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AN INVESTIGATION OF THE EFFECTS OF HELPLESSNESS TRAINING, NUMBER OF HELPLESSNESS TASKS AND ABILITY ON THE DEVELOPMENT OF HELPLESSNESS BEHAVIORS

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AN INVESTIGATION OF THE EFFECTS
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According to the theory of learned helplessness, a person develops an expectation that responding will not lead to reinforcement following exposure to an environment of response independent reinforcement. This expectation leads to cognitive and motivational deficits. Experiments designed to test this theory do not consistently produce results which support it. Experiments which operationalize helplessness as exposure to inescapable aversive events find both debilitation and facilitation effects. Experiments which operationalize helplessness training as exposure to random reinforcement find facilitation effects following exposure to the random reinforcements. However as dosages of helplessness training are increased, debilitation effects are observed. A curvilinear relationship between helplessness training and the manifestation of helplessness behaviors has been suggested. Thus the present study was designed to test the proposed curvilinear

relationship between experiences of no control and performance deficits. There were three factors in the experimental design. The first factor was the treatment factor which consisted of inescapable noise treatment and a noise control treatment. The second factor, ability, consisted of a group of subjects who scored above average on preliminary anagram task and a group of subjects who scored below average on this task. The third factor, number of tasks, consisted of a group of subjects that received a single helplessness training task and a second group of subjects that received three tasks of helplessness training. Two dependent variables from the test task were analyzed: mean solution time of the twenty anagrams and the number of failures. These manipulations allowed a 2 (inescapable noise treatment vs. no treatment) x 2 (high ability vs. low ability) x 2 (single task vs. triple task) MANOVA design. A priori predictions were made and tested with a per error contrast rate of .05.

A preliminary test of anagram ability was given to a large section of introductory psychology. Scores on the anagram test were then used to assign the students to high and low ability groups. The subjects were then randomly assigned to treatment groups and run individually. In the inescapable noise condition, subjects were exposed to twelve minutes of five second (or less) noise bursts and asked to make the correct response which would terminate the noise. However, there was no correct response.

In the control group the subjects were exposed to the same noise but they were not asked to terminate the noise. Subjects in the single task condition were exposed to one task of either inescapable noise or control noise. In the triple task condition, the subjects were exposed to three tasks of either inescapable or control noise.

Results showed a significant main effect for ability and a significant three way interaction. The helplessness x task interaction varied at the different levels of ability. The a priori planned comparisons revealed that both facilitation and debilitation effects were demonstrated when helplessness training was operationalized as exposure to inescapable aversive events. Facilitation effects were found when low ability subjects were exposed to a single task of helplessness training and when high ability subjects were exposed to a triple task of helplessness training. Debilitation effects were found when low ability subjects were exposed to a triple task of helplessness training. No significant differences were found when low ability subjects were exposed to a single task of helplessness training. These results do not support the original learned helplessness hypothesis. However, this pattern of results is partially supportive of the hypothesized curvilinear relationship.

CHAPTER I

Introduction

The theory of learned helplessness developed from unexpected experimental observations. Dogs placed in a hammock and given inescapable shock behaved in an unexpected manner when observed twenty-four hours later. When these dogs were removed from their cages, they seemed to wilt; they passively sank to the bottom of the cage and occasionally they even rolled over and adopted submissive posture. When subsequently placed in a shuttlebox and given inescapable shock, they were slow to respond and some dogs failed to escape the shock altogether. These dogs sat passively through the shock and showed signs of fear and anxiety (Seligman and Maier, 1967).

These findings led to subsequent experiments designed to isolate the cause of these behaviors. A triadic experimental design was used which simultaneously exposed these dogs to the same frequency, intensity and level of shock. Only the escapability or inescapability of the shock was experimentally manipulated. Using this triadic experimental design, it was found that the lack of control over stimulation and not the aversive stimulation itself resulted in later interference with learning (Seligman and Maier, 1967).

After repeating the experiment on cats, rats and fish and obtaining similar results across species, a theory of learned helplessness was proposed to account for these findings (Maier, Seligman and Solomon, 1969). According to this theory, after exposure to an environment in which reinforcement is independent of voluntary responding an organism cognitions change; he develops an expectation of independence between his responses and reinforcement. This expectation leads to two deficits; it interferes with the later learning of contingencies (cognitive deficit) and causes debilitation of response initiation. These deficits (motivational deficit) result in performance deficits on subsequent tasks.

Thus, exposure to helplessness training is hypothesized to produce cognitive changes as well as performance deficits. Although developed from animal studies, this theory of learned helplessness has been proposed as the explanation of many behavioral problems in people. Helplessness is the popular construct now used to account <u>ex post</u> <u>facto</u> for cognitive and motivational deficits in human beings as well as in animals. Accordingly, a person who makes no attempt to change an aversive environment would be viewed as helpless. Recently, helplessness has also been suggested as a contributing factor in psychosomatic ailments (Krantz, Glass and Snyder, 1974), reactive depression and sudden unexpected deaths (Seligman, 1975).

Because this theory is currently used to explain behavioral problems in humans, it is important to assess the extent to which it is supported by experimental data. Many experiments have been conducted which test this theory of learned helplessness. Typically, the control group of subjects is exposed to an aspect of the experimental situation other than helplessness. The helplessness group and control group of subjects are subsequently tested on another task and are then asked to complete a questionnaire assessing their expectations. To support the hypothesis of performance deficits, the performance of the subjects receiving helplessness training should be inferior to the performance of the other group(s). To support the hypothesis of cognitive change, only the beliefs of those subjects who received helplessness training should demonstrate expectations of noncontingency between their responses and reinforcement.

