The Effects of a "Therapeutic" Card Sorting Task on Anagram and Mood Assessment Measures Using Nondepressed Helpless Subjects

Harvey J. Pennington
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THE EFFECTS OF A "THERAPEUTIC" CARD SORTING TASK ON ANAGRAM AND MOOD ASSESSMENT MEASURES USING NONDEPRESSED HELPLESS SUBJECTS

by

Harvey J. Pennington

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Master of Arts

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Harvey J. Pennington
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INTRODUCTION

Review of the Literature

The experimental design to investigate the behavioral consequences of the line of uncontrollability has been delineated by Seligman and other researchers using the learned helplessness paradigm. In the "triadic design" three experimental groups are used in order to control for the effects of the response outcome. The first group receives a pretreatment with a controllable outcome—the second group is yoked to the first insofar as it receives the identical outcome but without having any control over it. Finally, a nonpretreated or a "naive" group is used. For example, in the original work of Seligman and Maier (1967) with dogs, they arranged a group that could control electrical shock by performing a simple operant while the yoked group received the same number, duration, and pattern of shocks but without the benefit of having any influence over the onset and offset of the aversive outcomes. Later, when tested on a simple escape/avoidance shuttle box the yoked group performed significantly poorer than either the group that could control the shocks or the experimentally naive group.

The most ostensible deficit is that of a motivational nature which is generally observed as lowered response initiation. Dogs that have been pretreated with uncontrollable shock sit passively and accept the electrical shock in the shuttle box where the
potential to escape and avoid exists. Similarly, human subjects after experiencing a noncontingent task perform more poorly in terms of trials to criterion for escape acquisition, number of failures to escape, and mean latency for the total set of escape trials on a modified shuttlebox test task (see Hiroto and Seligman, 1975, for example). The procedure with dogs that produces motivational deficits is not restricted, within limits, to the use of any particular shock parameters—of frequency, intensity, duration, or temporal pattern—or whether the inescapable shocks are preceded by signals. Furthermore, it does not matter by what apparatus inescapable shocks are administered or where the test tasks of escape/avoidance take place. Finally, debilitation is exhibited on both escape and avoidance maneuvers. The following studies provide a thorough review of learned helplessness experiments with dogs and infrahuman subjects: Overmier, 1968; Overmier and Seligman, 1967; Seligman and Groves, 1970; Seligman and Maier, 1967; Seligman, Maier, and Geer, 1968.

A conceptual understanding of learned helplessness is most easily understood in terms of the "response contingency space." A primary experimental tenet is that organisms learn conjointly two dimensions of reinforcement: Graphically, the x-axis (p(RFT/R)) represents the traditional parameter where the conditional-probability of reinforcement following a particular response may range from extinction, to partial reinforcement, and ultimately, continuous reinforcement. (Let "p" represent probability, "RFT"
represent reinforcement, "R" represent response, and "\(R\overline{R}\)" represent absence of that particular response.) Orthogonal to this, the y-axis \(p(R/\overline{R})\) represents the conditional probability of reinforcement given the absence of that particular response. Hence, an organism may learn the extent to which termination of an aversive noise is dependent on making a specific response and also the extent to which noise termination occurs when not emitting that particular response. The points in this contingency training space that lie along the 45° line, where \(x = y\), are of special focus for the concept of learned helplessness. Herein, the organism is rendered reinforcement at the same density whether or not a particular operant is performed, i.e., responding and reinforcement are independent. Graphically, it is stated as \(p(R/\overline{R}) = p(R/\overline{R})\) when the subject has no control over the consequences of a designated response class; control exists only if \(p(R/\overline{R}) \neq p(R/\overline{R})\). A considerable body of evidence exists that organisms do indeed learn conjointly within the aforementioned training space inclusive of the 45° line (e.g., Catania, 1971; Church, 1969; Maier, Seligman, and Solomon, 1969; Rescorla, 1968; Seligman, Maier, and Solomon, 1971; Weiss, 1968).

The first published account of learned helplessness in humans that followed the Seligman paradigm was reported by Hiroto (1974). Three groups were employed in his design: a pretreated helpless group, an escape group, and a group that was not exposed to the pretreatment aversive tone as were the former. Hiroto also selected
subjects for "internality-externality" since this concept is similar to the characteristics of learned helplessness. The internal tends to perceive his reinforcement as being response contingent whereas the external attributes his reinforcement as being quite independent of his behavior—i.e., fate, luck, or another person. Prior to the test task, which was a human analogue to the two-way shuttle box for dogs, subjects received instructions that were intended to induce expectations about the test task; these instructions suggested that the task was of a "chance" or "skill" nature. Hiroto found that all three conditions produced impaired escape responding: that is pretreatment with inescapable tone, the selection of external subjects, and the chance inducement instructions.

