Journal of Experimental Psychology

VOL. 102, NO. 2 FEBRUARY 1974

LOCUS OF CONTROL AND LEARNED HELPLESSNESS [1]

DONALD S. HIROTO [2]

University of Portland

Failure to escape, the defining characteristic of learned helplessness, was investigated with perceived and instructed locus of control *S*s in a learned-helplessness paradigm. Three groups, equally divided between internals and externals and counterbalanced for sex, received different treatments with an aversive tone prior to the testing for helplessness. The first group could neither escape nor avoid an aversive tone, the second group could escape the tone, and the third group was not exposed to the treatment. Eighteen escape–avoidance trials followed, using a human analogue to an animal shuttle box, in which *S*s received an instructional set describing the task as skill or chance determined. In addition to a complete replication of learned helplessness in man, externals were significantly more helpless than internals, and chance-set *S*s were more helpless than skill-set *S*s. Since uncontrollability of noise, externality, and chance instructional set all impaired escape–avoidance in parallel ways, it was speculated that a common state may underlie all 3 dimensions—expectancy that responding and reinforcement are independent.

Overmier and Seligman (1967) and Seligman and Maier (1967) demonstrated a profound interference with shuttle box escape–avoidance behavior of dogs given prior inescapable electric shock. They hypothesized that dogs given inescapable shock failed to escape later because they had learned that shock termination was independent of responding. This learning was hypothesized to interfere with later acquisition of escape because the incentive for initiating responses had been lowered, and the ability to associate responding and shock had been proactively impaired. "Learned helplessness" was chosen as the descriptive label for the phenomenon and also as the hypothesized process by which learning of independence between responding and reinforcement interferes with future responding.

A social-learning construct, internal–external control of reinforcement (Lefcourt, 1966; Rotter, 1966), seems conceptually similar to the hypothesized learned-helplessness process. The internal–external locus of control refers to the degree to which an individual perceives that reinforcements are contingent on his actions. An "internal" tends to perceive reinforcement as a consequence of his responses and to attribute the reinforcement contingencies to his skills and abilities; an "external" tends to perceive reinforcements as un-

[1] This article is based on a dissertation submitted to the University of Portland in partial fulfillment of the requirements for the PhD degree. The author thanks the dissertation chairman, William H. James, and the members of the committee, John R. Donoghue, George S. Larimer, B. Kent Parker, and Philip Van Bruggen. Special acknowledgments go to Martin E. P. Seligman for his comments and suggestions in the preparation of this report.

[2] Requests for reprints should be sent to Donald S. Hiroto, who is now at the Counseling Center, California Polytechnic State University, San Luis Obispo, California 93401.

related, i.e., independent of his behavior, and to attribute outcomes to luck, chance, or another person.

Learned helplessness and the internal–external construct both view control of reinforcement as a crucial variable. Maier, Seligman, and Solomon (1969) and Seligman, Maier, and Solomon (1971) emphasized 2 consequences of uncontrollable events on later learning: dogs, cats, mice, goldfish, and probably rats are (*a*) slower to initiate responses to escape, and (*b*) retarded at learning that responding controls trauma. Reviews of the literature on the internal–external construct (Joe, 1971; Lefcourt, 1966, 1972; Rotter, 1966) report that external *S*s are slower than internal *S*s in learning a variety of tasks. Apparently, lack of control over reinforcement, whether real or perceived, impairs a variety of species on a variety of tasks.

A major purpose of the present study was to investigate learned helplessness in internal and external *S*s. It was predicted that *S*s given inescapable/unavoidable pretreatments would show retarded acquisition and performance measures relative to *S*s without such pretreatments, and that such retardation might be a function of externality. Previous studies with dogs as well as humans (Racinskas, 1971; Thornton & Jacobs, 1971) used electric shock as the aversive stimulus. The present study used a loud tone rather than shock as the aversive stimulus in an attempt to extend the generality of learned helplessness to a new noxious event (see also Braud, Wepmann, & Russo, 1969).

The concept of control is central to both helplessness and internal–external studies, but the definitions of the term differ. In helplessness, control refers to *E* actually arranging the events as independent of responding; while internal–external construct studies refer to perceptions of the actual events. In view of the differing reference bases of control, we introduced an instructional set to determine if perceptual set interacted with helplessness. It was predicted that *S*s pretreated with inescapable noise and then given escape–avoidance trials under an instructional set of chance would be more helpless than under skill instructions. This parallels our prediction that externals would be more helpless than internals following inescapable noise.