To what extent does the experimental data support these hypotheses? Do the subjects exposed to helplessness training exhibit performance deficits and expectations of noncontingency? To address these questions, experiments which define helplessness training as exposure to inescapable aversive events are critically reviewed. Because the recent proliferation of such experiments make it impossible to discuss each experiment individually, those experiments using the same procedure and treatment groups are discussed together. Following the critical review of these experiments, experiments which operationalize helplessness training as exposure to random reinforcement will be reviewed individually. An attempt to reconcile the findings of both sets of experiments is made and a study is conducted to clarify problems in both groups of experiments.

In a group of studies operationalizing helplessness training as exposure to inescapable aversive events, subjects were exposed to fifteen minutes of five second noise bursts with intertrial intervals ranging from 6.5 to 21.8 seconds. Subjects were asked to make a response to terminate the noise. One group (escapable group) was able to escape or avoid this aversive noise by making an appropriate response. A second group was not able to escape or avoid the noise. Both groups of subjects were then tested on a subsequent task. In three of the four experiments, the test task required the subjects to learn a new response to terminate a similar aversive noise (Gatchel, Paulus and Maples; 1935; Krantz, et al., 1974; Glass and Singer, 1972) while in the fourth experiment (Cole and Coyne, 1977) half of the subjects were asked to solve a cognitive test task. In all four experiments, a performance decrement was found in the inescapable group relative to the escapable group (Cole and Coyne, 1977; Gatchel et al, 1975; Krantz, et al, 1974). However, a problem of interpretation of these results is apparent. Because of the lack of a control group, it is impossible to ascertain whether these results are due to enhancement effects in the escapable group or to interference effects in the inescapable group.

A second group of studies used the same procedure but added a control group. In these experiments, the control group received only the test task and the performance of the inescapable group was compared to the performance of this control group (Hiroto, 1974; Miller and Seligman, 1975; Klein and Seligman, 1976; Price, Tyron and Raps, 1978). Results were consistent with the learned helplessness hypothesis of motivational deficit. In all four experiments, the inescapable group performed significantly worse than the control group on the test task. This performance decrement was obtained when dissimilar (Price et al, 1978) as well as similar test tasks were used (Hiroto, 1974; Miller and Seligman, 1975; Klein and Seligman, 1976).

Although these results offer tantative support of the learned helplessness hypothesis, problems of interpretation due to confounding of the treatment groups emerged. In the escapable and inescapable treatment groups, the aversiveness of the noise was confounded with the controllability of the noise. The control group was not exposed to either the aversive stimulation or to the dimension of controllability. Thus, the obtained difference between the inescapable and control group may be the result of mere exposure to aversive stimulation rather than to the inescapability of this noise. Before these results can be interpreted as unequivocally supportive of the learned helplessness hypothesis, the results must be shown to be the result of uncontrollability per se.

In another group of studies the experimental confounding was removed by exposing the control group to noise and comparing their performance to the performance of the inescapable groups given inescapable noise (Hiroto and Seligman, 1975; Gatchel, McKinney and Koebernick, 1977; Gatchel and Proctor, 1976; Sacco and Hokanson, 1978). In three of these experiments (Hiroto and Seligman, 1975; Gatchel, et al., 1977; Gatchel and Proctor, 1976) the inescapable group performed significantly worse than the control group while in one experiment (Sacco and Hokanson, 1978) the performance of the inescapable group did not significantly differ from the performance of the control group.

Although the authors interpret these results as evidence of the demonstration of learned helplessness in humans, this interpretation is questionable. Close inspection of the questionnaire results suggest that the subjects demonstrating the performance deficits believed the task was unsolvable because they had been deceived. If this is so, this belief may have led them to distrust the experimenter's hint of a single correct pattern which would solve all twenty anagrams. The difference in performance between the inescapable and control group may have been due to the effects of this deception, not to the effects of helplessness training.

Replications of Hiroto and Seligman's (1975) study by Benson and Kennelly, (1976), offer some support to this alternate interpretation. Using the same experimental procedure as used in Hiroto and Seligman's experiment (1975), these authors found a performance decrement in the inescapable group on only one dependent measure: trials to criterion. Since this dependent measure reflects knowledge of the repeated pattern, it is the dependent measure most sensitive to the effects of deception. Although this experiment was not designed to test the two possible interpretations, these findings do not support a learned helplessness interpretation. If the insoluble group had developed a belief that responding was futile because there was no relationship between their responses and subsequent reinforcement, a performance decrement on all three dependent measures would be expected. However, if the alternate interpretation is correct and the subjects simply distrusted the experimenter's instructions, the performance decrement on only the dependent measure sensitive to the pattern of solution would be expected.

Evidence in support of this alternative deception interpretation comes from a replication of Hiroto and Seligman's (1975) experiment 3 (Waskiewicz and Schickedanz, Note 1). To minimize the salience of deception, these authors omitted the suggestion of a repeated pattern in the anagram test task. Contrary to the expectations of these authors, subjects in the inescapable groups performed better than subjects in the control group. These authors reported that exposure to inescapability led to performance facilitation and not debilitation, and suggest that performance deficits found in earlier studies may be an experimental artifact.