A later study by Hiroto and Seligman (1975) broadened the understanding of learned helplessness in man by altering the type of pretreatment and test tasks used. Besides replicating that subjects pretreated with aversive inescapable noise exhibit deficits on another instrumental task (shuttlebox) the experimenters also found: (1) insoluble discrimination problems produced impairment on shuttlebox learning; (2) inescapable noise reduced performance accuracy on anagrams; and (3) insoluble discrimination problems also evidenced their effects by deficits in anagram solving. One major implication of this series of experiments is that learned helplessness in humans is a "cross-model" phenomenon; in other words, the helplessness training may involve the use of a
cognitive or motoric pretreatment and the impairment may be detected in performance on test tasks that require cognitive or motoric responses. The authors conclude the notion of a more general "organismic" debilitation is a feasible conceptualization of this phenomenon in humans.

The learned helplessness model has been proposed as an experimental analogue of reactive depression man (see especially Seligman, 1974; Seligman, 1975; and Seligman, Klein, and Miller, 1976, for extensive analyses that evidence detailed commalities between human depression and human learned helplessness). The salient convergencies that have been charted are as follows: First, passivity or lowered response initiation characterizes both depression and learned helplessness; second, the "negative cognitive set" in depression appears very similar to the difficulty helpless subjects experience in learning that responses can indeed produce reinforcement; and it is clear that both tend to dissipate over time. Further, psychodynamic theorists of depression have hypothesized that "introjected hostility" is an important feature of the psychopathology--the learned helplessness model suggests merely that lack of aggressivity is part of helplessness and similarly so in depression mainly because the organism's expectation of reinforcement via aggression is severely reduced. Additionally, weight loss, anorexia, sexual and social deficits are often observed in both conditions. And finally, neurophysiological findings suggest norepinephrine depletion in helpless and
depressed subjects (Maier and Seligman, 1976).

Seligman, Klein, and Miller (1976) reason in order for conditioned helplessness to be validated as a laboratory analogue of clinical depression four areas of overlap are necessary: First, both must be characterized by similar symptoms of a behavioral and physiological nature. Second, the source or etiology must be operationally convergent; third, the reversal or cure should be effective for both sets of symptoms. Finally, preventative measures should be similarly effective. The burgeoning evidence for the validity across these specifications has been increasing in the past three years but the emphasis has been mostly on the symptomatic and reversal commonalities.

The physiological correlates of learned helplessness in man were discovered to be parallel to those in depressed individuals in a recent study by Gatchel and Protor (1976). The often observed clinical manifestations of depression are (a) dulled affect, (b) reduced psychomotoric activity, (c) and cognitive hopelessness; these manifestations are thought to correspond to a decrease in skin resistance responses and increased heart rate. Gatchel and Protor induced helplessness via the methodology of Hiroto and Seligman (1975) wherein aversive tones were utilized in the pre-treatment and anagrams served as the test task. The behavioral results were similar to those of Hiroto and Seligman; the physiological concomitants were also of mostly predictable content: the inescapable subjects demonstrated reduced phasic skin conductance...
when responding to the noise stimuli when compared to escape subjects; further, the inescapable subjects exhibited lower skin conductance fluctuations and a greater frequency of spontaneous skin conductance fluctuations during the later pretreatment trials. Lowered tonic and phasic skin conductance responses are seen as indicative of decreased task engagement while increased fluctuations are probably reflective of the emotional stress of uncontrollability. The heart rate measures suggested no significant differences.

Miller and Seligman (1973) provided data that supported the learned helplessness model of depression from a perceptual-behavioral framework. The crux of this model is that helpless subjects believe that responding is independent of reinforcement—hence, depressives should also prove to perceive outcomes as more response independent than nondepressed individuals. In order to test the hypothesis that depressed subjects perceive their response outcomes as being more independent than nondepressed subjects Miller and Seligman used test tasks of a "chance" and "skill" nature; and as they had predicted, nondepressed individuals indicated significantly greater expectancy change than depressed subjects on the skill task. But, Miller and Seligman proposed that depressed and nondepressed expectancy differences should disappear on the chance task since depressed subjects should have no trouble perceiving that outcomes were indeed independent of responding; also, the nondepressed subjects should be able to
accurately discern a chance situation when it is presented to them. Again, these predictions were supported by these data. As an adjunctive note, Miller and Seligman failed to replicate Hiroto's original finding insofar as the measure of internality-externality employed did not significantly affect the direction of the dependent measures.

Miller, Seligman, and Kurlander (1975) further investigated the role of expectancy changes following "chance" and "skill" instructions, the role of anxiety, and depression in terms of expectational changes, and if depression was a factor in the number of trials needed to learn multidimensional, simultaneous discrimination problems. Again, it was found that depressed individuals had less change following reinforcement in skill tasks than nondepressed subjects. Nondepressed subjects exhibited greater changes in the skill than in the chance task--quite unlike the depressives who perceived both tasks as being expectationally similar. Marginally, more trials were required by depressives to reach criterion on the discrimination task--only when this task was presented following the other test task, the impairment was more salient. No systematic findings were revealed for the variable of anxiety.

Miller and Seligman (1975) reported more empirical evidence for the parallel between human clinical depression and learned helplessness. The performance on an anagram task was significantly impaired in nondepressed subjects pretreated with inescapable noise compared to nondepressed pretreated with escapable noise or
with no noise; once again, the Hiroto and Seligman (1975) work was in part replicated. The additional factor investigated was the role of depression: the nonpretreated depressed were differentiated from the no noise nondepressed in the same way that helpless subjects were contrasted against the nonpretreated-nondepressed subjects. Additionally, the greater the depression, the poorer the performance on the anagrams.

