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Effects of proximity on the learned helplessness phenomenon in rats.

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EFFECTS OF PROXIMITY ON THE LEARNED HELPLESSNESS PHENOMENON IN RATS

by

Mary Burt Seay

A Thesis

Presented to the Graduate Committee

of Lehigh University

in Candidacy for the Degree of

Master of Science

in

Department of Psychology

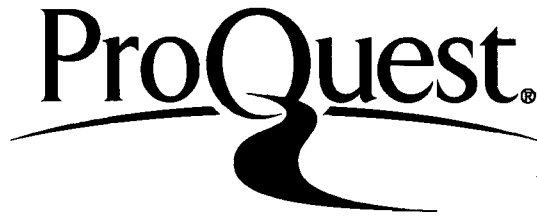
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Abstract

The learned helplessness hypothesis holds that an organism which is exposed to inescapable/uncontrollable events will later show a deficiency in learning. Two experiments investigating the learned helplessness phenomenon were performed. The first experiment replicated the helplessness phenomenon, showing that rats pretreated with 1.0 ma inescapable shock subsequently performed worse than rats receiving only restraint or rats receiving no pretreatment, on an FR-2 shuttle task using 0.6 ma shock level. A second experiment was then performed to assess the effects of pretreating a restrained animal in the proximity of an animal receiving inescapable shock. The findings of this study replicated the results of the first experiment i.e. rats which received inescapable shock subsequently performed worse on the test task than restrained or naive rats. In addition, rats which were restrained in the proximity of an inescapably shocked animal did not differ significantly in test performance from rats which were restrained in isolation or rats which received no pretreatment. Reasons for the lack of effects of proximity found in the second experiment were explored. The results of both experiments were explained in terms of the learned helplessness hypothesis. Alternative hypotheses and explanations for the helplessness phenomenon found in the present experiments were also examined.

EFFECTS OF PROXIMITY ON THE LEARNED HELPLESSNESS

PHENOMENON IN RATS

Exposing animals to inescapable shock sometimes interferes with their later learning of an operant response. To explain this phenomenon, Maier, Seligman and Solomon (1969) have proposed the "learned helplessness" hypothesis. According to their hypothesis, an organism learns that outcomes are independent of its responses to stimuli, i.e., events are not under its control. For example, dogs pretreated in a Pavlovian harness with inescapable/unavoidable shock performed poorly in subsequent learning to escape or avoid shock in a shuttle box. Dogs pretreated with escapable shock showed no deficiency in learning the task, showing that the deficiency was caused by the uncontrollability of the shock and not the shock itself. According to the learned helplessness hypothesis, a dog pretreated with inescapable shock learns that no response it makes results in termination of shock. This experience with uncontrollability seriously debilitates the animal in later learning situations.

This effect was first noted in dogs by Overmeir and Seligman (1967). Since then similar effects have been noted in various other species, including goldfish, cats, rats, and man (see Maier and Seligman, 1976, for review). As a species, the rat has posed an interesting problem for the learned helplessness hypothesis. Initial attempts to demonstrate the effect in rats were unsuccessful. (See Maier, Albin, and Testa, 1973, for a review of this work). Maier, Albin, and Testa (1973) manipulated various pretreatment conditions such as shock intensity,

number of shocks, and the intertrial interval without success. However, when they switched from experiments using an FR-1 shuttle response, where one crossing of the shuttle box terminates shock, as the test task to an experiment where the test task consisted of five trials of FR-1 shuttle responses followed by 25 trials of FR-2 shuttle responses (two crossings result in shock termination), results similar to those seen in dogs were achieved. They concluded that for a difference to be seen among the treatment groups, the test task should be relatively difficult and should not be readily performed by the rat. Other studies have explored additional modifications of the test task parameters. For example, rats pretreated with inescapable shock did not differ from controls in an FR-2 shuttle response if there was a brief interruption in the shock between the first and second shuttle crossing (Maier and Testa, 1975, Exp. 1). In a second experiment, rats were forced to endure three seconds of shock before they were allowed to make the FR-1 shuttle response that would terminate shock. A deficit was found using this test regime (Maier and Testa, 1975, Exp. 2). According to Maier and Testa, the contingency between the escape response and outcome is of greater importance in producing an effect than either: 1) the amount of shock received in the test situation; or 2) the effort required by the test situation.

Recently, however the importance of the pretreatment conditions and the interaction between the pretreatment conditions and the test conditions have come under closer examination. Lowry, Lupo, Overmeir, Kochevar, Hollis, and Anderson (1978) found that rats pretreated with equal amounts of shock from an AC continuous, AC pulsating, or DC

continuous shock source were retarded in their escape performance when tested for escape/avoidance in a shuttle box, while rats pretreated with shock from a DC pulsating shock source did not differ in the test performance from non-preshocked controls. Rosellini and Seligman (1975), using a 3 x 3 design, found interference effects when the same shock intensity (0.4; 1.0 and 2.0 ma) was used in both pretreatment and test, but no interference effect when the shock intensity differed between pretreatment and test. Glazer and Weiss (1976, Exp. 2) found that the duration of each inescapable shock trial had to be at least five seconds in length in order for an interference effect to be produced. Shorter durations (2, 3, or 4 seconds) were insufficient to produce an interference effect even when the number of shocks was increased. These studies illustrate that, in addition to the nature of the test task, the parameters of the pretreatment condition are of major importance in the demonstration of a learned helplessness effect. In the following series of experiments, I will investigate select parameters of pretreatment which may interact with the interference effect.

