An Analysis of Learned Helplessness: II. The Processing of Success

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Helpless children attribute their failures to lack of ability and view them as insurmountable. Mastery-oriented children, in contrast, tend to emphasize motivational factors and to view failure as surmountable. Although the performance of the two groups is usually identical during success or prior to failure, past research suggests that these groups may well differ in the degree to which they perceive that their successes are replicable and hence that their failures are avoidable. The present study was concerned with the nature of such differences. Children performed a task on which they encountered success and then failure. Half were asked a series of questions about their performance after success and half after failure. Striking differences emerged: Compared to mastery-oriented children, helpless children underestimated the number of successes (and overestimated the number of failures), did not view successes as indicative of ability, and did not expect the successes to continue. Subsequent failure led them to devalue their performance but left the mastery-oriented children undaunted. Thus, for helpless children, successes are less salient, less predictive, and less enduring—less successful.

When individuals view their actions as irrelevant to subsequent outcomes, they may be said to display "learned helplessness" (see Seligman, Maier, & Geer, 1968). Such beliefs about control over outcomes have been found to be important determinants of behavior in achievement situations. For example, perceiving that one is unable to surmount failure can have highly debilitating effects on performance, as seen in studies on learned helplessness (Diener & Dweck, 1978; Dweck, 1975; Dweck & Bush, 1976; Dweck & Reppucci, 1973). In contrast, perceiving that one is able to avoid or to escape from failure can have facilitating effects (Diener & Dweck,

1978; Dweck, 1975). Interestingly, these divergent responses to failure occur despite equivalent performance prior to failure and equivalent performance on measures of ability such as IQ and reading comprehension (Dweck & Licht, in press).

Much research on learned helplessness has focused on attributions as indicants of belief about control over outcomes. Specifically, it has been shown that attributions of failures to relatively invariant factors, like a lack of ability, are associated with performance decrements under failure; attributions of failures to more readily modifiable factors, like a lack of effort, characterize the more "mastery-oriented" individuals and are associated with maintenance or improvements in performance following failure (e.g., Dweck, 1975; Dweck & Reppucci, 1973; Weiner, 1972, 1974).

More recently, Diener and Dweck (1978) sought to determine what other achievement cognitions might be important in mediating responses to failure. In prior studies, statements of particular achievement cognitions were solicited at prespecified times. For ex-

ample, in studying attributions, the experimenter has typically been the one who defines when the failure has occurred and when its causes should be explained. This approach rules out the possibility of obtaining information about cognitions other than attributions. Even considering only attributions, one learns nothing about the time at which they would have ordinarily occurred or if, indeed, they would have occurred at all. To allow detection of a wider constellation of cognitions, Diener and Dweck (1978) requested children to report "what they were thinking about" as they performed a task. They could thereby monitor potential differences in a variety of achievement-related verbalizations under failure.

The statements offered by helpless and mastery-oriented children in Diener and Dweck's (1978) study were virtually indistinguishable prior to the introduction of failure. However, following failure there was almost no overlap in the types of statements made by the two groups. The helpless children made the expected attributions to uncontrollable factors, but the mastery-oriented children did not offer explanations for their failures. Instead they appeared to be searching for a remedy to their current lapse in performance by engaging in solution-directed verbalizations such as self-instructions and self-monitoring. The attitudes of the two groups toward the task after the onset of failure differed as well. The mastery-oriented children tended to maintain positive affect toward the task, and they continued to express a positive prognosis for their performance. Indeed, the mastery-oriented children did not appear to define themselves as having failed at all. In contrast, the helpless children began to express an appreciable degree of negative affect along with statements that implied they had given up trying to solve the problems. In sum, the verbalizations of the helpless children under failure reflected a tendency to dwell on the present, to emphasize the negative, and to seek escape from the situation. The verbalizations of the mastery-oriented reflected a tendency to look toward the future, to emphasize the positive, and to redouble their task-directed efforts.

Thus far research has concentrated on cog-

nitions about failures. What about success? Even though the helpless and mastery-oriented groups typically solve equal numbers of problems in equal amounts of time prior to failure, there is evidence to suggest that they may differ in their perceptions of their past success. For example, Dweck and Reppucci (1973) showed different attribution patterns for the two groups, with mastery-oriented children attributing success to factors that implied their successes were replicable (e.g., effort) but with helpless children attributing their success to factors that did not suggest that past performance was indicative of future performance (e.g., external factors). In addition, in the Diener and Dweck study, several statements offered by the mastery-oriented children suggested that past success was perceived as highly relevant to future success, but those statements given by helpless children suggested that they might be perceiving past success as irrelevant to future outcomes. For example, mastery-oriented children made statements like, "I was doing well before, so if I slow down and concentrate I'll get it right again." Helpless children, on the other hand, appeared to ignore their earlier successes, and as their performance deteriorated in quality, they made statements like, "I've never been good at this sort of thing" and "I never did have a good rememory (sic)," even though only minutes earlier, before the failure began, they demonstrated quite admirable memory and ability at the task. Although some helpless children did acknowledge their prior success, they tended to discount its bearing on present or future performance with statements like, "I'm getting confused" and "I don't know what I'm doing anymore." In view of these observations, one might not expect success to prevent the negative effects of failure to the same extent for helpless and mastery-oriented children; indeed, Dweck (1975) has shown that for helpless children, continued success in an area was *not* sufficient in itself to buffer the effects of failures.