Klein, Fencil-Morse, and Seligman (1976) replicated some of the findings of Hiroto and Seligman (1975) in that they found nondepressed subjects that had experienced unsolvable problems performed with impairment on a set of anagrams when compared with nondepressed solvable and control groups. The role of depression was also investigated and the following significant comparisons were empirically supported: depressed controls demonstrated poorer anagram performance than nondepressed controls, while the performance of the depressed group was similar to that of the nondepressed unsolvable group—thus, again evidencing validity for the learned helplessness model of depression. This latter comparison was also verified in that depressed-solvable subjects did worse than nondepressed-solvable subjects; further, depressed-unsolvable subjects again showed more deficits when compared to the nondepressed-unsolvable subjects. Another interesting variable was included: that of the role of "attribution;" the authors note that Wortman and Brehm (1975) predicted that blaming subjects with incompetence should intensify helplessness, while Lictenberg (1957)
posited that depression is the expectation of failure compounded with belief that one's defects are responsible for failure.

Klein, Fencil-Morse, and Seligman (1976) included the role of attribution in three values: one, no attribution of failure; second, "internal" attribution of failure, and third, the "external" attribution of failure. In order to induce an internal attribution of failure the subjects were led to believe that failure on some discrimination problems was a result of personal incompetence whereas the external attribution of failure was accomplished by having led subjects to believe that failure was a result of the difficulty of the task rather than because of personal inadequacies. The implementation of failure instructions were met with relative imperviousness by the nondepressed but not by the depressed subjects. Depressed subjects under conditions of internal failure performed significantly worse than if they had received external or no attribution instructions. Hence, the nature of the expectancy of response-reinforcement independency is more debilitating if one attributes the helplessness to personal deficits vis-a-vis externally imposed hardships.

Miller and Seligman (1976) investigated the effects of depression and learned helplessness on "chance" and "skill" tasks. Support for the learned helplessness model of depression was rendered in this way: depressed-no noise and nondepressed-inescapable noise subjects performed similarly on the skill task insofar as smaller decreases in expectancy following failure were
observed--i.e., the intervening belief of response-reinforcement independence probably obviated a flexible cognitive state that would have led to significant expectational alterations. Contrary to predictions, the depressed and helpless subjects did not exhibit significantly smaller increases following success on the skill task; the experimenters interpreted this as a result of the particular skill task used since Miller and Seligman (1973); Miller, Seligman, and Kurlander (1975); and Klein and Seligman (1976) found results to support the hypothesis that helpless and depressed individuals tend to perceive both success and failure as being response independent with regard to skill tasks. Lastly, the chance task was perceived by the inescapable noise and depressed groups similar to other groups again indicating that no interference is noted in random task situations.

Klein and Seligman (1976) reported the first study that involved the reversal of deficits associated with learned helplessness and depression. In the first of the two experiments described in their paper, replication of the similarity between helpless and depressed subjects was accomplished insofar as both groups exhibited common deficits on a shuttlebox test--providing that they had not undergone what Klein and Seligman called "therapy." Therapy in their study consisted of administering to subjects cognitive problems that were solvable. In addition to the replication results achieved in the first experiment, it was found that helpless and depressed subjects that had received solvable
discrimination problems exhibited no deficits on the shuttlebox text.

The second experiment of the Klein and Seligman (1967) study demonstrated two significant findings: first, (as reported in other learned helplessness studies) helpless and depressed subjects performed in such a fashion that supported the hypothesis that the said groups display response-reinforcement independence in perception. Second, the experience with solvable discrimination problems reversed the perceptual impairment associated with learned helplessness and depression. This research by Klein and Seligman has no replication in the literature of its type--no other experiments on learned helplessness in human subject to this author's knowledge have attempted to rehabilitate the performance impairments connected with the aforedescribed conditions.

Synoptically, the most salient pieces of research relating learned helplessness and clinical reactive depression have been reviewed on one level--that of the symptomatic domain of parallel behaviors and physiology, Maier and Seligman (1976) summarized the three major areas of impairment in learned helplessness; it is also posited that the three major parameters of impairment are observed in depression. The studies cited above abundantly demonstrate the motivational components: for example, impairment on learning shuttlebox escape and increased latency time for the solving of anagrams. The cognitive factor, the retardation of the perception of control, has been generally demonstrated on expectational
tasks of "skill" versus "chance" as reported above. And finally, the emotional component of learned helplessness is considered isodynamic with that of human depression. This is indirectly indicated by the positive correlation between increasing depression scores on the Beck Depression Inventory and increasing impairment on anagrams and shuttlebox performance (Miller and Seligman, 1975; Klein and Seligman, 1976). Gatchel, Paulus, and Maples (1975), by using the Multiple Affect Adjective Check List, were able to report specific affective changes associated with learned helplessness—a negative affective arousal that is similar to the depression complex seen in the applied setting of clinical treatment.

