A Two-Process Theory of Learned Helplessness

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College students solved problems under feedback conditions designed to differ systematically in the amount of information they conveyed and the amount of motivation they produced. During a pretest series of trials, one group received response-contingent feedback designed to enhance both information and motivation. Another group was yoked to the contingent group and thus received low information and low motivation. A third group experienced noncontingent success (low information, high motivation), and a fourth received noncontingent failure feedback (low information, low motivation). A two-process model that gives equal weight to information and motivational cues correctly predicted that the performance of the noncontingent success group on a transfer task would fall in between that of the contingent group and the failure/yoked groups. As a more stringent test of the model, four interventions were factorially combined with the pretreatments. The intervention treatments involved giving either no information, information about the contingencies, praise, or derogation. As predicted by the model, simply giving subjects information about the contingencies removed the debilitating effects of learned helplessness.

Learned helplessness studies have demonstrated that perceived noncontingency between response and outcome results in (a) cognitive interference in learning new associations of response to outcome; (b) a motivational deficit, manifested as a reduced incentive toward instrumental responding; and (c) depressed affect (Seligman, 1975). The psychological processes responsible for this phenomenon are still a matter of some debate, however. Motivational models suggest that perceived inability to control the environment demotivates subjects, while information models argue that perceived stimulus–response independence leaves subjects uninformed about the correct solution to the problem. In this article we suggest that a model of helplessness must give equal weight to both motivational and cognitive components. In addition, we have hypothesized that both factors may have either a facilitative or a deleterious effect upon future instrumental responding.

In its initial form, learned helplessness theory predicted that noncontingent success should be equally as debilitating as noncontingent failure (Seligman, 1975). In support of this hypothesis, Cohen, Rothbart, and Phillips (1976) reported that helplessness was a consequence of learning that reinforcement was uncontrollable and was not primarily an affective response to failure. Our two-process theory agrees that noncontingent feedback will produce impaired learning and subsequent performance decrements. It predicts, however, that noncontingent success will produce greater expectations of continued success and, hence, will result in significantly less depressed affect than would be experienced with noncontingent failure. This hypothesis is compatible with the reformulation of learned helplessness theory recently presented by Abramson, Seligman, and Teasdale (1978).

Attribution models adequately explain the motivational components of learned helplessness but fail to consider the information-processing aspects (Dweck, 1975). By excluding the information value of contingent
feedback, these theories do not account for the observed performance differences between groups of subjects receiving equivalent amounts of contingent or noncontingent reinforcement.

Other explanations of learned helplessness suggest that decrements in performance result from inaccurate learning acquired during the helplessness training. Exposure to noncontingent feedback may teach the subject that the problem is either not solvable or leads to the inaccurate belief that it is being solved. According to this information interpretation, noncontingent pairings of a conditioned stimulus (CS) and punishment serve to impair learning by destroying the cue value of the CS. If this is true, then the decremental effect should be eliminated by making the experimental contingencies clear to subjects. Several lines of evidence support this interpretation (Dweck & Reppucci, 1973; Eisenberger, Kaplan, & Singer, 1974).

A Two-Process Theory

Neither a motivational nor an information model alone can adequately account for results in learned helplessness experimentation. As an alternative, we propose an additive model that gives equal weight to motivational and information components of helplessness training. To test this model, subjects were given either contingent or noncontingent feedback in an escape-learning task. Helplessness was then measured by comparing performance on a contingently reinforced problem-solving task. For the first task, one group of subjects was given feedback contingent upon performance. Another group was yoked to them and thus received noncontingent feedback. A third group experienced noncontingent success, and a fourth received noncontingent failure feedback. The contingent training was expected to provide positive problem-solving information to subjects. As a mastery experience, this contingent control was also expected to produce an expectancy of continued success and thus be positively motivating. Conversely, all noncontingent conditions provided negative information, in that problem-solving approaches could not be systematically verified or disconfirmed. Further, noncontingent failure and yoked subjects were expected to be demotivated as a result of the pretreatment experience. Subjects exposed to noncontingent success would gain positive motivation based on the expectation of continued (noncontingent) positive reinforcement. The yoked and the failure groups should perform most poorly on a series of transfer trials, because they would receive no information about the problem solution along with a negatively motivating experience. Although they also receive no information, the success group should perform somewhat better, because their experience should be more positively motivating. That is, despite uncontrollability, it was hypothesized that noncontingent success should be less debilitating than noncontingent failure.