To summarize, experiments which operationalize helplessness training as exposure to inescapable aversive events yielded results which were initially interpreted as evidence for the demonstration of helplessness in humans. However, problems with the experimental procedure in these studies raise questions concerning the interpretation of these results. Subjects in these experiments were deceived and it is possible that the deception, rather than the helplessness training contributed to the results. When deception was minimized, one experiment suggested that performance was actually enhanced (Waskiewicz and Schickedanz, Note 1).

Because exposure to random reinforcement is also predicted to produce performance deficits and expectations of noncontingency, the procedure and results of experiments must also be reviewed. In one experiment designed specifically to test the learned helplessness hypothesis (Roth and Bootzin, 1974), two experimental treatment groups and two control groups were run. A single helplessness group received random reinforcement on a concept formation task while a double helplessness group received random reinforcement on two consecutive concept formation tasks. The performance of these groups on a test task was compared with the performance of a control group receiving contingent reinforcement and a control group that participated only in the test phase of the experiment. These authors hypothesized that subjects receiving random reinforcement would manifest a performance deficit in the test situation relative to the two control groups. However, the obtained results were contrary to predictions. Subjects in the helplessness groups exhibited more control in the test phase and on the questionnaire, these subjects reported feeling more in control than subjects in the control groups.

These findings led these authors to suggest that a curvilinear relationship between experiences of no control and helplessness behavior may exist. Thus, subjects may initially react to feelings of no control by behaving assertively whereas repeated experience with no control may lead these subjects to behave in a passive and helpless manner.

To assess the validity of this proposed curvilinear relationship a second study was designed (Roth and Kubal, 1975). This study varied the amount and the importance of helplessness training. In this second study, four experimental groups (single dose unimportant, single dose important, double dose unimportant, and double dose important) were exposed to helplessness training. These groups were instructed to solve a concept formation task on which they received random reinforcement. In the important condition, the subjects were told that this treatment task was a good predictor of success in college while in the unimportant condition, the subjects were told that the treatment task was a puzzle. In the single dose condition, subjects received helplessness training on one concept formation task and in the double dose condition, subjects received helplessness training on three concept formation tasks. Following the treatment task, subjects were asked to solve another concept formation problem which required the subjects to use veridical feedback to determine a particular series of playing cards.

Results showed that only the subjects in the double dose important condition demonstrated a performance deficit on the test tasks. The remaining groups (single dose unimportant, single dose important, and double dose unimportant) manifested facilitative effects on the test task. Relative to the control group, these groups solved more of the test tasks. Although the double dose unimportant group showed these facilitation effects, they did not demonstrate these effects as markedly as did the single dose groups.

Roth and Kubal (1975) interpret these results as supporting the predictions of a curvilinear relationship between amount of exposure to experiences of no control and behavioral manifestations of helplessness. Furthermore, they suggest that the effect of increasing the amount of importance of training is to increase the likelihood of helplessness effects and to decrease the likelihood of facilitation effects.

Because of a number of problems with the experimental design, these results do not provide unequivocal support for their hypothesis of curvilinearity. One of the problems involves the confounding of trials and tasks. The double dose helplessness groups were given triple the number of trials of helplessness training as well as triple the helplessness tasks compared to the control group. Thus, it cannot be determined from this experiment whether the performance deficit resulted from exposure to triple the tasks or triple the trials of helplessness training. Since it has been found elsewhere that increasing the trials of helplessness training does not lead to performance deficits (Hanusa and Schultz, 1977) it is important to test for the effects of increasing the number of tasks.

The second problem with this study involves confounding of time and treatment. The double dose treatment group spent a longer period of time on the treatment task than any of the other groups. Yet, it was only these double dose groups that demonstrated a decrease in facilitation effects (double dose unimportant) or helplessness effects (double dose important). It is possible that this decrease in performance is the result of greater time spent on the treatment task and not the result of the experimental manipulation.

Finally, a problem of interpretation due to the similarity of the treatment and test task is apparent. Both tasks were concept formation tasks which involved the same ability. Because of task similarity, a set of expectations other than response independence may have led to the obtained results. For example, the subjects who received helplessness training may have performed poorly on the test task because the insolubility of the training task may have led them to hypothesize that the solution was relatively complicated. Or alternatively, these subjects may have continued to assume that the next concept formation task was also unsolvable. Although the questionnaire results indicate greater stress in the subjects receiving a double doze of helplessness training, the reason for the stress is not clear.

In summary, there is some support for a curvilinear relationship between exposure to helplessness training and the demonstration of motivational deficits. In experiments which operationalize helplessness training as exposure to inescapable aversive events, facilitation effects were found when deception was minimized. However, effects of further dosages of helplessness training have not been studied. In experiments which operationalized helplessness training as exposure to random reinforcement, both facilitation and debilitation effects have been found, but alternate interpretations of the data have yet to be ruled out.

Therefore, the following study was designed to test the proposed curvilinear relationship between experiences of no control and performance deficits with the following improvements in design. The treatment and test tasks were made dissimilar by the use of an instrumental treatment and a cognitive test task. Helplessness training was operationalized as exposure to inescapable aversive events with the effects of deception minimized. To remove possible sources of confounding, time in the treatment phase and trials of helplessness training were held constant across the treatment groups. The number of helplessness tasks was experimentally manipulated. Thus, the overall effect of helplessness training as well as the effect of number of helplessness tasks was studied.