The relationship of the etiology of learned helplessness to that of depression is at this stage much more tentative than the parallels of a symptomatic nature reported above. The relationship is descriptively apparent though. Life changes that often generate human depression are situations where the element of loss of control over aversive events is predominant—e.g., separation or rejection by significant others, death of a loved one, physical disease, and failure at work or school. The common theme of lack of control over suffering or occasions of gratification are noted in the literature; see Paykel, Myers, Dienelt, Klerman, Lindenthal, and Pepper (1969); Beck (1967; and Melges and Bowlby (1969).

As discussed earlier, the learned helplessness model of depression should result in parallels not only in symptoms and
etiology but also in curative treatments; of course, the Klein and Seligman (1976) discovery of how solvable "therapy" trials reversed deficits of learned helplessness and depression provided such evidence. The reversal of learned helplessness in animals has been explored on a preliminary level (Seligman, Maier, and Geer, 1968; and Seligman, Rosellini, and Kozak, 1975). The Seligman, Maier, and Geer study utilized helpless dogs in this way to exemplify therapeutic reversal: with the use of leashes, the experimenters dragged the subjects back and forth across boundaries that terminated electrical shock until they presumably supplanted the belief of response-reinforcement independence with perceptions of control or mastery; this was evidenced by eventual successful escape and avoidance on the part of the animals. Seligman et. al., ascertain that a cognitive impairment must be posited to account for the disproportionately high number of "directive therapeutic trials" required to alleviate the deficits of helplessness. The Seligman, Rosellini, and Kozak study of reversing helplessness in rats provided similar evidence on the resistance of conditioned cognitive components.

The prevention of immunization against learned helplessness has been reported with dogs, rats, and humans (Seligman and Maier, 1967; Seligman, Rosellini, and Kozak, 1975; and Jones, Nation, and Massad, 1977, respectively). Ratiocinating from the learned helplessness paradigm, immunization hypothetically should be achieved if some initial training of mastery over the environment.
is completed prior to the experience of helplessness conditioning; it is theorized that a proactive interference resulting from the immunization learning will retard the development of helplessness that in turn requires the formulation of response-reinforcement independence on the part of the subject. In the Seligman and Maier study a group of dogs were immunized by being given ten escape-avoidance trials in a shuttlebox twenty-four hours prior to being placed in that situation again after having been inescapably shocked in a hammock during the interim. Maier and Seligman (1976) reported more data that indicate immunization is effective even if the test situation is unlike the original immunizing task—hence, the generality of prevention appears possible. The Jones, Nation, and Massad investigation found that immunization against helplessness in humans is possible with the use of cognitive discrimination task mastery. Interestingly, the investigators found that the most effective immunization strategy was partial mastery rather than total or continuous mastery on the discrimination task.

The Present Problem

The major goal of this experiment was to reverse helplessness differentially by utilizing various levels of a therapy or mastery task on nondepressed human subjects. The technique advance to alleviate the helplessness is an analogue of a behavior therapy procedure discussed in the literature only as a methodology in case studies or in the framework of a quasi-experimental investigation--
i.e., without the use of a control group condition. As previously delineated (Seligman, Klein, and Miller, 1976) passivity is a hallmark of depression just as lowered response initiation is a most salient feature of learned helplessness; one strategy aimed at increasing the subject's activity while concomitantly reversing the expectation that responding is ineffectual in a behavioral procedure known as the graded task assignment. The graded task procedure is a global application of the operant technique known as "shaping." The gist of this approach is to arrange initially for immediate reinforcement following successful completion of a simple task; gradually the therapist increases the demand upon the depressed subject while yet guaranteeing positive reinforcement for every step until the individual has regained a high level of adaptive responses. This has been successfully employed by Beck (1970) and Burgess (1968, 1970) as reported in case studies. Beck, Seligman, Binik, Schuyler, and Brill (unpublished research reported by Seligman, 1975) used graded levels of expressive reading with a group of hospitalized patients to break-up severe depression. One distinct problem with the Beck, Seligman, et. al. study was that no control group was utilized to compare the results.

The hypotheses tested for the experiment are as follows:

1. Within treatment groups receiving 8- or 16-trials of therapy, the posttest mood assessment scores should be significantly lower than the pretest scores. Within the 0-trials condition no significant pretest-postest mood assessment change is predicted.
2. Across the three treatment conditions it is predicted that the average change scores will be significantly differentiated among themselves according to the number of therapy trials administered. The 0-trials condition should reflect the least mood change, the 8-trials condition should exhibit significantly improved scores over the 0-trials condition, while the 16-trials condition should be significantly superior to the other two conditions.

3. Across the three treatment conditions it is predicted that the anagram test scores will be significantly differentiated among themselves according to the number of therapy trials administered. The 0-trials condition should demonstrate the greatest impairment, the 8-trials condition should show significantly less impairment over the 0-trials condition, while the 16-trials condition should be significantly superior to the other two conditions.