Method

Subjects. All *S*s were introductory psychology students at the University of Portland who were administered the Internal–External form of James's Dekalb Survey Tests: Student Opinion Survey at least 8 wk. prior to the study. The James scale is based on the early work of Rotter (1954) and Phares (1955) and provides a measure of the extent to which *S* perceives reinforcements as being contingent on his actions or as resulting from external factors. The scale is a Likert-type instrument with 4 response choices for each of the 30 critical and 30 filler items.

A total of 96 *S*s with internal–external scores at least 1 *SD* above or below the mean were randomly assigned to 1 of the 3 treatment groups and 1 of the 2 instructional-set groups, with each cell counterbalanced for sex and locus of control.

Apparatus. Two distinctively different units were located on different tables. The apparatus in the pretreatment was a red spring-loaded button housed in a 1-in.-sq. wooden base. In the escape condition the button was connected to relays controlling the termination of the aversive stimulus, while in the inescapable condition the button was independent of the aversive-stimulus termination.

The apparatus in the phase testing for helplessness was a modified Manipulandum Type S task originally designed by Turner and Solomon (1962) as a human analogue to the 2-way shuttle box used in animal learned-helplessness studies. The manipulandum was 24 × 5 × 6 in., with a 3-in. knob protruding from the top. The knob slid on a 19 × ¼ in. straight channel on the cover of the box. Attached to the knob on the underside of the channel was a 2½-in. wooden disk. The escape–avoidance response was sliding the knob to either side of the manipulandum so that the wooden disk made contact with a hidden microswitch. Only 1 of the microswitches on any trial would terminate the stimulus, so that on the next trial, the alternate switch would terminate the stimulus.

The aversive stimulus was a 3,000-Hz. tone pretaped on a Sony tape recorder and presented to *S* through North American earphones. A Beltone 15-C Audiometer recently calibrated to standards set by the International Organization for Standardization measured the stimulus at 110 db. All response variables were measured by standard (1/100-sec.) timers and counters located in an adjacent room separated by a 1-way mirror.

Procedure. Each *S* was escorted into the experimental room and informed that the study involved listening to "some loud noise which has been judged to be somewhat unpleasant but not harmful or dangerous to you." A 3-sec. sample of the 3,000-

Hz. tone was first presented, then each *S* was assigned to 1 of the 12 cells from the $3 \times 2 \times 2$ (Treatments × Instructional Sets × Locus of Control) factorial combination.

The treatment groups included (*a*) escape (E) *S*s, who received unavoidable/escapable pretreatments, (*b*) inescapable (Ē) *S*s, who received unavoidable/inescapable pretreatments, and (*c*) no-pretreatment (NP) *S*s who received only the test trials with the manipulandum.

Tape-recorded instructions for pretreated *S*s were an expanded and modified version which Turner and Solomon (1962) described as adequate:

> Listen to these instructions carefully. I am not allowed to give you additional information other than what is given to you now. So please listen and do not ask me any questions. From time to time a loud tone will appear. When that tone comes on, there is something you can do to stop it.

The pretreatments consisted of 30 unsignaled 5-sec. trials with the 3,000-Hz. tone. The intertrial interval (ITI) ranged 15–25 sec., with a 20-sec. mean ITI. At the conclusion of the pretreatments, *S* rated the aversiveness of the auditory stimulus.

The testing for helplessness was conducted with the shuttle box manipulandum at a different table but within the same experimental room. The NP *S*s were given the preexperimental instructions and a 3-sec. sample of the tone prior to being seated at the table. The manipulandum was covered until *S* received 1 of the 2 instructional sets describing the task. The first half of the taped instructions was identical and were presented to all *S*s:

> You will be given some trials in which a relatively loud tone will be presented to you at different intervals. Now here is the important part, and I want you to listen carefully. Whenever you hear the tone come on there is something you can do to stop it.

The second half of the instructions varied according to the particular set. The "skill" instructions emphasized direct control over the 3,000-Hz. tone:

> What you do is really up to you to figure out. There is a solution to the problem, and if you figure it out the tone will stop. Therefore, the amount of unpleasantness you receive is dependent on your skills and abilities to find the solution to the problem. You are potentially in control of the situation.

The "chance" instructions emphasized that *S* had no direct control over the stimulus and that chance factors predicted success:

> But I will be controlling the solution to the problem. In other words, the way to stop the tone is really up to me. As far as you are concerned this is a guessing game. When you guess correctly, the tone will automatically stop. But if your guess is wrong the tone stays on.

