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Learned Helplessness, Test Anxiety, and Acknowledgment of Contingencies

Tara L. Lavelle, Gerald I. Metalsky, and James C. Coyne
University of California, Berkeley

Subjects designated as high-test-anxious or low-test-anxious received either controllable or uncontrollable noise in a typical helplessness induction. One half of them subsequently received an acknowledgment of contingencies in the induction task, and the other half did not. An anagram task was then administered. Test anxiety theory successfully predicted group differences in anagram performance: Only high-test-anxious subjects were debilitated by the helplessness induction. The effects of providing acknowledgment of contingencies proved ambiguous, but this may have been due to the wording of the acknowledgment and the susceptibility of high-test-anxious subjects to social dimensions of the task situation. Because of differences in terminology, learned helplessness theory has failed to take into account a large body of literature that has similarly employed experimenter-induced failure, and there are numerous competing explanations for impairments following a helplessness induction. Test anxiety theory suggests that the deficits underlying impaired performance are likely to be attentional in nature.

Learned helplessness theory was originally formulated on the basis of laboratory experiments with infrahuman species. After Seligman (1975) proposed learned helplessness as an appropriate model of depression and he and other investigators extended the paradigm to research with human subjects, considerable controversy developed. This controversy ultimately led to major reformulations of the theory that incorporated a revision of attribution theory (Abramson, Seligman, & Teasdale, 1978). The added attributional framework has permitted learned helplessness theory to account for a number of findings that are otherwise embarrassing to, or unexplained by, the theory.

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Reprint requests should be sent to James C. Coyne, Department of Psychology, University of California, Berkeley, California 94720.

The reformulated theory has also lost much of the precision of the earlier theory and, in many cases, its falsifiability (Huesmann, 1978). It does, however, make a readily testable prediction concerning the effects of informing subjects that their failure to achieve control over aversive noise was a result of the experimental design and that others in the same situation were similarly helpless:

> Experimenters in human helplessness studies seem to believe that telling a subject that no one could solve the problem will cause helplessness deficits to go away. The prior discussion suggests convincing a subject that his helplessness is universal rather than personal will remove self-esteem deficits suffered in the experiment. Neither the old nor the new hypothesis, however, predicts that such debriefing will remove the cognitive and motivational deficits. (Abramson et al., 1978, p. 55.)

Elsewhere in the same article, Abramson et al. stated, "It is important to emphasize that the cognitive and motivational deficits occur in both personal and universal helplessness" (p. 55). It is indeed important to establish that an expectation of universal noncontingency in a laboratory helplessness induction does not remove deficits, if the viability of the laboratory study as an analogue to depression is to be maintained. Presumably many of the aversive life events that may be involved in the etiology of depression are, in the parlance of learned helplessness theory, universally noncontingent in nature. If the laboratory helplessness study is an adequate analogue of clinical depression, then in the context of laboratory study the expectation of universal noncontingency should involve cognitive and motivational deficits.

Although telling the subjects in a typical helplessness study that the noise was inevitable should lead to an expectation of universal noncontingency (if the subject believes the experimenter), there is no evidence to date that such expectations produce interference on any task other than the one to which the information specifically applies (Buchwald, Coyne, & Cole, 1978). The present study was in part an effort to determine whether such evidence can be produced and in part an effort to critically compare learned helplessness theory with the theory of test anxiety.

There is disagreement as to the relation between the concept of noncontingency and failure (Abramson et al., 1978; Benson & Kennelly, 1976; Buchwald et al., 1978), but it is clear that the typical learned helplessness induction with human subjects involves experimenter-induced failure. Subjects either fail to escape aversive stimulation they have been led to believe is escapable or fail to solve problems they have been led to believe are solvable. Numerous studies document the interference with subsequent task performance engendered by such procedures, but a demonstration of such interference is not ipso facto proof of the specific underlying cognitive and motivational deficits postulated by learned helplessness theory (Buchwald et al., 1978; Costello, 1978). In fact, a variety of theoretical models predate learned helplessness theory in attempting to explain impaired performance following experimenter-induced failure, and the ambiguities of this methodology have long been known (Lazarus, Deese, & Osler, 1952).