Several investigators have encountered difficulty establishing an effect following the procedures used by Maier, Albin, and Testa (1973, Exp. 5). Jackson, Maier, and Rappaport (1978) reported a failure to replicate using 1.0 ma shock in the pretreatment and test task. However, an interference effect was seen when pretreatment shock level was 1.0 ma and test task shock level was 0.6 ma. This experiment included only inescapable shock and restrained pretreatment groups. No naive control group was included. Findings by Bracewell

and Black (1974) indicate that restraint alone may have an effect. Seay and Vatzka (note 1) also failed to replicate Maier, Albin, and Testa (1973) using 1.0 ma shock in pretreatment and test task. In their study, while the results were not statistically significant, there was a tendency for rats restrained during pretreatment to perform worse on the test task than naive controls and inescapably shocked animals. Their study contained what might be considered a minor modification of the pretreatment procedures used by Maier, Albin, and Testa (1973). Maier, et al. (1975) pretreated animals individually. Seay and Vatzka (1979) pretreated the inescapably shocked rats and restrained rats simultaneously and in close proximity in the attempted replication. Such proximity may affect the subsequent performance of the restrained rats. For example, it has been found that rats can discriminate between the odors of stressed, i.e., shocked, and unstressed rats (Valenta and Rigby, 1965). It is possible that chemical communication may affect the restrained animal.

Also, I have noted in my extensive pilot work that inescapably shocked rats tend to vocalize during many of the shock presentations. In addition to audible forms of vocalization, rats emit ultrasonic vocalizations as a form of communication in a variety of situations (See review by Nyby and Whitney, 1978) though it is not known if this form of communication is present in pretreatment. Vocal communications may also have an effect on subsequent behavior of the restrained animal.

Thus, it seems possible that proximity of the shocked animal to

the restrained rat during pretreatment markedly affects their behavior in a later escape task.

The first experiment presented in this paper was an attempt to replicate the findings of Jackson, Maier, and Rapaport (1978) with a shock level of 0.6 ma in the test situation. This experiment expanded on their study by examining the effects of restraint during pretreatment by including a group which received no pretreatment.

The second experiment was designed to examine the effects of pretreating animals in isolation versus pretreatment in pairs. The performance on the FR-2 shuttle task of animals which were restrained or inescapably shocked in isolation was compared to the performance of animals which received pretreatment in the presence of another animal receiving pretreatment and to the performance of animals which received no pretreatment.

Experiment 1

Methods

Subjects. Thirty male Sprague-Dawley rats, 90-120 days of age, were obtained from Ace Breeders, Inc., Boyertown, Pa. Subjects were individually housed under a 12 hour day/night cycle. Water and Purina Lab Chow were provided ad lib.

Apparatus. During pretreatment, rats were restrained in two circular, acrylic tubes, 23 cm long and 6.4 cm in diameter. The front of each tube was covered with 1.3 cm grid wire mesh. The rear of each tube was closed off by a removable acrylic plate containing 1.3 cm diameter hole through which the rat's tail was threaded. A 1.0 ma shock could be applied through an electrode taped to the rat's tail;

the tail and the electrode were taped securely to a 15.2 cm by 1.4 cm acrylic rod extending from the rear of the tube. Both tubes were attached, side by side, 22.2 cm apart, to a 60.3 cm by 29.2 cm board. Pretreatment shock was supplied by a 28V DC shock source.

The shuttle box used in the test phase was constructed of 1.3 cm acrylic walls and top, and measured 60.3 cm by 18.4 cm by 25.4 cm. A clear acrylic panel divided the box crosswise into two compartments. The opening between the compartments was an archway, 5.7 cm wide and 5.7 cm high. The floor was constructed of 32 steel bars, 0.3 cm in diameter and spaced 2 cm apart. The weight of the rat on the floor in each compartment closed a microswitch which recorded the crossing of the rat from one compartment to the other. Scrambled shock was supplied to the flooring by a Grason Stadler, model E6070B, shock source. The shock intensity was 0.6 ma. A BRS/Foringer (AU-902) audio generator supplied a 600 Hz tone used in the test phase. A BRS/Foringer (AU-902) audio generator supplied 80 db white noise during pretreatment and test sessions.

Procedure. The rats were randomly assigned to three groups: a naive group (N), a restrained group (R), and an inescapable shock group (I). Each group was composed of 10 subjects.

Pretreatment. The naive group remained in their home cages and received no pretreatment. Rats in the R and I groups were run individually. Each animal was placed in a tube and electrodes were attached to the tail. The restrained animals received no shock. Animals in the inescapable shock condition received 60

trials of 5 sec., 0.6 ma shock. The ITI ranged in a random manner, taking a rectangular distribution of the following 15 second intervals: 15, 30, 45, 60, 75, 90 and 105. The mean was 61 seconds. The restraining tubes and the board on which the tubes were secured were washed with disinfectant after each rat was run.