After the instructions, *S* uncovered the manipulandum. The knob was always located at the midpoint of the manipulandum, so that *S* could slide the knob equidistant to either the left or right end of the box. The test phase consisted of 18 signaled 10-sec. trials. A 5-sec. red light, located at the midpoint of the manipulandum cover, preceded the onset of the 5-sec. auditory stimulus, with the offset of the light coinciding with the onset of the 3,000-Hz. tone. The ITI ranged 20–55 sec., with a mean ITI of 20 sec.

The appropriate response was moving the knob to one side of the manipulandum on one trial and sliding the knob to the opposite side on the next trial. An avoidance response was terminating the red light prior to the onset of the auditory stimulus, i.e., a response latency of 5 sec. or less, while an escape response was terminating the tone between 5 and 10 sec. after trial onset. If *S* did not terminate the light or noise, a latency of 10 sec. for that trial was recorded. At the completion of the test phase, *S* was asked to rate the unpleasantness of the tone, paid $2, and debriefed.

Five response measures were used during the test: (*a*) trials to criterion for avoidance acquisition, defined as 3 consecutive avoidance responses; (*b*) trials to criterion for escape acquisition, defined as 3 consecutive escapes; (*c*) number of avoidance responses for the 18 trials; (*d*) number of failures to escape, defined as number of trials with a latency of 10 sec.; and (*e*) the overall mean response latency for the 18 trials. These indices, particularly *c*, *d*, and *e* parallel the indices reported in the animal helplessness literature.

Results

Animal learned helplessness was characterized by the similarity in escape–avoidance behavior between E and NP *S*s, while Ē *S*s revealed longer response latencies and more failures to escape than either of the other *S*s. The results of this experiment disclosed remarkable similarities to the animal studies. The Ē group was retarded in escape–avoidance measures relative to the E and NP groups, with the latter groups not differing from each other.

Maier et al. (1969) reported that approximately 63% of Ē dogs and about 5% of naive dogs failed to escape in the shuttle box. Human *S*s demonstrated similar but somewhat less dramatic findings. On the average, Ē *S*s failed to escape the aversive stimulus on over 50% of the 18 trials, while E *S*s failed on 13% and NP *S*s failed on 11% of the trials. Approximately 34% of the Ē *S*s failed to reach criterion, compared to 8% of the E and NP *S*s who also failed to reach criterion. Figure 1 presents the response latencies of the 3 treatment groups on the 6 blocks of 3 trials. The horizontal line at the 5-sec. mark on the ordinate represents the boundary between escape and avoidance: Points plotted above the 5-sec. line represent escapes, while points below the line denote avoidance responses. The Ē group shows consistently longer latencies than either the E or NP groups, with the latter groups performing near equality.

An analysis of variance (ANOVA) test on response latency found a main effect of treatment, F (2, 84) = 12.38, $p < .01$, and a Treatments × Trial Blocks interaction, F (10, 420) = 2.29, $p < .05$. Two planned orthogonal comparisons between groups indicated that the main effect was due to the variability of Ē *S*s. The first comparison between Ē vs. the average of E and NP *S*s was significant ($p < .01$), while the second comparison found no differences between E and NP *S*s. A simple main effects analysis on the Treatments × Blocks interaction disclosed significant differences between groups at each of the 6 trial blocks ($p < .02$). Scheffé *S* tests revealed that Ē *S*s had consistently longer latencies at each of the trial blocks than either E or NP *S*s, while the latter *S*s did not differ from each other.

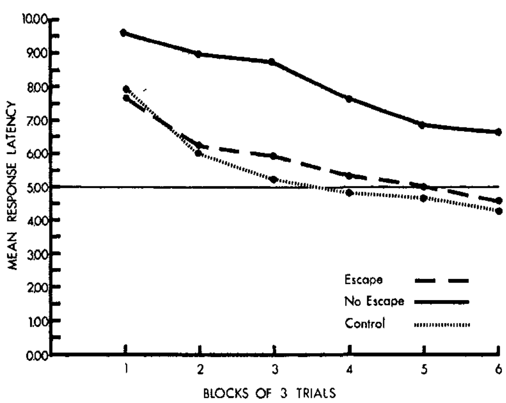

FIGURE 1. Mean response latencies of the 6 escape–avoidance trial blocks for the 3 treatment groups.

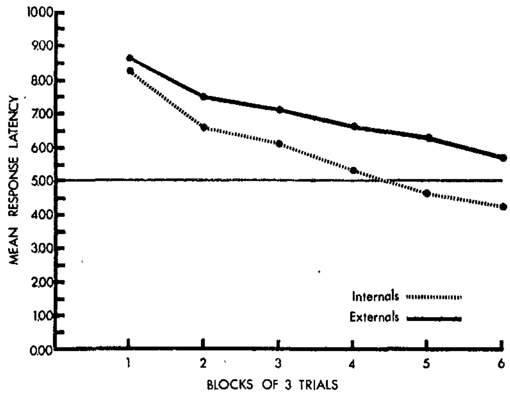

FIGURE 2. Mean response latencies of the 6 escape–avoidance trial blocks for internal and external control *S*s collapsed over the 2 experimental factors.

