THE EFFECT OF LEARNED HELPLESSNESS
ON GROUP PROBLEM SOLVING
EFFICIENCY

A THESIS
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APPALACHIAN STATE UNIVERSITY

IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE
MASTER OF ARTS
CLINICAL PSYCHOLOGY

BY
DAVID V. RICCIARDELLI

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Learned helplessness has been found to produce motivational deficit, disruption of the ability to learn, and emotional disturbance in individual human subjects. This study has attempted to begin investigation into the effect of learned helplessness on groups, specifically its effect on group problem solving efficiency. Ninety-six undergraduate psychology students were assigned to one of four conditions. Two conditions consisted of individual subjects and two conditions consisted of groups of three individuals. In one individual condition and one group condition subjects were administered four insoluble cognitive problems to induce learned helplessness; subjects in the other two conditions were administered four soluble cognitive problems. All subjects were then tested for problem solving efficiency on a cognitive task. No learned helplessness, in the form of reduced problem solving efficiency, was found to have been induced by the insoluble problem treatment. Consequently, no conclusions could be drawn regarding the effect of learned helplessness on group problem solving efficiency. Groups were found to be more efficient in problem solving than individuals, independent of treatment. The cognitively induced-cognitively measured method of studying learned helplessness in humans was found to have little utility as the method's validity to the learned helplessness model was not supported. Further research into this validity is called for and it is suggested that the number of trials of insoluble treatment may be a critical variable.
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in the success of the cognitively induced-cognitively measured method in producing learned helplessness.
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Introduction

Overmier and Seligman (1967) and Seligman and Maier (1967) have shown that dogs exposed to inescapable shock are later retarded in their learning of escape responses when escape is possible. Overmier and Seligman (1967) report that dogs given inescapable shock in a Pavlovian harness and later tested for escape in a two-way shuttle box behave initially in the same manner as dogs not pretreated with inescapable shock; i.e., they yelp, run around, and defecate, but they soon begin to cower in silence, passively taking the entire shock duration with no further attempts at escape. If these inescapable shock pretreated dogs did happen to cross a barrier and escape the shock they did not reliably learn this behavior as do normal (naive) dogs—they went back to passively accepting the shock. It was hypothesized that this interference with normal escape responding was a result of learning that shock termination was independent of responding. This learning of independence between outcome and instrumental response was termed "Learned Helplessness" (LH). The operation of independence between events has been proposed to be a third operation which will produce learning, the first two being the explicit contiguity between events (acquisition), and the explicit noncontiguity between events (extinction) (Seligman & Maier, 1967). Seligman (1975) defines the circumstances under which LH will occur: when the probability of an outcome is the same given the occurrence or nonoccurrence of any and all responses. This situation is termed
"uncontrollability" and is hypothesized as the single determinant of LH.

Seligman (1975) has organized an extensive review of the LH literature and describes the three manifestations of LH: a reduced motivation to initiate voluntary responding, a disruption of the ability to learn, and emotional disturbance. The reduced motivation to respond is seen in reduced escape responding. The disruption of the ability to learn is shown by dogs who escape once and fail to learn the response and repeat it. The emotional disturbance is an interpretation of a LH phenomenon called time course. Overmier and Seligman (1967) discovered that dogs tested for helplessness 48 hours after inescapable pretreatment did not exhibit a deficit in escape learning. However, Seligman and Maier (1967) found that if tested within 24 hours of inescapable pretreatment, dogs would exhibit helplessness and the interference effect would continue for up to 168 hours. Seligman suggests that one experience with uncontrollable trauma produces an emotional state which will dissipate in time. Any more immediate experiences with uncontrollable trauma produces a lasting emotional state.

Levis (1976) has examined Seligman's hypotheses concerning the development and measurement of the motivational, cognitive, and emotional components of the LH effect. He notes that the motivational deficit brought on by LH is defined by Seligman as a decrement in performance or a failure to learn. He questions whether decrement in performance can be equated with the concept of motivation without any attempt to separate it from reinforcement effects. Levis also
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argues that, as performance decrement or failure to learn is included in the definition of LH, using these as dependent measures to define the motivational effect of LH results in the development of a tautology.

Levis, in the same article, criticizes helplessness theory in its treatment of the hypothesized cognitive component of LH. Here, Levis reasons that the LH effect, and thus its cognitive component, has been shown to have "considerable" species generality, and as brain capacity of any species is not mentioned by LH theorists as a variable effecting the strength or even the appearance of LH, "We are left with the conclusion that both qualitatively and quantitatively the 'expectancy' mechanism of a fish or cockroach is equivalent to that of a man" (p. 56).