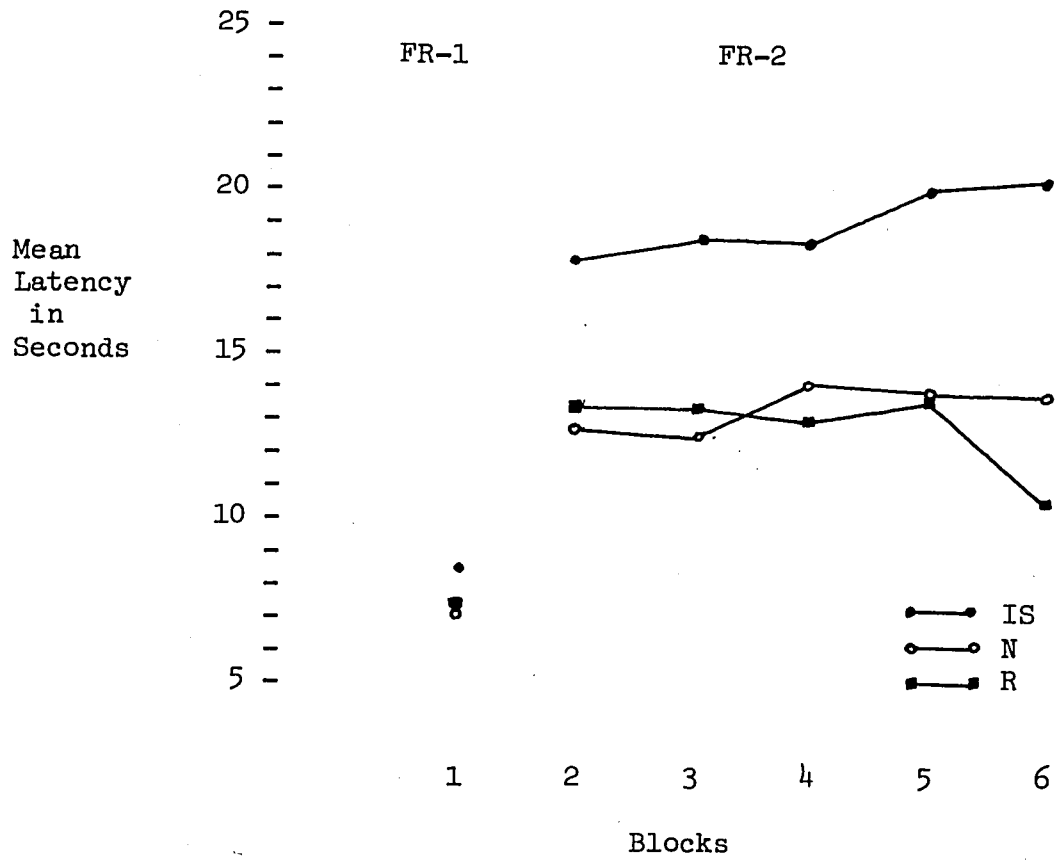
Test. Animals were tested 24 hours after pretreatment for an escape/avoidance shuttle response. Each animal was placed in the shuttle box and given 5 minutes to habituate to the equipment. The subject was then given 5 trials of FR-1 training, i.e., the rat must cross from one side of the shuttle box to the other to escape or avoid shock. This was followed by 25 trials of FR-2 training where two crossings were required to escape or avoid shock. The beginning of each trial was signalled by the onset of the tone which preceded the onset of shock by 5 seconds. The tone and shock were simultaneously terminated when the rat responded correctly. If the animal failed to escape after 30 seconds of shock, the trial was automatically terminated and a latency of 35 seconds was recorded and a failure to escape was recorded. The ITI was randomly varied using a rectangular distribution of the following 15 second intervals: 15, 30, 45, 60, 75, 90, and 105. The mean ITI was 61 seconds. The shuttle box and surroundings were disinfected after each animal was tested.

Results

The mean latencies to escape, over blocks of 5 trials for each treatment group, are shown in Figure 1. A 3 (Treatment) by 5 (Blocks) AOV, with subjects nested under Treatments, was



Figure 1: Mean Latencies to Escape over
Blocks, Exp. 1



performed on the mean latency for the blocks of FR-2 trials, Blocks 2-6 (see Table 1). A significant treatment effect was present ($F(2,27) = 3.68, p < .05$). Two planned comparisons were performed. The naive group did not differ significantly from the restrained group ($F(1,27) < 1$).

The inescapably shocked group performed significantly slower on the test task than did the naive and restrained groups ($F(1,27) = 7.32, p < .05$). There was no significant blocks effect ($F(4,108) < 1$); nor was there a significant interaction of blocks and treatment ($F(8,108) < 1$).

Because data derived from measures of latencies tend to result in a positively skewed distribution, a log transformation was performed on the latency scores for each rat on each trial. The mean log latency for each block of 5 trials for blocks 2-6 was then determined. These data are shown in Figure 2. An AOV using the same design employed in the previous analysis was performed on the mean log latency scores. The results of the analysis are shown in Table II and are similar to those derived from the AOV on the mean latency. It would appear the AOV is robust to the skewness of the first distribution.