A treatments main effect was found with the failure to escape measure, F (2, 84) = 22.57, $p < .01$, and trials to criterion for escape acquisition,[3] F (2, 66) = 18.49, $p < .01$. A planned orthogonal comparison indicated that these main effects were due to differences between Ē *S*s and the average of E and NP *S*s ($p < .01$). This planned comparison also found a significant effect on the trials to criterion for avoidance acquisition: Ē *S*s took longer to reach acquisition than the average of E and NP *S*s, F (1, 84) = 4.45, $p < .05$. The second orthogonal comparison found no differences between E and NP *S*s on any of the 4 dependent measures.

Other factors, independent of treatment, were also significant. External locus of control *S*s, regardless of their pretreatments and instructional sets, were slower to escape or avoid than internal control *S*s. Figure 2 presents the response latencies of the internal–external factor on the 6 trial blocks. An ANOVA on response latencies disclosed an internal–external main effect, F (1, 84) = 6.58, $p < .05$, and a Trial Blocks × Internal–External interaction, F (5, 420) = 3.24, $p < .05$.

[3] Analysis of the escape-acquisition measure was based on unequal *n*s as some *S*s (18) reached avoidance criterion without first reaching escape criterion. There was no statistical relationship between the 18 *S*s dropped from the analysis and any of the experimental treatment factors.

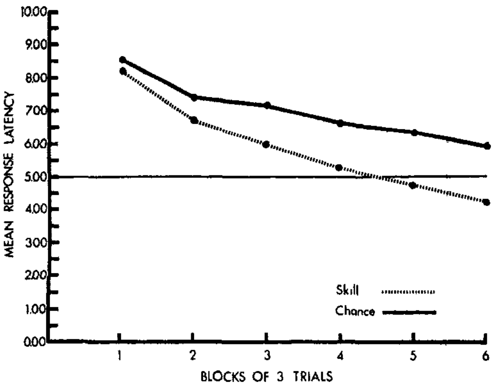

FIGURE 3. Mean response latencies of the 6 escape–avoidance trial blocks for the instructional-set *S*s collapsed over the 2 experimental factors.

A test for simple main effects on the interaction revealed that external control *S*s responded slower than internal control *S*s on Trial Blocks 4, 5, and 6 ($p < .025$). External *S*s also required more trials to reach avoidance criterion ($M = 18.3$) and made fewer avoidance responses during the 18 trials ($M = 3.1$) than internal *S*s (*M*s = 15.0 and 6.2, respectively). The ANOVA tests on these measures statistically verified the observed differences ($p < .05$). There were no internal–external differences for the escape-acquisition or failures-to-escape measures.

The chance-set group displayed retarded measures compared with the skill-set group. Figure 3 presents the response latencies of the instructional set factor collapsed over the 2 experimental factors. The ANOVA found a main effect of instructions, F (1, 84) = 5.93, $p < .05$, and a Trial Blocks × Instructions interaction, F (5, 420) = 4.28, $p < .05$. A simple main effects analysis indicated that chance-set *S*s had longer latencies than skill-set *S*s on Trial Blocks 4, 5, and 6 ($p < .025$). The effects of instructional set also interfered with avoidance responding. Compared to skill-set *S*s, chance-set *S*s required more trials to reach avoidance criterion (*M*s = 18.2 and 15.1, respectively) and made fewer avoidance responses (*M*s = 3.2 and 6.1, respectively). The ANOVAs computed on these measures were all significant ($p < .05$). There was no effect of instructions on either the escape-acquisition or failures-to-escape measure.

The results of internal vs. external and instructional set indicate that either factor can produce parallel results of inescapability. That is, inescapability, chance set, and externality retard escape–avoidance behavior.

Interestingly $\bar{E}$ internal *S*s made more button presses i.e., escape attempts, in pretreatment than $\bar{E}$ external *S*s (*Mdn*s = 21 and 5.5, respectively), $\chi^2 = 3.97$, $p < .05$, suggesting that persistence in trying to control an uncontrollable event may be correlated with the absence of later helplessness. This is similar to Seligman and Maier's (1967) concept of immunization where dogs with prior escapable shock demonstrated enhanced panel pressing under inescapable shock and were later not helpless.

