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The effect of subjects' expectancies on the appetitive learned helplessness effect

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by

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The Effect of Subjects' Expectancies on the Appetitive Learned Helplessness Effect

by

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Over the last few years, theorizing in the area of learned helplessness has been dominated by an attributional approach, most notably the reformulated Learned Helplessness Theory of Seligman and his collaborators. This approach emphasizes the subjects' phenomenal experiences as determinants of helplessness symptoms. More recently, evidence has been presented (Oakes and Curtis, 1982) that the learned helplessness effect can occur independently of subjects' phenomenal experiences, thus contradicting the attributional approach. However, this research has been criticized for not addressing the "fundamental premise" of Learned Helplessness Theory, that it is the expectancy of future noncontingency that is responsible for helplessness symptoms (Alloy, 1982). The present investigation was an attempt to test this latter Learned Helplessness Theory premise.

Subjects played a computer game in which their feedback was either contingent or noncontingent upon their responses. Half of the subjects from each group were led to believe that their responses might be noncontingently related to the outcome on a subsequent target-shooting task. No significant effects of the expectancy manipulation were obtained. Correlational evidence was obtained supportive of the Learned Helplessness Theory premise that subjects' expectancies of future noncontingency is related to subsequent performance.

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INTRODUCTION

Brief Overview

Since the initial demonstrations of debilitated escape-avoidance responding by dogs exposed to uncontrollable shocks (Overmeier and Seligman, 1967; Seligman and Maier, 1967), learned helplessness research has proliferated. Similar effects have been demonstrated in a variety of species including cats, fish, mice and rats, and across a wide range of experimental situations (See Maier and Seligman 1976 for a review.)

More relevant to the present paper is the learned helplessness research conducted with human subjects. A wide variety of conditions, including intellectual achievement (Dweck and Licht, 1980), crowding (Rodin, 1976), victimization (Bulman and Wortman, 1977), the coronary prone personality (Glass and Carver, 1980), and aging (Schulz, 1980), have been related to the helplessness effect (See Garber and Seligman, 1980). Martin Seligman and his collaborators have formulated the theoretical perspective on which most of this work is based (Seligman, 1975; Maier and Seligman, 1976; Abramson, Seligman and Teasdale, 1978; Abramson, Garber and Seligman, 1980; Seligman, Maier and Solomon, Alloy and Seligman (cited in Garber and Seligman, 1980). Despite the abundance of work inspired by this theoretical model, recent research (Oakes and Curtis, 1982) has raised serious questions regarding the theory's most basic assumptions.

Recently, Lauren Alloy, a collaborator of Seligman, has noted, "Surprisingly, after 10 years of intensive research on human helplessness and its applications, the basic postulates of the Learned Helplessness Theory have not been tested adequately. In particular, the pivotal hypothesis of the theory that it is the expectation of act-outcome noncontingency which causes the behavioral and emotional deficits characteristic of helplessness has gone largely unexamined" (Alloy, 1982, p 444).

It is the purpose of the present investigation to examine this pivotal hypothesis of Learned Helplessness Theory. However, in order to fully appreciate the issues at hand, it is useful to review briefly the historical development of the Learned Helplessness Theory.

Review of Learned Helplessness Theory

The earliest version of the theory was designed to explain the interference effects demonstrated in dogs exposed to inescapable shocks. "These dogs behaved differently from naive dogs when placed in a shuttlebox where barrier-jumping would terminate shock. As opposed to the naive dog which urinates, defecates and howls while scrambling across the barrier with shorter and shorter latencies, the dog which has experienced inescapable shocks prior to avoidance training soon stops urinating and howling and remains silent until shock terminates. The dog does not cross the barrier and escape from shock. Rather it seems to give up and passively accept the shock. On succeeding trials, the dog continues to fail to make escape movements and will take as much shock as the experimenter chooses to give" (Maier, Seligman and Solomon, 1969, pp 319-320). In addition, it was observed that if these animals happened to find their way across the barrier, they failed to profit from the response-shock termination contingency. This was as opposed to naive dogs whose successful barrier-jump reliably predicted future, short-latency escape responses.

To explain this interference phenomenon, the original version of Learned Helplessness Theory made certain assumptions:

"(1) The subject makes active responses during exposure to inescapable shocks. (2) Because shock cannot be controlled, the subject learns that shock termination is independent of its behavior. (3) Subjects' incentive for initiating active instrumental responses during a shock is assumed to be partially produced by its having learned that the probability of shock termination will be increased by these responses. When this expectation is absent, the incentive for instrumental responding should be reduced. (4) The presence of shock in the escape/avoidance training situation should then arouse the same expectation that was previously acquired during exposure to inescapable shocks: shock is uncontrollable. Therefore, the incentive for initiating and maintaining responses in the training situation should be low" (Seligman, Maier and Solomon, cited in Garber and Seligman, 1980).

In addition to this "motivational deficit," two other deficits were proposed by Seligman et al., a "cognitive deficit" and an "emotional deficit." The cognitive deficit is exhibited by the subject having difficulty in learning that responses and outcomes are contingently related on subsequent tasks. The prior learning that responses and outcomes are unrelated proactively interferes with subsequent learning that they are related. The "emotional deficit" was proposed as a result of evidence demonstrating that uncontrollable shocks are more aversive, distressing and physiologically stressful than are controllable shocks.

As a result of additional research with animals and the many demonstrations of helplessness with humans, Learned Helplessness Theory was later embellished (Maier and Seligman, 1976; Alloy and Seligman, cited in Garber and Seligman, 1980). In this version of the theory, a subject's expectation of future noncontingency could be influenced by prior expectancies and/or subsequent information about contingencies. An example of prior expectations influencing the expectancy of future noncontingency is the immunization phenomenon (Seligman and Maier, 1967). An organism first exposed to a contingent relationship between responding and reinforcement becomes immune to the effects of a subsequent noncontingent relationship. These subjects show no deficits representative of helplessness.

Additionally, just telling subjects that events are uncontrollable can lead to effects that mimic the effects of noncontingency (Glass and Singer, 1972). The theory predicts that this information produces an expectancy of noncontingency without the subject having ever experienced noncontingency.

In other words, this newer version of Helplessness Theory asserts that the connection between objective noncontingency and a behavioral deficit is not automatic. An intermediate stage including the subject's perception of present and past noncontingency determines that expectancy.

The Reformulation

Seligman and his collaborators later deemed this version of Learned Helplessness Theory inadequate on a number of grounds. Their reformulation (Abramson, Seligman and Teasdale, 1978; Abramson, Garber and Seligman, 1980), is very similar to other learned helplessness models recently proposed (e.g., Miller and Norman, 1979; Roth, 1980). The first inadequacy as they saw it, concerned the possibility of more than one type of human learned helplessness. There appeared to be individual differences among subjects concerning their attributions to the cause of uncontrollable events. One might assume that the events in question are indeed uncontrollable, whereas another subject might assume that the events are controllable but he or she lacks the ability to control them. The latter subject would believe that, although he or she lacks the ability to terminate the noise or solve the problem, for example, other subjects would not lack this ability. These individual differences and their differential effects on self-esteem are addressed more fully in the reformulation of Learned Helplessness Theory. This inadequacy of the older version of the theory will be dealt with below in terms of the new distinction between personal helplessness and universal helplessness.

The second inadequacy addressed in the reformulation concerns the generality of helplessness across situations and chronicity over time. The former versions of the theory did not clearly address this issue. Why helplessness sometimes generalizes to dissimilar situations and sometimes does not was not unaccounted for. Similarly, the amount of time that the helplessness effect persists was dealt with, for the most part, with only post hoc explanations.

In order to deal with these inadequacies, the reformulated learned helplessness theory details dimensions of causal attributions. The three primary attribution dimensions are internal/external, stable/unstable and global/specific.

It is essential to point out that both the old and reformulated versions of Learned Helplessness Theory emphasize that the expectation of noncontingency is the crucial determinant of the symptoms of learned helplessness. Only in the reformulated version of the theory is it specified when experience with objective noncontingency will lead to the expectation that events will be noncontingent in the future. The determining factor for this expectancy is the type of attribution the subject makes after his or her initial experience with a noncontingency between their responses and an outcome. "It is these expectations which, in turn, determine the generality, chronicity and type of helplessness symptoms" (Abramson, et al., 1980, p. 9).

The first inadequacy dealing with whether or not subjects believe that they alone cannot control events, or nobody can, is explained in terms of the first attributional dimension, internal/external. The distinction drawn here is between personal helplessness and universal helplessness. The subject who attributes the noncontingency between responses and reinforcers to his or her own inabilities would be expected to make attributions high on the internal end of the dimension. The subject who believes that this noncontingency is as likely to occur in relevant others as himself or herself should make external attributions. The implications relevant to this distinction are clear. Personal helplessness, the result of internal attributions, is expected to lead to a reduction in self-esteem; universal helplessness, the result of external attributions, does not lead to this deficit.

The remaining attribution dimensions are employed to account for the second set of inadequacies of the older versions of the theory, how persistent the effect is over time and how much generalization occurs to dissimilar situations. The subject's attributions relevant to the stable/unstable dimension serve as a predictor of the persistence of helplessness symptoms. Stable factors are considered to be long-lived and recurrent, whereas unstable factors are short-lived or intermittent. These attributions have a direct effect on the subject's expectancy of noncontingency in the future, with stable attributions more likely to lead to this expectancy, and hence to the persistence of helplessness symptoms. The third dimension, global/specific, addresses the generality of helplessness across situations. Global factors affect a wide variety of situations, whereas specific factors do not.

Because the three dimensions are assumed to be orthogonal to each other, crossing the three dimensions (internal/external × stable/unstable × global/specific) yields eight kinds of attributions individuals can make concerning an objective noncontingency. For example, an attribution for poor performance on the math section of the GRE that is global, internal and stable would be "lack of intelligence" or "laziness." An attribution that is specific, internal and stable would be "lack of math ability" or "math always bores me" (Abramson, Seligman and Teasdale, 1978).

It is necessary to point out that the theory is unable to predict the types of attributions that subjects make following an experience of noncontingency, but rather they can only be assessed post hoc. For example, a subject who experiences an objective noncontingency may or may not formulate an internal/stable/global attribution such as "I am dumb." Only after this point does Learned Helplessness Theory make predictions about subsequent performance.

<u>Attributions and Learned Helplessness</u> (<u>Relevant Research</u>)

Dweck and Repucci (1973) explored the relationship between childrens' attributions for failure and subsequent performance deficits. Children were exposed to two experimenters, one who presented soluble problems and one who presented insoluble problems. Problems from the "success" and "failure" experimenters were randomly interspersed. After a number of trials, the failure experimenter began presenting soluble problems, ones that were virtually identical to problems previously presented by the success experimenter. A surprisingly large number of children failed to solve these problems. This was despite the fact that the children were well rewarded with "highly attractive prizes" for correct solutions. The children were split at the median into two groups, those who failed the soluble problems of the failure experimenter versus those whose performance was not disrupted. It was found that the children whose performance was not disrupted were significantly more likely to attribute their failure to lack of effort. The children who showed performance deficits were more likely to attribute their failure to uncontrollable external factors or lack of ability.

This study does not appear to be a satisfying demonstration of the importance of attributions in learned helplessness. Given that the "successful" children had solved problems with the "failure" experimenter after having failed in this context, the most plausible explanation for that failure would be an unstable factor such as effort. Nisbett and Wilson (1977) have pointed out that people often lack introspective awareness of their own cognitive processes. Explanations for their behavior are based on "a priori causal hypotheses." Therefore, it follows as well that children who persistently fail would most likely utilize a stable factor to explain that failure. Uncontrollable external factors and lack of ability seem more plausible explanations for persistent failure than "lack of effort," a more transient state.

The correlations discovered by Dweck and Repucci between attributions and behavior do not supply evidence that one caused the other despite the inferences drawn that the behavior is the result of the attribution. With Nisbett and Wilson (1977) in mind, the reverse causal relationship, the idea that attributions are the result of behavior, is equally plausible. This would mean that the experience of failing could have caused the subjects to make the attributions they made.

Another attempt at demonstrating the role of attributions in learned helplessness was made in a subsequent study (Dweck, 1975). It was hypothesized that altering children's attributions for failure would alter their responses to failure. "Helpless" children were divided into two treatment groups. One group received "success only" treatment designed to expose these children to the contingency between behavior and outcome and to bolster their confidence. An easier task permitted these children to succeed on every trial. The other group of children received "attribution retraining." Although, here too, success predominated, several failure trials were programmed. During these failure trials, the failure was explicitly attributed by the experimenter to a lack of effort. The results showed no improvement for the success only children in performance following failure in subsequent testing. Failure on this post-testing led to debilitated performance in these subjects despite the fact that they showed steady improvement during the success only phase. Children in the attribution retraining condition showed improvement in their responses to failure.

