must assume there to be sequences. If this were not the case, they would probably wonder why the request for involvement was made. It is likely that mere participation in a psychology experiment precludes from consideration the hypothesis that the events are randomly related. However, the present study included and defined the possibility of disavowing control in the context of the task. Yet, overestimations of control were prevalent throughout the sessions. Maybe it has to do with understanding the concept of noncontingency.

Piaget and Inhelder (1975) cogently maintained that comprehending independent connections develops at a more advanced stage than grasping contingent relationships. They asserted that for the young child the idea of chance is absent from his/her repertoire.

Certainly, professors of learning would attest to the difficulty in explaining the probability ratio of a truly random CS-UCS relationship! (For evidence, just peer into some bewildered student's eyes after the initial contact with this reinforcement schedule.)

From a common sense viewpoint, the argument that the difficulty in detecting noncontingency signifies a flaw in human cognitive functioning is totally confusing. A quotation from a book chapter by Chanowitz and Langer (1980) sums up this position:

> . . . how does one go about looking for "nothing"? And what does "nothing" look like when it is found? The conclusion of "nothing" can only be directed in characterizing the relation among predefined elements. However this assertion of "bias" is even more puzzling when it comes from experimental psychologists. Why should we expect subjects to assert noncontingency? We all know that the null hypothesis cannot be proven."

ACTIVE INVOLVEMENT

Although the present results are not totally consistent with the Alloy and Abramson (1979) findings, they are compatible with a competing viewpoint proposed by Chanowitz and Langer (1980). From their theoretical stance, the Alloy and Abramson conclusions could be reinterpreted to assert that both mood groups were accurate in their assessments of contingency. This reinterpretation deals with the investment of activity involved in attempting to solve a presented task. They consider the environmental influence of the experimental design as a crucial factor in the position of the subject. In a situation in which control is assumed by

the experimenter, the subject must develop his/her own scheme which might not correspond with the experimenter's. It then becomes the involving experience that employs an integral role in the perception of control. This increased involvement, then, allows for the possibility of creating a disparity between objective and subjective control.

To illustrate this case Langer (1975) varied involvement in a lottery through inducing thinking about the lottery either once or on several occasions. Results displayed significantly greater control for high involvement than for low involvement subjects. On each trial, the subject who was intent on control focused on actions that might influence the production of responses. It is no wonder that when participants in the present investigation were asked for evidence of personal control, they suggested the "patterns" or "sequences" of light onset as proof. Thus, when individuals are requested to engage in determining the relation between events, they remain occupied defining the form of the situation. It comes, then, as no surprise that viewing noncontingency is difficult. Therefore, the actor's involvement is not an "illusion" but a salient process in determining control. A redefining of the Alloy and Abramson findings viewed the nondepressed subjects as investing a higher degree of involvement relative to the uninvolved, depressed groups. Consequently they actually possessed a greater measure of control (Chanowitz & Langer, 1980).

Using this explanatory framework, one can attempt to support two artifactual discoveries of the present research as distinguishing between the mood groups. Not only did the nondepressed students press the telegraph key at a higher frequency during the first session, they were willing to explore alternative strategies (invest greater involvement) during session two in order to seek maximum monetary gain or solve the contingency problem. Additionally, evidence from the attributional questionnaire suggested that the nondepressed groups were accepting more personal responsibility for the outcomes; again emphasizing their involvement in manipulating problem-solving tasks. These results could add credence to the position that depressed individuals suffer a motivational deficit. Therefore, future research should focus more on differences between the two mood populations in cognitive and behavioral activity. In order to accomplish this, measures that demonstrate how the person is involved during the experiment need to be included in traditional helplessness paradigms.

A supplementary finding in the present data which could further strengthen the position of the nondepressed groups' greater involvement during the experimental sessions was the importance they attached to solving the contingency problems. Certainly giving priority to deciphering an answer over monetary gain demonstrates a preference for activity (albeit mental)! Conversely, the significant difference between the mood groups on both questions concerning reinforcer effectiveness possibly demonstrates the depressed students choosing a more passive stance.

This lack of commitment could also provide additional support for Costello's (1972) claim regarding reinforcer ineffectiveness as a prime characteristic of depression.

RELEVANCE TO DEPRESSION

A question could be raised concerning whether the results of this research were relevant to clinical depression. Additionally, the distinction between the two mood groups could be criticized. Beck's (1967) original depth of depression cutpoints for the BDI were 0-9-no depression, 10-15-mild depression, 16-23-moderate depression, and 24+-severe depression. In this study, since the depressed group's score (M=11.90) was toward the lower end of the continuum, it would seem possible that "depressed" individuals were not being used. Also, the final cut-off criteria had to be lowered from an originally planned combined total of 23 points to 21, making the correlation between the screening instruments a significant but only moderate .50. Another argument concerns the lack of correlation between the two depression inventories with the various dependent measures in this investigation. The fact that the only significant correlations discovered were between the screening instruments and the MAACL (Today Form) attests to the belief that the so-called depressed participants were really no more depressed than the nondepressed individuals.