It appears likely that just as there is a variety of achievement-related cognitions about failure that separate helpless and mastery-oriented children, there are also important differences in their perceptions of suc-

cess. Critical questions relate to the precise nature of these differences and whether the differences occur before or after failure. The present investigation was therefore concerned with differences between helpless and mastery-oriented children in their perception of their successes. As in the Diener and Dweck (1978) study, all of the children were given a series of success problems, followed by failure problems. However, either following the success problems or following the failure problems, children were asked a set of questions designed to tap their perceptions of their prior success and their predictions of future success.

There are several possible ways in which helpless children may differ from mastery-oriented children in their evaluation of their success. Some of these differences may occur during success, or they may be prompted by failure. First, it is possible that helpless and mastery-oriented children differ in their perceptions of how successful they have been. Although both groups may recognize that they have correctly solved the problems, the mastery-oriented children may think they have performed well, whereas the helpless children do not. For example, the helpless children may feel they should have solved the problem more quickly. Second, it is possible that the two groups make different judgments about how other children would do at the same task, with helpless children more likely to view others as outperforming them. It is also possible that helpless children may actually remember having had fewer successes; that is, compared to mastery-oriented children they may underestimate the number of problems they solved. To evaluate these possibilities, children were asked after the success problems to evaluate their performance, to estimate how well most children would do at the task, and to estimate how many problems they had solved correctly.

A further possibility is that helpless children do not view their present success as predicting future success. For example, as suggested by the Dweck and Reppucci (1973) findings, helpless children may attribute their successes to factors that do not imply continued success. Mastery-oriented children may, on the other hand, attribute success to

ability or to other factors that do predict future success. If this were true, then we would expect helpless children, even while they are experiencing success, to be more pessimistic in their predictions of their future performance and to choose a level equal to or lower than their current performance. Mastery-oriented children would be expected to predict a future performance level at least equal to their current level—or better—if they expect to improve with additional practice. This possibility was assessed by asking the children to apportion their attributions for success among several stable and variable causes. The children were also asked to predict their future performance and to estimate how many problems they could get right if given 15 more problems of the same type.

Another possibility is that helpless and mastery-oriented children perceive their successes similarly until failure occurs. It may be that at that time, helpless children reevaluate their prior success in light of the current failure. For example, failure may overshadow the actual successes of the helpless children— they may now underestimate the number of past successes and may overestimate their failures. Perhaps helpless children and mastery-oriented children have similar attributions following success, but they revise their attributions for success when failure occurs. If helpless children reinterpret their success, one would predict that following failure, they would be less likely to attribute their past successes to ability and more likely to attribute them to external factors than they were immediately following success. Mastery-oriented children would be expected to maintain their attributions of success to internal factors. To assess these possibilities, a second group of helpless and mastery-oriented children were asked, following failure, to recall the number of successfully solved problems, to estimate the number of unsolved problems, to identify the reasons for their earlier success, and to judge whether they would be able to successfully complete the earlier (success) problems if they tried them again. It is also possible that helpless children are more likely than mastery-oriented children both to devalue their successes as they occur and to further discount their successes after failure.

In summary, although past research has not addressed these issues directly, various findings suggest that mastery-oriented children tend to view their successes as predictive of future success, even after failure. In contrast, the available evidence implies that helpless children do not appear as likely to acknowledge their successes and that even when they do, they are less likely to see them as relevant to future performance. The present research was aimed at determining more clearly how helpless and mastery-oriented children process their successes as they occur and how they might reevaluate their successes in light of failure.

Method

Overview

Children, classified as helpless or mastery-oriented, received eight success and four failure problems on a discrimination task. The level of their hypothesis-testing strategy was monitored throughout. Half of the group answered a series of questions about their performance following the success problems and again after the failure problems. The other half of the group answered the questions only at completion of the task (following both success and failure problems).

Participants

The participants were 14 fourth graders, 72 fifth graders, and 26 sixth graders from a working-class school district. Approximately one third of the children were black and two thirds were white. Several children were randomly eliminated (before the collection of data on the individual task) so that there would be equal numbers of males and females, helpless and mastery-oriented. The final sample was composed of 56 males and 56 females.