The number of failures to escape for each subject is given in Table III. A one way AOV (See Table IV) on the number of failures to escape yielded no significant difference between treatment groups ($F(2,27) = 2.25, p > .05$).

Discussion

An interference effect was produced by pretreating with

Table I: AOV on Mean Escape Latencies of Blocks 2-6
with Planned Comparisonson Treatment Effects, Exp. 1

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
A (Treatment)	12,086,026.20	2	6,043,013.10	3.68*
ψ_1 (N vs R)	74,583.61	1	74,583.61	0.05
ψ_2 (N + R vs I)	12,011,442.73	1	12,011,442.73	7.32*
B (Blocks)	164,745.30	4	41,186.33	0.26
A x B	921,242.50	8	115,155.31	0.74
S (Subjects)	44,304,516.40	27	1,640,908.02	
BS	16,849,721.20	108	156,015.94	

* $p < .05$

Figure 2: Mean Log Latencies to Escape
over Blocks, Exp. 1

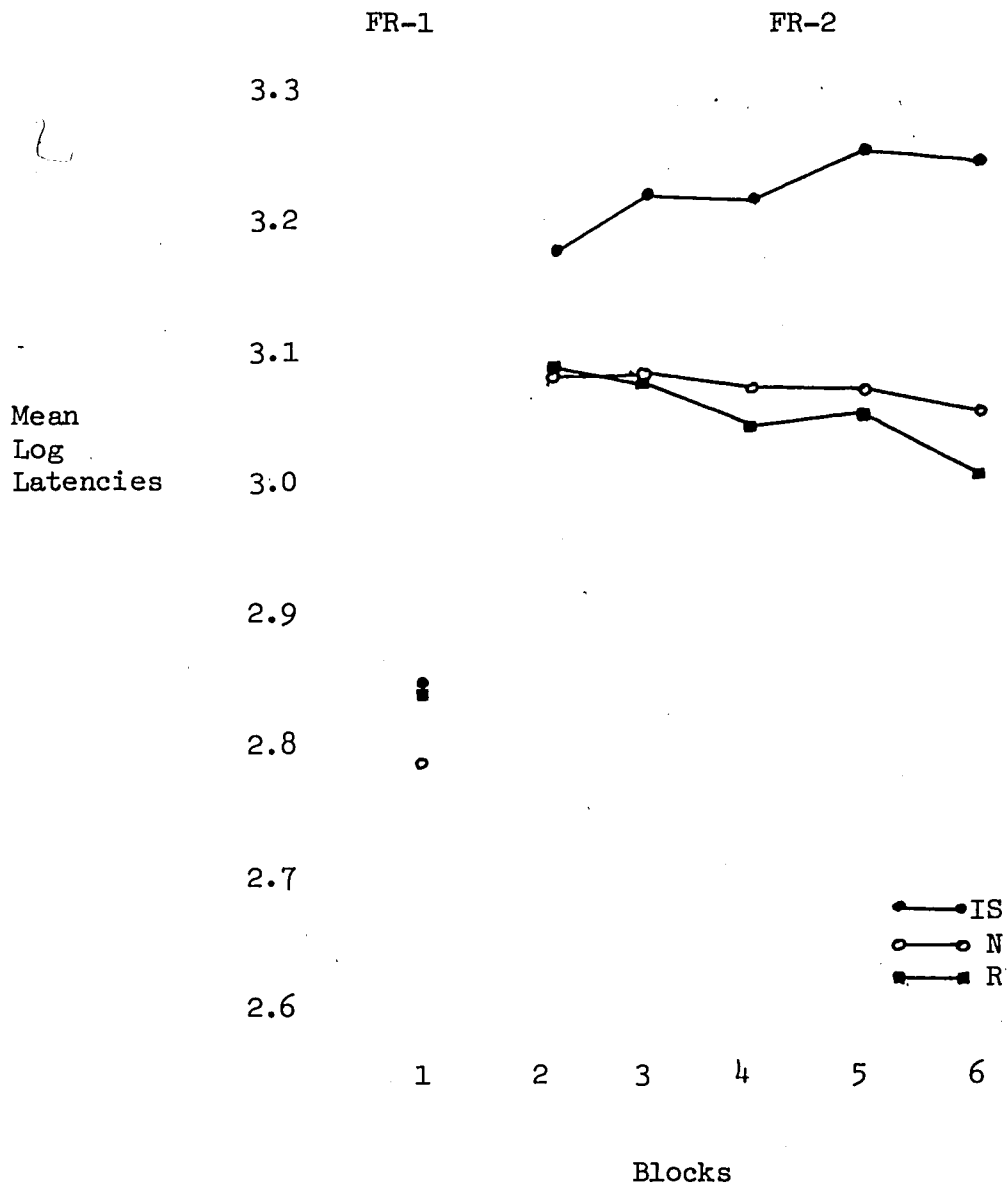


Table II: AOV on Mean Log Latencies to Escape
 Over Blocks 2-6 with Planned Comparisons
 on Treatment Effects, Exp. 1