The theory of test anxiety (Mandler, 1972a; Mandler & Sarason, 1952; Sarason, 1972; Wine, 1971) predicts that some subjects—high-text-anxious subjects—are particularly prone to be debilitated by the stress of failure in a laboratory helplessness induction. High-test-anxious subjects are inclined to blame themselves for poor performance (Doris & Sarason, 1955). The deficit underlying impaired performance under stress is postulated to be attentional in nature; after the stress of a laboratory helplessness induction, the high-test-anxious person is assumed to engage in attentionally demanding self-preoccupation:

> The high-test-anxious person spends a part of his task time doing things which are not task oriented. He worries about his performance, worries about how well others might do, ruminates over choices open to him, and is often repetitive in his attempts to solve the task. (Marlett & Watson, 1968, p. 203)

The low-test-anxious person, on the other hand, is not predicted to show such subsequent task interference. Instead, he or she is presumed to orient behavior and cognition toward the specific task requirements while excluding extraneous ideation, even under stress.

An examination of the theory of test anxiety as an alternative to learned helplessness theory seems warranted for a number of reasons. First, both theories have been tested in experimental situations whose similarity has been obscured by differences in terminology and the failure of authors to make appropriate references to earlier studies (Doris & Sarason, 1955; Mandler & Sarason, 1952). Second, doubts have been raised as to whether subjects readily employ the concept of noncontingency, which is so critical to the learned helplessness theory (Buchwald, et al., 1978), whether people in general make the attributions predicted by the theory, and whether attributions are systematically related to behavior (Wortman & Dintzer, 1978). Third, test anxiety theory predicts individual differences in response to a laboratory helplessness induction that have not typically been considered in learned helplessness studies (Diener & Dweck, 1978). Finally, numerous successful interventions with test-anxious persons have focused on their anxious reactions to the examination situation (Cohen, 1969; Snyder & Deffenbacher, 1977). If a measure of test anxiety could predict responses to a helplessness induction, it would raise doubts as to whether it is depression that is most accurately being modeled in laboratory helplessness studies.

The present study provided a test of whether (a) acknowledgment of contingencies would eliminate the interference of a helplessness induction with subsequent anagram performance and (b) the use of unselected subjects in the typical helplessness study obscures an important interaction between test anxiety and controllability.

Our specific predictions were as follows:

1. High-test-anxious subjects would generally perform more poorly on the anagram task than would low-test-anxious subjects. A review of the literature suggests that high-test-anxious subjects generally perform more poorly, but particularly under stressful conditions (Wine, 1971).

2. There would be a significant interaction between controllability and text anxiety.

3. In planned comparisons of subjects who had control over the noise in the pretreatment (C) and those who did not (NC), there would be a significant difference in anagram performance for high-test-anxious subjects in the no-acknowledgment condition but no significant difference for low-test-anxious subjects.

4. There would be no NC–C differences in anagram performance when there was acknowledgment of contingencies for the high-test-anxious subjects or the low-test-anxious subjects.

Method

The experiment employed a 2 × 2 × 2 design. High-test-anxious and low-test-anxious subjects received (a) controllable or uncontrollable pretraining and (b) acknowledgment or no acknowledgment of contingencies in the pretraining before they attempted to solve the anagrams.

Selection of Subjects

The Test Anxiety Questionnaire (TAQ; Mandler & Sarason, 1952) was used to select high- and low-test-anxious subjects. The TAQ is a 35-item questionnaire in rating scale format, designed to measure anxiety proneness in a specific stressful situation—the testing situation. Subjects were designated high test anxious if their mean item score was 4.5 or higher on a 7-point scale and were designated low test anxious if their mean item score was 3.5 or lower.

Subjects

Thirty-six high-test-anxious and 36 low-test-anxious subjects were selected on the basis of group testing of students enrolled in introductory psychology classes at the University of California, Berkeley. A total of 118 students were tested to obtain the present sample. Subjects selected for the experimental phase of the study were informed that they would be exposed to a "slightly unpleasant" tone, given a sample tone, and offered a chance to refuse further participation. Students not selected for inclusion in the experimental phase of this study participated in another study. All subjects received course credit for their participation.

Apparatus

Instrumental pretreatment. The apparatus used in the pretreatment was similar to that used in other studies employing a noise-exposure pretreatment (Cole & Coyne, 1977; Hiroto & Seligman, 1975). A spring-loaded button was located in the center of the top of a rectangular black box. On each side of the button was a 24-V direct current light: on the right a green success light and on the left a red failure light. The 3000 Hz 90-dB (SPL) tone was produced by an audio oscillator and was presented through calibrated Knight earphones. The apparatus used in the escapable and inescapable pretraining conditions was identical.