The effects of ability, a factor which may influence test results but which has received little study was also manipulated. Although ability on the test task has been suggested as one reason for nonsignificant findings (Benson and Kennelly, 1976; Sacco and Hokanson, 1978), it has not been experimentally studied by researchers. Ability may influence test results in two ways. It may contribute to subject variability and thus mask a treatment effect. It may also interact with the helplessness training, as suggested by a recent pilot study by this author. In this pilot study a single task of helplessness training produced the facilitative effect predicted by Roth and Kubal's proposed curvilinear hypothesis. However, the high and low ability groups were differentially affected by the triple task of helplessness training. The high ability subjects receiving a triple task of helplessness training demonstrated more marked facilitative effects. On the other hand, the low ability subjects who received a triple task of helplessness training manifested response debilitation. These subjects showed a decrement in performance relative to the low ability single dosage subjects. Thus, this present study is also designed to test the effects and interactions of ability.

Because of the findings of the preceding studies and the pilot data, the following predictions were made:

1. A significant treatment effect is expected with the groups exposed to helplessness training exhibiting overall facilitation of performance, relative to the control group.
2. A significant effect due to ability is expected with high ability groups performing better than low ability groups.
3. A significant treatment x task interaction effect is expected with the subjects in the single task helpless group performing better than the subjects in the control group and subjects in the triple task performing worse than subjects in the control group.
4. A significant three way interaction effect is expected with the treatment x task interactions differing at the two ability levels.

The following orthogonal a priori predictions are made:

5. Subjects in the inescapable high ability triple task condition will perform significantly better than subjects in the high ability triple task control condition.

6. Subjects in the inescapable low ability single task group will perform significantly better than subjects in the low ability single task control group.

7. Subjects in the inescapable low ability triple task will perform significantly worse than subjects in the low ability triple task control group.

CHAPTER II
Method

Subjects

Sixty men and sixty women, enrolled in an introductory psychology course, participated in this study in partial fulfillment of a laboratory experience.

Design

There were three factors in the experimental design. The first factor was the treatment factor which consisted of inescapable noise treatment in level one and noise control treatment in level two. The second factor, ability, consisted of two levels. In the first level, the high ability group consisted of subjects whose score on an anagram test surpassed the score of 51% of those who took the test. The second level, low ability, consisted of subjects whose score on the anagram test was below the score 49% of those who took the anagram test. The third factor, number of tasks, consisted of two levels. In the first, subjects received 45 trials of inescapable noise on one task. In the second, subjects received 45 trials of inescapable noise on three tasks.

Two dependent variables from the test task were analyzed: mean solution time of the 20 anagrams, measured with a stopwatch, and the number of failures operationalized as trials with latencies of 100 seconds, the point at which the trial ended.

These manipulations allowed a 2 (inescapable noise treatment vs. no treatment) x 2 (high ability vs. low vs. noise control) x 2 (single task vs. triple task) MANOVA design with two dependent measures. A no noise naive control group was also run to determine if there were any differences on these dependent measures between a noise control group and a control group.

Procedure

Preliminary Ability Measure

One section of introductory psychology was chosen to participate in a classroom experiment which was described as a correlational study of the verbal abilities of college students. During the first week of classes, a professor administered tests of anagrams, spelling and vocabulary. The anagram test consisted of 20 five letter anagrams found to have 15 to 40 second median solution times (Tresselt and Mayzner, 1966). Scores on the anagram test were used to assign the students to high and low ability groups. They were randomly assigned to treatments. The experimenter who conducted this experiment was blind to the hypothesis and blind to the subjects' score on the anagram test.

Main Study

Each subject was run individually. The male experimenter introduced himself to each subject and then took each subject to the experimental room. The subjects were seated at a table on which the treatment apparatus, a button on the center of a square base, was placed. The subjects were asked to put on earphones and were informed that the study involved listening to noise. The experimenter then left the room, entered an adjacent room, and gave each subject two sample bursts of noise. Each subject was given the opportunity to leave after listening to these sample bursts; one subject chose to leave. The subjects were randomly assigned to treatment groups and were then given the treatment task.

In both the inescapable and noise control groups, subjects received 45 trials of unsignaled, inescapable 90 db noise bursts with intertrial intervals ranging from 6 to 21 seconds. Although five different patterns of noise bursts were systematically used during the experiment, each subject heard one pattern of noise bursts which lasted for twelve minutes. Each pattern was divided into three four minute noise presentations with a short rest at the end of each segment. In the inescapable noise condition, the subjects were asked to terminate the noise by pressing the button in front of them. However, pushing the button had no effect on the noise. In the control group, the subjects were asked merely to listen to the same pattern of noise bursts as their inescapable group counterparts.

The subjects assigned to the inescapable noise group in the single task condition were given the following instructions: "Here are your directions. From time to time a loud noise will come on for awhile. When that noise comes on, there is something you can do to stop it. There are two lights located on the box standing in front of you. The lights will tell you how the noise on each trial was controlled. If you do not stop the tone then the red light will flash when the noise stops, like this. Remember when the green light flashes on, this means you have stopped the noise. But if the red light flashes, you did not stop the noise, but it stopped automatically. The correct response involves gently pressing the button on the box in front of you. Dismantling the apparatus, taking the earphones off or forcibly pushing the button will not stop the noise." At the end of four and eight minutes, subjects were told that they had a one minute break from solving the task. At the end of this minute, they were asked to continue.