In his summary, Levis suggests that further definition of the emotional and cognitive components of the LH effect is needed, as are specified methods of measuring the process by which each develops so that the constructs of emotional and cognitive effects can be linked to antecedent conditions and circular reasoning avoided.

The phenomenon of LH has been experimentally produced in dogs (Overmier & Seligman, 1967; Seligman & Maier, 1967), fish (Padilla, Padilla, Ketterer & Giacalone, 1970), rats (Maier, Albin & Testa, 1974; Seligman, Rosellini & Kozak, 1974), and man (Hiroto & Seligman, 1974; Williams & Moffat, 1974; Thornton & Jacobs, 1971). LH has also been shown to generalize across situations; that is, from one inescapable pretreatment situation to a different testing situation, which may involve a different aversive stimulus. Maier, Anderson, and Lieberman (1972) found that inescapable pretreatment
with shock later sharply reduced the shock elicited aggression of rats. Rosellini and Seligman (1974) reported that rats given inescapable shock later responded significantly less often to escape a goal box where they had experienced frustrative nonreward of a previously rewarded response than did rats who had not received prior inescapable shock. It was hypothesized that generalization of LH had occurred from one aversive event, shock, to another, frustration. Hiroto and Seligman (1974) showed, using human subjects, that the LH phenomenon created by an instrumental task, button pressing to escape inescapable noise, generalized to a cognitive task, anagram solving, and that an insoluble discrimination problem (cognitive task) later produced LH behaviors in an instrumental escape situation.

The generalizability of LH has been found to be limited. Seligman and Beagley (1975), in a series of studies using rats as subjects, found that: (1) rats receiving inescapable shock as a pre-treatment did not perform significantly more poorly than non-shocked controls when tested for escape with a jumping response; and (2) while rats pretreated with inescapable shock exhibited more failures to escape and longer response latencies when tested with an FR-3 bar press escape response, no significant differences were found when rats similarly treated were tested for escape with an FR-1 schedule. When tested on an FR-2 schedule, rats pretreated with inescapable shock has "marginally more" (p. 537) failures and did not differ significantly in response latency than non-preshocked controls. The authors contended that the jumping response and FR-1 and FR-2 bar pressing responses are not adequately sensitive indexes
to measure the LH effect in rats. They go on to suggest that these responses (jumping, FR-1 and FR-2 bar pressing to escape) are not affected by prior inescapable shock because, "Inescapable shock interferes with the emission of highly voluntary, instrumental, responses, but not with reflexive responses" (p. 537). Levis (1976) has taken issue with Seligman and Beagly on this point. He suggests that LH researchers must come to grips with such questions as why, if LH only interferes with highly voluntary response, prior inescapable shock interferes with crossing a shuttlebox for some animals, or the removing of a hand from an electric grid by humans (used to measure LH effects by Hiroto, 1974), when these responses are effortless for these organisms, are readily performed, and quickly learned. Levis suggests that the procedural definition for producing LH could be made more precise by operationalizing task difficulty.

Researchers in the field of LH have been sensitive to the possibility of alternative hypotheses providing an explanation for the effects of inescapable aversive stimuli. Overmier and Seligman (1967) experimentally tested two possible alternative explanations—competing response and adaptation. The competing response hypothesis suggests that while experiencing inescapable shock, dogs learned a motor response which alleviated the shock; then, when placed in the shuttlebox this response occurred and was incompatible with barrier jumping, the shuttlebox escape response. Subjects were curarized while given inescapable shocks and it was found that they still failed in shuttlebox escape, unlike controls who had been curarized but given no inescapable shocks. These results disconfirmed the competing response
hypothesis. In another experiment shock intensity was varied and no differences were found in frequency of shuttlebox escape, thus dis-confirming the adaptation hypothesis.

The hypothesis that control over outcomes is the determinant of LH has been confirmed by Seligman and Maier (1967). It was found that dogs given control over shock termination (ability to escape) in a harness did not differ in subsequent escape learning in a shuttlebox from unshocked controls. However, dogs who were yoked for shock to the dogs able to escape shock in the harness, but who could not escape the shock, showed impaired escape learning later. The escape-possible dogs and the yoked dogs received the same intensity and duration of shock; only their control over shock termination was different, leading Seligman and Maier to suggest that differential learning had taken place—the yoked group learned that shock termination was independent of their responding, and the dogs who could escape by panel pressing learned that shock termination was correlated with their responding. It was suggested that the incentive for active responding was the expectation that responding would lead to shock termination and, "in the absence of such incentive, the probability that responding will be initiated decreases" (p. 4).