METHOD

Subjects

Subjects were 24 Western Michigan University undergraduates voluntarily recruited from psychology courses; the experiment was advertised as an "experimental investigation of problem solving." All subjects that were invited to participate scored 8 or below on the Beck Depression Inventory (Beck, 1961, 1967), a pencil-and-paper test of the behavioral, affective, and somatic symptoms of
depression. Seligman and his colleagues (Miller and Seligman, 1973, 1975; Klein, Fencil-Morse, and Seligman, 1976; Klein and Seligman, 1976) have utilized the above cut-off score in forming groups of nondepressed individuals. All subjects were assigned randomly to three experimental conditions without regard to sex because research indicated that males and females do not differ in their performance on anagrams (Miller and Seligman, 1975). The sample was composed of 6 males and 2 females in the 0-trial condition; 1 male and 7 females in the 8-trial condition; and 3 males and 5 females in the 16-trial condition.

Apparatus

Pretreatment

The pretreatment apparatus consisted of a button pressing task. On the wall in front of where the subject was seated there was a blue on one side and a green light to the right of it. The aversive stimulus, a 3,000-Hz. 75-db. tone, was presented to the subjects through a loudspeaker immediately behind the desk where the subject was seated. A Precision Sound Level Meter (Bruel and Kjaer, Type 2203) measures the decibel level of the tone. All subjects were assigned to nonescapable conditions; hence, the telegraph key that was attached to the desk was disconnected from the noise source. The circuitry and oscillator were in a room separated from the experimental chamber by a one-way mirror.
Therapy

The therapy task was a series of 0, 8, or 16 card sorting trials adapted from Loeb, Beck, and Diggory (1971) where card sorting was used successfully to induce expectations with depressed and nondepressed individuals. Miller and Seligman (1976) used the same card sorting apparatus as Loeb, et. al. and concluded that subjects did not attribute success on this task to chance but rather to their own efforts. A total of sixteen packs of cards were used, one pack for each trial. The object of each task trial was to sort a predetermined number of cards onto their respective places on the board in front of them which has pasted on it ten different cards. The cards had markings of a star, a cross, and other geometrical designs similar to those of Loeb, Beck, and Diggory. The packs were prearranged prior to each experimental run so that each subject experienced the same random sequence for every trial. The order of the cards did differ though for each trial. In front of the subject, perpendicular to the table whereupon the sorting board was set, a pegboard was set up to look like a graph with the number of cards sorted along the abscissa and the number of trials along the ordinate. After each trial the experimenter inserted a golf tee on the graph to indicate the trial number and the number of cards sorted.

The trials were graded in a manner with the number of cards necessary to be sorted increasing for each trial; the numerical
goals were: 10, 12, 13, 15, 17, 18, 19, 20, 21, 23, 25, 26, 29, 32, 34, and 35. Concurrently, the experimenter allowed consecutively more time per trial in proportion to the increase of the number of required cards; 2 seconds per card was set as a standard. The entire sequence provided a set of graded activities with almost guaranteed success on each trial. At the point of every-other-trial beginning with trial number 2, the experimenter commented to the effect that the subject was performing well—e.g., "Your performance is improving." In order to clearly attempt to challenge the subject for each trial against the alloted time the experimenter overtly timed each trial with a stopwatch.

Anagram test

The test task was a series of 20 anagrams taken from a list of anagrams developed by Tresselt and Mayzner (1966). Hiroto and Seligman (1975) also utilized anagrams from the same list. The anagrams were shown on a movie screen by an overhead projector for bold display. Each anagram consisted of five letters in a standard sequence, 3 4 2 5 1, that is, the first letter of the solution was always the last letter in the anagram, the second letter was the third letter in the anagram and so on. Examples are as follows: (a) I A R D T = TRIAD; (b) E R L K C = CLERK; and (c) B I A T H = HABIT.

Mood assessment

The Multiple Affect Adjective Check List, Today Form, was
used to measure the level of "negative affective arousal" (Zuckerman and Lubin, 1965; Zuckerman, Lubin, and Robins, 1965). Increasing scores on this device indicate elevated levels of hostility, anxiety, and depression; while the scoring provides for differential assessment of each of the above emotions it has been concluded (Pankratz, Glaudin, and Goodmonson, 1972) that the overall score is the most reliable index.

Procedure

The subject was seated at the desk in the experimental chamber and given the following pre-experimental instructions:

Your name is (subject's), right? As I mentioned to you earlier, this experiment is neither painful nor harmful to you. The nature of the study involves having you listen to some noise which has been rated by students such as you as being unpleasant. Now, you can choose to leave after hearing what a sample of this noise sounds like or remain for the experiment. After the experiment is over I'll answer your questions as well as telling you what the purpose of the study is about.

In a moment you will hear the noise come from the speaker behind you. (A 5 second sample of the noise was administered.)