To provide a more stringent test of the model, four interventions were factorially combined with the pretreatments. The predictions noted above were for a no-intervention condition. The other interventions involved giving either praise, derogation, or a description of the reinforcement contingencies immediately before the transfer trials. Praise and derogation were expected to provide positive or negative instruction, respectively. As a source of feedback, praise would imply that a correct solution had been found, and derogation would imply that it had not. Thus, for example, praise would provide useful feedback for contingently but not for noncontingently reinforced subjects. The information intervention suggested to subjects that pretreatment feedback had been noncontingent. This should have reversed the cognitive and motivational benefits derived from contingent pretreatment. For “helpless” subjects, the information gave an exact description of the contingencies and was expected to provide a form of brief “therapy,” removing the debilitating effects of learned helplessness (Eisenberger et al., 1974).

The success of this information intervention should provide an effective test of the proposed two-process model versus the current reformulation of learned helplessness theory. Abramson et al. (1978) claim that such a debriefing should remove self-esteem decrements, but neither the old nor the new theory would predict that it would remove the cogni-
tive and motivational deficits. Our theory predicts that the learning interference components of experimental helplessness can be remedied by simply informing subjects that feedback was noncontingent in the past but will be contingent in the future.

**Method**

**Subjects**

The subjects were 102 female and 58 male students enrolled in introductory psychology classes at San Diego State University.

**Experimenters**

The experimenters were 4 male and 6 female upper-class psychology majors and graduate students. Each of the 10 experimenters administered all of the experimental conditions.

**Apparatus**

A 110-dB (SPL), 3,000-Hz tone produced by an audio oscillator was used as an unconditioned aversive stimulus. Throughout the 40 pretreatment trials and 18 test trials, the tone was presented for periods ranging from 0 to 5.0 sec per trial. A Hunter Klack-Counter was utilized for timing response latencies, and a Vadeer-Root counter was used to record the number of responses.

The device used during the pretreatment consisted of four buttons mounted on a slanted base, with a speaker and one white, one red, and one green light mounted on the vertical face. The device used for the testing was identical except that four additional buttons were mounted on the base. All buttons were arranged in a circular pattern. On both pieces of apparatus, a correct solution consisted of pushing two unchanging buttons, in either order, with any number of other buttons pushed between the two.

**Design and Procedure**

A 4 × 4 factorial design was utilized. The independent variables were (a) pretreatment conditions, consisting of contingent-control, yoked, success, and failure groups and (b) intervention conditions, made up of no intervention, information intervention, praise, and derogation groups. Thus, there were 16 cells, with subjects assigned to these groups by a random process.

**Pretreatment.** During the pretreatment phase, the subject was seated before the four-button apparatus and instructed to try to turn off the tone as quickly as possible using the buttons. In the contingent-control condition, if the subject successfully solved the problem, the tone and red light went off and the green light flashed, indicating a correct solution. If the correct solution was not found within 5.0 sec, the tone and red light went off automatically, but the green light did not flash. This process continued for 40 trials. Under experimenter-controlled (noncontingent) conditions, the same procedure was used, but the experimenter manually controlled feedback latencies according to predetermined schedules. Yoked subjects' trial times were each matched to one contingent-control subject in the corresponding intervention group. Mean pretreatment latencies for contingent and yoked subjects were 85 sec per trial.