Measure of Helplessness

Since past research (Diener & Dweck, 1978; Dweck, 1975; Dweck & Reppucci, 1973; Floor & Rosen, 1975) has indicated that a major difference between helpless and mastery-oriented subjects lies in their respective tendencies to neglect or emphasize the role of effort in determining their failures, this relative emphasis was used as the criterion for dividing children into helpless and mastery-oriented groups. The Intellectual Responsibility (IAR) Scale (Crandall, Katkovsky, & Crandall, 1965) was used for this purpose. The IAR consists of 34 forced-choice items that describe either a positive or negative achievement experience that frequently occurs in the daily lives of children. The child must choose between two alternative attributions on each item, one attributing the cause of the event to someone else in the child's environment (external responsibility) and the other to his/her own behavior (internal responsibility). A subset (10 items) of the questions on the IAR specifically taps the child's attributions of failure to lack of effort.

As in the Diener and Dweck (1978) study, both the mean and median number of effort responses were about 7 (6.83 and 7.00, respectively). Those children scoring 6 or below were placed in the helpless group, and those scoring 8 and above were designated as mastery-oriented. Subjects scoring 7 were excluded from the present study. The IAR was administered in written form to all subjects at least 1 month prior to the experimental session.

Task and Materials

The same task as the one used in the prior study by Diener and Dweck (1978) was employed. The task consisted of a series of three-dimension, two-choice discrimination problems on which the child searches for the one solution that is correct. Each child was presented with eight solvable problems (success problems) followed by four unsolvable problems (failure problems). A problem consisted of a set of four stimulus cards (see Figure 1), with each card containing two figures that varied on the three dimensions: color (e.g., red or blue), form (e.g., square or triangle), and the symbol in the center of the form (e.g., dot or star).

The stimuli were varied in a systematic fashion so that the child's hypothesis about the correct solution could be inferred unambiguously from his or her choices. For example, a child who is testing the hypothesis "triangle" would choose cards in the sequence of left, left, right, left, as can be seen in Figure 1. In order to monitor hypothesis testing, a "blank trial" procedure was employed in which the children did not receive feedback about the correctness of their responses on the first three of every four trials (Levine, 1966). A hypothesis was defined as the consistent selection of the same stimulus property, such as the shape "triangle," over the four trials prior to feedback. The instructions explicitly pointed out that when the experimenter gave no responses this meant neither right nor wrong. The stimuli were ordered within a single block of four trials so that all useful hypotheses could be separated from position responses—for example, choosing the right side of the card each time or alternating right and left responses without considering the stimuli. The instructions also explicitly stated that the only possible solution was one of the colors, shapes, or interior symbols.

Procedure

Success problems. The problems were introduced to the child as being "a task for kids of your age." It was stressed that the child's job was to find the
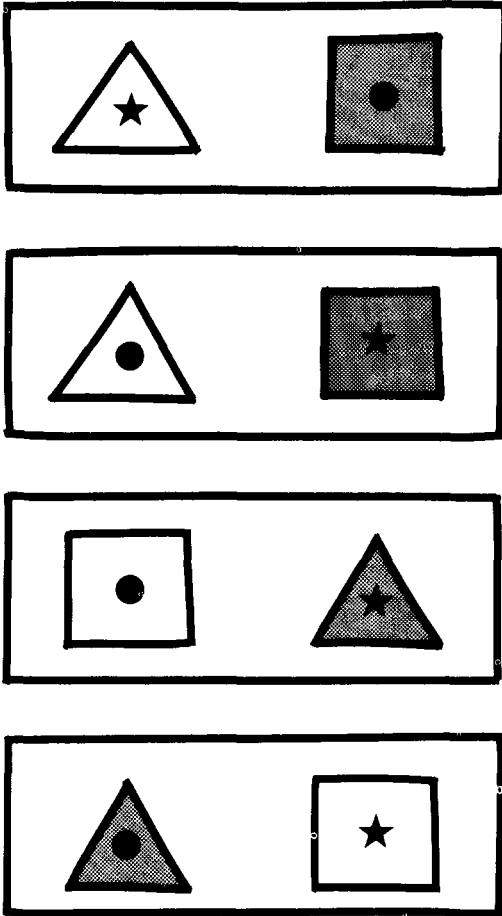
Figure 1. Example of four consecutive stimulus cards that allow the tracking of a hypothesis over the no-feedback trials.

correct solution for each deck of cards. On the first problem, veridical feedback ("right" or "wrong") was given after every response. If the child was unable to reach the solution on completion of a deck of 16 cards, the same problem was repeated, with a hint provided by the experimenter (see Diener & Dweck, 1978, for exact procedure). Each child was gradually introduced to the no-feedback procedure, so that by the seventh and eighth problem they were receiving feedback only after every fourth response. Each child was guaranteed to have solved all eight problems correctly before continuing.

Following the eight success problems, one half of the children (equal numbers of boys and girls, helpless and mastery-oriented) were questioned about their performance up to that point. The measures included an evaluation of their performance, an evaluation of how well they thought other children their age would do, an expectancy of future performance on the same task, an assessment of how many they expected to get right if given 15 more similar problems, an accuracy of recall measure (for

number of successes), and attributions for their success.