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
A (Treatment)	0.81080	2	0.4054	4.132*
ψ_1 (N vs R)	0.01000	1	0.0100	0.102
ψ_2 (N+R vs I)	0.80080	1	0.8008	8.163*
B (Blocks)	0.01198	4	0.0030	0.323
A x B	0.06305	8	0.0079	0.850
S (Subjects)	2.64740	27	0.0981	
B x S	1.0088	108	0.0093	

* $p < .05$

Table III: The Number of Failures to Escape, Exp. 1

<u>Treatment</u>	<u>Subjects</u>										<u>Total</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	
IS	6	4	4	0	1	17	0	2	17	0	51
R	0	8	3	0	0	1	0	1	0	0	13
N	0	0	1	12	0	0	0	0	0	0	13

Table IV: AOV on the Number of Failures to Escape, Exp. 1

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Treatment	96.27	2	48.14	2.25
Error	577.10	27	21.37	

* $p < .05$

inescapable shock thus replicating the findings of Jackson et al. (1978). No difference was found between the naive and restrained groups indicating that restraint during pretreatment had no effect on subsequent performance in the FR-2 shuttle task. The next experiment was designed to determine the effects of pretreating an animal with restraint in the presence of an animal receiving inescapable shock.

Experiment 2

Method

Subjects. Fifty male, Sprague-Dawley rats, 90 to 120 days of age were obtained from Ace Breeders, Inc., Boyertown, Pa. Subjects were individually housed on a 12 hour day/night cycle. Water and Purina Rat Chow were provided ad lib.

Apparatus. The apparatus was the same as that used in Exp. 1.

Procedure. The rats were randomly assigned to one of five groups: naive rats (N), rats which were restrained individually (RS), rats which were inescapably shocked individually (ISS), rats which were restrained in the presence of a shocked animal (RP), and rats which were inescapably shocked in the presence of a restrained animal (ISP).

Rats in the ISS and RS groups were pretreated following the pretreatment procedures used in Experiment 1. Animals in groups RP and ISP were pretreated in randomly assigned yoked pairs such that the animal in the ISP received inescapable shock and the animal in the RP group received identical pretreatment conditions without receiving shock. One rat from each of the two groups was placed in one of the two side-by-side tubes and the pair was

pretreated simultaneously. The remaining pretreatment regime was the same as in Experiment 1.

Animals were tested 24 hours following pretreatment in the shuttle box using 0.6 ma shock level following the testing procedure used in Experiment 1.

Results

The results of Experiment 2 are represented graphically in Figure 3. A 5 (Treatment) x 5 (Blocks) AOV with subjects nested under Treatments was performed on the mean latency to escape in blocks of 5 trials each for Blocks 2-6 (see Table V). There was a significant treatment effect ($F(4,45) = 3.222, p < .05$). Three planned comparisons were performed. These comparisons were designed as a 2 x 2 AOV to compare the following factors: 1) restraint vs inescapable shock; 2) proximity vs separateness; and 3) the interaction of these factors. The planned comparison, ψ_1 , comparing the restrained groups, RS and RP, to the inescapably shocked groups, ISP and ISS, yielded a highly significant difference $F(1,45) = 9.03, p < .01$, with the shocked animals showing longer latencies to escape. No significant difference, $F(1,45) < 1.0$, was found in the comparison ψ_2 of the animals pretreated in proximity (RP and ISP) to animals pretreated separately (RS and ISS). A comparison, ψ_3 , of the interaction of proximity and inescapable shock conditions (RP and ISS versus ISP and RS) resulted in no significant difference ($F(1,45) < 1.0$). Thus, pretreating animals in proximity had no effect on subsequent test performance. Pretreating animals with inescapable shock (groups ISS and ISP)