A more appropriate test of attribution retraining would call for the inclusion of a group of subjects receiving the same pattern of successes and failures during the attribution retraining phase without the experimenter mentioning "lack of effort." Otherwise, the results are easily derivable in terms of basic conditioning principles with the attribution manipulation irrelevant. The success only group is equivalent to a continuous reinforcement group, the attribution retraining group is equivalent to a partial reinforcement group, and the resulting performance in the face of failure is interpretable in terms of a partial reinforcement effect.

Klein, Fencil-Morse and Seligman (1976) attempted to manipulate subjects' attributions for failure during exposure to insoluble problems. Subjects receiving internal-attribution-for failure instructions were led to believe that most subjects solve at least three of the four problems. Subjects receiving external-attribution-for-failure instructions were led to believe that the problems were very difficult with 90% of the subjects failing on all four.

The results showed that subjects who experienced insoluble problems were impaired on the anagrams test task. Subjects who were predetermined as "depressed" by means of the Beck Depression Inventory were differentially effected by the attribution manipulation in the predicted direction. For these "depressed" subjects, the external attribution instructions eradicated the effect of pretreatment with insoluble problems; the internal attribution manipulation did not. These results are difficult to interpret even in terms of attribution theory explanations of learned helplessness. The internal/external attributional dimension is expected to affect self-esteem, not subsequent performance per se. The global/specific and stable/unstable attribution dimensions are thought to be relevant to subsequent performance. The fact that the internal/external dimension manipulation affected anagram performance in these "depressed" subjects could be explained by the proposition that the global/specific and stable/unstable dimensions may have covaried with the internal/external dimension. Therefore the presence or absence of the behavioral deficit found in this study for "depressed" subjects may have been due to an attributional dimension other than the one that the experimenters had planned to manipulate. In this study, subjects were led to believe that they were "stupid" for being unable to solve problems that almost everyone else could solve (a global factor), or subjects were led to believe that those problems were especially difficult (a specific) factor. Surprisingly, however, the results also showed that for "nondepressed" subjects anagram performance was the same regardless of what type of attributional manipulation they received. Why attribution manipulations had differential effects for "depressed" and "nondepressed" subjects is unclear.

Another study that attempted to manipulate attributions experimentally in a learned helplessness context was that of Tennen and Eller (1977). Subjects were given insoluble discrimination problems that were labeled either progressively "easier" or progressively "harder." The argument was that failure on easy problems would more likely lead to attributions that were internal, stable and global such as lack of ability. Subjects who failed on the "easier" problems performed worse on a subsequent anagrams task. Subjects who failed on the "harder" problems were not so affected. This study failed, however, to include self-report data of what subjects' attributions were, along with the behavioral evidence.

Oakes and Curtis (1982) have argued that studies such as these have suffered from confounding. In these studies the noncontingency has been quite easy for the subjects to recognize. The frustration and anger that this causes in subjects who are aware that they have been "lied to," may be the cause of the behavioral deficit as opposed to the noncontingency per se. "Easier" problems recognized as insoluble may lead to greater frustration than "harder" problems since subjects may resent being made to look "stupid."

This confound is more evident in a study by Koller and Kaplan (1978). Subjects were given reinforcement feedback for problem solving noncontingently related to their own performance. "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" (Koller and Kaplan, 1978, p. 1179). Some of these subjects were later told that they had not been in control of the pretreatment task but were assured that during testing reinforcement would be contingent upon the subject's responding. During testing, no behavioral deficits indicative of helplessness were found in these Told subjects though helplessness effects were found in subjects Not Told.

This study would appear to support Learned Helplessness Theory in that test performance was seemingly determined by the subjects' expectancy of future noncontingency. Subjects who were told that the test task would be contingent presumably did not have an expectancy of noncontingency and hence did not show performance decrements. However, since subjects were obviously aware of the noncontingency, resulting frustration could have been responsible for behavioral deficits. Subjects in the Told condition may have become less frustrated by virtue of their being assured that the test task would be response-contingent, which eliminated performance deficits on the test task.

A similar explanation of this "debriefing-produced reversal" has been offered by Tennen and Gillen (1979). Their argument is that ."... debriefing lends credibility to the subsequent test task by validating subjects' existing perceptions. When an individual is exposed to uncontrollable outcomes in a laboratory, s/he perceived the task to be 'fixed' by the experimenter or the experimental situation. Debriefing validates this perception" (p. 639).

The most impressive of the studies testing the attributional approach to learned helplessness was conducted by Miller and Norman (1981). Using clinically depressed inpatients as subjects, this investigation found alleviation of learned helplessness and depression consistent with the predictions of an attribution model. After induction of learned helplessness with inescapable noise, subjects were given a success phase. Subjects were asked to take two kinds of intelligence tests, one measuring social intelligence, the other measuring verbal intelligence.

"After these instructions subjects, in attribution conditions, were given one of five sets of attribution instructions: internal-general, internal-specific, external-general, external-specific, or success only. Subjects in both internal conditions were told that performance was due to ability. Subjects in the internal-general condition were told that performance on both tests was due to general intellectual ability, 'which, influences how well a person will do on a large number of different types of tests'. The subjects in the internal-specific condition were told that performance was related to social ability, 'which only influences how well people do on tests of social skills or interpersonal functioning'. Subjects in the external conditions were told that performance was due to task ease or difficulty. The subjects in the external-general condition were told that both tests would be either difficult or easy, whereas subjects in the external-specific condition were told that performance on the first test was related to task difficulty. Subjects in the success only condition received no attribution instructions" (p. 116).

After completing these tests, subjects were told that they had gotten 80% correct, placing them in the top 10% of all people tested. The results of the dependent measures for depressed mood were consistent with an attribution approach. Subjects who received the internal attribution manipulation for the success phase reported significantly less depressed mood than subjects who received the external attribution or success only (or exposure to helplessness induction only) manipulations. Recall that the internal/external dimension is related to self-esteem.

Also, results that the subjects in the general attribution conditions reported significantly higher expectancies for success and performed better on anagrams than subjects in the specific attribution conditions fall right in line with an attributional interpretation of learned helplessness. However, a measure of subjects' expectancy of "control" yielded no significant main effects. This is contrary to an attribution model of learned helplessness where it is predicted that expectancy of control is the key determinant of helplessness symptoms. The independence between the expectancy of control and the helplessness results found here are explained by Miller and Norman (1981) in terms of the inadequacy of the methods used to assess expectancies of control. These authors point out that subjects in their study, as well as in previous studies, "reported considerable difficulty in understanding the construct of control, especially when presented in a single item questionnaire format" (p. 122). This problem has also been noted in our laboratory; each subject had his or her own interpretation of what the term "experimenter control" meant to them (Oakes and Linden, Note 1).

This construct of control, which subjects have difficulty understanding, has been given a crucial role by attributional models of learned helplessness. Recall that the critical premise of Learned Helplessness Theory is that the expectancy of future noncontingency (used interchangeably by that theory's authors with expectancy of future uncontrollability) determines helplessness symptoms. Miller and Norman note, however, "that the lack of recognition of the construct of control does not necessarily imply that the construct is irrelevant to the individual's behavior. As discussed by Nisbett and Wilson (1977) and Langer, cited in Garber and Seligman, 1980), individuals may not have cognitive awareness of the relevant dimensions of their behavior" (p. 123). Though it is granted that the concept of control is relevant to behavior, it is not accepted that it can be used in an attributional framework if subjects are not aware of it. What is a "cognitive expectancy" of which a subject is not aware? If a conscious awareness that one is not in control is held responsible for behavioral deficits, what does it mean for this awareness to be unconscious?

In a similar study, Pasahow (1980) had found that a manipulation designed to result in global attributions for failure on a response-independent task led to a behavioral deficit on anagram solving. Another group experienced a manipulation designed to result in specific attributions for their failure. The specific attribution group performed significantly better than the global attribution group or a no attribution group. These results are highly supportive of an attributional model of learned helplessness which predicts that failure attributed to specific causes should not generalize to a subsequent task. In addition, the specific attribution group reported higher expectancies for success on the anagrams task. However, global-attribution and specific-attribution groups did not make different global-specific attributions. Pasahow also cites Nisbett and Wilson to explain their result. The argument presented, therefore, is that subjects in this experiment had the causal attributions in question but were not aware of them. It seems Pasahow must be calling for a new definition of the concept "attribution" since it has heretofore always been treated in the literature as a conscious process.

It does appear, interestingly, that both Pasahow (1980) and Miller and Norman (1981) were successful in influencing subjects' "expectancy for success" which correlated highly with anagram test task performance. The conceptual differences between "expectancy of success" and "expectancy of control," however subtle, need to be addressed in future research of this type.

The Challenge

An experimental challenge to the attributional explanation of the learned helplessness phenomenon has been mounted in a pair of studies which demonstrate the behavioral deficits characteristic of helplessness independently of subjects' perceptions of and/or attributions for noncontingency (Oakes and Curtis, 1982).

Subjects shot a light gun at a target in a brightly illuminated room. It was the subjects' task to hit a photoreceptor at the bullseye with the beam of light from the gun. The subjects had no way of telling whether or not they were successful in hitting the bullseye except for a tone that sounded indicating a hit. For half of the subjects, the tone was contingently related to shooting accuracy. The other half of the subjects were yoked to the first, and received an equal number of tones as the contingent subjects (in the same pattern) but unrelated to their own responses.

For Experiment 1, a manipulation orthogonal to the Contingency/Noncontingency manipulation was whether or not the tone feedback was a positive or negative signal. For half of the subjects, the tones signaled hits; for the other half, the tones signaled misses. All subjects, including a control group not exposed to the target-shooting phase, were later tested for learned helplessness with an anagram task. At the conclusion of the experiment, subjects who participated in the target-shooting phase of the experiment were given a questionnaire designed to assess their awareness of the noncontingency. Their attribution for success or failure in the target-shooting task was also assessed, with subjects asked to assign percentages to the factors of ability, task difficulty, effort, chance or luck, and experimenter control. The results showed that noncontingent subjects performed significantly worse than contingent and control subjects in solving anagrams. The type of feedback experienced, positive or negative, had no effect. In addition, the results showed no differences among the four groups in terms of perception of the noncontingency or the attributions for success or failure. Experiment 2 took the issue of awareness an additional step. After the target-shooting phase of the experiment, in which subjects received either contingent or noncontingent positive feedback, half of the subjects were told that their feedback was not related to their actual performance. This manipulation was orthogonal to the Contingency/Noncontingency manipulation; thus half the subjects told about the "noncontingency" were in fact contingent subjects. This was followed by the same anagrams test task and questionnaire used in Experiment 1.

The results showed that the only factor to have an effect on anagram performance was the actual Contingency/Noncontingency factor. Once again, the noncontingent subjects performed significantly worse than the contingent and the control subjects. Whether or not subjects were told about the "noncontingency" had no effect and there were no significant interactions. As in Experiment 1, no differences were found in terms of perception of the noncontingency, "during the target-shooting task," or attributions for success or failure.

Oakes and Curtis argue that the results of these two experiments demonstrate learned helplessness in the absence of "awareness" of the noncontingency and in the absence of differential attributions. In explanation for the discrepancy between these findings and previous research in support of an attribution-expectancy approach, these authors point out that "in most learned helplessness research with human subjects, the noncontingency has been quite easy for the subjects to recognize" (Oakes and Curtis, 1982).

For example, in studies that have exposed subjects to uncontrollable shock (e.g., Glass and Singer, 1972; Hiroto, 1974; Thornton and Jacobs, 1971) or uncontrollable noise (e.g., Hiroto and Seligman, 1975; Krantz, Glass and Snyder, 1974), it is reasonable to assume that a subject can readily tell that the aversive stimuli are noncontingently related to his or her responding. Studies such as these confound noncontingency with the frustration and anger produced in subjects in this type of situation. Behavioral deficits on a subsequent task may be the result of this frustration and anger rather than the noncontingency per se. Similarly, subjects' attributions to failure might be the result of their awareness of the noncontingency as opposed to the noncontingency itself.

In another type of learned helplessness experiment, subjects are exposed to insoluble problems and given nonveridical feedback about whether or not they were solving the problems (e.g., Benson and Kennelly, 1976; Cohen, Rothbart and Phillips, 1976; Fosco and Geer, 1971; Griffith, 1977; Hiroto and Seligman, 1975; Koller and Kaplan, 1978; Roth and Kubal, 1975). It is likely that subjects can tell whether or not their solutions actually work independently of experimenter feedback. Once again, a confound exists between the frustration and anger resulting from feelings of being "lied to" and noncontingency. Subjects' attributions may once again be the result of awareness of the noncontingency as opposed to noncontingency per se.