O.K. (subject's name), that's what you'll be hearing during the experiment. It will not get any louder than that. If you want to stay with the experiment, read and then sign the consent form in front of you. (The experimenter then picked up the consent sheet.)
Pretreatment

The pretreatment consisted of 50 trials of the unsignaled 75 db. tone that remained on for 5 seconds during each trial. The telegraph key did not terminate the sound in any of the experimental conditions. The intertrial interval had a mean of 20 seconds with a range from 15-25 seconds. The following instructions were read to the subject: From time to time the tone will come on for awhile. When that tone comes on there may be something you can do to stop it. There are two lights in front of you on the wall which will tell you how the noise on each trial was controlled. If you find a way to stop the noise then the blue light will flash momentarily after each time you stop the loud tone. If you don't stop the tone then the green light will flash when the tone stops. Remember, when the blue light flashes on this means you have stopped the tone. But, if the green light flashes, this means you failed to terminate the sound on your own and that the tone has stopped automatically. Taking the apparatus apart or in any way dismantling it is not an accepted method of stopping the tone. When the trials are finished the experimenter will come to escort you to the next phase of the experiment.

Therapy

In the therapy phase all subjects were seated at the place where the cart sorting apparatus was. In order to control for
the time the other conditions used, the 0-trial group was asked to "study the board of cards. I'll return in a few minutes." (The experimenter left the room for seven minutes.) For the 8- and 16-trial groups a set of instructions similar to those used by Loeb, Beck, and Diggory (1971) were communicated: In a minute or so you are going to take this discriminative card sorting test. First I thought you might like to know a little more about it. We've found from past experience that much can be learned about problem solving from this type of task.

It consists of sorting cards correctly and quickly from a deck onto this board. This is not as simple as it may seem. It involves several abilities: the ability to recognize forms as they appear, the ability to remember where they go, and the ability to handle the cards. Most of all, it means coordinating all these abilities in order to do a good job.

Now let me explain exactly what you are going to do. You're to sort the cards onto the matching cards pasted on the board here. You will have two seconds per card and I want to see whether you can sort the entire deck correctly for each trial. Again, this is something that is a little harder than you would initially think. You will have (8 or 16) trials and your goal for each trial is sort each card in the deck.

You see that the peg board lists the number of cards on the bottom and the trial number on the side. After each trial, your progress will be marked on this graph with a peg. Your final goal
is (20 or 35 cards). Begin.

**Anagram test**

All subjects at this point were presented with the anagram test task. The instructions used are similar to those used by Hiroto and Seligman (1975) and Gatchel and Procter (1976): During this part of the experiment you will be asked to solve anagrams. As you know, anagrams are words with the letters scrambled. The problem for you is to unscramble the letters so they form a word. The letters will be projected on the screen in front of you. When you've found the word tell me what it is—when you say the word, please pronounce it loudly and clearly. After you give a correct answer, the next set of letters will be presented. If you fail to give a correct answer within a certain time period, the next set of letters will be presented. Now, there could be a pattern or principle by which to solve the anagrams. But that's up to you to figure out. I can't answer any questions now. (In cases where the subject guessed the wrong word the experimenter replied, "That's not the word--try again.")

Three dependent measures were obtained on the test task for each subject: (a) mean response latency (a failure is counted as 100 seconds or more); (b) number of failures to solve an anagram within 100 seconds; and (c) conditional probability of solving an anagram given that the prior anagram was solved. All measures were recorded according to the time indicated by a stopwatch.
Following the anagrams all subjects completed the post experimental questionnaire (the reader is referred to the appendix for an examination of the questions); finally, all subjects were debriefed with regard to the nature of the experiment.

The first two measures represent attempts to isolate the motivational deficit associated with learned helplessness while the third presumably assesses the cognitive impairment.

**Mood assessment**

Immediately following the pretreatment phase all subjects completed the Multiple Affect Adjective Check List, Today Form (MAACL) after these instructions were read out loud to the subject: On the sheet in front of you, you will find words which describe different kinds of moods and feelings. Mark and "X" in the boxes beside the words which describe how you feel now. Some of the words may sound alike, but check all the words that describe your feelings. Work rapidly. To indicate that you are finished simply lay the pen on the table.

After the therapy trials or control condition these instructions were read before the re-administration of the Check List: This is the same as the questionnaire you filled out earlier. Your answers may or may not be the same as they were before—that is not important. The important thing is to check off all those adjectives that describe how you are feeling right now. Again, set the pen on the table to signal that you are finished.

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RESULTS

Beck Depression Inventory (BDI)

The means and standard deviations of the BDI scores for the three groups are presented in Table 1. The equivalence of the groups on this selection variable was confirmed, $F(2,21) = 0.69$, $p>.05$.

Table 1

Means and Standard Deviations of BDI Scores

<table>
<thead>
<tr>
<th>Group</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-trials</td>
<td>4.75*</td>
<td>3.06</td>
</tr>
<tr>
<td>8-trials</td>
<td>3.25*</td>
<td>2.61</td>
</tr>
<tr>
<td>16-trials</td>
<td>4.00*</td>
<td>1.85</td>
</tr>
</tbody>
</table>

*p>.05.

Therapy

As predicted, the MAACL ratings for the 0-trials of therapy did not differ from the pretest to the posttest, $t(7) = -0.17$, $p>.05$. The pretest and posttest ratings for the 8-trials of therapy group differed significantly, $t(7) = 1.99$, $p<.05$, indicating mood improvement. The 16-trial group also demonstrated mood improvement from the pretest to the posttest, $t(7) = 1.91$, $p<.05$. 