Subjects assigned to the inescapable noise groups in the triple task condition were given the following instructions over the intercom: "There are three separate phases to this experiment which we would like you to do. Since each is not too long, we can get all three phases finished in the experimental hour. Here are your directions for solving the first task. From time to time, a loud noise will come on for awhile. When that noise comes on, there is something you can do to stop it. There are two lights located on the box standing in front of you. The lights will tell you how the noise on each trial was controlled. If you find the way to stop the noise then the green light will momentarily flash on after each time that you stop the loud noise, like this (experimenter demonstrates). If you do not stop the noise then the red light will flash on, like this. Remember when the red light flashes, you did not stop the noise but it stopped automatically. The correct response involves gently pressing the button on the box in front of you. Dismantling the apparatus, taking the earphones off or forcibly pushing the button will not stop the noise." At the end of the first four minutes, the subjects were told that the first phase had ended. They were then given the following instructions. "In the second phase of this experiment, a loud noise will again come on. You will again be able to turn off the noise with an appropriate response using the button on the box in front of you. The correct solution has changed but it still involves gently pushing the button on the box in front of you. It is up to you to determine the particular response which will turn off the noise. If the red light flashes on, you did not stop the noise, but it stopped automatically." At the end of the second four minutes, the subjects were told that the second phase of the experiment had ended and were given the following instructions for the third phase. "Now let's go on to the final problem. We are going to be doing the same thing, only the correct pattern of button presses has again changed. You should again try to discover the

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correct pattern of response." At the end of the last four minutes, the subjects were told that the third phase has ended.

The noise control single task group was told "from time to time a loud noise will come on for awhile. Please sit and listen to it." They were given a one minute break from the noise at the end of four and eight minutes. Subjects assigned to the noise control group in the triple task condition were given the following instructions over the intercom: "There are three separate phases to this experiment which we would like you to do. Since each is not too long, we can get all three phases done in the experimental hour. Here are your directions for the first task. From time to time, a loud noise will come on for awhile. Please sit and listen to it." At the end of the first four minutes, the subjects were told that the first phase had ended. They were then given the following instructions: "In the second phase of this experiment, a loud noise will again come on. Please sit and listen to it." At the end of the second four minutes, the subjects were told that the second phase had ended and they were given the following instructions for the third phase: "Now let's go on the final phase. We are going to be doing the same thing. Please continue to sit and listen to the noise."

Following the treatment, the subjects were asked to change seats and to listen to the following instructions which introduced the test task. Subjects in the no noise control group received the same instructions. "You will be asked to solve some 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. When you have found the word, tell me what it is. Don't go on to the next word until I tell you to do so." The test task was a soluble cognitive task which consisted of 20 five letter anagrams found to have 20 to 30 second median solution times (Tresselt and Mayzner, 1968).

Following the completion of the test task, each subject was asked the following questions by the experimenter and was then debriefed.

A. On a scale of 1-7, the greater the number, the more characteristic the attribute, rate:

1. the aversiveness of the noise
2. motivation during the anagram
3. confidence
4. feeling that no matter what, couldn't solve (helpless)
5. things beyond control (helpless)
6. problems unsolvable
7. incompetent
8. systematic approach in solving problems
9. wanted to do best on the problem
10. involved
11. important to do well
12. aroused
13. angry
14. anxious
15. fatigued

16. bored
17. unfair
18. felt that the two experiments were separate.

The subjects were also asked if they saw any relationship between this and any other experiment which they had been in this semester. If they answered affirmatively, they were asked to describe the relationship.

CHAPTER III
Results

Results which were significant when the two dependent measures, failures to solve and response latency, were analyzed together by MANOVA were also significant when analyzed separately by two ANOVAS. The means and standard deviations for both dependent measures are presented in Table 1.

Table 2 presents the MANOVA summary table for these two dependent measures. The main effect of ability proved to be significant, $F(2, 71) = 36.114$, $p < .001$.

Subjects in the high ability group performed significantly better than subjects in the low ability group. No significant differences were found for the treatment factor, $F(2, 71) = 1.253$, $p < .29$, or for the task factor, $F(2, 71) = .203$, $p < .82$). There was a significant treatment by task by ability interaction effect, $F(2, 71) = 7.305$, $p < .001$.

The effect of the helplessness by task interaction changed as a function of the level of the ability factor. In the low ability condition, the performance of the subjects receiving a single task of inescapable noise was facilitated while the performance of the subjects receiving a triple task of inescapable noise was debilitated. In the high ability condition, only the performance of the subjects receiving a triple task of inescapable noise was facilitated. The results of the a priori planned comparisons

TABLE 1

Means and Standard Deviations of
Treatment, Task and Ability Groups

Helplessness	Task	Ability	Dependent Variable: Mean Response Latency M	SD	Failure to Solve M	SD
Inescapable	Single	Low	48.9	18.8	6.1	3.5
		High	35.9	16.8	4.1	3.4
		Combined	42.4	17.8	5.1	3.3
	Triple	Low	73.7	9.5	11.3	4.2
		High	23.5	10.2	1.8	1.1
		Combined	48.6	9.8	6.5	2.6
	Combined	Low	60.3	14.1	8.7	3.8
		High	29.7	13.5	2.9	2.2
		Combined	45.0	13.8	5.8	3.0
Control	Single	Low	66.9	14.7	9.9	3.9
		High	36.6	16.7	4.4	3.2
		Combined	51.7	15.7	7.1	3.5
	Triple	Low	58.7	18.3	7.6	4.1
		High	40.7	8.2	5.2	1.4
		Combined	49.7	13.2	6.4	2.7
	Combined	Low	62.8	16.5	8.7	4.0
		High	38.6	12.4	4.8	2.3
		Combined	50.7	14.4	6.7	3.1
Combined	Single	Low	57.9	16.7	8.0	3.7
		High	36.2	16.7	4.2	3.5
		Combined	47.0	16.7	6.1	3.5
	Triple	Low	66.2	13.9	9.4	4.1
		High	32.1	9.2	3.5	1.2
		Combined	49.1	11.5	6.3	2.6
	Combined	Low	62.1	15.3	8.7	3.9
		High	34.1	12.9	3.8	2.2
		Combined	48.1	14.1	6.2	3.1