Oakes and Curtis (1982) argue that their target-shooting studies, in which subjects were not aware of the noncontingency, represent the first unconfounded demonstrations of human learned helplessness. Oakes (1982) argues that the two Oakes and Curtis experiments employed all necessary controls to demonstrate an unequivocal causal relationship between objective reinforcement noncontingency and a subsequent behavioral deficit. He points out that the cognitive learned helplessness theory makes no provision for objective noncontingency producing a behavioral deficit or an explanation of future noncontingency presumed to cause the behavioral deficit except through a chain of cognitive processes that necessarily includes the subject's awareness of the objective noncontingency. Since contingent and noncontingent subjects in the two Oakes and Curtis experiments were not differentially aware of noncontingency, the helplessness of the noncontingent subjects, he argues, is inexplicable in terms of that theory.

Evidence has been previously presented showing that attribution manipulations can alter subjects' "expectancy of success" and subsequent performance (e.g., Pasahow, 1980; Miller and Norman, 1981), but no evidence has yet been presented demonstrating that these attributions are necessary for the demonstration of a helplessness effect.

A Rebuttal

In response to the challenge to the Learned Helplessness Theory presented by the Oakes and Curtis studies, Alloy (1982) argues that those studies fail to directly address the major premise of the model. In all versions of the Helplessness Theory, the fundamental proposition is that "it is the expectation of future response-outcome independence that is the cause of behavioral and emotional helplessness effects" (Alloy, p. 457). The Oakes and Curtis studies measured the subjects' perceptions and attributions relevant to the past noncontingency, the target-shooting, but no measure was taken relevant to their expectations about the future task, anagram solving.

It is puzzling why subjects should have an expectancy of future noncontigency without having perceived a past noncontingency. However, in order to put this specific issue at rest, such measures were employed in the present investigation.

In addition, Alloy argues that the Oakes and Curtis studies are irrelevant to the issue because they challenge the necessity of the subjects' awareness and expectancies. She argues that in Learned Helplessness Theory the expectation of the future response-outcome independence is a "sufficient" condition for helplessness deficits to occur.

The Present Investigation

It was the purpose of the present investigation to explore more fully the issue of the subjects' expectancy of future noncontingency with a design that does not allow subjects to "see through" the deception. Given the report by Oakes and Curtis (1982) that such a design prevents subjects from recognizing the noncontingency, it was hypothesized that subjects would not have an expectancy of future noncontingency. A finding that there are behavioral deficits characteristic of helplessness, independently of an expectancy of future noncontingency, would support the argument that this proposition of Learned Helplessness Theory and similar models is not necessary for the demonstration of the helplessness effect. The present study utilized a computer game (note 2) in which the subjects' task was to launch a rocket to intercept a moving target. Whether or not the rocket collided with the target was programmed to occur contingently or noncontingently with subjects' responding. This game has been successfully utilized in a recent study (Oakes and Fox, 1984) in which a behavioral deficit was established on a word recognition task independently of subjects' perceptions of and/or differential attributions for the noncontingency during the computer game.

Directly after the computer game task, as opposed to after the entire experiment as in the Oakes and Curtis studies, subjects were asked, by means of a questionnaire, about their perceptions of noncontingency and attributions for success or failure. Because of the problems discussed by Miller and Norman (1981) and Oakes and Linden (note 1) in reference to subjects' understanding of the construct of control, additional questions were added in this study designed to address this same issue. Oakes and Curtis used the term "experimenter control" as the one item to be considered by subjects if they happened to believe that they had been receiving noncontingent feedback. The additional questions address this possible problem of questionnaire reliability when single items are used to assess subjective perceptions (see Miller and Norman, 1981). The test task in the present study was the target-shooting task that Oakes and Curtis employed as their pretreatment task. A recent study (Oakes and Linden, note 1) has found this to be a sensitive task to helplessness deficits after noncontingent feedback on an auditory discrimination pretreatment. However, because that study found a strong sex effect, with males performing the task significantly better than females, the present experiment included a separate analysis for the two sexes. The key manipulation in this study occurred before the target-shooting phase. Subjects were led to believe that the target-shooting machinery may not have been giving veridical feedback such that the tone reinforcers may have been noncontingently related to their shooting accuracy. Subjects were then asked, by means of a questionnaire, about their expectancy of future noncontingency on the target-shooting task that followed.

To ensure against this questionnaire affecting target-shooting performance independently of any of the other manipulations, half of the subjects were administered this questionnaire at the completion of the experiment. Questions were reworded in the past tense to see how subjects expected to perform on the target-shooting task (see Appendix for questionnaires).

The fundamental premise of Learned Helplessness Theory would be severely challenged if a behavioral deficit were obtained on the target-shooting as a result of the objective noncontingency on the computer game independently of the expectancy manipulation. A demonstration of the objective noncontingency of the computer game influencing subsequent target-shooting performance while the expectancy of future noncontingency manipulation does not would challenge the sufficiency of this Learned Helplessness Theory premise as well.

Method

Subjects

The subjects were 120 males and 120 females recruited from the Brooklyn College Introductory Psychology course subject pool. Subjects were randomly assigned with the constraint that males and females were equally distributed among the six cells.

Procedure

The experiment involved two phases, the first was the computer game, and the second the target-shooting task. The computer game was played on a Radio Shack TRS-80 (Model 1) computer. During the game, an arrow moved across the top of the video display from left to right. It was the subject's task to launch an intercepting rocket (accomplished by depressing the space bar on the keyboard) to collide with the arrow traversing the screen. If this was accomplished, three asterisks flashed at the point of impact indicating a "hit." Subjects were informed that the target arrow moved at a "varying rate of speed such that even the best shooter cannot expect to hit it every time." The game continued until 100 intercepting rockets were launched. For a contingent subject, the asterisks flashed if the intercepting rocket collided with the target arrow. If not, no flashing asterisks appeared indicating a "miss." Each noncontingent subject was yoked with the preceding contingent subject, with the noncontingent subject receiving the same pattern of "hits" or "misses" as the yoked contingent subject had received on the basis of his or her performance. When a noncontingent subject was due for a "hit," the computer sped up or slowed down the target arrow to ensure a collision with the rocket independently of when the subject launched the rocket. Thus yoking permitted the noncontingent subjects to "improve with practice" like the contingent subjects, thus reducing the likelihood of their becoming suspicious.

As an additional safeguard against the subjects becoming suspicious, the computer did not permit the launching of a rocket if the target arrow had already moved too far to the right of the screen. A collision in this case would have been impossible unless the target arrow were to move backwards. Subjects would certainly have perceived such an oddity. Therefore, if noncontingent subjects were due a reinforcement, they would receive one on the very next trial provided they did not once again fire too late. With this exception, the yoking resulted in the contingent and noncontingent subjects receiving exactly the same numbers and patterns of reinforcement.

After the subjects completed the computer game, each subject was administered The Multiple Affect Adjective Checklist (Zuckerman and Lubin, 1965) and a questionnaire assessing their awareness, feelings of helplessness, and attributions for success or failure.

The second phase of the experiment was the target-shooting task. In the target-shooting, the subjects' task was to aim a light gun at a target and pull the trigger. The gun was fashioned by adding a pistol grip and a trigger switch to a flashlight designed for use as a pointer with projected slides. The intensity of the concentrated v-shaped beam was reduced by fixing two polaroid lenses over the flashlight lens, with one polaroid lens turned so that the intensity is reduced enough that the subject could not see it, but so it was just intense enough to activate a photoelectric cell in the bullseye of the target. The target was 12 in. in diameter, consisting of concentric rings painted flat black and white, with a photoreceptor cell in the bullseye. The room was fully illuminated with fluorescent bulbs in the ceiling. The subject was seated 5 ft. from the target, which was at his or her eye level.

Subjects were given 100 trials. For each trial an orange signal lit up on a panel above and behind the target for a two second period, during which time the subject had to aim and pull the trigger. At the end of the period, a tone would sound indicating a "hit" if the photoreceptor cell was hit at any time during the two second trial period by the light beam from the gun. If not, no tone would sound, indicating a "miss."

Prior to the target-shooting but after the subjects received their target-shooting instructions, half of the contingent subjects and half of the noncontingent subjects (on the computer game) were told: "Only one out of every three subjects who shoots at this bullseye can control the tone. That means that for one out of three subjects, when he or she hits the bullseye, the tone will sound just like I said it would. However, for the remaining two out of three subjects this machinery is rigged. That means when the subject hits the bullseye the tone may not sound or when the subject misses the bullseye the tone may sound anyway. It would have nothing to do with your shooting accuracy if this machinery is rigged. It's going to be your task to figure out whether or not the machinery is rigged."

Subjects at this point were given the "rationale" for this procedure in order to alleviate their obvious suspicion regarding the credibility of the experiment: "Now there's an easy way to do that (figure out if the machinery is rigged). If you were to aim at the ceiling or the walls and the tone sounded you would know that it is rigged...but I don't want you to do that...as a matter of fact if you don't aim directly at the bullseye, I arrange for the tone not to sound so that you couldn't benefit from that kind of testing anyway. Let me tell you how I want you to do this. Let's say on a given trial you aim right at the bullseye. Now on that trial the muscles in your arm will feel a certain way which sends biofeedback to your brain telling you where your arm is. Let's say on that trial you pull the trigger and you hear the tone. Now let's say another trial comes along and on this trial your arm feels exactly the same way it did on the trial when you heard the tone only this time you pull the trigger and you don't hear the tone; that might make you suspicious. The object of this experiment is to see if you can use that biofeedback to determine whether or not this machinery is rigged. As you can probably see for yourself, biofeedback is the only cue we have left available to you. That tone I said would signal a hit may not be telling you the truth. You can't see the light from the gun hitting the target because we have this lamp shining on the target. There is no sight on the gun to line up with. We have left you nothing except for your own biofeedback and we want to see if you can use that alone to solve our problem." This manipulation was meant to create an expectancy of noncontingency and yet still get subjects to attempt to aim properly at the bullseye. This expectancy of noncontingency was then measured by means of a questionnaire administered at this point. "Before we proceed with the target-shooting I have this questionnaire for you to fill out." This questionnaire was administered to half of all subjects including a control group who received no computer game experience. This control group provided a baseline for target-shooting. The remaining half of the subjects filled out the expectancy questionnaire after the target-shooting.

There were thus six groups of subjects. Four groups participated in the computer game phase: Contingent Told (CT), receiving contingent feedback on the computer game and led to believe that their feedback during the target-shooting would be noncontingent; Contingent Not-Told (CNT), receiving contingent feedback on the computer game and given no expectancy manipulation relevant to the target-shooting; Noncontingent Told (NCT), receiving noncontingent feedback during the computer game and led to believe that their feedback on the target-shooting would be noncontingent; and Noncontingent Not-Told (NCNT), receiving noncontingent feedback on the computer game and given no expectancy manipulation relevant to the target-shooting. The two remaining groups participated only in the target-shooting phase without playing the video game. These subjects were told "the computer isn't working so go directly to the second phase task." Half of these subjects were given the expectancy manipulation and half were not.

RESULTS

All subjects who played the video game were given a questionnaire designed to assess whether or not they were "aware" of a noncontingency between their performance and the number of hits for which they were given credit. The 80 control subjects who did not play the video game did not fill out an attribution questionnaire. The mean responses for all attribution questionnaire items for all subjects is presented in Table 1. At this point in the experiment, the expectancy manipulation had not yet occurred, thus the only meaningful comparison relevant to this issue was between the contingent and noncontingent groups. If the noncontingent subjects had conscious awareness of the deception then it would be expected that their questionnaire responses would differ from the responses of those who were not deceived. The results of a multivariate analysis of variance (MANOVA) found no differential responses for the two groups ($F < 1$). (See Table 2 for summary table).

The mean responses for contingent and noncontingent subjects separately for each questionnaire item are presented in Table 3. Of the 12 univariate tests performed, one for each questionnaire item, 1 item resulted in an apparent significant difference between contingent and noncontingent subjects. However, the probability value for item 8E, $p = .049$, was obtained without adjustment for the number of tests performed.