Figure 3: Mean Latencies to Escape
Over Blocks, Exp. 2

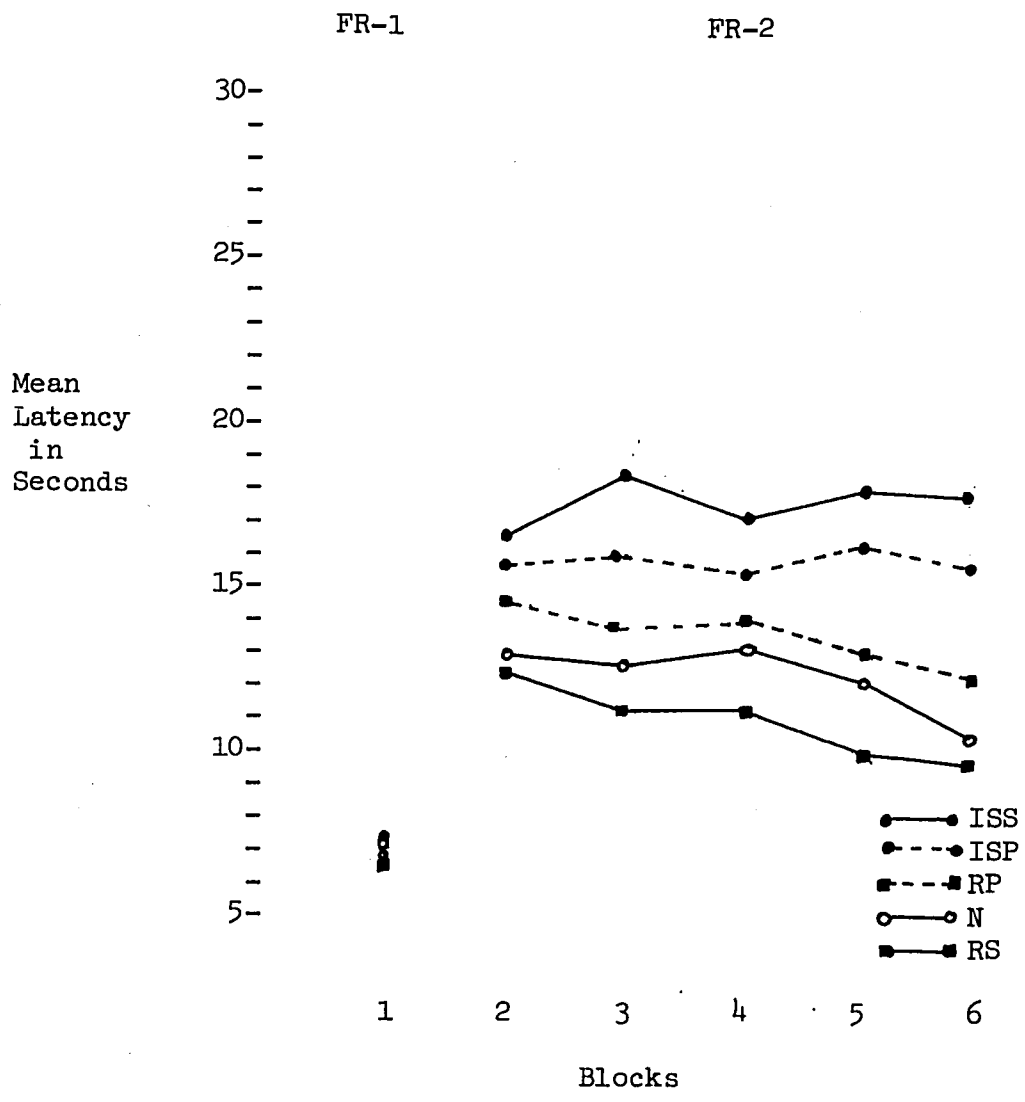


Table V: AOV on Mean Escape Latencies of
 Blocks 2-6 with Planned Comparisons on
 Treatment Effects, Exp. 2

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
A (Treatment)	15,291,864.66	4	3,822,966.17	3.18*
ψ_1 (RS+RP vs ISP+ISS)	10,848,202.52	1	10,848,202.52	9.03*
ψ_2 (RP+ISP vs RS+ISS)	59,422.83	1	59,422.83	0.05
ψ_3 (RP+ISS vs ISP+RS)	2,778,714.53	1	2,778,714.53	2.31
B (Blocks)	660,072.31	4	165,018.08	0.14
A x B	943,509.88	16	58,969.37	0.54
S (Subjects)	54,060,072.50	45	1,201,334.94	
BS	19,490,418.83	180	108,280.10	

* p < .05

resulted in longer latencies to escape than animals receiving either restraint (RP and RS) or no pretreatment (N). The performance of the naive control group did not differ from the performance of the restrained animals (RP and RS). There was no significant blocks effect, $F(4,45) < 1$; nor was there a significant interaction, $F(16,180) < 1$, of blocks with treatment.

The mean log latency for each block of 5 trials for blocks 2-6 is shown in Figure 4. The above AOV was also performed on the mean log latency for blocks of 5 trials. Results of this analysis were comparable to those cited above (see Table VI).

The number of failures to escape for each subject are given in Table VII. A one-way AOV on failures to escape yielded a highly significant difference, $F(4,45) = 43.55$, $p < .01$. Animals which were given inescapable shock failed to escape on more trials than did restrained and naive animals (see Table VIII).

Discussion

The findings of this study replicated the results found by Jackson, Maier, and Rapaport (1978) and also replicated the results found in my first experiment. An interference effect was found using .6 ma shock level in the test situation. However, the affect is the same whether pretreatment is single or simultaneous. There are several explanations for this finding beyond the possibility that proximity does not affect subsequent test performance. White noise was used to mask the noise of the equipment. The rats may not have been able to hear the vocalizations from the inescapably shocked animals. It may be that the olfactory