Hiroto (1974) provides additional evidence that LH and non-control of reinforcement are closely related. Using human subjects, Hiroto found that persons with external locus of control and those who had received a task instructional set of chance (that success or failure in the task would be due to chance) responded in ways parallel to those who had received prior inescapable noise. It was suggested
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that a single process may underlie externality, chance instructional set, and LH—the expectancy that responding and outcomes are independent.

The interference effect of LH has been experimentally eliminated in two ways—one proactive, one retroactive. Seligman and Maier (1967) found that dogs pretreated with escapable shock did not show any interference with normal escape learning after receiving inescapable shock. Thus, it was found that an escapable experience prevented dogs from suffering the effects of LH; this proactive procedure has come to be known as "immunization" in the helplessness literature (Seligman, 1975). Seligman, Maier and Geer (1968) describe a procedure which retroactively dissipated the effects of inescapable shock on canine subjects. Dogs were placed in a shuttle-box and called to by the experimenter from the other side (shock termination side) during CS-US interval and shock. This procedure began producing escape and avoidance responses in one out of four subjects. The other three subjects were forcibly moved over the barrier by use of leashes pulled by the experimenter. Eventually, all subjects began to escape and avoid. The dogs were forcibly exposed to the contingent relationship between barrier jumping and shock termination and the interference effect established by inescapable shock was gradually eliminated.

Seligman, Maier and Geer (1968) suggest that the LH phenomenon may be at the root of some psychopathological behaviors in man, particularly those characterized by passive acceptance of aversive events and which may have a time course similar to that found in LH.
Wallace's (1957, in Seligman, Maier and Geer, 1968) "disaster syndrome" is suggested as an example. Seligman (1975) has proposed a LH model of reactive depression. It is suggested that uncontrollable trauma first leads to a state resembling fear which will be replaced by the helpless state of trauma continues and continues to be uncontrollable. It is suggested that depression is the emotional concomitant of the helpless state. Miller and Seligman (1973) have tested the cognitive response to reinforcement of depressed and non-depressed humans and found that depressed subjects perceive reinforcement in a way concurrent with the predictions of the LH model; depressed subjects tend to view reinforcement as more response independent than nondepressed subjects when reinforcement is actually response dependent. Miller and Seligman (1975) produced data in support of the LH model of depression by showing parallel effects of the two. It was found that depressed subjects and nondepressed subjects receiving no inescapable aversive event differed on task performance in the same manner as did nondepressed subjects given inescapable and escapable pretreatment. Seligman (1975) proposes that the behavioral and cognitive manifestations of LH are parallel to the behavioral and cognitive manifestations of depression. He points out the similar reduced rate of responding (and incentive to respond), the similar time course and the learning deficit found in helpless subjects which he relates to the depressive "negative cognitive set."

The LH literature has, to this time, dealt only with its effects on individuals. In all LH studies to date, inescapable
aversive events have been administered to individuals who were then individually tested on various dependent measures. LH theory also has dealt exclusively with individuals in its discussion of all aspects of the phenomenon, its causation, manifestations, and interpretation. The question of the effect of member helplessness upon the efficiency or process of groups has not been studied experimentally or dealt with theoretically. The literature has indicated that problem solving in helpless individuals is not as efficient as problem solving in non-helpless individuals. No studies exist to indicate whether groups whose members have been exposed to LH inducing situations are less efficient at problem solving than groups whose members have not been exposed to such situations.

Drawing firm conclusions from the literature concerning the relative quality of individual versus group performance in normal subjects is difficult, as the tasks given the subjects, the statistical analyses used, the procedures used to create "groups", and the conclusions drawn have varied among researchers.

One type of task given to subjects in experiments designed to study individual versus group performance has been judgment, usually the estimating of lengths, weights, temperatures or numbers of objects. Many of these studies have utilized "statisticized" groups--the judgments of noninteracting individuals statistically grouped to create an artificial group without actual interaction among the members. One such study, done by Gordon (1924), consisted of individual subjects ranking a group of weights from lightest to heaviest, then correlating each subject's ranking with the true order of the
weights. Using two hundred subjects, the mean correlation was .41. Gordon then randomly selected and averaged groups of five individual rankings, producing forty "statisticized" group rankings. These rankings correlated .68 with the true order of the weights. By grouping 10, 20, and 50 individual rankings, Gordon similarly produced 20, 10, and four "statisticized" groups. The four groups of 50 individual judgments correlated .94 with the true ranks of the weights. Gordon concluded that group judgment was superior to individual judgment overall. Her finding that some individuals' rankings correlated at or above .94 with the true ranks of the weights led her to conclude that judgment by the "best member" was equal to the judgment of the group. Similar superiority in judgment by "statisticized" groups over individuals has been found in studies using as tasks the judgment of weight and number of buckshot (Bruce, 1935-36), the estimate of temperature in a classroom (Knight, 1921; in Davis, 1969), and even anticipating the date of victory in Europe, World War II (Klugman, 1947). In 1932, Stroop pointed out that comparing individual and "statisticized" group judgments did not demonstrate any social psychological principles of group process, but that it only demonstrated the statistical principle that error variance is reduced by the operation of grouping as was done in these studies.