TABLE 1

Means and Standard Deviations of Responses to the

Attribution Questionnaire (Overall)

(Items 1 to 7 represent subjects' ranking 1 - 10)

(NOT AT ALL - COMPLETELY)

ITEM	DESCRIPTION	MEAN	S.D.
1	Ability	5.61	(1.87)
2	Task Difficulty	5.22	(2.22)
3	Effort	6.30	(2.05)
4	Chance or Luck	5.12	(2.31)
5	Exp. Rigging	4.68	(2.74)
6	Game Rigged	4.06	(2.59)
7	Exp. Misled	2.36	(1.91)

(Items 8A to 8E represent subjects' ranking 1 - 5)

(MOST RESPONSIBLE - LEAST RESPONSIBLE)

ITEM	DESCRIPTION	MEAN	S.D.
8A	Ability	2.65	(1.25)
8B	Task Difficulty	3.18	(1.24)
8C	Effort	2.46	(1.25)
8D	Chance or Luck	3.25	(1.40)
8E	Exp. Rigging	3.41	(1.65)

TABLE 2

Summary table for MANOVA on the

Attribution questionnaire

SOURCE	Hotellings T^2	F	DF	p
C	11.53824	.58586	12,145	.851
T	14.71078	.74693	12,145	.704
C × T	24.84006	1.26108	12,145	.248

C = The Contingency/Noncontingency factor

T = The Told/Not Told factor

TABLE 3

Means and Standard Deviations of Responses to the

Attribution Questionnaire

(By the Contingency/Noncontingency Factor)

(Items 1 to 7 represent subjects' ranking 1 - 10)

(NOT AT ALL - COMPLETELY)

ITEM	DESCRIPTION	CONTINGENT		NONCONTINGENT		p
		MEAN	S.D.	MEAN	S.D.	
1	Ability	5.59	(1.94)	5.63	(1.80)	.899
2	Task Difficulty	5.11	(2.35)	5.32	(2.09)	.547
3	Effort	6.31	(2.08)	6.29	(2.04)	.939
4	Chance or Luck	5.04	(2.36)	5.20	(2.26)	.657
5	Exp. Rigging	4.44	(2.93)	4.91	(2.53)	.189
6	Game Rigged	3.84	(2.62)	4.29	(2.56)	.273
7	Exp. Misled	2.45	(2.06)	2.28	(1.76)	.564

(Items 8A to 8E represent subjects' ranking 1 - 5)

(MOST RESPONSIBLE - LEAST RESPONSIBLE)

ITEM	DESCRIPTION	CONTINGENT		NONCONTINGENT		p	p*
		MEAN	S.D.	MEAN	S.D.		
8A	Ability	2.56	(1.28)	2.74	(1.21)	.376	
8B	Task Difficulty	3.16	(1.12)	3.20	(1.36)	.849	
8C	Effort	2.38	(1.29)	2.54	(1.22)	.414	
8D	Chance or Luck	3.19	(1.42)	3.31	(1.39)	.574	
8E	Exp. Rigging	3.66	(1.56)	3.15	(1.70)	.049	.45

p* = the probability value corrected with the Bonferroni technique

When the Bonferroni technique[1] was utilized to correct for the 12 statistical tests that were administered, the adjusted significance for item 8E became $p = .45$.

Item 8 asked subjects to rank, from "most responsible" to "least responsible" for their video game performance, 5 attributions: Ability, task difficulty, effort, chance or luck, and experimenter rigging.

If we examine these attributions separately, as shown in Table 3, item 8E, "Experimenter Rigging," was apparently ranked higher by noncontingent subjects ($p < .05$). This would indicate that noncontingent subjects correctly identified that the video game was rigged. However, caution should be exercised before reaching a conclusion of significant differences based on the results of one of many univariate tests. The increased expectancy of a type 1 error ($p = .45$ after Bonferroni adjustment) can be applied here as an explanation for the obtained result.

On the other hand, the conclusion of no differential attributions as a function of the objective noncontingency, though consistent with the hypothesis, was reached on the basis of nonsignificant differences on a MANOVA, not the most powerful test for finding significant differences. In order to strengthen the argument that subjects, who received noncontingent feedback during the video game, did not

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[1] $p^* = 1 - (1 - p)^k$ when p = the observed significance and p^* = the corrected significance for k number of statistical tests.

respond differently on the attribution questionnaire than contingent subjects, a scale was created combining questionnaire items.

Questionnaire items 1 through 4 measured the degree to which subjects attributed their computer game success to the factors of ability, task difficulty, effort and chance or luck, respectively, factors other than experimenter rigging or deception. A high score on these items represents a belief on the part of the subject that deception on the part of the experimenter was not responsible for their computer game performance. However, a high score on items 5, 6 and 7, in which subjects could attribute their success to rigging or deception, represents a belief on the part of subjects that they were deceived. Therefore, items 5, 6, and 7 were recoded so that 10=1, 9=2, etc., and a high score would mean a lack of suspicion of the experimenter as in items 1 through 4.

Items 8A through 8E were made consistent with this scale. Subjects were asked to rank from 1 to 5 (most responsible to least responsible for their computer game performance) ability, task difficulty, effort, chance or luck or experimenter rigging. A value of 1 in this case would mean that subjects thought the factor to be "most responsible." A low value, such as 1, for "experimenter rigging" would be consistent with the scale where low values represent suspicion. Therefore, item 8E, "experimenter rigging," was left the way it was. However, items 8A through 8D were recoded so that 1=5, 2=4, etc. A low score on ability and effort, for example, would be consistent with a higher level of suspicion and consistent with the scale. Responses on items 1 through 8E were summed to create a single scale score. Contingent subjects' scale scores were compared to noncontingent subjects' scale scores and once again no significant differences were obtained (t (158) = 0.8, p = .426). Contingent subjects had a mean scale score of 60.70 while noncontingent subjects had a mean scale score of 59.46.

The use of the more powerful univariate test provides additional support to the hypothesis that contingent and noncontingent subjects made similar causal attributions related to their computer game performance.

Subjects who played the video game were also administered the Multiple Affect Adjective Check List (MAACL) to examine the hypothesis that subjects exposed to a noncontingency would experience an "emotional deficit." Scores on the MAACL for all subjects together, and for contingent and noncontingent subjects separately, are presented in Table 4A. MAACL scores for Told and Not Told subjects are presented in Table 4B.

A multivariate analysis of variance, with the independent variable of contingent vs. noncontingent and dependent variables of hostility, anxiety, and depression

TABLE 4A

Means and Standard Deviations of Scores on the MAACL

(By the Contingency/Noncontingency Factor)

	COMBINED		CONTINGENT		NONCONTINGENT		*p*
	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	
Anxiety	8.25	(3.08)	8.44	(3.10)	8.06	(3.07)	.445
Depression	14.80	(5.04)	14.29	(5.48)	14.54	(5.26)	.536
Hostility	9.11	(3.07)	8.76	(3.40)	8.94	(3.23)	.498

TABLE 4B

Means and Standard Deviations of Scores on the MAACL

(By the Told/Not Told Factor)

	COMBINED		TOLD		NOT TOLD		*p*	*p*'
	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.		
Anxiety	8.25	(3.08)	8.43	(2.59)	8.08	(3.51)	.476	
Depression	14.54	(5.26)	15.39	(4.66)	13.70	(5.70)	.043	.12
Hostility	8.94	(3.23)	8.95	(3.15)	8.92	(3.34)	.961	

p' = the probability value corrected with the Bonferroni technique scores was performed on these data. No significant differences between contingent and noncontingent subjects were obtained ($F < 1$), supporting the hypothesis that noncontingent feedback on the computer game would not produce changes in mood. (See Table 5 for summary table). The 3 univariate tests performed on the MAACL components yielded an apparent significant effect of the Told/Not Told factor on depression ($p = .043$) (see Table 4B). However, the Bonferroni technique was utilized to adjust for the increased alpha rate as a result of performing 3 tests of statistical significance. The resulting corrected significance was $p = .12$ representing a failure to demonstrate a significant effect. This is a reasonable finding considering that the Told/Not told manipulation had not yet occurred at the time subjects filled out the MAACL.

Half of all subjects were led to believe that the target-shoot task would be rigged when in fact it never was. As a manipulation check, subjects filled out a questionnaire designed to assess their expectancies of future noncontingency. Table 6 shows mean responses on all of the expectancy questionnaire items for Told and Not-Told subjects separately. Table 7 separates subjects on the basis of whether they were administered the expectancy questionnaire before or after the target-shooting task. Table 8 shows expectancy questionnaire mean responses for contingent subjects, noncontingent subjects and control

TABLE 5

Summary table for MANOVA on the

MAACL

SOURCE	Hotellings T^2	F	DF	p
C	1.00198	.21586	3,154	.885
T	12.81154	2.76318	3,154	.044
C × T	.74732	.16142	3,154	.922

C = The Contingency/Noncontingency factor

T = The Told/Not Told factor

TABLE 6

Means and Standard Deviations of Responses to the

Expectancy Questionnaire

(By the Told/Not Told Factor)

(Items represent subjects' ranking 1 - 6)

(DEFINITELY NO - DEFINITELY YES)

ITEM	DESCRIPTION	COMBINED	TOLD	NOT TOLD	p
		MEAN S.D.	MEAN S.D.	MEAN S.D.	
1	Ability	3.99 (1.18)	3.72 (1.07)	4.26 (1.23)	.000[a]
2	Effort	4.06 (1.14)	3.69 (1.09)	4.42 (1.07)	.000[a]
3	Chance or Luck	3.36 (1.29)	3.38 (1.26)	3.35 (1.33)	.751
4	Task Difficulty	3.65 (1.40)	3.36 (1.39)	3.96 (1.35)	.036[b]
5	Exp. Rigging	3.56 (1.39)	4.12 (1.15)	3.00 (1.38)	.000[a]
6	Shoot Accuracy	4.08 (1.37)	3.68 (1.32)	4.48 (1.32)	.000[a]

a < .01 after Bonferroni correction

b = .197 after Bonferroni correction

TABLE 7

Means and Standard Deviations of Responses to the

Expectancy Questionnaire

(By whether the questionnaire preceded (EQ1) or followed (EQ2) target shooting

(Items represent subjects' ranking 1 - 6)

(DEFINITELY NO - DEFINITELY YES)

ITEM	DESCRIPTION	COMBINED		PRECEDED		FOLLOWED		p
		MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	
1	Ability	3.99	(1.18)	3.97	(1.12)	4.01	(1.24)	.778
2	Effort	4.06	(1.14)	4.02	(1.03)	4.09	(1.24)	.635
3	Chance or Luck	3.36	(1.29)	3.43	(1.32)	3.23	(1.26)	.128
4	Task Difficulty	3.65	(1.40)	3.72	(1.37)	3.59	(1.44)	.481
5	Exp. Rigging	3.56	(1.39)	3.58	(1.36)	3.54	(1.42)	.839
6	Shoot Accuracy	4.08	(1.37)	4.08	(1.22)	4.08	(1.51)	.960

TABLE 8

Means and Standard Deviations of Responses to the

Expectancy Questionnaire

(By the Contingency/Noncontingency Factor)

(Items represent subjects' ranking 1 - 6)

(DEFINITELY NO - DEFINITELY YES)

ITEM	DESCRIPTION	COMBINED		CONTINGENT		NONCONTINGENT		CONTROL		p
		MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	
1	Ability	3.99	(1.18)	4.12	(1.24)	4.00	(1.08)	3.84	(1.22)	.282
2	Effort	4.06	(1.14)	4.06	(1.04)	4.11	(1.12)	4.00	(1.25)	.807
3	Chance or Luck	3.36	(1.29)	3.39	(1.27)	3.29	(1.34)	3.41	(1.28)	.816
4	Task Difficulty	3.65	(1.40)	3.71	(1.36)	3.81	(1.48)	3.44	(1.34)	.203
5	Exp. Rigging	3.56	(1.39)	3.56	(1.38)	3.36	(1.37)	3.75	(1.40)	.156
6	Shoot Accuracy	4.08	(1.37)	4.09	(1.42)	4.24	(1.36)	3.91	(1.33)	.289

subjects for each of the questionnaire items.

The expectancy manipulation was successful. The MANOVA conducted on the expectancy questionnaire found significant differences as a function of this Told/Not Told factor overall (F (6, 223) = 11.54; $p < .01$). The summary table for the MANOVA on the expectancy questionnaire is presented in Table 9. The relative contribution of the expectancy questionnaire items can be examined. However, the reader should be cautioned about the interpretation of these items on an individual basis since the type 1 error rate is inflated when we examine the six items separately.

Predictably, the Told group did expect that their target-shooting score would be determined by "experimenter rigging or control" to a greater extent than the Not Told group (item 5). Subjects who were Told that the task may be rigged responded "significantly" more towards the "YES" end of the 6-point scale (F (1, 228) = 46.63).

Similar results were obtained for item 2, which asked subjects about the role of their own effort. Subjects led to believe that the task may be rigged expected their own effort to play a smaller role in the target-shooting task (F (1, 228) = 27.32).