TABLE 2

Univariate and Multivariate Analysis of Varience for Mean Response Latency and Failure to Solve

Source	Univariate	Mean Response Latency		Failure to Solve		Multivariate
	df	MS	F	MS	F	F
Helplessness	1	546.013	2.530	18.050	1.682	1.253
Task	1	86.113	0.399	2.450	0.228	0.203
Ability	1	15540.312	72.002	470.450	43.831**	36.114**
Help x Task	1	340.313	1.577	24.20	2.255	1.112
Help x Ability	1	277.512	1.286	16.200	1.509	0.759
Task x Ability	1	775.013	3.591	24.200	2.255	1.791
Help x Task x Ability	1	3062.813	14.191*	140.450	13.085*	7.305**

*$p < .05$
**$p < .001$

were tested by a per error contrast rate of .05. These results are reported in Table 3.

Prediction 5

There was a significant difference between the high ability subjects that received a triple task of inescapable noise and those that received a triple task of control noise, $F (2, 71) = 3.396$, $p < .04$. The performance of the high ability subjects was facilitated relative to the control group in the inescapable triple task condition. Thus, hypothesis 5 was supported.

Prediction 6

There was a significant difference between the low ability subjects who received a single task of inescapable noise and those who received single task of control noise, $F (2, 71) = 3.826$, $p < .02$. The performance of the low ability subjects was facilitated, relative to the control group, in the inescapable single task condition. Thus, the sixth hypothesis was supported.

Prediction 7

Hypothesis 7 was supported. There was a significant difference between the low ability subjects who received a triple task of inescapable noise and those who received single task of control noise, $F (2, 71) = 3.718$, $p < .04$. The performance of the low ability subjects was debilitated relative to the control group in the inescapable triple task condition.

TABLE 3

Univariate and Multivariate Planned Comparisons for Mean Response Latency and Failure to Solve

	Univariate	Mean Response Latency		Failure to Solve		Multivariate
	df	MS	F	MS	F	F
Help w task 1 Abil 1	1	1620.000	7.506**	72.200	6.727*	3.826*
Help w task 1 Abil 2	1	2.450	.001	.450	.042	.029
Help w task 2 Abil 1	1	1125.000	5.212*	68.450	6.377*	3.178*
Help w task 2 Abil 2	1	1479.200	6.853*	57.800	5.383*	3.396*

*$p < .05$

**$p < .01$

No significant differences between the noise control group and the no noise control group were found, $F (2, 71) = .268$, $p < .765$.

There were no significant differences between high ability subjects in the inescapable single task condition and high ability subjects in the single task control condition, $F (2, 71) = .029$, $p < .97$. Thus, performance of high ability subjects was neither facilitated nor debilitated relative to the control group by single dosage of inescapable noise.

Questionnaire Data

The ratings of each subject were tabulated for the following six questions.

1. aversiveness of the noise
2. feeling that, no matter what, couldn't solve (helpless)
3. treatment problems were unsolvable
4. incompetent
5. aroused
6. bored

The results of the last question concerning the relationship between this experiment and any others which the subjects may have been in were tabulated to determine whether or not the subjects were differentially aware of connections between the two experiments.

Table 4 presents the frequency of the rating responses to the questions.

TABLE 4

Frequency of Rating Responses for Subjects in Each Group to Each of Six Questions.

Treatment	Task	Ability	Rating 1	2	3	4	5	6	7
		1. Aversiveness of the noise							
Inescapable	Single	Low	0	2	2	2	2	2	0
		High	0	1	3	3	2	1	0
	Triple	Low	0	1	3	1	3	2	0
		High	0	1	3	2	2	2	0
Control	Single	Low	0	4	5	1	0	0	0
		High	0	2	1	2	4	1	0
	Triple	Low	0	3	5	1	1	0	0
		High	0	3	2	2	1	2	0

Treatment	Task	Ability	1	2	3	4	5	6	7
		4. Feeling...helpless							
Inescapable	Single	Low	0	0	2	3	3	2	0
		High	0	0	2	1	4	3	0
	Triple	Low	0	0	0	3	6	1	0
		High	0	0	0	0	3	5	2
Control	Single	Low	0	4	5	1	0	0	0
		High	0	1	6	2	1	0	0
	Triple	Low	0	3	6	1	0	0	0
		High	0	3	6	1	0	0	0

Treatment	Task	Ability	Rating 1	2	3	4	5	6	7
		6. Treatment...insoluble							
Inescapable	Single	Low	0	2	1	4	2	1	0
		High	0	0	1	3	4	2	0
	Triple	Low	0	0	4	2	3	1	0
		High	0	1	0	1	4	4	0
Control	Single	Low	0	2	4	2	1	1	0
		High	0	3	2	2	2	1	0
	Triple	Low	0	0	3	3	3	1	0
		High	0	4	1	2	1	2	0