Learning tasks have been utilized by some researchers studying the performance differences between groups and individuals. Perlmutter and DeMontmollin (1952), for example, had subjects learn lists of two syllable nonsense words. Half the subjects studied the list first as individuals, then in interacting, face to face
groups of three, the other subjects studied in a group first, then as individuals. Half of the subjects in each of the above conditions were tested as groups, half as individuals, creating, in all, four conditions. Results showed that when tested in groups, prior experience (group or individual) produced no significant differences in number of nonsense words correctly recalled. However, when tested as individuals, prior group experience produced significantly greater recall than did prior individual experience. Group and individual learning curves were computed and the authors stated that the group learning curve "... is a smooth curve that resembles the curve of individual learning, but is more positively accelerated" (p. 267). Perlmutter and DeMontmollin also found that while the groups were superior in recall to the average individual, there was no significant difference found between group recall and the average recall of the best individuals.

Gurnee (1937) conducted a maze learning study in which half of the subjects worked as individuals and half as groups. Group decisions were made at each step of the maze by majority vote or acclimation without discussion. (This is referred to in the literature as a "climatized" group.) Gurnee found that groups made significantly fewer errors and completed a perfect trial sooner than did individuals.

As part of his 1937 study and his 1939 study of similar design and procedure to the 1937 research, but involving the learning of pairs of two digit numbers, Gurnee tested all subjects as individuals on a final trial. He found, in 1937, no significant difference on this final trial between individuals who had had previous group
experience and individuals with previous experience learning as individuals. In contrast, in 1939, results showed that those individuals who had worked in groups did significantly better than those who had worked alone. Thus, one of Gurnee's studies (1939) supported Perlmutter and DeMontmollin's (1952) conclusions that group experience enhances learning, and one of his studies (1937) contradicted those conclusions. These results have led Davis (1969) to state that, "From the limited experimental data on group learning it appears that when a group-individual difference exists at all, groups tend to make fewer errors, and sometimes reach the learning criterion in a shorter time" (p. 36).

Some researchers have studied individual-group product differences using problem solving tasks. A study in this area which is considered a classic was that of Shaw (1932), in which individuals and ad hoc (face-to-face) groups solved riddles requiring several steps, constructed meaningful (in a provided context) sentences from a list of words, and determined the minimum mileage necessary for a vehicle to travel, given a series of tasks to perform. Shaw found that groups reached a significantly greater number of correct conclusions than did individuals when the total number of solutions for all problems was computed. Lorge, Fox, Davitz, and Brenner (1958), however, have taken issue with Shaw's group superiority conclusion. They point out that when group and individual solutions of the same problem within Shaw's experiment are compared for some problems, the number of correct solutions is not significantly different. Lorge, et al., in the same review hypothesize, from the fact that in Shaw's study two
groups solved no problems and three groups got eight solutions, that
the groups were able to correctly solve a problem only if an indivi-
dual within that group could solve it alone. Davis (1969) and
Worchel and Cooper (1976) have agreed that an overview of the problem
solving literature reveals, despite some contradictory evidence, that
groups are usually superior to individuals in terms of number of
correct solutions, number of errors, and time per answer.

The nature of the group problem solving process has been a
matter of disagreement among theorists and researchers. Watson (1928)
and Marquart (1955) have held that group efficiency in problem solving
is due to the efficiency of the superior individual of the group,
whereas Shaw (1932), Barnlund (1959), and Taylor and Faust (1952)
contend that groups are superior in their problem solving abilities to
their most able member. Shaw's work led her to conclude that the
main factor differentiating group from individual problem solving
efficiency was the rejection of incorrect suggestions and the checking
of errors in groups. Barnlund (1959) taped group discussions and
interviewed his subjects following problem solving and concluded that
several factors were involved which differentiated group process from
the individual process, including: (a) membership in groups increased
subjects' interest in successful task completion; (b) group membership
caus ed subjects to critically examine their own ideas before communi-
cating them to the group, resulting in fewer erroneous ideas considered
in groups; (c) a greater number of viewpoints were brought forth and
examined in groups; and (d) group membership caused discussion to be
more objective as individual prejudices were likely to be challenged
by another group member. Lorge, et al. (1958) have suggested that, "Group interaction may inhibit the fullest potential contribution of its members" (p. 354), citing a study (Watson, 1928) in which the sum of the products of the individuals in a group were found to be significantly larger than the product of a group comprised of the same individuals.