The children were told, "There are a number of things I would like to ask you about these problems. We are going to stop here for a few minutes so I can talk to you about them." Children were then shown a chart that contained the numbers between 1 and 10, anchored by "not at all good" and "very, very good." The scale was explained, and the children were asked to choose the number that corresponded to how well they thought they had done up to that point. The children were then asked, "How well do you think most kids your age would do on these problems?" They again chose a number from 1 to 10, using the chart that was used for their own evaluation. Knowing the children's predictions of others' performance allows a clearer interpretation of their evaluation of their own performance. For example, a child may rate his or her own performance as 8 on a 10-point scale; but if that child thinks that most other children would rate a 9 or 10 on the scale, then he or she may not consider 8 to be a successful score. On the other hand, if the child believed most other children would only rate a 4 or 5, then his or her performance might be outstanding by comparison.

Using the same chart, the children were then asked, "How well do you think you will do on the rest of the problems?" To ascertain more precisely the meaning of their performance estimates, the children were asked to estimate how many problems they thought they could solve if they were given 15 more problems of the same type.

During piloting, children were asked to generate attributions for success, but they appeared to find the whole idea foreign. That is, they failed to comprehend what was being requested and why. This did not seem to be a methodological problem because when the nearly identical question was asked vis-à-vis failure in the earlier study (Diener & Dweck, 1978), the children had no difficulty in answering the question. It appeared that "explaining" success was not something children find natural. However, this does not mean that different children may not understand their success differently but only that explaining success in an explicit fashion is not typical. There may well be a differential tendency in what helpless and mastery-oriented children see as reflecting ability, and it was desirable to have a procedure to tap this. Therefore, attributions were measured using an "attribution wheel" that children could adjust to show the relative importance of possible causes for their success (see Nicholls, 1975). The wheel was composed of four interconnected discs, each representing a causal factor. By moving the metal handles attached to each disc, the child could easily adjust the discs to expose any proportion of a given disc. Each disc was clearly labeled with one of the following choices: I was lucky; It was easy; I am good at this; I am smart. Of interest was any differential tendency on the part of helpless and mastery-oriented children to see success as reflecting ability (either general or task specific) versus impersonal factors. An attribution to effort was not included

because the task clearly required an appreciable expenditure of effort for success, and it was undesirable to have the choice of this factor obscure the difference of interest. In short, this procedure was designed not to tap "true" or "natural" attributions but to detect any differential emphasis on ability in identifying the causes of success.

Children were shown how to use the wheel to indicate the relative importance of each of the four causes. Following the instructions, they were given the wheel with the four segments equally exposed and were asked to show the reasons for their successful solution of the problems. Each disc was divided into 35 equal segments, and the number of segments allotted to each causal factor was recorded. After the children made their choices, they were told, "Let's go on now and do some more problems."

Failure problems. Following the eight success problems, the children were given four problems of 20 cards each with the consistent feedback of "wrong" (i.e., after every fourth response) on each problem. This allowed the children sufficient opportunity to search for the solution but ensured that given their strategy level, they would not have tested all possible solutions. This, in effect, made the problems unsolvable for them, but not obviously so. To determine children's retrospective perceptions of their success, following the failure problems all children were asked the questions described at the end of the success problems, with appropriate wording changes. For example, the question dealing with attributions for success was reworded: "Why do you think you did well on the earlier problems?" In addition, they were asked to estimate the total number of problems for which they had not found a solution. Finally, to see if the children believed they retained their ability to work the problems they had previously solved, the children were asked, "If we went back to these first problems (showing them an earlier package), would you still be able to do them?"

Scoring procedures. The children's hypothesis-testing strategies can be classified as "useful" (i.e., those that would eventually lead to problem solution when followed perfectly) or "ineffective" (i.e., sequences of hypotheses that would never lead to problem solution). Within these two broad categories, strategies can be further defined. The useful strategies, in descending order of efficiency, are focusing, dimension checking, and hypothesis checking. In focusing, the child processes information perfectly and eliminates all dimensions that have been logically disconfirmed on each feedback trial. Focusing was not included in this analysis because only a very few children showed any evidence of using it. In dimension checking, the child proceeds through all three dimensions (color, form, interior symbol) in a systematic fashion. When the child tests one number of a dimension and receives feedback, on the next trial, he or she chooses the stimulus that is consistent with that feedback, even if she or he is now testing a different dimension. For example, suppose the child tested the shape dimension on the previous trial by choosing a yellow circle and was told "wrong." If the child is now

testing the color dimension, she or he will choose red. In hypothesis checking, the child eliminates only one possible solution per feedback. For example, suppose the child tested the shape dimension by choosing a yellow circle and received "wrong" feedback; if the child then decided to test the color dimension, she or he would still try both yellow and red.