Treatment	Task	Ability	1	2	3	4	5	6	7
		7. Incompetent							
Inescapable	Single	Low	0	0	2	3	3	2	0
		High	0	2	6	1	1	0	0
	Triple	Low	0	1	1	0	4	4	0
		High	0	3	1	4	2	0	0
Control	Sincle	Low	1	2	4	3	0	0	0
		High	0	2	5	2	1	0	0
	Triple	Low	0	2	5	3	0	0	0
		High	0	3	5	2	0	0	0

Treatment	Task	Ability	Rating 1	2	3	4	5	6	7
		12. Aroused							
Inescapable	Single	Low	0	3	3	3	1	0	0
		High	0	1	4	4	1	0	0
	Triple	Low	0	2	3	5	0	0	0
		High	0	3	2	4	1	0	0
Control	Single	Low	0	3	3	2	2	0	0
		High	0	2	4	2	1	1	0
	Triple	Low	0	3	3	2	2	0	0
		High	0	2	3	2	2	1	0

Treatment	Task	Ability	1	2	3	4	5	6	7
		16. Bored							
Inescapable	Single	Low	0	2	2	4	2	0	0
		High	0	3	5	1	1	0	0
	Triple	Low	0	3	4	2	1	0	0
		High	1	3	1	1	4	0	0
Control	Single	Low	0	1	4	4	1	0	0
		High	0	2	5	3	0	0	0
	Triple	Low	0	4	3	2	1	0	0
		High	0	3	4	3	0	0	0

CHAPTER IV

Discussion

Five of seven predictions were supported by the data. The significant three way interaction indicated that the helplessness x task interaction differed at the different levels of ability. The a priori planned comparisons revealed that both facilitation and debilitation effects were demonstrated when helplessness training was operationalized as exposure to inescapable aversive events. Facilitation effects were found when low ability subjects were exposed to a single task of helplessness training and when high ability subjects were exposed to a triple task of helplessness training. Debilitation effects were found when low ability subjects were exposed to a triple task of helplessness training. No significant differences were found when high ability subjects were exposed to a single task of helplessness training.

It is interesting to note that, contrary to predictions, the two way interactions were not significant. The reason for this lack of significance becomes apparent by studying the appropriate means for the significant three way interactions. The helplessness x task interaction differed at the two levels of ability. When this helplessness x task interaction effect is collapsed across the levels of ability the two way interaction is less pronounced.

It is also interesting to note that the overall treatment effect is not significant in the MANOVA analyses ($p < .29$). The centroids of the inescapable and control groups did not significantly differ from each other. The reason for this lack of significance can again be found by referring to the table of means. The combined effect of the facilitation and debilitation results at the specific levels appear to cancel each other out at the overall treatment level.

Questionnaire results suggest that the manipulations were successful. More subjects reported feeling very helpless and incompetent (ratings of 6 and 7) after the helplessness treatment than after the control treatment. Those subjects who reported feeling very incompetent after the helplessness treatment were all in the low ability group. No high ability inescapable group subject reported feeling very incompetent following the helplessness treatment. More subjects reported feeling that the task was insoluble following helplessness treatment than after the control treatment. Of those subjects who rated the task as very insoluble (ratings of 6 and 7) after the helplessness treatment, six or 75 percent were in the high ability group. Only two subjects or 25 percent were in the low ability group.

The results obtained in this study do not support the original learned helplessness hypothesis. The overall response debilitation predicted by the model was not found in the inescapable group, relative to the control group, and the facilitation effects and the specificity of the debilitation effects are not consistent with the original learned helplessness model.

The pattern of results was partially supportive of the hypothesis of a curvilinear relationship between exposure to inescapability and the manifestation of performance deficits. However, the results suggest that this relationship is more complicated than the original hypothesis suggests. A single task of helplessness training did not consistently produce an overall facilitation effect and a triple task of helplessness training did not consistently produce an overall debilitation effect. Rather, number of tasks of helplessness training interacted with ability level to produce facilitation and debilitation effects. In the low ability group, a single task of helplessness training produced a facilitation effect while a triple task of helplessness training produced a debilitation effect. Thus, the pattern of results for the low ability group supports the hypothesized curvilinear relationship. In the high ability group, no effect was found in the single task conditions while facilitation effects were found in the triple task condition. Thus, the results obtained in the high ability group are only partially supportive of the curvilinear hypothesis. However, it is possible that debilitation effects would have been found if the number of tasks of helplessness training had been greater. Although this remains an empirical question, it is possible that subjects who have high ability are more resistant to helplessness training.

It is interesting to speculate on the reasons for this pattern of results. Why are facilitation effects found after exposure to helplessness training? And why do subjects low in ability on the test task manifest performance deficits faster than subjects high in ability on the test task?

One explanation of these results is that the facilitation effects are rebound reactions to the perceived lack of control (Solomon and Corbett, 1973; Seligman, 1978). According to this interpretation, subjects exposed to helplessness training perceive their inability to control reinforcement but they respond by trying harder to reassert control when the situation changes. Thus, the test task performance of these subjects is initially enhanced following exposure to helplessness training. As the number of helplessness tasks increase, performance deficits, rather than enhancement occurs because the situation has already changed many times during the treatment and yet the subjects remain unable to assert control.