Figure 4: Mean Log Latencies to Escape
over Blocks, Exp. 2

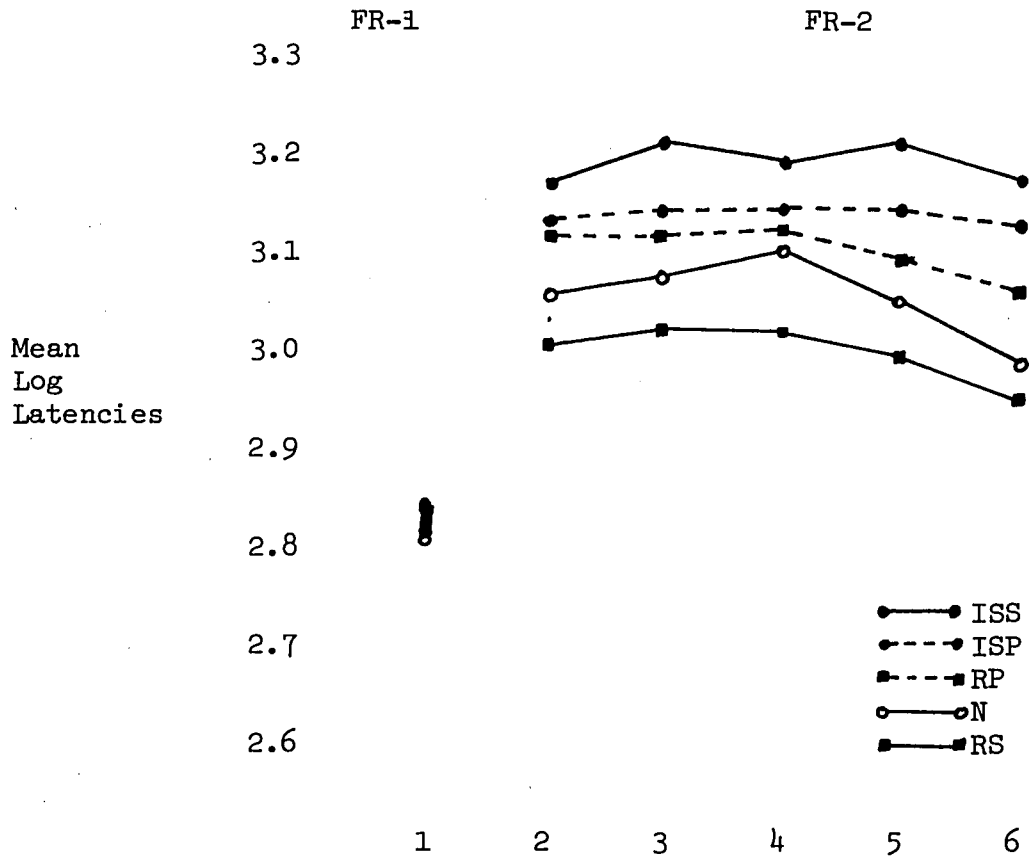


Table VI: AOV on Mean Log Latencies to Escape
over Blocks 2-6 with Planned Comparisons on
Treatment Effects, Exp. 2

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
A (Treatment)	1.08	4	0.27	3.222*
ψ_1 (RS+RP vs ISP+ISS)	0.7100	1	0.71	8.478*
ψ_2 (RP+ISP vs RS+ISS)	0.0283	1	0.0283	0.338
ψ_3 (RP+ISS vs ISP+RS)	0.2738	1	0.2738	3.267
B (Blocks)	0.1100	4	0.0275	1.0036
A x B	0.080	16	0.005	0.1825
S (Subjects)	3.77	45	0.0838	
B x S	4.93	180	0.0274	

Table VII: The Number of Failures to Escape, Exp. 2

<u>Treatment</u>	<u>Subject</u>										<u>Total</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	
ISS	10	1	0	0	0	0	2	11	10	0	34
ISP	0	0	0	0	6	0	0	0	11	4	21
RS	0	0	0	0	0	0	0	0	1	0	1
RP	1	0	1	0	0	1	0	0	0	0	3
N	0	0	0	1	0	0	0	0	0	0	1

Table VIII: AOV on the Number of Failures to Escape, Exp. 2

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Treatment	343.2	4	85.8	43.55*
Error	88.8	45	1.97	

* $p < .01$

cues were masked by other odors or were insufficient to produce an effect. The amount of stimulation may have been of insufficient duration to effect a change. In any case, it is doubtful that the effects of proximity can be used to explain failures to replicate the findings of the Maier, Albin, and Testa experiment (1973), such as the Seay and Vatz (1979) study. Seay and Vatz (1979) found no interference effect using 1.0 ma shock in the test situation and pretreatment, when rats were pretreated in yoked pairs. While rats have been found to discriminate the odors of stressed and unstressed rats (Valenta and Rigby, 1965), it seems stimulation from a stressed animal had no effect in the present experiment. The design used in the present experiment may have lacked power resulting in type II error. Increasing the number of subjects per group might produce significant results.

General Discussion

Both experiments were successful in demonstrating the interference effect as described by the learned helplessness hypothesis, i.e., animals which had received inescapable shock in pretreatment performed worse on the test task than the non-preshocked control animals. In these studies restrained animals did not differ from naive control animals in test performance. This appears to contradict the findings of Bracewell and Black (1974). In their experiment, animals were given differing levels of shock or no shock while restrained in a harness or while in an activity box. Animals were then tested on 10 trials of FR-1 shuttle escape training. The shock level in the test situation was 0.5 ma.