Subjects who experienced either success or failure conditions were given noncontingent reinforcement schedules with mean solution latencies of 25 and 3.75 sec per trial, respectively. This meant that virtually any response or lack of response by the success group was reinforced, and nearly all responses for the failure group were not reinforced. No attempt was made by the experimenter to either conceal or obviate contingent or noncontingent conditions, but verbal self-reports and observations made it clear that noncontingent subjects were aware of their lack of control. Frequently the tone would go off without the helpless subject pushing a button.

**Intervention.** One of four interventions was then introduced: (a) no intervention, (b) information, (c) praise, and (d) derogation. The information intervention involved accurately informing the subject that during pretreatment the experimenter had been controlling the tone and problem solution. It was stressed, however, that during testing, reinforcement would be entirely contingent upon the subjects' responding. In the praise and derogation interventions, subjects were told that their pretreatment performance had been significantly better (praise) or worse (derogation) than average. It should be noted that subjects who received contingent pretreatment coupled with the information intervention were given nonverbal feedback. They were told that they had not controlled the problem solution, when, in fact, they had.

**Testing.** For the test phase, all subjects were asked to move to a second seat in the same room, facing the new eight-button panel. They were told only that the new task would be "similar but different." The subjects were then given 18 contingent trials on the test apparatus. No additional instructions were given. On the pretreatment task, the tone was escapable (for contingent-control groups) but not avoidable. On the test apparatus, however, all subjects could completely avoid presentation of the tone by solving the problem during the 5.0-sec presignal period.

1 According to the Occupational Safety and Health Act, 1976, the aversive tone was well within safety parameters. The procedure was reviewed by the University Human Subject Committee, and subjects were also advised that they were free to withdraw from participation at any time, for any reason, with no adverse repercussions.
Debriefing. Immediately after the experiment, all subjects were thoroughly debriefed about the experiment, the apparatus, and the individual conditions they had experienced. They were also given a brief description of the theoretical principles of learned helplessness.

Results

Five variables were used as measures of performance. These were (a) response latencies, averaged over the 18 postintervention trials; (b) avoidances, defined as the number of trials in which a subject avoided the aversive tone by solving the problem within the 5.0-sec presignal period; (c) failures or the mean number of times the subject failed to solve the problem during either the 5.0-sec presignal period or the 5.0-sec period while the tone was being presented; (d) the total number of correct responses emitted by a subject; and (e) the total number of emitted responses. Since the dependent variables were highly correlated, it was necessary to employ a form of analysis that took these relationships into consideration. Multivariate analysis of variance (MANOVA) was chosen for this purpose (Kaplan & Litwornik, 1977).

The data were first analyzed in a 4 X 4 (Pretreatment X Intervention) MANOVA. The results of this analysis revealed that there were significant differences between group centroids for pretreatment, \( F(15, 387) = 2.45, p < .01 \), and for the interaction between pretreatment and intervention, \( F(45, 629) = 2.10, p < .01 \).

<table>
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<th>Variable</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
<th>DFC</th>
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<tr>
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<td>1.44</td>
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<td>-.55</td>
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<tr>
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<td>9.49</td>
<td>1.38</td>
<td>.164</td>
<td>1.80</td>
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<td>Total responses</td>
<td>15,144</td>
<td>12.92</td>
<td>1.84</td>
<td>.035</td>
<td>.59</td>
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</tbody>
</table>

Note. MANOVA = multivariate analysis of variance. DFC = raw discriminant function coefficients.

Discriminant Function Analysis

To clarify the meaning of the differences between groups, a discriminant function analysis was performed with the 16 groups in a nonfactorial arrangement. This analysis revealed that the first root of \( W^{-1}A \) (where \( W^{-1} = \) the inverse of the Sums of Squares and Cross-Products, or SSCP, matrix, and \( A \) is the within-groups dispersion matrix) was statistically significant, approx. \( F(75, 675) = 1.38, p < .05 \). This suggests that the 16 groups differed for one weighted linear combination of variables.