Soluble cognitive task. Twenty anagrams obtained from a list of five-letter anagrams (Tresselt & Mayzner, 1966) were used in the cognitive task. Each anagram was placed on a 4-inch by 6-inch (10.2 cm by 15.2 cm) file card and bound in a ringed deck of 20 stimulus cards. The letters of all anagrams were arranged in a constant order so that subjects could learn the fixed pattern (3-4-2-5-1). For example, b-i-r-t-o is the anagram of the word *orbit*.

Procedure

The experimental phase of the study was conducted 6–10 days following the group testing situations. The pretreatment task procedures for the NC and C yoked groups were similar to those employed in previous research and are described elsewhere (Cole & Coyne, 1977). In the present study there was the additional restriction that high-test-anxious subjects be yoked to other high-test-anxious subjects and low test-anxious to other low-test-anxious subjects. This introduced the possibility of bias due to differences in the amount of noise received (Costello, 1978), but results from studies in which a group that received escapable noise and a group that received no pretreatment were compared suggest that these differences are unlikely to influence results (Buchwald et al., 1978). As in previous studies, there were a total of 45 trials of noise exposure for all groups.

After a noise pretreatment, subjects completed a questionnaire consisting of unipolar adjective scales. They were then given a statement to read, which, depending on condition, either did or did not contain an acknowledgment of the contingencies in the pretreatment.

The statement for the no-acknowledgment groups read as follows:

> As you know, the present study involves personality and task performance variables. Phase 1 of this experiment provided for the measurement of the

Table 1
Measures of Anagram Performance

Condition	Control *M*	Control *SD*	No control *M*	No control *SD*
No acknowledgment				
High test anxious				
Latency	22.9	13.7	46.2	17.3
Mistakes	3.11	2.97	7.11	2.80
Low test anxious				
Latency	29.7	15.6	27.3	22.9
Mistakes	3.77	2.43	4.11	4.37
Acknowledgment				
High test anxious				
Latency	35.8	18.6	40.3	17.1
Mistakes	4.66	2.91	6.11	2.80
Low test anxious				
Latency	23.4	13.3	21.6	12.9
Mistakes	3.00	2.34	3.11	2.47

personality variables. Phase 2, in which you are currently participating, involves the measurement of task performance.

Please do your best to solve the anagrams in as short a time as possible.

Thank you.

Subjects in the acknowledgment groups received the following insert:

In the first task of Phase 2, one of the subjects did not, in fact, have control over the termination of the noise. There was nothing that the subject could do that would have solved the button-pressing problem.

After subjects read the appropriate statement, the anagram task was administered. The anagrams were introduced with instructions similar to those used in previous research. Subjects were informed that this was a task in which they were to unscramble letters in order to form a five-letter word. They were told that there could be a pattern or principle by which to solve the anagrams. On each trial, an experimenter recorded the subject's response and the response latency. The order of anagram presentation was the same for all subjects. The three dependent measures of anagram performance used by Hiroto and Seligman (1975) were obtained: (a) number of trials to criterion for anagram solution, defined as the subject's solving three consecutive anagrams in less than 15 sec each; (b) number of failures to solve, defined as the number of trials with latencies of 100 sec, at which point the trial ended; and (c) mean response latency for the 20 anagrams. However, it was found that a number of subjects in various conditions solved three or more consecutive anagrams in less than 15 sec each without discovering the pattern, and therefore trials to criterion were eliminated from further analysis. Other investigators have noted problems with this measure (Price, Tryon, & Raps, 1978).

After completion of the anagram test, subjects were asked to complete a postexperimental questionnaire that included ratings of aversiveness of the noise, perceived control of the noise, and motivation to solve the anagrams. Subjects were then debriefed, thanked, and dismissed.

Results

Anagram Performance

In confirmation of Hypothesis 1, a three-way analysis of variance revealed a significant main effect for latency, $F(1, 64) = 7.53$, $p < .008$, and for failures, $F(1, 64) = 10.92$, $p < .002$. High-test-anxious subjects performed more poorly than low-test-anxious subjects on both measures.