However, there are valid points favoring a qualitative distinction between the mood groups. The majority of human helplessness studies have only used BDI scores to assign subjects to depressed and nondepressed groups with a score of nine being

the minimum score for placement in the depressed (e.g. Miller & Seligman, 1973). The use of the MAACL (General Form) in conjunction with the BDI bolstered the prospects that the depressed group was actually significantly different from the comparison group. Additionally, the discovery of significant main effects for Mood derived from the analyses on the Expectation of Control scale and MAACL (Today Form) also contributes to the probability of an actual difference between the two mood groups in the present investigation.

Whichever, it would be worthwhile, though, to replicate sections of this research with subjects screened with stricter criteria. Certainly, the artifactual findings are worth exploring in greater depth. Moreover, recent studies have alluded to the possibility that manipulations typically used in learned helplessness studies come within the broader category of "experimenter-induced failure," and thus, are likely to mimic anxiety, frustration, or stress as components of depression (Coyne, Metalsky, & Lavelle, 1980). Whether learned helplessness is actually a model for depression or resembles more vividly some other pathology remains to be determined.

SUGGESTIONS FOR FUTURE RESEARCH

There are several ways in which future investigations might benefit from the present results. It might be recommended that researchers interested in generalized perception of control focus particular attention to the assessment instruments. For example, the specific questions designed to determine differences in

attributional style had never been used previously and therefore require sufficient support of their reliability and validity. Although the statements were an adaptation of Seligman's et. al. (1979) Attributional Style Questionnaire, this instrument is still in the process of being refined. Another improvement that might be considered is the discovery of more sensitive inventories to measure the expectation or judgment of control and mood changes.

Of course, developmental considerations should always be considered when devising future instruments and questionnaires. Expectations involving control and familiarity with the type of instrument used are heavily influenced by level of cognitive functioning and general activity. No studies have yet utilized the present paradigm to directly assess children's or elderly populations' perceptions of control. For example, since preoperational children have not developed the nature of chance, they could not generate the hypothesis of noncontingency and would naturally always feel in control. Within elderly populations, moderating variables such as personal health or prior losses might be more influential in perceiving control than the actual definition.

Accompanying attempts to develop refined measures of control should be a closer examination of the interactive systems. As demonstrated in this present experiment, there were some relationships between the behavioral, motivational and cognitive measures. It may be helpful at this juncture to include physiological measures (e.g., pulse rate or skin temperature) into the helplessness paradigms to gain additional evidence for differences in perceiving

or not perceiving control. In so doing, it might become clearer how particular physical reactions become linked with subsequent mood and behavioral changes when guaging uncontrollable consequences. An example of research pursuing this direction is a recently published study relating maternal learned helplessness to infant crying which involved measures of motivation (response latency, number of trials to criterion and failure to escape) to cardiac responses (Donovan, 1981).

Another type of research worthy of pursuing employs manipulation of reinforcement schedules. In light of Alloy and Abramson's (1979) findings, that both mood groups could detect contingent, but not noncontingent situations, it would be reasonable to assume differences when presenting alternating reinforcement outcomes (i.e., contingent then noncontingent). Also, one hypothesis of the present investigation was the addition of another session of trials to induce accuracy in estimations of control. It is possible that more than eighty trials is needed to ascertain the correct relationship.

Finally, since the concept of control is a difficult concept to understand, the directions provided might be improved to become more direct and simplified. Possibly a pre-trial questionnaire might be provided to assess the comprehension of possessing control or no control to insure that the students are actually understanding the complex assignment. It might even be more effective to instruct the students before they enter the room to give them the opportunity to absorb the task and have questions available for the experimenter upon arrival.