The absence of data bearing upon the effect of LH on groups and the inability of group problem solving and process data to adequately predict efficiency in groups, even with normal subjects, creates a demand for preliminary investigation into the effect of LH on groups. This study has attempted to begin to investigate that effect. The following specific issues were explored:

1. Do groups whose members have been exposed to a LH inducing treatment exhibit a difference in problem solving efficiency from groups whose members have not been exposed to such a treatment?

2. What is the relative effect of LH on individual versus group problem solving efficiency? Is the magnitude of LH phenomena larger in groups than in individuals on problem solving tasks?

Concerning question 1, it cannot be automatically assumed that the demonstrated deficit in problem solving in helpless individuals will generalize to groups. The facilitative effect of group decision making may be a more powerful one than the deficit-producing effect of LH, resulting in similar problem solving efficiency between groups with helpless members and those with non-helpless members. On the other hand, the combining of helpless individuals into a group to solve problems by consensus may result in an additive deficit effect,
creating significantly lowered problem solving efficiency in relation to groups of non-helpless subjects.

A definite hypothesis concerning question 2 above was made for this experiment. Kelley and Thibaut (1954), following an exhaustive review of the group problem solving and process literature, state that group and individual problem solving processes are not replicas of each other, that "... group problem solving involves individual problem solving, but much more (Kelley and Thibaut's italics). The 'extra'... refers to the simple fact that the thinking done by a group member occurs in a different context from that done by the 'isolated' thinker. Because it occurs in communication and interaction with other persons, the products of the group members' thought may be unpredictable from the observation of solutions obtained in isolation" (p. 737). This statement leads to the hypothesis that LH and the group process will in some way interact, resulting in an effect that is different (either attenuated or exaggerated) from the effect that it has upon individuals.

Some extension of earlier research was also carried out. Specifically, more evidence was gathered on the question of individual versus group problem solving efficiency, and on the cognitive method of inducing LH.
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Method

Design

A 2 x 2 factorial design was used. One factor was type of problem administered to subjects on the first of two tasks that the subjects were required to complete. The two levels of this factor were soluble problems versus insoluble problems. The second factor was the setting on task two, i.e., individual subjects versus groups of three subjects. See Table 1 for a representation of the design.

Subjects

Subjects were ninety-six student volunteers solicited from undergraduate psychology classes at Appalachian State University.

Materials

An insoluble cognitive problem satisfies the formal requirements of "inescapability", as reinforcement (correct or incorrect) is independent of responding (Seligman, 1973). Such insoluble cognitive problems will be used to produce helplessness in this study.

Soluble and insoluble problems were administered using a series of four dimensional stimulus patterns of the type used by Levine (1971), with each pattern photographed in black onto a 5 x 8 white background, glossy finish print. Each of the four dimensions of the stimulus patterns had two associated values: (a) letter (A or T); (b) size of letter (large or small); (c) type of border around letter (square or triangle); and (d) number of borders around letter (one or two). Every stimulus pattern had in it one
Table 1

Design

Variable A

<table>
<thead>
<tr>
<th>Variable B</th>
<th>Grouped (G)</th>
<th>Individual (I)</th>
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<tbody>
<tr>
<td>Soluble Problem (SP)</td>
<td>G-SP</td>
<td>I-SP</td>
</tr>
<tr>
<td>Insoluble Problem (IP)</td>
<td>G-IP</td>
<td>I-IP</td>
</tr>
</tbody>
</table>
value of each dimension. See Appendix A for sample stimulus patterns.

One trial of stimulus pattern presentations consisted of the value of each dimension once. Each value of each dimension was paired with each value of all other dimensions over trials so that over four trials each value was paired with each other value once and only once.

The presentation of soluble or insoluble problems was the first task required of subjects. This task will be referred to as "Task I."

The dependent measure was number of correct answers to the Advanced Progressive Matrices, Set II, 1962 Revision (John C. Raven, 1962). The matrices will be referred to as "Task II."

Procedure

Subjects were randomly assigned to one of four conditions, two of which had as subjects on Task II three-member groups, and two of which had individuals as subjects. Twelve subjects were assigned to each condition. In each of the individual conditions half the subjects were males and half females. In the grouped conditions, half the groups were comprised of two females and one male, and half the groups of two males and a female. Half of the experimentors were male and half were female. Sex of subject and experimenter were counterbalanced so that half of the subjects had experimentors of the same sex and half had opposite sex experimentors.