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These mean pretest and posttest ratings are presented in Figure 1.

In order to assess if there were significant mood changes among the three groups an analysis of variance was performed on the mean change scores, $F(2,21) = 1.03, p>.05$. Even though there were no significant differences among the group change scores the resulting means were ordered in the predicted hierarchy. The means and standard deviations are summarized in Table 2.

An analysis of covariance, using the pretest as a covariant was not performed since the assumption of homogeneity of within group regressions was violated, $F(2,18) = 3.63, p<.05$.

An analysis of variance of the pretest MAACL scores for the three groups indicated that there were no differential effects of the pretreatment, $F(2,21) = 0.11, p>.05$.

Anagram Test

Nondepressed subjects, after being pretreated with the helplessness task, should show improvement according to the level of therapy received on these anagram measures: (a) mean latency to solve anagrams; (b) number of anagram failures; and (c) the conditional probability of success for a given anagram providing that the previous anagram had been solved. All measures were nonsignificant; the results respectively, are, (a) $F(2,21) = p>.05$; (b) $F(2,21) = 1.42, p>.05$; and (c) $F(2,21) = 2.45, p>.05$. Table 3 presents the means and standard deviations for the anagram performance measures.

A tendency toward nonlinearity is observed insofar as the

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Figure 1. Pretest and posttest means for the three groups on the MAACL. (Abbreviations: 0 = 0-trials of therapy, 8 = 8-trials of therapy, 16 = 16-trials of therapy.)

*p < .05
**p < .05
### Table 2

Means and Standard Deviations of MAACL Change Scores

<table>
<thead>
<tr>
<th>Groups</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-trials</td>
<td>0.50*</td>
<td>8.25</td>
</tr>
<tr>
<td>8-trials</td>
<td>-2.50*</td>
<td>3.55</td>
</tr>
<tr>
<td>16-trials</td>
<td>-3.75*</td>
<td>5.55</td>
</tr>
</tbody>
</table>

*p > .05

### Table 3

Means and Standard Deviations of Anagram Performance Measures

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean latency M</th>
<th>SD</th>
<th>No. of failures M</th>
<th>SD</th>
<th>Conditional Probability M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-trials</td>
<td>21.41*</td>
<td>13.05</td>
<td>2.13*</td>
<td>1.81</td>
<td>0.93*</td>
<td>0.06</td>
</tr>
<tr>
<td>8-trials</td>
<td>36.97*</td>
<td>14.24</td>
<td>4.00*</td>
<td>2.27</td>
<td>0.81*</td>
<td>0.12</td>
</tr>
<tr>
<td>16-trials</td>
<td>30.91*</td>
<td>15.95</td>
<td>3.63*</td>
<td>2.83</td>
<td>0.84*</td>
<td>0.14</td>
</tr>
</tbody>
</table>

*p > .05.
means for the 0-trials group consistently indicate lower latencies, fewer failures, and a higher probability of success. A test for nonlinearity was performed for the three test measures with only the mean latency measure reaching a marginal level of significance, $F(1,21) = 2.98, p<.10$; the $F$ tests for the number of failures and conditional probability of success measures are $F(1,21) = 1.21, p>.05,$ and $F(1,21) = 2.34, p>.05$ respectively.

**Sex Effects**

If the tendency of the 0-trials group to perform better than the other groups is a result of its disproportionate number of males to females, the analysis of covariance using sex as a covariate will attenuate this and then the means can be adjusted accordingly. But the analysis did not reveal any differential sex effects; the $F$ tests of the adjusted treatments are $F(2,20) = 1.45, p>.05, F(2,20) = 1.06, p>.05,$ and $F(2,20) = 1.70, p>.05$ for the mean latency, number of failures, and conditional probability of success measures respectively. Hence, it may be concluded that the tendency of the 0-trials group to perform better than the other groups is not a result of sex disproportionality.

**Postexperimental Questionnaire**

The questionnaire revealed that all groups perceived the tone as "mildly unpleasant," $F(2,21) = 0.76, p>.05$. When asked to "indicate the extent of control" over the noise no subject deviated
from the report that they "never controlled" the noise. Also, when asked to "rate the amount of frustration in trying to stop the tone" an overall assessment of "mild frustration" was made, $F(2,21) = 0.36, p>.05$.

The "amount of trying" exerted on the anagram task was given an overall rating that corresponded to the descriptor of "considerable effort," $F(2,21) = 0.18, p>.05$. And lastly, the "assessed difficulty of the anagrams" approximated the descriptor of "moderately difficult" for all groups, $F(2,21) = 2.83, p>.05$.