The results from item 6 were also as predicted. Subjects who were not led to believe that the task may be rigged were more inclined to report that they expected their

TABLE 9

Summary table for MANOVA on the

Expectancy questionnaire (6 items)

SOURCE	Hotellings T^2	F	DF	p
BEFORE/AFTER (E)	3.18682	.49771	6,223	.810
CONT./NONCONT. (C)	11.45494	.89041	12,444	.557
TOLD/NOT TOLD (T)	73.89900	11.54038	6,223	.000
E × C	19.02810	1.47912	12,444	.128
E × T	14.06580	2.19637	6,223	.044
T at E1(Before)	80.62468	12.86799	6,113	.000
T at E2(After)	23.99530	3.82978	6,113	.002
C × T	12.93530	1.00545	12,444	.443
E × C × T	9.08446	.70612	12,444	.746

"shooting accuracy" would affect the occurrence of the tone reinforcement ($\underline{F}$ (1, 228) = 22.20).

Item number 1 on the questionnaire asked subjects about the extent to which they expected their target-shooting performance to be determined by their own ability. Subjects who were Told that the task may be rigged responded "significantly" more towards the "NO" end of the 6-point scale ($\underline{F}$ (1, 228) = 13.46). These subjects expected that their own ability would be less of a determining factor than subjects who were Not Told.

The Told group also attributed less to the expected effect of task difficulty (item 4) ($\underline{F}$ (1, 228) = 11.17). No significant differences were found for item 3 which asked subjects about the role of chance or luck ($\underline{F}$ < 1).

Univariate Anova summary tables for each of the expectancy questionnaire items are presented in Tables 10 through 15. Once again the reader should be cautioned when interpreting the probability values associated with the univariate tests since the alpha rate for the many tests is inflated. Whether or not subjects experienced an objective noncontingency during the video game phase had no effect on subjects' expectancies about the target-shooting phase ($\underline{F}$ < 1) (see Table 9). Given the conclusion above that subjects were not cognitively aware of this objective noncontingency, no differential expectancies about future noncontingency as a result of this factor would be expected.

TABLE 10

Univariate Summary Table for the Expectancy Questionnaire

(ITEM 1)

(Counter determined by your own ability?)

SOURCE	SS	DF	MS	F	p	p*
E	0.10417	1	0.10417	0.08	0.778	
C	3.32500	2	1.66250	1.27	0.282	
T	17.60417	1	17.60417	13.46	0.000	.006
E × C	2.05833	2	1.02917	0.79	0.456	
E × T	6.33750	1	6.33750	4.85	0.029	.162
C × T	3.10833	2	1.55417	1.19	0.307	
E × C × T	2.27500	2	2.27500	0.87	0.420	
error	298.15000	228	1.30768			

E = Whether the questionnaire was administered before or after

C = The Contingency/Noncontingency factor

T = The Told/Not Told factor

p^* represents the probability value corrected by means of the Bonferroni technique. This procedure corrects for the 6 univariate analyses performed (1 for each questionnaire item).

TABLE 11

Univariate Summary Table for the Expectancy Questionnaire

(ITEM 2)

(Counter determined by your own effort?)

SOURCE	SS	DF	MS	F	p	p*
E	0.26667	1	0.26667	0.23	0.635	
C	0.50833	2	0.25417	0.22	0.807	
T	32.26667	1	32.26667	27.32	0.000	.006
E × C	5.25833	2	2.62177	2.23	0.110	
E × T	0.15000	1	0.15000	0.13	0.722	
C × T	0.50833	2	0.25417	0.22	0.807	
E × C × T	0.92500	2	0.46250	0.39	0.676	
error	269.30000	228	1.18114			

E = Whether the questionnaire was administered before or after

C = The Contingency/Noncontingency factor

T = The Told/Not Told factor

p* represents the probability value corrected by means of the Bonferroni technique. This procedure corrects for the 6 univariate analyses performed (1 for each questionnaire item).

TABLE 12

Univariate Summary Table for the Expectancy Questionnaire

(ITEM 3)

(Counter determined by chance or luck?)

SOURCE	SS	DF	MS	F	p
E	4.00417	1	4.00417	2.33	0.128
C	0.70000	2	0.35000	0.20	0.816
T	0.03750	1	0.03750	0.02	0.883
E × C	1.73333	2	0.86670	0.50	0.605
E × T	0.10417	1	0.10417	0.06	0.806
C × T	0.70000	2	0.35000	0.20	0.816
E × C × T	0.03333	2	0.01667	0.01	0.990
error	392.15000	228	1.71996		

E = Whether the questionnaire was administered before or after

C = The Contingency/Noncontingency factor

T = The Told/Not Told factor

TABLE 13

Univariate Summary Table for the Expectancy Questionnaire

(ITEM 4)

(Counter determined by task difficulty?)

SOURCE	SS	DF	MS	F	p	p*
E	0.93750	1	9.75017	0.50	0.481	
C	6.03333	2	3.01667	1.60	0.203	
T	21.00417	1	21.00417	11.17	**0.001**	.006
E × C	2.70000	2	1.35000	0.72	0.489	
E × T	0.20417	1	0.20417	0.11	0.742	
C × T	1.03333	2	0.51667	0.27	0.760	
E × C × T	7.63333	2	3.81667	2.03	0.134	
error	428.75000	228	1.88048			

E = Whether the questionnaire was administered before or after

C = The Contingency/Noncontingency factor

T = The Told/Not Told factor

p* represents the probability value corrected by means of the Bonferroni technique. This procedure corrects for the 6 univariate analyses performed (1 for each questionnaire item).

TABLE 14

Univariate Summary Table for the Expectancy Questionnaire

(ITEM 5)

(Counter determined by experimenter rigging?)

SOURCE	SS	DF	MS	F	p	p*
E	0.06667	1	0.06667	0.04	0.839	
C	6.00833	2	3.00417	1.87	0.156	
T	74.81667	1	74.81667	46.63	0.000	.006
E × C	7.25833	2	3.62917	2.26	0.106	
E × T	1.06667	1	1.06667	0.66	0.416	
C × T	2.35833	2	1.11791	0.73	0.481	
E × C × T	1.80833	2	0.90417	0.56	0.570	
error	365.80000	228	1.60439			

E = Whether the questionnaire was administered before or after

C = The Contingency/Noncontingency factor

T = The Told/Not Told factor

p^* represents the probability value corrected by means of the Bonferroni technique. This procedure corrects for the 6 univariate analyses performed (1 for each questionnaire item).

TABLE 15

Univariate Summary Table for the Expectancy Questionnaire

(ITEM 6)

(Accuracy effect occurrence of the tone?)

SOURCE	SS	DF	MS	F	p	p*
E	0.00417	1	0.00417	0.00	0.960	
C	4.23333	2	2.11667	1.25	0.289	
T	37.60417	1	37.60417	22.20	0.000	.006
E × C	2.63333	2	1.31667	0.78	0.461	
E × T	11.70417	1	11.70417	6.91	0.009	.053
C × T	6.53333	2	3.26667	1.93	0.148	
E × C × T	0.53333	2	0.26667	0.16	0.854	
error	366.25000	228	1.69408			

E = Whether the questionnaire was administered before or after

C = The Contingency/Noncontingency factor

T = The Told/Not Told factor

p* represents the probability value corrected by means of the Bonferroni technique. This procedure corrects for the 6 univariate analyses performed (1 for each questionnaire item).

Half of all subjects were administered the expectancy questionnaire, in a slightly modified form, after the target-shooting task. This Before/After factor, per se, did not effect questionnaire responses ($F < 1$). This Before/After factor did not interact with the objective noncontingency factor. However, this factor did interact with the Told/Not Told factor. This interaction was evident for the questionnaire overall (F (6, 223) = 2.20; $p < .05$) and for item 1 (F (1, 228) = 4.85; $p < .05$) and item 6 (F (1, 228) = 6.91; $p < .01$) individually.

Analysis of simple effects for the Told/Not Told factor for each of the levels of the expectancy questionnaire explain the nature of the interaction. Subjects who were led to believe that the task may be rigged indicated the influence of this manipulation on their expectancies whether they were given the questionnaire immediately or after the target-shooting task. If the questionnaire was given immediately, Told subjects were more likely to expect a noncontingency as indicated by a significant difference between Told at Not Told groups on the questionnaire overall (F (6, 113) = 12.87; $p < .01$).

A significant effect of the Told/Not Told factor was in the same direction if the questionnaire was given after the target-shooting task (F (6, 113) = 3.83; $p < .01$). However, the magnitude of the difference was reduced when the questionnaire was given afterward. Tables 16A to 16F

TABLE 16A

2 × 2 Table of Means and Standard Deviations for
Expectancy Questionnaire Item 1 (The effect of Ability)
as a function of
whether the questionnaire preceded or followed target shooting
by whether subjects were
Told or Not Told the expectancy manipulation

	TOLD	NOT TOLD	DIFF
BEFORE	3.53 (1.03)	4.40 (1.04)	-.87
AFTER	3.90 (1.08)	4.12 (1.38)	-.22

TABLE 16B

2 × 2 Table of Means and Standard Deviations for
Expectancy Questionnaire Item 2 (The effect of Effort)
as a function of
whether the questionnaire preceded or followed target shooting
by whether subjects were
Told or Not Told the expectancy manipulation

	TOLD	NOT TOLD	DIFF
BEFORE	3.63 (0.96)	4.42 (0.96)	-.79
AFTER	3.75 (1.22)	4.43 (1.17)	-.68

TABLE 16C

2 × 2 Table of Means and Standard Deviations for
Expectancy Questionnaire Item 3 (The effect of Chance or Luck)
as a function of
whether the questionnaire preceded or followed target shooting
by whether subjects were
Told or Not Told the expectancy manipulation

	TOLD	NOT TOLD	DIFF
BEFORE	3.48 (1.31)	3.50 (1.33)	-.02
AFTER	3.27 (1.21)	3.20 (1.33)	.07

TABLE 16D

2 × 2 Table of Means and Standard Deviations for
Expectancy Questionnaire Item 4 (The effect of Difficulty)
as a function of
whether the questionnaire preceded or followed target shooting
by whether subjects were
Told or Not Told the expectancy manipulation

	TOLD	NOT TOLD	DIFF
BEFORE	3.45 (1.37)	3.98 (1.32)	-.53
AFTER	3.27 (1.41)	3.92 (1.39)	-.65

TABLE 16E

2 × 2 Table of Means and Standard Deviations for

Expectancy Questionnaire Item 5 (The effect of Rigging)

as a function of

whether the questionnaire preceded or followed target shooting

by whether subjects were

Told or Not Told the expectancy manipulation

	TOLD	NOT TOLD	DIFF
BEFORE	4.20 (0.97)	2.95 (1.41)	-1.25
AFTER	4.03 (1.31)	3.05 (1.36)	-.98

TABLE 16F

2 × 2 Table of Means and Standard Deviations for

Expectancy Questionnaire Item 6 (The effect of Accuracy)

as a function of

whether the questionnaire preceded or followed target shooting

by whether subjects were

Told or Not Told the expectancy manipulation

	TOLD	NOT TOLD	DIFF
BEFORE	3.47 (1.07)	4.70 (1.05)	-1.23
AFTER	3.90 (1.50)	4.25 (1.51)	-.35

present 2 × 2 tables (Before/After - Told/Not Told) for each of the Expectancy Questionnaire items. In general, the magnitude of the difference between the means of Told and Not Told subjects was greater for subjects who completed the questionnaire before the target-shoot test task.

Subjects were perhaps less inclined to report an expectancy of noncontingency after exposure to the task which was not noncontingent. In fact, any difference between Told and Not Told groups seems to have disappeared as indicated by items 1 and 6 individually.

Item 1, which assessed the subjects' expectancies about the role of their own ability, resulted in Told subjects expecting a reduced role of their own ability in the target-shooting task when the expectancy questionnaire was given immediately (F (1, 228) = 17.60; $p < .01$). No significant differences were obtained when the questionnaire was administered later (F (1, 228) = 1.08; $p > .05$). The same effect of when the questionnaire was administered was obtained with item 6 which asked subjects about the impact of their shooting accuracy on the tone reinforcement.

Told subjects expected a noncontingency when given the questionnaire immediately (F (1, 228) = 26.94; $p < .01$). No differences were obtained when the questionnaire was administered after the target-shooting task (F (1, 228) = 2.17; $p > .05$). In summary, expectancies reported by Told subjects' about the task were influenced by the occurrence of the task.