Although this explanation is intuitively appealing, the results of this study suggest that organismic factors such as ability also must be taken into account. What is there about ability that contributes to this pattern of results? One possibility is that it is not ability, per se, but the subject's prior beliefs about his ability which play an important role. For example, a person may believe that he/she does well on an anagram task and thus he/she may feel that he/she is able to control reinforcement on this task. The prior perception of control on the test task then interacts with the perception of control generated by the helplessness training. Thus, subjects who have a prior belief in their ability to do well on anagrams (in this experiment, college students who are above average in solving anagrams) may conclude once the anagram task is introduced that the situation can now be brought under their control, regardless of the helplessness training. The number of tasks of helplessness training may then affect the subjects motivation to assert control. Thus, the single task of helplessness training may produce only a mild effort to reassert control while a triple task of helplessness training produces a strong effort to reassert control. By contrast, subjects who have experienced a past history of failure on this test task (in this case, college students who are below average in solving anagrams) may make a strong effort to reassert control following a single task of helplessness training but this strong effort occurs before the triple task of helplessness training is completed. The facilitation effect would then occur during the treatment but would be diminished as helplessness training continued. Thus these subjects would exhibit performance decrements on the test task.

Another possible reason why this pattern of results was obtained may be due to the different attributions made for failure by the subjects in the high and low ability groups. According to the recent reformulation of the learned helplessness theory (Abramson, Seligman, and Teasdale, 1978) attributions, rather than expectancies are given the central role in mediating aspects of the performance deficit. Recall that in the original learned helplessness model, an organism exposed to an environment where reinforcement is independent of all voluntary responding is expected to develop an expectation of response-reinforcement independence (Seligman, 1973). This expectation was hypothesized to produce subsequent interference with learning response dependency. This theory fails to account for why helplessness was sometimes specific and sometimes global and fails to account for the time course of performance deficits. Thus, the theory was reformulated to account for obtained differences in the manifestation of performance deficits (Abramson, Seligman and Teasdale, 1978).

In the reformulated model a new set of predictions are made. The individual first finds out that certain outcomes and responses are independent of reinforcement and then he/she makes an attribution about the cause. This attribution may be external vs. internal, global vs. specific or stable vs. unstable. These attributions affect his/her expectations about future response-outcome relations and thereby determine the chronicity, generality and intensity of the deficit.

It is possible in this experiment that the high and low ability subjects made different attributions for their failure on the test task. The results of the questionnaire items suggest possible differences in attributions between high and low ability groups: subjects in the high ability groups tended to perceive the treatment as unsolvable while subjects in the low ability groups reported feeling that they themselves were incompetent. Thus high ability subjects in the single task condition may have concluded that their failure on the test task was due to an unsolvable treatment task (e.g., these tasks are insoluble because they depend on luck). This specific attribution would not be expected to cause a performance deficit on the dissimilar test task. The high ability subjects given triple tasks of helplessness training may have attributed a different yet specific cause for failure (e.g., these tasks are unsolvable because this part of the experiment is rigged). This attribution would also not be expected to produce a performance deficit on a dissimilar test task but may contribute to increased motivation when the task becomes soluble.

In contrast, low ability subjects may have made a specific attribution in the single task condition but general attributions in the triple task condition. For example, subjects given a single task of helplessness training may have hypothesized that they failed because they lack manual dexterity. When the task changed, they may have responded by attempting to reassert control. However, subjects in the triple task condition may have attributed their failure to a general attribute such as lack of general competence which then transferred from the instrumental noise task to the cognitive anagram tasks.

Although attributions were not manipulated, it would be interesting to manipulate attributions and determine how they interact with the subjects ability. For example, a person who attributed his failure to a global cause, e.g., lack of general ability, would be expected to demonstrate a performance deficit on diverse subsequent tasks while a person who attributed his failure to a specific cause, e.g,, lack of manual dexterity, would be expected to demonstrate performance deficits on only a similiar subsequent task. Likewise, a person who attributed his failure to a stable factor such as laziness would demonstrate performance deficits for a longer period of time than a person who attributed his failure to an unstable cause, such as having a cold.

Finally, these results suggest some possible reconciliations for the conflicting results obtained in the literature. Under some circumstances, it has been demonstrated that people seem to react to uncontrollable life events with passivity, helplessness and depression (Seligman, 1975; Klein, Fencil-Morse and Seligman, 1976). At other times, they appear to respond with renewed determination to influence the outcome in question (Wortman and Brehm, 1975). As noted in the introduction, laboratory studies have found that subjects who are exposed to non contingent reinforcement on a cognitive task perform better on subsequent problems than subjects exposed to contingent reinforcement or no treatment (Hanusa and Schultz, 1977); Roth and Bootzin, 1974; Roth and Kubal, 1975; Tennen and Eller, 1977; Wortman et. al., 1976). Previous experimental laboratory studies which defined helplessness training as exposure to inescapable aversive events have demonstrated mainly deficit effects. This study demonstrates that facilitation effects also occur when helplessness training is operationalized as exposure to inescapable insoluble events. Both facilitation and debilitation effects were also demonstrated when treatment and test task were made dissimiliar. Therefore, both facilitation and debilitation effects have been demonstrated in many experiments and appear to be a reliable phenomenon. Results of this study suggest specific situations in which college students will react to lack of control by debilitation and when they will react to lack of control by facilitation.

It would be interesting to study the effects of ability and dosages of helplessness training on other groups of subjects to determine if the same pattern of results occur. In this study, college students (even those low in ability on anagrams) must have experienced some prior success in tasks relating to anagram ability (e.g., spelling and vocabulary skills, reading and general intelligence). It would be interesting to determine whether facilitation effects would be demonstrated in younger students who have been diagnosed as learning disabled in reading and spelling. It may be that these students would immediately demonstrate performance deficits because of their prior history of failure.

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