Task I problems were administered to all subjects individually. The setting of groups versus individuals occurred on
Task II only.

Subjects in one grouped condition and subjects in one individual condition received insoluble problems on Task I (G-IP and I-IP conditions, respectively); the other grouped condition and individual condition subjects received soluble problems on Task I (G-SP and I-SP conditions, respectively).

All subjects were administered Task I problems by graduate or upper level undergraduate students of Appalachian State University between 8:00 a.m. and 5:00 p.m. in offices of Smith-Wright Hall of Appalachian State University. Each subject and experimenter were isolated in an office where they were seated, facing each other across a desk. Stimulus patterns comprising the first trial of the first problem were presented on the desk to the subject by the experimenter. Instructions were then read to the subject. See Appendix B for instructions to subjects. Subjects were to indicate by pointing which stimulus pattern in each trial contained the "correct" value of the "correct" dimension after being told that the experimenter had secretly and arbitrarily chosen one value to be the correct one, to remain the same until the subject was told otherwise. Subjects were given verbal feedback of "correct" or "incorrect" on each trial of each problem, supposedly depending on whether or not their choice of stimulus patterns indeed did contain the correct value chosen by the experimenter. Ten seconds were allowed for subjects to choose a stimulus pattern on each trial. After ten seconds the subject was asked for his answer. A problem consisted of five trials. At the end of the fifth trial subjects were asked which value they believed
had been the correct value for that problem. These answers were recorded by the experimenter and subjects were told that they were correct or incorrect, supposedly depending on whether they had ascertained the correct value. If, after problem #1, a subject gave two values for an answer or otherwise indicated nonunderstanding of what was expected of him or her, a rereading of the instructions was carried out.

Four problems were administered to each subject with the subject being informed between problems that a new problem was beginning and that the "correct" value may remain the same or be changed by the experimenter.

In the G-SP and I-SP conditions once value of one dimension was actually chosen by the experimentors to be correct and accurate feedback was given to the subjects as to the correctness or incorrectness of their responses. In the G-IP and I-IP conditions one value was chosen by the experimenter to be correct, rather, subjects were given feedback from the experimenter of "correct" and "incorrect" on each trial according to a prearranged schedule which was consistent for all subjects in these conditions. See Appendix B for schedule of feedback to subjects in G-IP and I-IP conditions. All subjects in these two conditions were told that their final answer for each of the four problems was incorrect.

Following the final problem on Task I every subject was told to remain where he or she was, that there was one more task to be completed. Experimentors then left the room. All subjects next were administered, without delay, the Advanced Progressive Matrices,
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Set II (Raven, 1962) (Task II). Subjects in the I-SP and I-IP conditions were administered this measure individually in the same room in which treatment problems were administered. Subjects in the G-IP and G-SP conditions were gathered in one room and seated at a table so that two members of the group were side by side and the other directly across from them. All subjects were provided with a copy of the Advanced Progressive Matrices, Set II, booklet containing thirty-six problems, an answer sheet, and one writing instrument. All subjects were administered the Matrices by the same male experimenter. A forty-minute time limit was set for completion of the Matrices for all subjects.

The organization and controlled processes of experimental groups have differed in the group problem solving literature. In this study group members were to interact on a face-to-face basis, discuss the problems before them, and render a consensus opinion. See Appendix C for instructions for the Matrices given to all subjects.

Debriefing

Following collection of the answer sheets all subjects were debriefed. Subjects were explained briefly the nature of the experiment and what questions it hoped to answer. They were told how the treatment they had received differed from the treatment other subjects had received. Subjects who had been given insoluble problems were informed about the impossible nature of the task. It was emphasized to these subjects that their lack of success was in no way due to a lack of ability on their part. Many subjects who had been
administered insoluble problems expressed relief during debriefing. No subjects expressed or exhibited distress. Subjects were given an opportunity to ask questions and all questions were answered to the best of the experimenter's ability. It is believed that this debriefing eliminated, as far as possible, possible harmful psychological after effects in the subjects, as required by APA ethical standards (1968).
Results

The results were analyzed using a 2 x 2 analysis of variance. The two factors were type of Task I problem, soluble versus insoluble, and the setting of Task II, individual versus group. The dependent variable was the number of correct responses on Task II, the Raven Progressive Matrices, Set II. Figure 2 shows the mean number of correct responses on the Matrices for all four conditions.

A significant difference was found to exist in the number of correct responses on the Matrices between groups and individuals, $F_1, (1,44) = 9.77, p < .01$. Figure 1 shows that groups provided the greater number of correct responses. The mean number correct for groups was 23.84 (SD = 3.56), while the mean number correct for individuals was 20.34 (SD = 3.98).