The key dependent variable was the number of hits subjects made in 100 shots at the target. It was hypothesized that an objective noncontingency, independent of cognitive awareness, would impair performance. However, no significant effects relevant to this contingency factor were obtained (F < 1). Table 17A shows the mean number of hits during the target-shooting task as a function of the objective contingency factor for each of the five blocks. These results represent a nonreplication of effects demonstrated in earlier studies by Oakes and Curtis (1982).

It was also hypothesized that an expectancy of future noncontingency would impair target-shooting performance. This is a prediction derived from Learned Helplessness Theory. However, the Told-Not Told factor did not significantly effect target-shooting performance (F < 1). Table 17B shows the mean number of hits during the target-shooting task as a function of the Told-Not Told factor for each of the five blocks. Subjects led to believe that the task may be rigged did not perform worse than subjects not so deceived.

Two factors did influence target-shooting performance. The first influential factor was the sex factor. Males clearly out-performed females (F (1, 228) = 41.29; p < .01). Table 17C shows the mean number of hits during the target-shooting task as a function of the sex factor for each of

TABLE 17A

Mean number of hits during the target-shooting task per block as a function of the Contingency/Noncontingency factor

	BLOCK					
	1	2	3	4	5	Total
CONTINGENT	3.67	4.12	4.37	4.39	4.34	20.90
NONCONTINGENT	3.16	4.44	4.69	4.25	4.32	20.86
CONTROL	4.05	4.99	4.84	4.65	5.40	23.90

TABLE 17B

Mean number of hits during the target-shooting task per block as a function of the Told/Not Told factor

	BLOCK					
	1	2	3	4	5	Total
TOLD	3.83	4.59	4.57	4.33	4.21	21.47
NOT TOLD	3.42	4.44	4.70	4.58	5.17	22.31

TABLE 17C

Mean number of hits during the target-shooting task per block as a function of the sex factor

	BLOCK					
	1	2	3	4	5	Total
MALES	4.67	5.75	6.15	5.82	6.33	28.73
FEMALES	2.58	3.28	3.12	3.03	3.04	15.06

the five blocks. These results are consistent with those obtained in a previous study by Oakes and Linden (note 1). The other influential factor was the blocks factor. Over the course of the 5 blocks of 20 trials, target-shooting performance improved (F (4, 912) = 6.48; $p < .01$). See Tables 17A through 17C.

The univariate summary table for the blocks factor can be found in Table 18. All interactions among these factors on target-shooting were nonsignificant. The univariate summary table for all of the between group factors is shown in Table 19.

It is worth noting that the Blocks by Told/Not Told interaction approached significance ($p = .053$). One hypothesis relevant here is that Told subjects would be impaired early in testing, relative to the Not-Told subjects, as a result of the expectancy that the target-shooting task was rigged. However,the results obtained are contrary to this hypothesis. Table 17B shows that Told subjects outperformed Not-Told subjects for the first 2 blocks of testing trials.

In fact, the performance of the Not Told group improved relative to the Told group for each successive block. It would appear that as the Not-Told subjects' performance followed a standard learning curve, the Told subjects' performance took some less predictable route. Figure 1 shows the learning curves for the two groups over the 5

TABLE 18

Univariate Summary Table for the Number of Hits during

the Target-shooting task

SOURCE	SS	DF	MS	F	p
S	2244.06750	1	2244.06750	41.29	0.000
C	98.83167	2	49.41583	0.91	0.404
T	8.50083	1	8.50083	0.16	0.693
S × C	96.43500	2	48.21750	0.89	0.413
S × T	1.26750	1	1.26750	0.02	0.879
C × T	2.48167	2	1.24083	0.02	0.977
S × C × T	49.62500	2	24.81250	0.46	0.634
error	12392.47000	228	54.35294		
(Within Factor BLOCK)					
B	178.45833	4	44.61458	6.48	0.000
B × S	53.27833	4	13.31958	1.94	0.102
B × C	39.87667	8	4.98458	0.72	0.670
B × T	64.72833	4	16.18208	2.35	0.053
B × SC	73.60667	8	9.20083	1.34	0.221
B × ST	5.12833	4	1.28208	0.19	0.946
B × CT	36.22667	8	4.52833	0.66	0.729
B × SCT	21.11667	8	2.63958	0.38	0.930
error	6276.38000	912	6.88200		

S = Sex Factor

C = The Contingency/Noncontingency factor

T = The Told/Not Told factor

TABLE 19

Summary Table for Multiple Regression

on Expectancy Questionnaire

Multiple R	.23652
R Square	.05594
Adjusted R Square	.03163
Standard Error	17.37031

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	6	4165.82973	694.30496
Residual	233	70302.56610	301.72775

F = 2.30110 Signif F = .0354

------------------ Variables in the Equation ------------------

Variable	B	SE B	Beta	t	Sig t
E6	.94461	.89768	.07339	1.052	.2938
E3	-1.60726	.87692	-.11772	-1.833	.0681
E5	1.20804	.91733	.09486	1.317	.1892
E4	-1.52984	.86861	-.12132	-1.761	.0795
E1	-.09465	1.21184	-6.329E-03	-.078	.9378
E2	2.92472	1.31168	.18845	2.230	.0267
(Constant)	13.24665	8.57342	1.545	.1237	

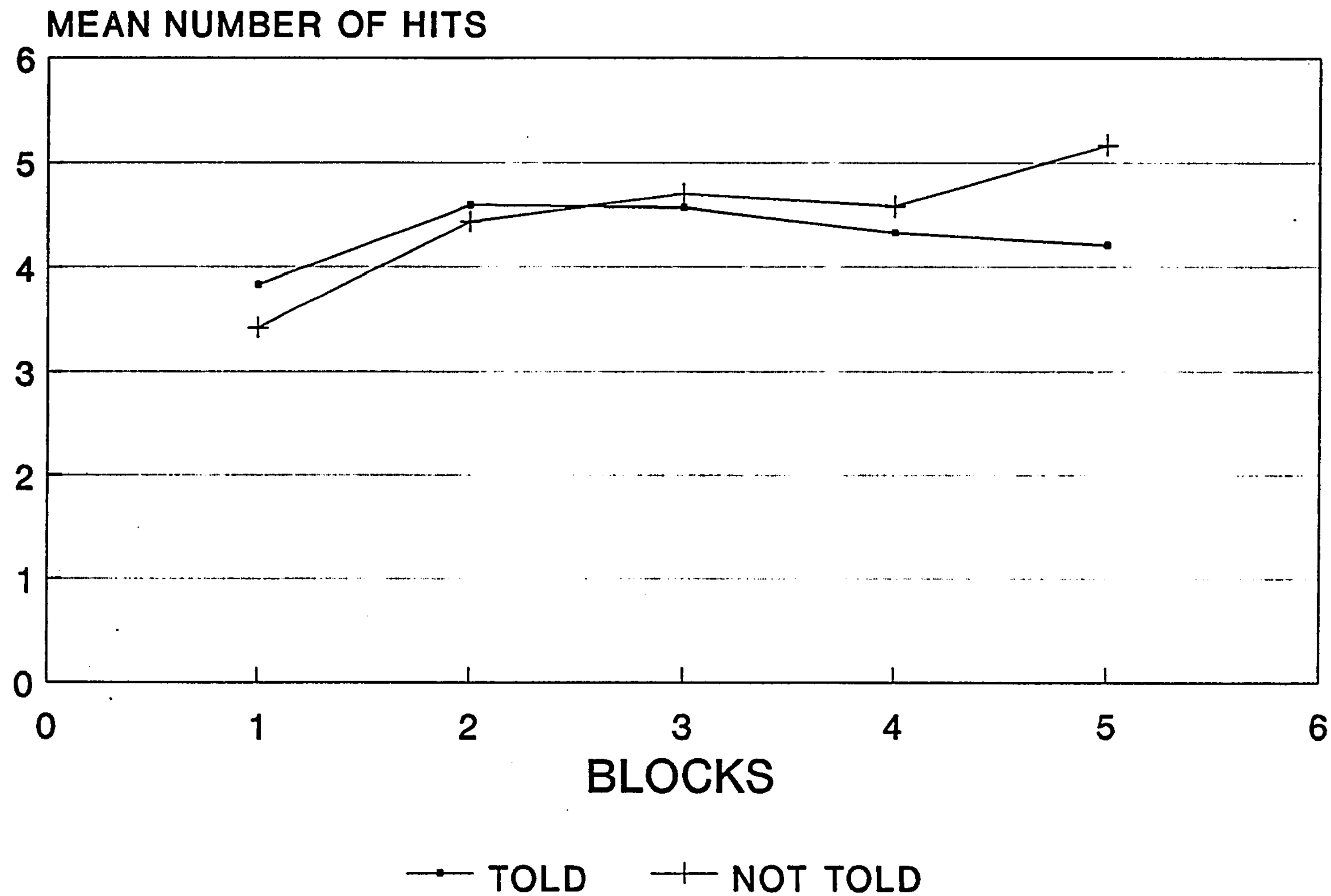

Figure 1 Mean number of hits over blocks for Told and Not Told subjects

blocks of test trials.

This could be interpreted as support for the cognitive model of learned helplessness. The learning curves in Figure 1 show a normal learning pattern for Not-Told subjects and "impaired" learning for Told subjects. It is arguable that with additional blocks of test trials an increasing separation in performance would result between the two groups; the Not-Told subjects would significantly outperform the Told subjects at some point.

A multiple regression analysis was performed to see if subjects' responses on the expectancy questionnaire could be used to predict target-shooting performance. When all 6 questionnaire items were entered into the regression equation, the expectancy questionnaire served as a predictor of the total number of target-shoot "hits" (F (6, 223) = 2.30; $p < .05$). The multiple regression summary table is presented in Table 19.

To further examine the relative contribution of the individual questionnaire items in the prediction of target-shoot performance, a stepwise multiple regression procedure was utilized. After the application of a statistical adjustment to take into account the number of post hoc tests conducted in stepwise multiple regression (Wilkinson, 1979), a nonsignificant relationship was found between questionnaire items and target-shooting performance ($p > .05$).

The individual expectancy questionnaire items that best predicted target-shooting performance were items 2 and 3 (see Table 20). The correlation matrix for the regression analysis is presented in Table 21. Subjects' expectancies about the influence of "their own effort" on their target-shooting performance (item 2), correlated positively with their actual performance with $r = +.14$. Subjects' expectancies about the influence of "chance or luck" on their target-shooting performance (item 3), correlated negatively with their actual performance with $r = -.14$. Surprisingly, item 5 which asked subjects about the expected influence of "experimental rigging or control" on the subsequent target-shooting task was not related to actual performance with $r = +.02$.

Given that half of the subjects were not given the expectancy questionnaire until after the target-shooting task, it is possible that the correlations between expectancies and outcomes could be reduced to "post-diction." Subjects' questionnaire responses may have been influenced by their target-shooting experience as opposed to their target-shooting performance being influenced by their expectancies. For this reason the multiple regression analysis was performed separately for the subjects who filled out the questionnaire prior to the target-shooting task (EQ 1) and those who filled out the questionnaire subsequent to the target-shooting task (EQ 2). The

TABLE 20

Summary Table for Stepwise Multiple Regression

on Expectancy Questionnaire

Multiple R	.18994
R Square	.03608
Adjusted R Square	.02794
Standard Error	17.40337

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	2	2686.51435	1343.25717
Residual	237	71781.88148	302.87714

F = 4.43499 Significance of F = .0129[b]

Variable	B	SE B	Beta	t	Sig t
E3	-1.75463	.87440	-.12851	-2.007	.0459
E2	1.99616	.99390	.12862	2.008	.0457
(Constant)	19.69472	5.32364	3.699	.0003	

Variable	Beta In	Partial	Min Toler	t	Sig t
E1	-.01699	-.01385	.63961	-.213	.8317
E4	-.10274	-.10058	.91636	-1.553	.1218
E5	.08454	.07779	.80974	1.199	.2319
E6	.02524	.02490	.93050	.383	.7024

[b] The application of an adjustment (Wilkinson, 1979), which considers the number of post hoc tests conducted in stepwise regression, results in a probability > .05.

TABLE 21

Regression on Expectancy Questionnaire

Correlation Matrix

E1	E2	E3	E4	E5	E6	HITS	
E1	1.000						
E2	.599	1.000					
E3	-.085	-.091	1.000				
E4	.205	.273	.016	1.000			
E5	-.356	-.424	-.025	-.131	1.000		
E6	.262	.249	-.021	.322	-.250	1.000	
HITS	.077	.140	-.140	-.062	.018	.058	1.000

HITS = the number of hits during the target-shooting task.

results of a multiple regression analysis for EQ 1 subjects only were not significant when all 6 questionnaire items were entered into the regression equation (F (6, 113) = 1.71; $p > .05$) See Table 22 for the summary.