Ineffectual task strategies are response sets that can never lead to the solution of the problem. The three ineffectual strategies are stimulus preference, position alternation, and position perseveration. Stimulus preference refers to the selection of a single stimulus characteristic (e.g., the color red) independent of feedback. Position alternation occurs when the child alternately chooses the left and then the right stimulus regardless of what they are, and position perseveration occurs when the child chooses the stimulus in the same position each time. These ineffectual task strategies can be ordered on the basis of the ages of children who most frequently use them, with stimulus preference being used by older children and position perseveration being used by the youngest children.

The particular strategy being used by the child could be determined by monitoring the child's hypotheses across blocks of trials. The scoring criterion used by Diener and Dweck (1978) was adopted for this study (cf. Gholson, Levine, & Phillips, 1972). If a child used the same strategy on three out of five blocks of trials, he or she was scored as employing that strategy.

In summary, each child received eight success problems and four failure problems. The sophistication of the child's strategy use was monitored. Half of the children were questioned about their perceptions of success following success and again after failure. The other half of the children were questioned after failure only.

Results

Overview

Performance measures taken during the success problems (prior to failure) are presented to document the equivalence of performance on the parts of helpless and mastery-oriented children. This similarity of performance was in marked contrast to the

Table 1

Number of Helpless and Mastery-Oriented Children Whose Hypothesis-Testing Strategy Improved, Remained the Same, or Deteriorated Following Failure

Group	Improved	Same	Deteriorated
Helpless	4	19	33
Mastery-oriented	15	33	8

Table 2

Percentage of Helpless and Mastery-Oriented Children Exhibiting Each Type of Strategy on the Four Failure Problems

Group	Problem number			
	1	2	3	4
Helpless				
Useful strategies				
Dimension checking	17.5	20.0	5.0	7.0
Hypothesis checking	77.0	51.5	48.5	41.0
Ineffectual strategies				
Stimulus preference	5.5	16.0	19.5	17.5
Position alternation	.0	9.0	25.0	23.5
Position perseveration	.0	3.5	2.0	10.5
Mastery oriented				
Useful strategies				
Dimension checking	44.5	50.0	44.5	55.5
Hypothesis checking	55.5	44.5	51.5	44.5
Ineffectual strategies				
Stimulus preference	.0	5.5	2.0	.0
Position alternation	.0	.0	.0	.0
Position perseveration	.0	.0	.0	.0

children's perceptions of those successes (and to their performance on failure problems).

Performance on Success Problems

None of the measures—total number of hints needed for all eight success problems, number of hints on problems seven and eight, or the number of times a child required more than one set of hints to solve the problem—showed a significant correlation with the subscales of the IAR, $r = -.15$ to .06. Chi-square analyses on the number of times children used dimension checking versus hypothesis checking during training also yielded no significant differences. Helpless children used dimension checking 50% of the time and hypothesis checking 50% of the time, as compared to the mastery-oriented children who utilized dimension checking 41% of the time and hypothesis checking 59% of the time.

Performance on Failure Problems

To provide a general picture of change in performance following failure, a 2 × 2 (helpless vs. mastery-oriented, male vs. female) analysis of variance was performed on the number of times that each child used a disconfirmed or ineffectual hypothesis on the test problems. The results show a significantly greater use of disconfirmed and ineffectual hypotheses by the helpless ($M = 8.5$) than by the mastery-oriented group ($M = 2.6$), $F(1, 108) = 130.6$, $p < .001$. This general finding is further supported by the significant negative correlation between the number of disconfirmed and ineffectual hypotheses used and the IAR effort items ($r = -.66$, $p < .01$).

Table 1 shows the number of children in each group whose strategies deteriorated, remained the same, or improved. A chi-square analysis for the data shown in Table 1 (combining the Same and Improved categories) yielded a highly significant difference between helpless and mastery-oriented groups, $\chi^2(1) = 24.04$, $p < .01$.

The percentage of helpless and mastery-oriented children who exhibited each type of effective and ineffectual strategy across the four problems is shown in Table 2. Helpless children showed a progressive decrease in the use of effective strategies and an attendant increase in ineffectual strategies. In contrast, the mastery-oriented children showed little deterioration in their use of strategies over

test problems, and, in fact, some mastery-oriented children showed a clear tendency to become more sophisticated in their strategy use as they received failure feedback. All of the above findings are consistent with those found in the Diener and Dweck (1978) studies.

The foregoing results clearly show that there was no difference between the helpless and mastery-oriented children in acquisition or performance while they were experiencing success. Their objective performance during success was the same, but were their *perceptions* of that performance equivalent?