Animals pretreated under restrained conditions showed longer latencies to escape in shuttle training than animals which were pretreated in an activity box. The apparent contradiction of these findings with the results of my studies may be accounted for by differences in experimental procedures, especially differences in the test task. Differences in the test included the number of trials, the level of shock, the number of crossings, and the presence of a warning tone. The type of crossing differed in the test apparatus. The shuttle box used by Bracewell and Black contained a 4.5 cm hurdle which separated the 2 compartments. The apparatus used in my studies contained a wall with an archway opening to distinguish the two sections.

Another possible explanation for the discrepancy between the studies is the failure of Bracewell and Black (1974) to include a naive, i.e., a no pretreatment, control group. It would seem possible that restraint does not have a debilitating effect and that exposure to an activity box has a facilitory effect on subsequent learning behavior in a shuttle box. Findings by Maier, Albin, and Testa (1973) also indicate that restraint does not have a debilitating effect. No difference was found between rats restrained in tubes and naive-controls when tested on a FR-2 shuttle response using 1.0 ma shock level.

The studies of Bracewell and Black (1974) also contained a confounding which may also explain the differences in the findings. During pretreatment, animals which were shocked during restraint in the harness received shock through electrodes attached to the

two rear feet. Animals receiving shock in the activity box were shocked through a grid floor. Studies cited earlier indicate that such parameters of the pretreatment such as shock source, length of shock, and level of shock have differing effects on the later test performance. The confounding of the method of shock delivery with restraint and nonrestraint in the Bracewell and Black study casts serious doubts on their conclusions about the effects of restraint.

The role of restraint on later test performance under differing experimental conditions is still unclear. In order to more fully understand the contradictions surrounding the effects of restraint, further investigation of the effects of differing methods of shock delivery, e.g. the position of the electrodes, should be conducted. Another parameter of the pretreatment conditions which should be investigated is the possible facilitory effects of pretreatment in an activity box.

Another finding which was consistent in both of the present studies was the lack of a significant blocks effect. There was no improvement over trials in any of the treatment groups. There was a difference in the initial level of performance which persisted throughout the test interval, but there was no difference in the rate of learning. The theory of learned helplessness proposed by Maier and Seligman (1976) states that experience with uncontrollability causes a deficiency in the acquisition of knowledge about the contingency between the response and the outcome in the test situation. This difference in the rate of learning was not

demonstrated in my experiments.

While the results do provide some support for the learned helplessness hypothesis, alternate hypotheses can also explain the findings. Bracewell and Black (1974) have proposed a hypothesis stating that movement is punished during pretreatment. The response of "freezing" is acquired during pretreatment and then competes with the shuttle response in the test situation. A similar hypothesis, the learned inactivity theory, has been proposed by Glazer and Weiss (1976). According to this hypothesis, there is an initial, brief burst of activity by the animal during the pretreatment. The burst of activity tends to be shorter in duration than the length of the shock interval. After this initial activity, the animal becomes quiet and it is during this period of inactivity that shock termination occurs. The animal is reinforced for activity. This learning generalizes to the test situation. The preshocked animal is deficient in learning the escape task because it has learned the competing response of inactivity.

The two hypotheses cited above do not assume a deficit in learning. They assume only a performance deficit. The learning of a competing motor response creates a performance deficit but not necessarily a deficiency in learning the association between response and outcome.

Jackson, Maier, and Rapaport (1978) have addressed the problems introduced by the lack of difference in the rate of learning. They state that the lack of an acquisition curve in the FR-2 shuttle response occurs: 1) because of the effects of averaging over

blocks of trials and 2) because shuttle training with FR-1 trials followed by FR-2 trials shortens the latency to escape on the FR-2 trials. Maier and Jackson (1977) found that subjects not given FR-1 trials first showed much slower latency in the initial trials of the FR-2 shuttling. If the shuttling response was acquired, the animal showed learning over trials. However, since many subjects in both the inescapably shocked group and the restrained group failed to acquire the response of escaping, FR-1 trials are typically included. Considering these limitations, the FR-2 shuttle task seems inadequate to provide findings which can discriminate between the learned helplessness hypothesis and the alternative performance theories. In order to separate these hypotheses, test tasks must be devised which show not only a difference in the initial levels of performance but that can also show a difference in the rate of acquisition of the task between the inescapably shocked animals and the naive and restrained animals.

There are many questions which still surround the learned helplessness hypothesis. Further study is necessary before the debilitating effects of inescapable shock can be attributed to the learned helplessness hypothesis. Understanding of the interacting effects of the parameters of both the pretreatment and test condition is necessary. Much more clarification and research of this phenomenon is necessary before firm conclusions can be drawn and before extrapolations to human populations are made.

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Work Experience

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I have been a teaching assistant for the following courses: general experimental psychology, personality, clinical approaches, learning laboratory. My duties have included classroom teaching, supervising student research, and assisting in course planning.

1979-summer Center for Social Research
I worked as a research assistant interviewing parents, observing parent-child interactions, and testing children on their general cognitive ability.

1976-1978 Allen Products Company
I was employed as a psycho-biologist. In this position, I designed, analyzed, and supervised research to examine canine food preferences.

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Other Projects

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