In partial confirmation of Hypothesis 2, we found a significant two-way interaction between control and test anxiety for latency, $F(1, 64) = 4.13$, $p < .05$, and the interaction approached significance for failures, $F(1, 64) = 3.33$, $p > .05$. In confirmation of Hypothesis 3, planned comparisons revealed a significant NC–C difference for high-test-anxious subjects who did not receive acknowledgment of contingencies: $F(1, 64) = 8.70$, $p < .01$, for latency and $F(1, 64) = 8.57$, $p < .01$, for failures. In confirmation of Hypothesis 4, planned comparisons did not reveal any significant NC–C difference for high-test-anxious subjects who did receive acknowledgment, for low-test-anxious subjects who did not receive acknowledgment, or for low-test-anxious subjects who received acknowledgment. This was true for both latency and failure measures.

Although the results obtained were consistent with all four hypotheses, some ambiguity remains as to the effect of acknowledgment on the performance of high-test-anxious subjects. An examination of the mean scores presented in Table 1 indicates that acknowledgment produced a small improvement in the performance of high-test-anxious subjects who were exposed to uncontrollable noise and a larger decrement in the performance of high-test-anxious subjects who received controllable noise. In neither case were those differences significant, but they do suggest that a more complex interpretation is needed than simply that acknowledgment of contingencies eliminates the debilitation of high-test-anxious subjects by the uncontrollable pretreatment.

Adjective Ratings

Overall, high-test-anxious subjects felt less competent, $F(1, 64) = 3.95$, $p < .05$; less strong, $F(1, 64) = 4.07$, $p < .05$; and more tense, $F(1, 64) = 4.26$, $p < .05$; and weak, $F(1, 64) = 7.45$, $p < .01$, than low-test-anxious subjects, following the noise pretreatment.

Overall, subjects who did not have control over the noise in the pretreatment reported feeling less competent, $F(1, 64) = 12.10$, $p < .001$; strong, $F(1, 64) = 6.88$, $p < .05$; successful, $F(1, 64) = 34.23$, $p < .001$; and happy, $F(1, 64) = 6.60$, $p < .05$, than subjects who had control, and more frustrated, $F(1, 64) = 37.76$, $p < .001$.

An interaction between test anxiety and control for ratings of how tense subjects felt was the only significant interaction effect for adjective ratings, $F(1, 64) = 4.81$, $p < .05$; and a follow-up Scheffé test revealed that in the C condition, high-test-anxious subjects reported being more tense than did low-test-anxious subjects ($p < .05$).

Postanagram Questionnaire

There were significant main effects for control, $F(1, 64) = 108.52$, $p < .001$; test anxiety, $F(1, 64) = 4.47$, $p < .05$; and acknowledgment, $F(1, 64) = 4.47$, $p < .05$, in perception of control over the noise. As can be seen in Table 2, subjects who were exposed to the uncontrollable pretreatment perceived less control over the noise than did subjects who received controllable pretreatment; high-test-anxious subjects perceived more control than did low-test-anxious subjects; and subjects who received acknowledgment of contingencies perceived more control than those who did not.

Planned comparisons revealed that high-test-anxious subjects in the NC condition felt significantly less like solving the anagrams than did high-test-anxious subjects in the C condition, $F(1, 64) = 5.42$, $p < .05$, but did not reveal other NC–C differences. However, under conditions of no acknowledgment and NC, low-test-anxious subjects felt significantly more like solving the anagrams than did high-test-anxious subjects, $F(1, 64) = 12.67$, $p < .01$.

Table 2
Postanagram Questionnaire Responses

Condition	Control	No control
Without acknowledgment		
High test anxious		
Feel like solving anagrams	4.44	2.67
Control over noise	5.00	1.22
Suspicious	4.88	4.56
Low test anxious		
Feel like solving anagrams	4.11	5.33
Control over noise	4.11	1.11
Suspicious	3.78	3.89
With acknowledgment		
High test anxious		
Feel like solving anagrams	4.78	4.44
Control over noise	5.44	1.78
Suspicious	4.33	4.89
Low test anxious		
Feel like solving anagrams	5.22	5.22
Control over noise	4.78	1.44
Suspicious	3.30	3.55

High-test-anxious subjects also felt more suspicious than did low-test-anxious subjects, $F(1, 64) = 4.78$, $p < .05$. There were no other significant differences for suspicion, ratings of aversiveness of the noise, or feelings of being evaluated.