However, the results of a stepwise multiple regression analysis for EQ 1 subjects is consistent with the overall regression analysis. Prior to any adjustment for the number of post hoc tests conducted in stepwise regression, items 3 and 2 appear to contribute to the prediction of the number of target-shoot hits. However, with the addition of such an adjustment (Wilkinson, 1979), the results are no longer significant. The summary table presented in Table 23 displays the equation produced after 4 of the items have been removed as a result of their small t values. The correlation matrix for EQ 1 subjects is presented in Table 24.

The summary table presented in Table 25 shows the analysis performed with all 6 questionnaire items in the regression equation for EQ 2 subjects.

The expectancy questionnaire does not serve as a predictor of target-shooting performance when administered after the target-shoot task. The multiple regression analysis performed on EQ 2 subjects yielded no items that contribute significantly to the prediction of "hits" (F < 1). The summary table presented in Table 26 represents the equation produced after all 6 of the questionnaire items

TABLE 22

Summary Table for Multiple Regression

on Expectancy Questionnaire

(Questionnaire administered prior to target-shooting)

Multiple R	.28829
R Square	.08311
Adjusted R Square	.03443
Standard Error	17.05196

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	6	2978.40539	496.40090
Residual	113	32856.91961	290.76920

F = 1.70720 Signif F = .1256

Variable	B	SE B	Beta	t	Sig t
E6	.92474	1.45161	.06502	.637	.5254
E3	-2.69732	1.21728	-.20450	-2.216	.0287
E2	2.80753	1.93731	.16709	1.449	.1501
E4	-1.65767	1.24476	-.13058	-1.332	.1856
E5	-.11527	1.32530	-9.018E-03	-.087	.9308
E1	-.14013	1.82843	-9.062E-03	-.077	.9390
(Constant)	21.29573		12.77670	1.667	.0983

TABLE 23

Summary Table for Stepwise Multiple Regression

on Expectancy Questionnaire

(Questionnaire administered prior to target-shooting)

Multiple R	.26044		
R Square	.06783		
Adjusted R Square	.05190		
Standard Error	16.89702		
Analysis of Variance			
	DF	Sum of Squares	Mean Square
Regression	2	2430.74504	1215.37252
Residual	17	33404.57996	285.50923

F = 4.25686   Significance of F = .0164[b]

Variable	B	SE B	Beta	t
E3	-2.68126	1.17797	-.20329	-2.276
E2	2.62238	1.50067	.15607	1.747
(Constant)	18.63201	7.58044		2.458
Variable	Beta In	Partial	Min Toler	t
E1	-.00663	-.00551	.64428	-.059
E4	-.11021	-.11194	.96057	-1.213
E5	-.02260	-.02117	.81799	-.228
E6	.02033	.02038	.93547	.220

[b] The application of an adjustment (Wilkinson, 1979), which considers the number of non a-priori tests conducted in stepwise regression, results in a probability > .05.

TABLE 24

Regression on Expectancy Questionnaire

Correlation Matrix

(Questionnaire administered prior to target-shooting)

	E1	E2	E3	E4	E5	E6	HITS
E1	1.000						
E2	.595	1.000					
E3	-.057	-.034	1.000				
E4	.207	.196	.003	1.000			
E5	-.395	-.388	-.164	-.052	1.000		
E6	.333	.252	.000	.367	-.242	1.000	
HITS	.100	.163	-.209	-.076	-.046	.058	1.000

HITS = the number of hits during the target-shooting task.

TABLE 25

Summary Table for Multiple Regression

on Expectancy Questionnaire

(Questionnaire administered after target-shooting)

Multiple R	.22275
R Square	.04962
Adjusted R Square	-.00085
Standard Error	17.78387

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	6	1865.80346	310.96724
Residual	113	35738.06321	316.26605

F = .98325 Signif F = .4400

Variable	B	SE B	Beta	t	Sig t
E6	.97451	1.15937	.08293	.841	.4024
E3	-.52218	1.31084	-.03707	-.398	.6911
E1	-.33050	1.65548	-.02306	-.200	.8421
E4	-1.18972	1.24347	-.09603	-.957	.3407
E5	2.23068	1.31246	.17813	1.700	.0920
E2	3.16195	1.82021	.21997	1.737	.0851
(Constant)	6.44377	11.69062	.551	.5826	

TABLE 26

Summary Table for Stepwise Multiple Regression

on Expectancy Questionnaire

(Questionnaire administered after target-shooting)

Multiple R	.00000
R Square	.00000
Adjusted R Square	.00000
Standard Error	17.77636

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	0	.00000	.00000
Residual	119	37603.86667	315.99888

F is undefined

Variable	B	SE B	Beta	t	Sig t
E1	.05376	.05376	1.00000	.585	.5598
E2	.11826	.11826	1.00000	1.294	.1983
E3	-.05023	-.05023	1.00000	-.546	.5859
E4	-.03941	-.03941	1.00000	-.428	.6691
E5	.07965	.07965	1.00000	.868	.3872
E6	.06040	.06040	1.00000	.657	.5122

have been removed and as a result the F statistic is undefined. The correlation matrix for the EQ 2 subjects is presented in Table 27.

Apparently expectancies, as measured by the expectancy questionnaire, can be used to predict target-shooting performance since significant results on the multiple regression analysis were achieved when the full regression model was employed. However, the predictiveness of the expectancy questionnaire cannot be explained by "post-diction" since the questionnaire responses of those who were administered the questionnaire after the target-shooting task cannot be used as a predictor of target-shooting performance.

TABLE 27

Regression on Expectancy Questionnaire

Correlation Matrix

(Questionnaire administered after target-shooting)

	E1	E2	E3	E4	E5	E6	HITS
E1	1.000						
E2	.602	1.000					
E3	-.109	-.138	1.000				
E4	.205	.339	.021	1.000			
E5	-.322	-.455	.112	-.204	1.000		
E6	.210	.248	-.040	.289	-.258	1.000	
HITS	.054	.118	-.050	-.039	.080	.060	1.000

HITS = the number of hits during the target-shooting task.

DISCUSSION

One purpose of the present investigation was to test the fundamental premise of the Learned Helplessness Theory. The premise that subjects' expectancies about noncontingency would disrupt performance received weak support. The results of the multiple regression procedure demonstrate that target-shooting performance could be predicted by subjects' expectancies. A conclusion that expectancies had a causal influence on target-shooting performance would not be justified, however. The demonstrated relationship between expectancies and performance could be as easily explained by the influence of extraneous factors. For example, subjects have access to information about themselves that the experimenter does not. Subjects have knowledge about their own prior histories at tasks similar to the experimental test task. If a subject has reason to expect that he or she will perform poorly at such a task, it is possible that these subjects will interpret the situation as one in which they lack control and fill out the questionnaire accordingly. In this case, it is not the expectancy of noncontingency that debilitates performance, it is the expectancy of debilitated performance that effects questionnaire responses. If subjects can accurately predict their own target-shooting performance, and these expectancies influence their responses on an expectancy questionnaire, then the questionnaire will accurately predict target-shooting performance. This can occur even if those expectancies have no causal influence on the target-shooting performance. A demonstration of a causal influence requires that the expectancy be manipulated by the experimenter independently of the subjects' personality characteristics and prior experience. Further research is necessary to see how subjects' expectancy of performance influences their responses on an expectancy of noncontingency questionnaire.

The expectancy factor as a cause of debilitated performance would have received stronger support if the expectancy manipulation (Told/Not Told) had affected target-shooting performance. It did not. The effectiveness of the manipulation was demonstrated by its predicted influence on questionnaire answers. Subjects who were led to believe that the target-shooting task may be rigged expected the task to be more a function of "experimenter rigging or control" than subjects not led to believe that the task may be rigged. These subjects expected that their performance on the target-shooting task would be less a function of their "control" or "effort" than subjects not misled.

One reason why the expectancy manipulation apparently had no effect on target-shooting performance could be that the premise of Learned Helplessness Theory, that expectancies of noncontingency debilitate performance, is wrong. This interpretation would be more impressive, however, if the objective noncontingency factor had affected target-shooting performance. The fact that neither factor influenced the dependent variable could be attributed either to these factors or to the dependent variable itself.

One possibility that can be ruled out to some extent is the idea that expectancies did debilitate performance but that the effect wore off right away. Although subjects have never been able to recognize the noncontingency in the target-shooting task, it is possible that participating in the task has the effect of convincing subjects that the task is not rigged. This effect would perhaps quickly remove any effects of expectancy of noncontingency. However, no statistical difference among groups were obtained for any of the 5 blocks of 20 trials, most notably the first block. The blocks factor did interact with the Told/Not Told factor, but Told subjects outperformed Not Told subjects early in testing, the first 2 blocks, contradicting the hypothesis that Told subjects' performance was debilitated and then the effect wore off.

Figure 1 (Page 65) shows the learning curves for Told and Not Told subjects separately over the 5 blocks of target-shoot trials. While the performance of the Not Told subjects steadily increased over the blocks of trials, as one would expect, the Told subjects peaked after the second block and steadily declined thereafter. A speculative explanation is that Told subjects were not certain that the target-shoot task was rigged when it first began; after all they were told that it "may" be rigged. These subjects may have been trying their best at first and later "decided" that the target-shoot was rigged even though it wasn't. The conclusion that the task was rigged was perhaps easy to reach because the task was relatively difficult.

The data presented in Figure 1 could also be interpreted as support for the cognitive explanation of learned helplessness. While Not-Told subjects displayed a normal pattern of learning over the five blocks of test trials, the Told subjects had a flat learning curve. This, perhaps, is evidence of "helplessness".

If such a pattern were to persist for additional blocks of test trials, a significant difference between Told and Not-Told subjects would show up. This would demonstrate that the manipulation of expectancy of future noncontingency does impair performance. Future research should utilize a less difficult test task which allows learning of the Not-Told subjects to occur more quickly. Therefore, if the learning of the Told subjects was impaired by the expectancy manipulation, the difference between the two groups would reach statistical significant levels before the experiment's conclusion.

In addition, future research in this area should include variations in difficulty of the test task following expectancy manipulations that leave subjects more or less certain that the test task will be rigged. It may turn out that Told subjects will perform worse than Not Told subjects early in testing when they are certain that the task is rigged. The effect may wear off more quickly for easy test tasks since subjects' belief that the task is rigged may endure for only difficult tasks.

Another problem with the target-shooting task as a dependent variable is its variability as a function of extraneous variables. Variability as a function of the shooter's ability independent of the experimenter's manipulations could easily mask any desired effects. This variability is reflected in the powerful sex effect demonstrated in this study.

The justification for the target-shooting task as a choice of dependent variable is that it was found effective in an earlier study by Oakes and Linden (note 1). That study showed that target-shooting was impaired after exposure to a noncontingency between responses and reinforcement during an auditory discrimination task. These positive results were obtained despite a strong sex effect on target-shooting. The lack of an objective noncontingency effect is a nonreplication of earlier work in our laboratory. The Oakes and Curtis studies used the target-shooting task as their first task where subjects were given noncontingent feedback. Their test task was anagram solving. The video game, which is a variation on the target-shoot theme, was successfully utilized as the first task in a study by Oakes and Fox (1984). Speculations as to why noncontingent feedback on the video game produced helplessness effects on the word recognition used in that study and not on the target-shooting task of the present study could be wide-ranging.

One possible problem which is far more relevant to the present study than to any of the previous ones has to do with coherence and consistency of the cover stories. From the point of view of the subjects, the experience of the present study may have been a bit overwhelming. Without any reasonable explanation, subjects were thrust in front of a home-made video game, given a series of questionnaires and hustled into another room to perform another task. Half of all subjects were given a complicated scenario as to how and why the machinery may be rigged. It is possible that the combination of these events may have reduced the impact of the two major independent variables, the objective noncontingency factor and the expectancy of noncontingency factor. The bottom line is that subjects may have been too confused or too suspicious to be affected by our subtle manipulations. This would explain why the video game, as an independent variable task, and the target shoot, as a dependent variable task, have both been proven effective in less complicated settings.

Goals of future researchers in this area should include the invention of a clever cover story which makes sense to subjects about why they may not be in control of the outcome of a task. In addition, the test task itself should be one which is not so strongly influenced by extraneous factors.

An alternative explanation worth exploring is the contribution of subjects' "egotism" (Snyder, Smoller, Strenta and Frankel, 1981). The egotism explanation predicts that subjects who attribute their poor performance on a task to their lack of ability will not try as hard on that task. This serves to "blunt" that attribution of low ability which preserves the subject's ego. However, the addition of an element alleged to inhibit performance allows subjects to try without fear of an attribution of low ability.