Perceptions of Success

Overall analyses. To examine the effects of race, sex, and time of questioning, a 2 (group: helpless vs. mastery-oriented) × 2 (sex: male vs. female) × 2 (race: black vs. white) × 2 (time of questions: after success vs. after failure) multivariate analysis of variance (MANOVA; Finn, 1972) was performed on eight dependent variables. (Since four of the nine dependent measures [the attributions] are ipsative and the fourth value is determined by the other three, only three were used in the MANOVA.) The main effect for group showed that helpless children responded to the questions in a different fashion from the mastery-oriented children, $F(8, 89) = 22.75$, $p < .001$. The main effects for race and sex were not significant ($p < .35$ and $p < .51$, respectively), and, therefore, all further analyses will be collapsed across these two variables. The main effect for time of questioning (after success or after failure) approached significance ($p < .07$). This was primarily due to the two items concerning future success (the expectancy of future success and the estimate of how many they would get right if an additional 15 similar problems were given) and reflected the tendency of children who have experienced failure to have lower expectations for the future. None of the higher order interactions was significant.

Multiple comparisons. Planned comparisons using Tukey's honestly significant difference (HSD) test (Kirk, 1968) were performed to test the major hypotheses of the study. These analyses allow us to examine separately the differences between helpless and mastery-oriented children's perception of success after they have experienced only success and the differences between the groups after they have experienced failures as well. (Again, these analyses are based on the responses of one set of children who experienced only success compared to a second group of children who experienced both success and failure. The postfailure responses of the children who were questioned twice—after success and after failure—are not utilized in these analyses.) Additionally, differences in perceptions of success before and after failure were examined by comparing the responses of the group of helpless children responding after success to the other group of helpless children who responded after failure. Similar comparisons were done for the mastery-oriented children. The results of these comparisons are summarized in Table 3. To maintain a conservative experimentwise significance level, .01 was adopted as the alpha level necessary for significance.

As can be seen in Table 3, when one looks at responses given after only success, there is no difference between groups in their overall evaluation of their performance. Both judged themselves to be doing well (helpless = 6.39; mastery-oriented = 7.00). However, significant differences emerged for their expectancy of future success, the number they expected to get right out of 15, and how well they believed that most children of the same age would do. The mastery-oriented children expected both to do better in the future and to get more right than did the helpless children. The mastery-oriented expected to get about 90% of the problems correct if they were given more of the same type, whereas the helpless children expected to solve only 50% of the problems. When asked to estimate how well most children of the same age would do at these problems, the helpless children believed that most other children would be better at the task than did the mastery-oriented children. (It should be noted that the helpless children's evaluation of other children's performance was higher than their evaluation of their own performance, whereas the mastery-oriented children believed that

Table 3
Means and Multiple Comparisons

	Mean				p levels of multiple comparisons			
	After success		After failure		Helpless compared to mastery oriented		Changes from success to failure	
Measure	Helpless	Mastery oriented	Helpless	Mastery oriented	After success	After failure	Helpless	Mastery oriented
Evaluation of performance (1–10)	6.39	7.00	5.18	6.79	ns	.01	.01	ns
Evaluation of "most" children (1–10)	7.25	5.89	6.61	5.39	.01	ns	ns	ns
Expectancy of future success (1–10)	6.04	8.75	4.36	8.14	.01	.01	.05	ns
How many right out of 15	7.46	13.43	6.07	11.79	.01	.01	ns	.01
How many right (answer = 8)	5.46	7.57	5.14	7.57	.01	.01	ns	ns
Attributions (total = 35)								
It was easy	7.89	4.89	13.96	5.46	ns	.01	ns	ns
I was lucky	13.32	7.32	14.50	8.11	ns	ns	ns	ns
I am good at this	8.04	8.39	3.00	8.96	ns	.05	ns	ns
I am smart	5.71	14.46	3.50	12.14	.01	.01	ns	ns

most children would perform more poorly than they had.) If being successful involves perceiving that one is performing at a level equal to or better than one's peers, it would seem to be more difficult for the helpless child to be successful than it is for the mastery-oriented.

Were the two groups of children equally accurate in estimating the number of problems they had solved? When asked following the eight success problems how many problems they had solved successfully, the mastery-oriented children were quite accurate ($M = 7.57$) but the helpless children gave themselves credit for significantly fewer successes ($M = 5.46$).

The responses of the helpless and mastery-oriented children following failure were also compared—their performance evaluation, their expectancy for future success, how many problems they expected to solve if given an

additional 15 problems similar to the success problems, and their estimate of the number of problems they had successfully solved. Although there was no difference between the two groups in how they rated their performance before the failure, differences did appear on this variable after the introduction of failure: The helpless children judged their performance to be significantly poorer than the mastery-oriented judged theirs to be ($M = 5.18$ and $M = 6.79$, respectively). Significant group differences again occurred for expectancy of future success (helpless = 4.36; mastery-oriented = 8.14), how many they expected to get right out of 15 (helpless = 6.07; mastery-oriented = 11.79), and how many problems they had successfully solved (helpless = 5.14; mastery-oriented = 7.57).