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APPENDICES

APPENDIX A

Judgment Scales

(1) Judgment of Control

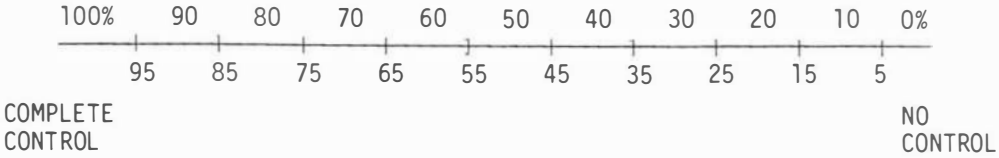
(2) Judgment of Total Reinforcement

(3) Judgment of Reinforcement If Press

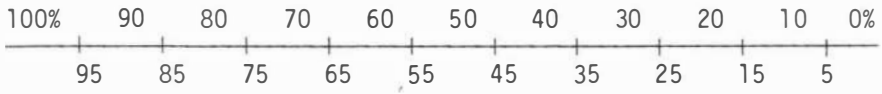
(4) Judgment of Reinforcement If Not Press

(5) Judgment of Expected Control

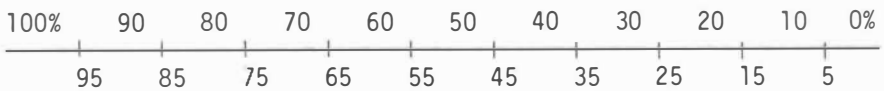
JUDGMENT OF CONTROL



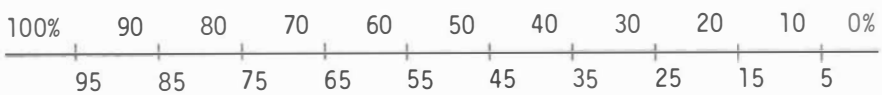
JUDGMENT OF TOTAL REINFORCEMENT (% of times the light came on)



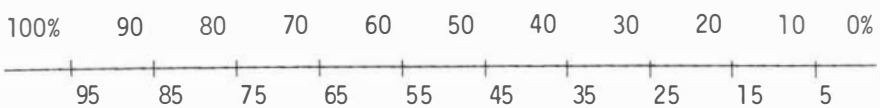
JUDGMENT OF REINFORCEMENT IF PRESS (% of times light came on when you pressed key)



JUDGMENT OF REINFORCEMENT IF NOT PRESS (% of times light still came on when you did not press key)



JUDGMENT OF EXPECTED CONTROL FOR NEXT SESSION



APPENDIX B

Post Questionnaires

(1) Attributional Style (Numbers 1-6)

(2) Task Importance (Numbers 7-8)

(3) Reinforce Effectiveness (Numbers 9-10)

1. The onset of the light and winning money was caused by personal factors (ability, personality, behaviors performed).

Strongly Agree : _____ . _____ . _____ . _____ . _____ . _____ . _____ : Strongly Disagree

2. The onset of the light and winning money was caused by factors caused by factors created by other persons or circumstances (experimental situations, experimenter's behavior, difficulty of the problem).

Strongly Agree : _____ . _____ . _____ . _____ . _____ . _____ . _____ : Strongly Disagree

3. The causes that influenced turning on the light and winning money will always be present (at other times in the future).

Strongly Agree : _____ . _____ . _____ . _____ . _____ . _____ . _____ : Strongly Disagree

4. The causes that influenced turning on the light and winning money will never again be present (will not be there in the future).

Strongly Agree : _____ . _____ . _____ . _____ . _____ . _____ . _____ ; Strongly Disagree

5. The causes that influenced turning on the light and winning money influences all situations in my life (everyday events, e.g. school or dating).

Strongly Agree : _____ . _____ . _____ . _____ . _____ . _____ . _____ ; Strongly Disagree

6. The causes that influenced turning on the light and winning money only influences this particular situation (will not be there in other situations).

Strongly Agree : _____ . _____ . _____ . _____ . _____ . _____ . _____ ; Strongly Disagree

7. Discovering how to turn on the light and win money was extremely important to me.

Strongly Agree : _____ . _____ . _____ . _____ . _____ . _____ . _____ : Strongly Disagree

8. Discovering how to turn on the light and win money was not at all important to me.

Strongly Agree : _____ . _____ . _____ . _____ . _____ . _____ . _____ : Strongly Disagree

9. Winning money was more important than discovering how to turn on the light.

Strongly Agree : _____ . _____ . _____ . _____ . _____ . _____ . _____ : Strongly Disagree

10. Finding out the relationship between pressing or not pressing the key and onset of the light was more important than winning money.

Strongly Agree : _____ . _____ . _____ . _____ . _____ . _____ . _____ : Strongly Disagree

APPENDIX C

Multiple Affect Adjective Check List (MAACL)

Directions:

General Form:

Please look over each of the following 132 adjectives and place a (√) next to each adjective that describes how you feel in general, that is, most of the time.

Today Form:

Please look over each of the following 132 adjectives and place a (√) next to each adjective that describes how you feel today, that is, at this moment.