No significant difference in number of correct responses on the Matrices was found to exist between those administered soluble problems and those administered insoluble problems on Task I, $F_1, (1,44) = 0.20, p > .05$. The mean number correct on the Matrices for those receiving soluble problems on Task I was 22.34 (SD = 4.25), compared with a mean number correct of 21.84 (SD = 4.04) for those receiving insoluble problems. This finding indicates that LH was not induced by the cognitive method used in this study.

No significant interaction effect was measured, $F_1, (1,44) = 1.42, p > .05$, indicating that groups provided a significantly greater number of correct responses on the Task II dependent measure independent of type of Task I problem, soluble or insoluble. No interaction effect being found also indicates that the lack of
Figure 1. Mean number correct on Raven Progressive Matrices, Set II, for soluble and insoluble conditions over groups and individuals.
measured difference in mean number of correct responses on the Matrices between those administered soluble versus insoluble problems on Task I was constant over groups and individuals.
Discussion

This study was unable to replicate Hiroto and Seligman's (1974) finding of cognitively induced LH measured by performance on a cognitive task. In the Hiroto and Seligman experiment, no LH was found on a cognitive test (anagram solving) when three insoluble problems were administered, but LH was found when four insoluble treatment problems are attempted by the subjects. In this study, four problems were administered and no LH was found.

The results fail to provide evidence that groups whose members have been exposed to a LH inducing treatment differ in problem solving efficiency from groups whose members have not been exposed to such a treatment. No evidence is provided that the difference in treatment conditions differentially affected the performance of groups versus individuals. Therefore, no evidence was found to support a conclusion that LH itself does so. The surprising finding was that LH was not produced in individuals or groups.

The type of insoluble problem used in this study is very much like that used by Hiroto and Seligman in 1974. Nevertheless, some differences in method exist between the two experiments which could account for the difference in results. First, the dependent measures differed. Hiroto and Seligman tested their subjects by having them solve anagrams, all of which were five letters in length, and all scrambled in the same order so that subjects could perceive the pattern of the scramble and, thus, make use of an easy formula for solving the problems. In this study a set of problems were used which increased the complexity and, therefore, difficulty as the test
progressed, providing for the subjects an initial success experience which could have retroactively interfered with any learning of response-outcome noncontiguity which may have taken place during treatment. LH is a phenomenon which may occur with some cognitive tasks, but, it appears, only with a limited set of cognitive tasks. A characteristic or set of characteristics which may identify those cognitive responses which can and cannot induce LH has yet to be proposed. Further definition of the conditions necessary to induce LH is needed.

Secondly, each insoluble problem administered as treatment in the Hiroto and Seligman study consisted of ten trials, resulting in forty trials over four problems; the problems used in this study consisted of five trials each, resulting in twenty trials over four problems. As the 1974 study found that four problems were sufficient to produce LH but three were not, it is possible that the number of trials is a more relevant variable in producing LH in this manner than is the number of problems. A third difference, and an important methodological one, between the two studies was created by the practice in the 1974 research of Hiroto and Seligman of rejecting as subjects those who failed to solve any one of the soluble treatment problems, and the nonuse of that practice in this study. Hiroto and Seligman introduced a confound to their results by this means. They rejected subjects who were unable to solve the soluble problems; thus the equivalency produced by random assignment was lost. Their comparison on the dependent measure was between a group of learners (those administered soluble problems) and a group of learners plus
non-learners (those administered insoluble problems).

The central issue which was studied in this research, how LH effects interact with group effects, has been left unanswered. The issue remains an important one, however, as LH has been presented as a theoretical model of depression and any insight into variables affecting LH would thus become legitimate variables to be studied in relation to depression.

This experiment has provided some relevant information pertinent to future research on LH in humans. The cognitively induced-cognitively measured method of studying LH provides a less than useful design at this time in that its validity to the LH model has been shown to be weak. This validity may yet become firmly established through further research which must address itself to the issues of whether there are variables within the set of cognitive tasks which control their ability to induce LH, such as the type of tasks and the quantity of noncontingent aversive stimuli necessary to produce a LH effect.

The finding of group superiority over individual performance in problem solving efficiency is further confirmation of the phenomenon and generalizability of group superiority in problem solving which has generally been reported in the literature.
References


Bruce, R. S. Group judgments in the fields of lifted weights and visual discrimination. *Journal of Psychology*, 1935-36, 1, 117-121.


Gurnee, H. A. The effect of collective learning upon the individual participants. *Journal of Abnormal and Social Psychology*, 1939, 34, 529-532.