The meanings of discriminant functions are defined by the loadings of variables upon them. A summary of the group comparisons, which includes the discriminant function coefficients, is shown in Table 1. The table reveals that the significant function is defined primarily by number of failures and number of correct responses. There were significant univariate effects for latencies, \( F(15, 144) = 2.76, p < .01 \); avoidances, \( F(15, 144) = 2.1, p < .02 \); and number of responses, \( F(15, 144) = 1.84, p < .05 \).

Group Centroids Within Levels of Intervention

Centroids are a multivariate analogy for means. They are calculated by multiplying each score by its corresponding raw discriminant function coefficient and summing the products. The centroids are shown in Figure 1 along with the predictions derived from the two-process model. These predictions were obtained by summing the four positive or negative influences in each cell and dividing by four. A positive influence was scored as +1, a negative as -1, and a neutral as 0. In order to make the scale for the theory more compatible with that for the group centroids, a constant of .1 was subtracted from all group centroids. Inspection of Figure 1 reveals that the data conform very well to the predictions obtained from the model.

In order to gain further understanding of the data, a separate discriminant analysis was performed for each intervention strategy. This was analogous to performing simple effects tests for the multivariate composite of per-
formance variables. Among these, the comparisons for the no-intervention conditions (left panel) were particularly important, because they allowed a straightforward comparison of the noncontingent success and the failure pretreatments. As noted earlier, our model differs from Seligman's (1975) original formulation and from information theory in its prediction that noncontingent failure will be more detrimental than noncontingent success. The centroids shown in Figure 1 reveal that the data conform closely to our predictions, and these predicted differences were statistically significant, $\chi^2(9) = 20.05, p < .02$.

The model suggests that information should have the effect of nullifying the pretreatment. In other words, it predicts no differences between groups when the information intervention is employed. Indeed, the small observed differences between group centroids are nonsignificant for the information intervention conditions.

The model predicts the largest differences between groups for the praise intervention. As predicted, the pretreated groups did differ sharply under praise, $\chi^2(15) = 45.43, p < .001$. Similarly, the observed differences between pretreatment groups were significant under derogation, $\chi^2(15) = 28.23, p < .005$.

To further clarify the obtained pattern of findings, univariate results will be reported for the response latency variable. This variable was selected out for presentation because it is the most common outcome measure of helplessness research.

**Response Latencies**

Response latencies for the 18 contingent test trials were summed to create six blocks of three trials each for analysis. Analysis of variance (ANOVA) for latencies revealed that subjects experiencing noncontingent reinforcement on the pretreatment task required significantly more time to solve the testing task than the contingent pretreatment groups, $F(3, 144) = 6.26, p < .01$. Duncan's multiple-range tests were used for comparisons of means within ANOVA contrasts.

Breaking down the latencies according to intervention condition, it was found that with no intervention, contingent-control subjects had significantly shorter mean latencies ($M = 5.0$) than yoked ($M = 6.5$) or failure ($M = 6.6$) subjects ($p < .01$); success latencies ($M = 5.3$) were also significantly shorter than
yoked or failure latencies ($p < .05$). As predicted, no significant differences were found within the information intervention ($p > .05$). For subjects experiencing the praise intervention, the contingent-control group had a shorter mean latency ($M = 3.9$) than failure ($M = 7.5$), success ($M = 6.5$), or yoked groups ($M = 5.9$), $p < .001$, with yoked and success latencies each shorter than those of the failure group ($p < .005$ and $p < .05$, respectively). In the derogation condition, contingent-control subjects obtained shorter latencies ($M = 5.0$) than yoked subjects ($M = 6.3$, $p < .005$, and success ($M = 5.9$) or failure subjects ($M = 6.6$), $p < .01$.