In terms of the present experiment, the egotism hypothesis would predict that subjects told that the target-shoot task may be rigged would have an alternative attribution to their poor performance. Therefore, subjects led to believe that the machinery was rigged should have outperformed those who were not given the expectancy manipulation. This did not occur. The lack of a significant effect of the Told factor represents, at best, a lack of support for both the egotism model and the learned helplessness model.

In the six years since the present research was conducted hundreds of experiments have been published on the topic of learned helplessness. However, an extensive literature search has not turned up a single learned helplessness publication where cognitive awareness of noncontingent reinforcement was manipulated. In 1982, Oakes and Curtis pointed out this confound in learned helplessness research, and the problem remains to the present.

In fact, most of the available research is concerned with the emotional side-effects of awareness of noncontingency. The explanation of learned helplessness in terms of attributions to failure is common in the literature (e.g., Craske, 1988; Mikulincer and Nizan, 1988; Mikulincer, 1988; Greer and Wethered, 1987 and Martin and Nivens, 1987). There is also the very popular explanation of depression in terms of learned helplessness with attributions as the intervening events (e.g., Zimmerman, 1988; Hammen, 1987; Patrick and Moore, 1986; and Friedlander, Traylor and Weiss, 1986).

It would appear that learned helplessness research has headed in the direction of explaining these more phenomenal effects as opposed to explaining response deficits. In an article written to critique specific laboratory research (by Harris and Tryon, 1983), Fincham and Cain (1985) began with the statement: "The necessary and sufficient conditions for the experimental induction of the cognitive, motivational, and emotional deficits associated with learned helplessness remain controversial." It was the view of these authors that response deficits, such as the number of trials to criterion (recognition of the pattern of letters in anagrams), number of failures to solve anagrams, and latency to solution, were means to operationalize cognitive and motivational deficits.

In a rebuttal to this article, Tryon (1985) pointed out that Fincham and Cain made no mention of behavioral deficits in their opening remark. Tryon's rebuttal continued with a discussion relevant to the direction of learned helplessness research:

"We (Harris and Tryon, 1983) proceeded from the assumption that behavioral deficits constituted the phenomenon to be explained and that cognitive, motivational, and emotional factors are but theoretical constructs used by some theorists to explain these behavioral deficits. Principles of operant and respondent conditioning can also be used to explain the behavioral deficits. Failure to distinguish between what is being explained (the dependent variable) and the explanation (the independent variable) results in confusion and circularity of argument.

"Fincham and Cain's statement illustrates a primarily cognitive paradigm, where behaviors themselves are unimportant except for the intrapsychic inferences that can be drawn from them. Investigators who assume this theory construction perspective will always be critical of more behavioral investigators, due to a paradigm clash. Hence, part of the controversy regarding the effects of noncontingent consequences is due to this paradigm clash."

Tryon (1985) added that future research of learned helplessness should focus on "boundary conditions," pertaining to the dependent measures that define the phenomenon and the independent variables of which it is a function.

The present avenue of research began with the findings of Oakes and Curtis (1982) that noncontingent positive reinforcement was a sufficient condition for the demonstration of debilitated performance on a subsequent task. Whether or not "cognitive awareness" is a necessary condition for learned helplessness effects is at the heart of the debate preceding the present investigation. It would appear that there is a need for investigators to re-examine these boundary conditions.

Whether or not a cognitive expectation of future noncontingency is a necessary condition for debilitated performance on a subsequent task or if it is simply a sufficient condition for such an effect (as stated in the reformulated "Learned Helplessness Theory") is also an important boundary condition worthy of additional investigation.

It is worth remembering that the present study examined two hypotheses, the effect of an objective noncontingency on subsequent performance and the effect of an expectancy of noncontingency on subsequent performance. Both issues are in need of further investigation perhaps before there is another attempt to compare the two manipulations in one experiment.

Research on the boundary conditions for establishing the effect of an objective noncontingency on subsequent performance should focus mainly on the nature of the test task. It would appear that the effect is a subtle one, at best, requiring a sensitive dependent measure. It may turn out that the difficulty of the test task will relate strongly to this sensitivity. A task which is difficult for all subjects, like the target-shoot task used in the present investigation, may yield performance based more on talent than a subtle manipulation. Conversely, a task that is too easy would be performed well by all subjects regardless of subtle conditioning that occurred previously.

Research on the cognitive expectancy manipulation should proceed in a similar direction. A test task that is too easy may not be perceived as rigged regardless of the expectancy manipulation. It would be too easy for a subject to recognize the contingent relationship between responses and outcomes. However, a difficult task may result in unusual learning curves like the one found in the present study. Subjects would never discover over the course of test trials that the task was not rigged. This would not be undesirable, in terms of finding differences among groups of subjects, provided that they could be convinced from the start that the task will be rigged. If they are not convinced, as might have been the case in the present study, then their best attempts to do well during testing would overshadow any differences between groups. After all, control subjects would not be able to outperform them enough to make a difference on the later test trials if the task is too difficult.

Reference Notes

1. Oakes, W.F., & Linden, S.D. Noncontingent feedback in auditory discrimination produces Learned Helplessness in target-shooting. Unpublished Manuscript, 1984.

2. The Video Game was a custom designed computer program by Norman F. Simenson.

APPENDIX

QUESTIONNAIRE A

1) To what extent do you feel that your degree of success on the computer game was determined by your own ability?

Not at all Somewhat Completely

1 2 3 4 5 6 7 8 9 10

2) To what extent do you feel that your degree of success on the computer game was determined by the difficulty of the task?

Not at all Somewhat Completely

1 2 3 4 5 6 7 8 9 10

3) To what extent do you feel that your degree of success on the computer game was determined by your own effort?

Not at all Somewhat Completely

1 2 3 4 5 6 7 8 9 10

4) To what extent do you feel that your degree of success on the computer game was determined by chance or luck?

Not at all Somewhat Completely

1 2 3 4 5 6 7 8 9 10

5) To what extent do you feel that your degree of success on the computer game was determined by experimenter rigging or control?

Not at all Somewhat Completely

1 2 3 4 5 6 7 8 9 10

6) To what extent do you feel that the computer game was rigged and that your shooting accuracy had no effect on the occurrence or nonoccurrence of the arrow exploding?

Not at all Somewhat Completely

1 2 3 4 5 6 7 8 9 10

7) To what extent do you feel that the experimenter has misled you in any way about the computer game?

Not at all Somewhat Completely

1 2 3 4 5 6 7 8 9 10

8) Rank order the following five factors from most responsible to least responsible for your computer game performance. (Use numbers 1 to 5, with 1 being the highest rank.)

______A) ability

______B) task difficulty

______C) your effort

______D) chance or luck

______E) experimenter rigging

QUESTIONNAIRE E-1

1) Do you feel that the score on the counter will be determined by your own ability?

Definitely NO	Likely NO	Possibly NO	Possibly YES	Likely YES	Definitely YES
1	2	3	4	5	6

2) Do you feel that the score on the counter will be determined by your own effort?

Definitely NO	Likely NO	Possibly NO	Possibly YES	Likely YES	Definitely YES
1	2	3	4	5	6

3) Do you feel that the score on the counter will be determined by chance or luck?

Definitely NO	Likely NO	Possibly NO	Possibly YES	Likely YES	Definitely YES
1	2	3	4	5	6

4) Do you feel that the score on the counter will be determined by the difficulty of the task?

Definitely NO	Likely NO	Possibly NO	Possibly YES	Likely YES	Definitely YES
1	2	3	4	5	6

5) Do you feel that the score on the counter will be determined by experimenter rigging or control?

Definitely NO	Likely NO	Possibly NO	Possibly YES	Likely YES	Definitely YES
1	2	3	4	5	6

6) Do you feel that your shooting accuracy will have an effect on the occurrence of the tone?

Definitely NO	Likely NO	Possibly NO	Possibly YES	Likely YES	Definitely YES
1	2	3	4	5	6

QUESTIONNAIRE E-2

1) Did you feel, before doing it, that the score on the counter in the target-shoot task would be determined by your own ability?

Definitely	Likely	Possibly	Possibly	Likely	Definitely
NO	NO	NO	YES	YES	YES
1	2	3	4	5	6

2) Did you feel, before doing it, that the score on the counter in the target-shoot task would be determined by your own effort?

Definitely	Likely	Possibly	Possibly	Likely	Definitely
NO	NO	NO	YES	YES	YES
1	2	3	4	5	6

3) Did you feel, before doing it, that the score on the counter in the target-shoot task would be determined by chance or luck?

Definitely	Likely	Possibly	Possibly	Likely	Definitely
NO	NO	NO	YES	YES	YES
1	2	3	4	5	6

4) Did you feel, before doing it, that the score on the counter in the target-shoot task would be determined by the difficulty of the task?

Definitely	Likely	Possibly	Possibly	Likely	Definitely
NO	NO	NO	YES	YES	YES
1	2	3	4	5	6

5) Did you feel, before doing it, that the score on the counter in the target-shoot task would be determined by experimenter rigging or control?

Definitely	Likely	Possibly	Possibly	Likely	Definitely
NO	NO	NO	YES	YES	YES
1	2	3	4	5	6

6) Did you feel, before doing it, that your shooting-accuracy would have an effect on the occurrence of the tone?

Definitely	Likely	Possibly	Possibly	Likely	Definitely
NO	NO	NO	YES	YES	YES
1	2	3	4	5	6

1 ☐ active
2 ☐ adventurous
3 ☐ affectionate
4 ☐ afraid
5 ☐ agitated
6 ☐ agreeable
7 ☐ aggressive
8 ☐ alive
9 ☐ alone
10 ☐ amiable
11 ☐ amused
12 ☐ angry
13 ☐ annoyed
14 ☐ awful
15 ☐ bashful
16 ☐ bitter
17 ☐ blue
18 ☐ bored
19 ☐ calm
20 ☐ cautious
21 ☐ cheerful
22 ☐ clean
23 ☐ complaining
24 ☐ contented
25 ☐ contrary
26 ☐ cool
27 ☐ cooperative
28 ☐ critical
29 ☐ cross
30 ☐ cruel
31 ☐ daring
32 ☐ desperate
33 ☐ destroyed
34 ☐ devoted
35 ☐ disagreeable
36 ☐ discontented
37 ☐ discouraged
38 ☐ disgusted
39 ☐ displeased
40 ☐ energetic
41 ☐ enraged
42 ☐ enthusiastic
43 ☐ fearful
44 ☐ fine
45 ☐ fit
46 ☐ forlorn
47 ☐ frank
48 ☐ free
49 ☐ friendly
50 ☐ frightened
51 ☐ furious
52 ☐ gay
53 ☐ gentle
54 ☐ glad
55 ☐ gloomy
56 ☐ good
57 ☐ good-natured
58 ☐ grim
59 ☐ happy
60 ☐ healthy
61 ☐ hopeless
62 ☐ hostile
63 ☐ impatient
64 ☐ incensed
65 ☐ indignant
66 ☐ inspired
67 ☐ interested
68 ☐ irritated
69 ☐ jealous
70 ☐ joyful
71 ☐ kindly
72 ☐ lonely
73 ☐ lost
74 ☐ loving
75 ☐ low
76 ☐ lucky
77 ☐ mad
78 ☐ mean
79 ☐ meek
80 ☐ merry
81 ☐ mild
82 ☐ miserable
83 ☐ nervous
84 ☐ obliging
85 ☐ offended
86 ☐ outraged
87 ☐ panicky
88 ☐ patient
89 ☐ peaceful
90 ☐ pleased
91 ☐ pleasant
92 ☐ polite
93 ☐ powerful
94 ☐ quiet
95 ☐ reckless
96 ☐ rejected
97 ☐ rough
98 ☐ sad
99 ☐ safe
100 ☐ satisfied
101 ☐ secure
102 ☐ shaky
103 ☐ shy
104 ☐ soothed
105 ☐ steady
106 ☐ stubborn
107 ☐ stormy
108 ☐ strong
109 ☐ suffering
110 ☐ sullen
111 ☐ sunk
112 ☐ sympathetic
113 ☐ tame
114 ☐ tender
115 ☐ tense
116 ☐ terrible
117 ☐ terrified
118 ☐ thoughtful
119 ☐ timid
120 ☐ tormented
121 ☐ understanding
122 ☐ unhappy
123 ☐ unsociable
124 ☐ upset
125 ☐ vexed
126 ☐ warm
127 ☐ whole
128 ☐ wild
129 ☐ willful
130 ☐ wilted
131 ☐ worrying
132 ☐ young

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