**DISCUSSION**

There were three main findings of this experiment: (a) For the two experimental groups that underwent the therapeutic card sorting trials significant mood improvement occurred within those groups; the control group that did not undergo the therapy task did not demonstrate a significant mood change. (b) No differential mood assessment across treatments was generated by the varying levels of the therapy task; it is noteworthy though, that the change scores for each group reflected hierarchically the predicted order of more therapy yielding improved mood rating. (c) The hypothesized relationship between therapy trials yielding improved anagram performance when compared to a condition of no therapy was not borne out. Alternately, there was a tendency for the nontherapy group to perform with less impairment on the anagrams than the experimental groups that had received therapy.
trials. The inclination by the nontherapy group toward improvement on the anagrams is not accounted for by the sex effects, by the ratings of the pretreatment aversive noise, by the effort exerted in solving the anagrams, or by the assessed difficulty of the anagrams.

It is probable that the helplessness interference was not produced in this study because of a change from the Seligman procedure. Conventionally, a noise level of 90 decibels or more is used whereas this study employed 75 decibels. Since the relationship between auditory perception and increasing decibel values is logarithmic, the drop of 15 decibels or more represents a sizable contrast in procedure to other learned helplessness experiments. It may be surmised that the learned helplessness effect developed by an aversive noise is somewhat dependent on the motivating properties associated with higher levels of the noise. Consequently, by lowering the decibel level, there may have been inadvertently less likelihood of the development of helplessness in this study.

As reported earlier, the card sorting trials were efficacious in significantly improving mood assessment within therapy groups but not across experimental groups. It is likely that the quality or subjective meaningfulness of the positive reinforcement on the card sorting task was not of such a magnitude as to develop the predicted mood differentiations across groups. The card sorting may have been perceived as being a simple task since reinforcement was almost guaranteed. Therefore, card sorting under the present
conditions, did not provide the necessary therapeutic potency to
develop across group differentiations in mood assessment.

Future attempts at reversing learned helplessness using a
motoric task may be more successful if two factors are considered:
One, the incorporation of a therapy task that is more challenging
or motivating than the present task was. Two, the employment of
a therapy task that utilizes a partial schedule of reinforcement
rather than a schedule of continuous reinforcement. The Jones,
Nation, and Massad (1977) study indicated that when immunizing
human subjects against helplessness that a partial schedule as
opposed to a continuous schedule of reinforcement was more
effective in minimizing deficits on a test task. This rationale
may also apply to the usage of reversal strategies for learned
helplessness.

Curative strategies of learned helplessness render implica­
tions for behavior therapy with depressives: therapeutic efforts
that involve partial reinforcement should increase resistance to
extinction of any newly developed nondepressed behaviors. Ideally,
the therapist would begin the depressed client on a continuous
reinforcement program in order to reduce the immediate severity of
the symptoms and then later shift to an intermittent reinforcement
regimen. A relapse of depression may more easily occur when
frustration is encountered by the client in the extratherapy world
if the therapist has ameliorated the pathology only via an almost
continuous reinforcement schedule.
The somewhat less impairment demonstrated by the control group may be interpreted post facto by what is known about the effects of frustration on the response repertoire (Amsel and Roussel, 1952). Frustration was experienced at a "mild" level by subjects in this study as was indicated by the postexperimental questionnaire data. At a mild level the tendency of frustration is to activate or energize behavior; it may be that the control subjects were slightly more frustrated at the time of the introduction of the anagrams since their within group mood ratings demonstrated no change whereas the experimental groups receiving therapy exhibited mood elevation within treatments. Hence, the nontherapy group may have performed with more activation as a result of their relatively low frustration. In order to reconcile this interpretation with the concept of learned helplessness the assumption that higher levels of frustration are debilitating is necessary; indeed Hiroto and Seligman (1975) reported that helpless subjects rate their frustration at levels usually in excess of what would be "moderate."
REFERENCES


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Miller, W. R. & Seligman, M. E. P. Learned helplessness, depression, and the perception of reinforcement. *Behavior Research and Therapy*, 1976, 14, 7-17.


APPENDIX

Postexperimental Questionnaire

1. Please rate the tone:

<table>
<thead>
<tr>
<th></th>
<th>Not Unpleasant</th>
<th>Mildly Unpleasant</th>
<th>Moderately Unpleasant</th>
<th>Considerably Unpleasant</th>
<th>Extremely Unpleasant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

2. Indicate the extent of control you had over the noise:

<table>
<thead>
<tr>
<th></th>
<th>Never Controlled</th>
<th>Infrequently Controlled</th>
<th>Occasionally Controlled</th>
<th>Usually Controlled</th>
<th>Always Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

3. Rate the amount of frustration in trying to stop the noise:

<table>
<thead>
<tr>
<th></th>
<th>Minimal Frustration</th>
<th>Mild Frustration</th>
<th>Moderate Frustration</th>
<th>Considerable Frustration</th>
<th>Extreme Frustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

4. Rate the amount of trying you exerted on the anagram task:

<table>
<thead>
<tr>
<th></th>
<th>Minimal Effort</th>
<th>Some Effort</th>
<th>Moderate Effort</th>
<th>Considerable Effort</th>
<th>Great deal of Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

5. Assess the difficulty of the anagram task:

<table>
<thead>
<tr>
<th></th>
<th>Mildly Difficult</th>
<th>Somewhat Difficult</th>
<th>Moderately Difficult</th>
<th>Considerably Difficult</th>
<th>Extremely Difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>