Discussion

Effects of Noncontingent Success

The information-motivation model successfully predicted impaired performance on a contingently reinforced task after subjects had experienced noncontingent reinforcement. The information interpretation suggested by Eisenberger et al. (1974) was less efficient than the two-factor model, because it failed to consider motivation. A strict information model would predict that noncontingent success would have the same effect as other types of noncontingent feedback. Our data clearly suggest otherwise. The lack of helplessness-like impairment in the noncontingent success group can be attributed to the added motivation produced during pretreatment. These results support the notion that noncontingency per se is not enough to account for differential helplessness effects. Noncontingent success appears to be significantly less debilitating than an experience of noncontingent failure and leaves a subject more inclined to actively continue responding. Noteworthy is the similarity of this pattern of responding to Raimy's (1975) "special-person" misconception, which he and McCordick (Note 1) feel stems largely from noncontingent positive reinforcement during early childhood. As an adult, the special person develops strong but unsubstantiated feelings of superiority, which he or she then vigorously defends. With no intervention, it was observed that the "spoiled" success subjects averaged significantly more test responses than those in any other pretreatment/intervention condition.

Information as a Remedy

As predicted, the information intervention virtually eliminated the effects of learned helplessness. The contingent and the noncontingent pretreatment groups that received the information intervention did not differ significantly in performance. The debilitating effects of learned helplessness were thus removed by accurately informing subjects that they had previously been operating within a noncontingent system of reinforcement but that in the future, reward and punishment would be administered contingent upon their performance. These results tend to support the findings of Eisenberger et al. (1974), who found that the effects of noncontingent reinforcement could be eliminated in much the same manner. The results appear to contradict Abramson et al.'s (1978) hypothesis that self-esteem is improved by debriefing, but cognitive and motivational deficits remain unaffected.

The model might also be able to handle some of the unusual results obtained by attribution theorists. For instance, Tenen and Eller (1977) reported that telling subjects they were facing a difficult task reversed the effect of helplessness training and actually facilitated performance. Our model would consider these instructions to provide positive information because they cue subjects that (a) the task is solvable, thereby increasing motivation, and that (b) they should be active in exploring alternative strategies.

Limitation

One limiting factor in the present experiment is the similarity between the pretreatment and transfer tasks. Both the pretreatment and the test apparatus were chosen because they require active discrimination learning. To the subject exposed to noncontingent pretreatment, the experimental conditions may have appeared essentially unchanged from one phase to the next. A different machine was used, and the problem
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was obviously made more complex; but otherwise no differences were immediately apparent. To the nonhelpless subject, however, the new apparatus called for renewed hypothesis testing and additional exploration of reinforcement parameters. If subjects were simply replicating their own pretreatment responses, the contingent-control groups should also have done poorly on the transfer task. However, they did very well. As Seligman (1975) has stated, it is essential to discriminate between situations in which contingencies can or cannot be controlled. It would, however, be valuable to replicate the present study employing distinctly different tasks in the pre-treatment and testing phases to assess the generalizability of the results.

Conclusion

Data from the present study tend to support the main body of learned helplessness literature. However, our data suggest that an adequate theory must consider both motivational and cognitive aspects of helplessness. It is clear that noncontingent reinforcement obscures the information necessary to solve a problem. However, some forms of noncontingent reinforcement, such as noncontingent success, may induce motivation while giving no information about the correct solution to a problem. Thus, performance following noncontingent success differs from performance following noncontingent failure. Systematic evaluation of situations depends upon contingent reinforcement. When exposed to contingent feedback, a subject can test strategies through trial and error until the correct solution is found. In effect, exposure to noncontingent failure empties the set of possible solutions by informing subjects that all their approaches are unlikely to be successful. Exposure to noncontingent success leaves the reservoir of potential solutions full. The increased motivation and resultant high rate of responding enhance the likelihood that the correct solution will be found.

Earlier models of learned helplessness held that once stimulus response independence was learned, it was difficult to unlearn. Our results, in concert with those of Eisenberger et al. (1974), suggest that experimental helplessness in humans can be remedied in a matter of seconds by providing accurate information about the reinforcement contingencies. In summary, effective problem solving depends on two independent factors: (a) motivation to respond and (b) the availability of the cues necessary to solve the problem.

Reference Note


References


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