Discussion

The results of the present study clearly demonstrate that subjects chosen on the basis of high TAQ scores are debilitated by a typical laboratory helplessness induction, whereas subjects chosen on the basis of low TAQ scores are not. The finding that not all persons are debilitated by failure is consistent with predictions derived from the theory of test anxiety, as well as with other theories of the dynamics of success and failure (Atkinson & Birch, 1970; Weiner, 1970). The ability of the TAQ to distinguish among those subjects who will be debilitated by a helplessness induction and those who will not raises some interesting possibilities for continued comparisons between the theory of test anxiety and learned helplessness theory. As can be seen in the quotation describing the high-test-anxious person under stress in the introduction to this article, test anxiety theory postulates a phenomenology of the person debilitated by a helplessness induction that is similar to that suggested by helplessness theory. The two theories differ in their description of the specific cognitive deficits underlying observed interference with subsequent task performance, however. Learned helplessness theory postulates that the specific deficit is the perception of noncontingency, whereas test anxiety theory postulates that the deficit is attentional in nature. The human subject has limited information processing capacity, and to the extent that attention is deployed to task-irrelevant self-preoccupation, there is less processing capacity available for task performance (Hamilton, 1975). A critical comparison of the two theories might involve the use of tasks differing in attentional demands as criteria following a helplessness induction. Test anxiety theory, unlike learned helplessness theory, predicts that debilitation in susceptible subjects will be proportional to the attentional demands of the tasks.

Questions can be raised as to the relation between test anxiety and depression. In the present study, we found that high-test-anxious subjects were not less happy than low-test-anxious subjects, $F(1, 64) = 2.04$, $p > .10$. In subsequent pilot work, we have found the TAQ and the Beck Depression Inventory to be significantly correlated, but hardly sufficiently so to account for our results, $r(51) = .25$, $p < .05$. The large literature relating test anxiety to an anxious response to a specific situation (Sarason, 1960; Sarason, 1975; Wine, 1971) also contradicts the assumption that the TAQ is simply an alternative measure of depression. Furthermore, the learned helplessness literature primarily emphasizes that depressed persons who have not received a helplessness induction perform like nondepressed persons who have, not that depressed persons should be more susceptible to an induction.

The results obtained in the present study do not settle the issues we raised in the Introduction concerning the effects of acknowledgment of contingencies on subsequent performance. Further research may be needed, but we believe that the particular wording of our acknowledgment introduced a confounding. We disclosed to the subjects that one subject did not have control over the noise and could not have terminated it. As well as conveying information about the controllability of the noise, we may have inadvertently suggested to the subjects that a comparison between the pair of subjects run together was involved. High-test-anxious subjects are particularly susceptible to social dimensions of the task situation and to performance demands (Sarason & Marmatz, 1965). A less ambiguous test of our hypothesis concerning acknowledgment of contingencies would involve an acknowledgment of contingencies specific to the subject's own task situation.

The finding that test anxiety has relevance to the performance of subjects in a helplessness study highlights the need to reconcile the learned helplessness literature with the large number of experiments that have used similar designs to test theories concerning frustration (Brown & Farber, 1951), stress (Lazarus et al., 1952), anxiety (Mandler, 1972b), test anxiety (Wine, 1971), and the dynamics of success and failure (Brickman, Linsenmeier, & McCareins, 1976). Differences in terminology should not obscure similarities in design. It remains to be seen which theories predict individual differences in susceptibility to failure, when failure produces the greatest subsequent debilitation, and when failure produces facilitation or has no effect. Rather than simply demonstrating the well-established fact that impaired performance often follows experimenter-induced failure, future investigators might better vary dimensions of the task situation relevant to theoretical comparisons.

The need to clarify the relations among competing explanations for the effects of experimenter-induced failure on subsequent performance should be distinguished from the need to demonstrate further parallels between laboratory phenomena and aspects of clinical depression. The reformulation of the helplessness model was accompanied by much speculation about how the depressed person appraises and transacts with his or her environment. In fact, little is known about these processes, although clinical lore abounds. As Lazurus and Launier

(1978; cf. Coyne & Lazarus, in press) have argued, more attention must be directed to the description of the precise natural phenomena that laboratory studies attempt to model. It may be premature to refine laboratory models in the absence of such data.

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