Stroop, J. B. Is the judgment of the group better than that of the average member of the group? *Journal of Experimental Psychology*, 1932, 15, 550-560.


APPENDIX A

Sample Stimulus Patterns
Learned Helplessness

34
Learned Helplessness

[Diagram of a square and a triangle with letters A and T]
Learned Helplessness

37
Learned Helplessness
APPENDIX B

Instructions to Subjects for Treatment Problems

I. Before seeing subjects:
   A. Be sure you have:
      1. These instructions
      2. A complete set of stimulus cards
      3. A notebook to record responses
   B. See David R. to determine in which group your subject belongs and which room you will be using.
   C. Turn on the lights in the testing room and position a desk and chairs so that you will be sitting directly across the table from the subject and facing him (her).
   D. Arrange your stimulus cards so that on each trial of each problem every stimulus dimension is represented.

II. When the subject comes:
   A. Greet the subject quietly. Ask the subject to be seated and sit opposite him (her). Be as impersonal as possible without being unfriendly.
   B. Read instructions as they are printed.

INSTRUCTIONS

To all subjects:

"I would like you to look at these cards." (Place the four cards which make up the first trial in front of the subject, the
letter facing the subject). "Each has on it one stimulus pattern, the stimulus patterns are composed of four dimensions. These dimensions are: the letter, the size of the letter, the type of border, and the number of borders. Each dimension has two values. For the letter the values are "A" or "T", for size of letter, large or small, for type of border, square or triangle, and for number of borders, one or two." (While reading the above point out the dimension values to the subject.) "Each stimulus pattern, or card, has only one value for each dimension. Do you understand what the values are?" (Have the subjects point out the dimensions and their values. If he or she cannot do this repeat instructions from, "These dimensions are . . . .")

"I am going to show you several series of cards like these. For each series I am going to show you one value has been chosen, by me, arbitrarily, to be the correct one. For example, the large "T", or the single triangle, or the double square border. For each series of cards you are to choose the stimulus pattern, or card, which you think contains the correct dimension value. You will be told whether your choice is correct or incorrect. Then another series of cards will be shown to you and you will choose again and be told whether that choice is correct or incorrect. In this way, after a few series of cards you should be able to tell what the correct value is. The correct value will remain the same until I tell you. Try to find out what the correct value is so that you
can choose correctly between the stimulus patterns. At the end of each problem I will ask you what the correct value is. Do you understand the task? Any questions?"

"We are now going to start a new problem, the correct stimulus value this time may be the same as in the last problem or it may be different, again, I will tell you if your answers are correct or incorrect."

Present the trials to the subject.

For SP-I and SP-G subjects you are to choose a value for each problem and give accurate correct-incorrect feedback.

For IP-I and IP-G subjects do not choose a value. Give feedback according to the following schedule:

- Problem 1: I-C-C-I-I
- Problem 2: I-I-C-C-I
- Problem 3: C-I-I-C-C
- Problem 4: C-I-C-I-I

Allow ten seconds for each response. After ten seconds ask for the subject's answer.

At the end of each problem ask all subjects what the correct value is. Write down their answer in your notebook.

At the end of the fourth problem say to all subjects: "There will be one more task for you to complete in this experiment."
APPENDIX C

Instructions to Subjects For Raven
Progressive Matrices, Set II

This test consists of 36 problems, one problem per page, all of which are set up in the same way. At the top of each page is a box which contains a pattern. There is one piece missing from each pattern (point to empty space). There are eight pieces at the bottom of each page, one of which fits into the missing piece to complete the pattern correctly, both across and down. You are to choose which piece at the bottom of the page completes the pattern correctly and write the number of that piece on your answer sheet.

To group subjects only:

I want you to work together on this test and give only one answer for each problem--a group answer. In other words, I would like you to come to a consensus, a group agreement, for each test item.

To all subjects:

You will be given 40 minutes to work on the test. I will keep your time for you while I wait outside.
APPENDIX D

Answer Sheet for Raven Progressive Matrices, Set II

1. ____  
2. ____  
3. ____  
4. ____  
5. ____  
6. ____  
7. ____  
8. ____  
9. ____  
10. ____  
11. ____  
12. ____  
13. ____  
14. ____  
15. ____  
16. ____  
17. ____  
18. ____  
19. ____  
20. ____  
21. ____  
22. ____  
23. ____  
24. ____  
25. ____  
26. ____  
27. ____  
28. ____  
29. ____  
30. ____  
31. ____  
32. ____  
33. ____  
34. ____  
35. ____  
36. ____
APPENDIX E

Number Correct Responses on Raven Progressive Matrices,
Set II For Each Subject

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### Summary of the Analysis of Variance

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