The effect of failure on each group's perception of success can be examined by comparing within-group responses made after only suc-

cess to responses made after failure. The helpless children showed a significantly lower rating of their performance after versus before failure, but the mastery-oriented did not. In addition, the ratings of helpless children reflected even more pessimism about their future performance than they had prior to failure, whereas the mastery-oriented tended to display equally high expectations. Although the mastery-oriented children did expect to get fewer right out of 15 than the mastery-oriented group had expected previously, predominantly they still expected success ($M = 11.79$).

The pattern of attributions made by the two groups also differed substantially, as seen in Table 3. When asked to choose the relative importance of various attributions for success, helpless children did not tend to give themselves as much credit for success: Even prior to failure, the mastery-oriented children attributed their successes to their intelligence more than did the helpless children. Following failure, this pattern of success attributions was evidenced by general ability attributions and in a trend toward task-specific attributions. Moreover, with the introduction of failure, the helpless children attributed their success significantly more to the task's having been easy than did the mastery-oriented children. Overall, then, the helpless children discounted their successes as indicative of ability or as implying continued or future success, whereas mastery-oriented children stressed their ability as an important determinant of their success.

Do the two groups have equally accurate memories for their failures? The children were asked, following four failures, to estimate the number of problems they had not been able to solve successfully. The mastery-oriented children were fairly accurate in their perception ($M = 3.71$), whereas the helpless children tended to overestimate their failures ($M = 6.14$). The difference between the groups was highly significant, $t(54) = 4.91$, $p < .001$.

When asked if they could find the solution to one of the original eight success problems if it were readministered, 100% of the mastery-oriented children said yes, whereas only 65% of the helpless children thought they could. Chi-square analysis on these data yielded a significant difference, $\chi^2 = 24.34$, $p < .01$. It would appear that helpless children see so little predictive power in past success and trust their own ability so little that they do not expect to solve the same problems they had previously mastered.

Effects of repeated questioning. Previous research (Dweck & Gilliard, 1975) has indicated that asking repeatedly for expectancy statements changes children's responses—both the expectancies they give and their actual performance on the task. Since data were obtained on one group of children who had responded to the set of questions twice, these children were compared to those who answered once following failure only. A 2 (group: helpless vs. mastery-oriented) × 2 (sex) × 2 (race: black vs. white) × 2 (questions asked once or twice) multivariate analysis of variance was conducted with eight dependent variables. The main effect for group was highly significant, $F(8, 89) = 30.543$, $p < .001$, indicating that the helpless children responded in a distinctly different fashion from the mastery-oriented children. The main effects for sex and race were not significant ($p < .40$ and $p < .32$, respectively). A significant F ratio, $F(8, 89) = 2.90$, $p < .01$, was found for the number of times the questions were asked. That is, the group that responded to questions about their performance only after failure differed from the group that answered both after success and after failure. The subsequent univariate analyses suggested that the major effects were due to expectancy of future success (those responding once $= 6.25$; those responding twice $= 5.39$), $F(1, 96) = 4.08$, $p < .05$, and evaluation of performance (those responding once $= 5.98$; those responding twice $= 4.91$), $F(1, 96) = 9.18$, $p < .01$. One might plausibly have hypothesized that responding after success would yield higher expectancies and evaluations on the second set of questions by virtue of calling children's attention to their successes. However, the fact that on both questions the means were lower for the group who responded twice suggested that repeated questioning resulted in the child's revising his or her first response to reflect the failures to a greater degree. It may be

that the original questioning heightened the salience of the subsequent failures.

Discussion

Past findings have suggested that success does not act as a buffer against the negative effects of failure for helpless children, as it seems to for the mastery-oriented. The present study examined the manner in which the helpless child's perception of success differs from that of the mastery-oriented child. Overall, the results show that if there is a way to devalue one's present performance or to be pessimistic about one's future performance, the helpless children are likely to make use of it. Indeed, they do not even have to experience a negative outcome for this tendency to display itself. In sharp contrast, the mastery-oriented are realistically optimistic when they are succeeding and are surprisingly undaunted by failure.

First, the helpless children do not recognize or remember the actual extent of their success. Relative to the mastery-oriented, they underestimate the number of problems they have correctly solved. Thus, from the beginning, there is "less" success to act as a buffer. Additionally, the success that the helpless children do acknowledge is not "as successful" as that experienced by the mastery-oriented. Although both helpless and mastery-oriented children, after experiencing success only, rated their performance about the same—somewhat above average—the similarity ended there. Their estimates of how well most children would do on the same task indicated that the helpless children expected most children to do quite well, whereas mastery-oriented children expected that the performance of most children would be closer to merely adequate. This suggests either that the helpless children view most other children as more able or that they are using a different comparison group for themselves. If the helpless children are comparing themselves not to the "average" but to a more proficient group, it would take a better performance for them to be "successful" than it would for the mastery-oriented. For example, if the helpless children consistently compared themselves to the very best children in the class, then it

would be more difficult to achieve success by social comparison standards than if they compared themselves to average classmates. This possibility might be a fruitful avenue for future investigation.