Form-General _____ Today _____ Date _____ Name _____

1( ) active
2( ) adventurous
3( ) affectionate
4( ) afraid
5( ) agitated
6( ) agreeable
7( ) aggressive
8( ) alive
9( ) alone
10( ) amiable
11( ) amused
12( ) angry
13( ) annoyed
14( ) awful
15( ) bashful
16( ) bitter
17( ) blue
18( ) bored
19( ) calm
20( ) cautious
21( ) cheerful
22( ) clean
23( ) complaining
24( ) contented
25( ) contrary
26( ) cool
27( ) cooperative
28( ) critical
29( ) cross
30( ) cruel
31( ) daring
32( ) desperate
33( ) destroyed
34( ) devoted
35( ) disagreeable
36( ) discontented
37( ) discouraged
38( ) disgusted
39( ) displeased
40( ) energetic
41( ) enraged
42( ) enthusiastic
43( ) fearful
44( ) fine
45( ) fit
46( ) forlorn
47( ) frank
48( ) free
49( ) friendly
50( ) frightened
51( ) furious
52( ) gay
53( ) gentle
54( ) glad
55( ) gloomy
56( ) good
57( ) good natured
58( ) grim
59( ) happy
60( ) healthy
61( ) hopeless
62( ) hostile
63( ) impatient
64( ) incensed
65( ) indignant
66( ) inspired
67( ) interested
68( ) irritated
69( ) jealous
70( ) joyful
71( ) kindly
72( ) lonely
73( ) lost
74( ) loving
75( ) low
76( ) lucky
77( ) mad
78( ) mean
79( ) meek
80( ) merry
81( ) mild
82( ) miserable
83( ) nervous
84( ) obliging
85( ) offended
86( ) outraged
87( ) panicky
88( ) patient
89( ) peaceful
90( ) pleased
91( ) pleasant
92( ) polite
93( ) powerful
94( ) quiet
95( ) reckless
96( ) rejected
97( ) rough
98( ) sad
99( ) safe
100( ) satisfied
101( ) secure
102( ) shaky
103( ) shy
104( ) soothed
105( ) steady
106( ) stubborn
107( ) stormy
108( ) strong
109( ) suffering
110( ) sullen
111( ) sunk
112( ) sympathetic
113( ) tame
114( ) tender
115( ) tense
116( ) terrible
117( ) terrified
118( ) thoughtful
119( ) timid
120( ) tormented
121( ) understanding
122( ) unhappy
123( ) unsociable
124( ) upset
125( ) vexed
126( ) warm
127( ) whole
128( ) wild
129( ) willful
130( ) wilted
131( ) worrying
132( ) young

APPENDIX D

BECK DEPRESSION INVENTORY (BDI)

Student Mood Survey

Instructions: This is a questionnaire. On the questionnaire are groups of statements. Please read the entire group of statements in each category. Then pick out the one statement in that group which best describes the way you feel today, that is right now! Circle the number beside the statement you have chosen. If several statements in the group seem to apply equally well, circle each one. Be sure to read all the statements in each group before making your choice.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

O. 0 I can work about as well as before.
1 It takes extra effort to get started at doing anything.
2 I have to push myself very hard to do anything.

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

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

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

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

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

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

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

APPENDIX E

Consent Form

CONSENT FORM

I UNDERSTAND THAT I WILL BE FILLING OUT QUESTIONNAIRES THAT DEAL WITH BASIC INFORMATION ON MYSELF AND REVEALING PERSONAL FEEINGS. I ALSO UNDERSTAND THAT THIS PROCEDURE DOES NOT CONTAIN ANY RISKS EITHER PHYSICALLY OR PSYCHOLOGICALLY.

I HAVE BEEN INFORMED THAT I WILL RECEIVE EXTRA CREDIT (OR MONEY) FOR PARTICIPATING. I UNDERSTAND THAT I MAY WITHDRAW AT ANY TIME, AND THAT SUCH WITHDRAWAL WILL NOT PENALIZE ME IN ANY WAY.

I FURTHER UNDERSTAND THAT THIS MATERIAL WILL BE USED FOR RESEARCH PURPOSES ONLY AND THAT IN THIS CONTEXT ALL IDENTITIES AND INDIVIDUAL DATA WILL BE KEPT STRICTLY CONFIDENTIAL.

I UNDERSTAND FULLY THE ABOVE MATTER AND CONSENT TO PARTICIPATE IN THESE PROCEDURES.

_____

SIGNATURE

_____

DATE

APPENDIX F

Debrief and Payment Form

DEBRIEF AND PAYMENT FORM

I have participated in this study and understand its purpose. I realize that the test used in this study was not a test of intelligence, nor does it reflect my intelligence in any way. I understand the information as to my success and failure was independent of my responses and answers.

I have been shown the purpose of this study and understand that it required this type of feedback.

_____
(signature)

I have been paid 3 dollars as agreed upon for participating in this study.

_____
(signature)

_____
(date)

_____
(witness)

VITA