There were no significant interactions between the experimental factors on any response measure. However, a priori comparisons permitted an analysis of possible interaction within the $\bar{E}$ group. Figure 4 presents the mean latencies of internal and external $\bar{E}$ *S*s across the 6 trial blocks. The F test for planned orthogonal comparisons revealed that the overall mean latency of externals was statistically longer than that of internals, F (1, 84) = 5.46, $p < .05$. No other dependent measure approached significance. Inescapability and instructional set were

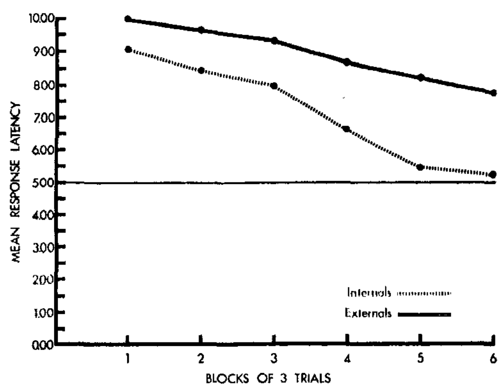

FIGURE 4. Mean response latencies of internal and external control *S*s in the inescapable treatment group for the 6 escape–avoidance trial blocks.

analyzed next. Dunn's test for planned nonorthogonal comparisons was not significant with any of the 5 response measures.

Further analysis was conducted on a possible confounding variable. There was no yoking procedure in the pretreatment, so that duration of noise exposure was not equated. The $\bar{E}$ group received 5 sec. of aversive noise on each trial, whereas the E group received an average of 1.4 sec. of noise per trial. Since $\bar{E}$ *S*s received longer periods of the loud tone, and perhaps greater stress, it could be argued that differential stress rather than uncontrollability led to the retarded performance with the shuttle box manipulandum. However, *S* ratings of the noise did not reveal significant differences: the $\bar{E}$ group rated the 110-db. tone at 3.55 on a 7-point scale, while E group rated the same tone at 3.66. This difference was not statistically different and suggests that differential stress did not produce the helplessness effects. It should also be noted that the relatively moderate ratings of the 110-db. stimulus indicates that learned helplessness can be produced with moderately aversive events as well as the more traumatic events used in the animal studies.

Discussion

Learned helplessness can be experimentally produced in man. Both animals and man show longer latencies and more failures to escape following inescapable aversive events than following escapable events or no pretreatment. The inescapable pretreatments did not affect the total number of avoidance responses between groups (see also Seligman & Maier, 1967). It should be noted that Overmier (1968) reported interference with avoidance acquisition when escape contingencies were eliminated in the shuttle box. Considering the divergent findings, perhaps it is only initial learning—escape or avoidance, whichever occurs first—that is disrupted by inescapability.

The first published account of learned helplessness in humans (Thornton & Jacobs, 1971) had 2 methodological problems. First, an instructional set was confounded with inescapability in the pretreatment. The $\bar{E}$ *S*s received instructions that described the noncontingency between shock and responding, and E *S*s received different instructions that described the contingency between shock and avoidance. These different instructions, embedded within the different pretreatments, may have predetermined *S*s' responses to impose a relationship in the study. The second problem relates to the unusual pretreatment procedures. Previous animal helplessness studies pretreated E *S*s with unavoidable–escapable shock. Thornton and Jacobs, however, pretreated their E *S*s with avoidable–escapable shock. Because of the different procedures, their study cannot be considered a homologue to the helplessness studies. Thornton and Jacobs, rather than demonstrating learned helplessness, demonstrated the effects of prior avoidance training on a later escape–avoidance task.

The learned-helplessness hypothesis identifies control over reinforcement as the crucial variable. The present study confirmed the hypothesis by demonstrating that $\bar{E}$ *S*s produced greater impairment in escape–avoidance than E or NP *S*s. In addition, the external locus of control variable, also concerned with control of reinforcement, interacted with inescapability to produce greater impairment than internal control *S*s.

In conclusion, this study demonstrated that helplessness can be experimentally induced in man wholly parallel to helplessness in animals. The *S* variable of externality appears to function like the pretreatment variable of inescapability, as evidenced by the interaction between externality and the helplessness induction. Both locus of control and skill–chance instructional set factors produced an effect similar to inescapability. In view of the parallel effects between the 3 factors, I suggest that a single process may underlie learned helplessness, externality, and the perceptual set of chance—the expectancy that responding and reinforcement are independent. Seligman (in press) and Miller and Seligman (1973) have pointed to this cognition as the underlying state in reactive depression in man.

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(Received March 5, 1973)