A second major difference is that helpless children do not view their present success as predictive of future success. Their expectancy for future performance was only a little above the midpoint despite their eight consecutive successes. When asked to make a specific prediction about how many problems they believed they could solve if given 15 more of the same type, they expected to get only about half right. What mediates their perception that successes are not replicable? The extent to which children see their successes as reflecting ability is likely to be one of the factors involved. When asked to make attributions for their success, mastery-oriented children credited their ability ("I am smart"), an enduring and general quality, significantly more than helpless children. Moreover, following failure, helpless children discounted their past successes as having been due to task ease to a greater extent than the mastery-oriented. The mastery-oriented children continued to view their success as reflecting ability and therefore predictive of future performance.

After the advent of failure, helpless children appeared to reevaluate (i.e., devalue even more) their prior success in light of their current failure in other ways as well. The major changes were in their lowered evaluation of their performance and in a trend toward lowered expectancy of future success. *Some* change in performance evaluation would be realistic, since children were now evaluating a performance that included both success and failure. However, the helpless children's plunge in expectancy for future success coupled with their previously low expectancy would suggest that although success is not perceived to be predictive of future performance, failure certainly is. It would appear that helpless children view failure as more "diagnostic" of their level of ability, whereas mastery-oriented children view success as more diagnostic (see Trope & Brickman, 1975). Additionally, the helpless children appeared to be so oriented toward fail-

ure that they inflated the actual amount of failure they received. The mastery-oriented children were accurate in their estimate of the number of problems they had missed.

One of the most striking examples of the tendency of helpless children to view failure as predictive and to discount their successes is their response to the question of whether they could solve one of the success problems if it were presented again. *All* of the mastery-oriented children believed they could redo the problem successfully, whereas only two thirds of the helpless children were willing to predict that they would be successful a second time. Not only is success not predictive of future success on similar problems, but a number of the helpless children are not sure it is even predictive of success on the same problems.

The tendency of helpless children to discount success cannot help having adverse effects on their persistence on a task in the face of obstacles (Feather, 1965; Zajonc & Brickman, 1969). Why do the helpless children discount their success to such an extent? Could this inattention to present success serve an adaptive function for the helpless children? Perhaps the anticipation of failure prevents the helpless children from being even more adversely affected by failure when it does occur. That is, if, following successes, they allowed themselves to believe that they had high ability but were still prone to see failure as indicating a lack of ability, then the occurrence of failure might have even greater negative impact. Indeed, Dweck (1975) found that a few helpless children actually appeared more sensitive to failure after they had experienced prolonged success. If this is true, it is possible that if such children come to believe in their ability, they might be *less* willing to risk a failure that indicated a lack of ability. On the other hand, there is also the possibility that making success salient to helpless children by teaching them to identify success and to view it as indicative of ability might prove helpful. For example, just as the retraining of failure attributions led to improved performance on the part of helpless children (Dweck, 1975), it might be useful as well to retrain helpless children to attribute success to more stable

and predictive factors such as ability. The precise relationship between perceptions of success and reactions to failure needs further exploration to clarify these possibilities.

Yet another important question relates to the public versus private nature of the child's performance evaluations and predictions. In this study, the children made their responses verbally to the experimenter. This may have made the situation more evaluative, made the helpless children focus even more on failure, and made them more cautious in their predictions. It is unlikely, however, that the public nature of the responses in itself accounts for the results. For example, how would this account for the helpless children's high evaluation of their peers? Also, since the number of successes and failures can be verified easily by the experimenter, the demand should be for accurate estimates. Yet the helpless children underestimated their successes and overestimated their failures. A related and even more interesting question involves the degree to which the helpless child's behavior depends on the performance situation's being a public one. That is, would the helpless child be as likely to discount success or react to failure as adversely if no one were monitoring the results? Is it helpless children's own doubts about their abilities that cause their deterioration or is it their knowledge that others may witness or have already witnessed their failures (i.e., their lack of ability)? This question is of general importance, since almost all academic situations involve public evaluation of some sort.

One might argue that the mastery-oriented children are unrealistic in their assessment of their performance, since they do not revise their evaluation after a series of failure trials. However, this does not seem to be the case for several reasons. First, they are accurate about the number of problems solved and not solved. Second, it appeared in an earlier study (Diener & Dweck, 1978) that mastery-oriented children did not define the "wrong" feedback as failure but only as information suggesting that they needed to alter their strategy. Third, they do appear to appreciate that they might not be able to solve quite as many problems as they had previously estimated. They also appear to be able to tolerate

a lapse from perfect performance (which is to be expected in most performance situations) and still view themselves as successful.

The goal of the present investigation was to broaden our understanding of learned helplessness by examining perceptions of success. The results indicate that just as the mastery-oriented children do not seem to define themselves as failing on the failure trials, the helpless children do not define themselves as succeeding on the success trials.

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