

EFFECTS OF PRAISE AND REPROOF ON DIGIT-SYMBOL
LEARNING AT THE ELEMENTARY SCHOOL LEVEL

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TABLE OF CONTENTS

	Page
LIST OF TABLES	iv
LIST OF ILLUSTRATIONS	v
Chapter	
I. INTRODUCTION.	1
II. REVIEW OF THE LITERATURE.	7
Studies Relating the Effects of Praise and Reproof	
Studies Relating the Effects of Success and Failure	
III. METHOD.	21
Experimental Design	
Description of Subjects	
Assignment of Subjects to Groups	
Task	
Procedure	
IV. RESULTS	28
V. DISCUSSION.	34
Interaction Effects between Achievement Levels and Nature of Reinforcement	
Effects of Different Achievement Levels on Performance	
Effects of Nature of Reinforcement on Performance	
VI. SUMMARY	40
APPENDIX.	44
BIBLIOGRAPHY.	49

LIST OF TABLES

Table	Page
I. Means and Standard Deviations of Correct Responses for the Treatment Combinations . .	29
II. Summary Table of the Achievement Level X Nature of Reinforcement Analysis of Variance. . . .	30

LIST OF ILLUSTRATIONS

Figure	Page
1. Experimental Design Model	22
2. Nature of Reinforcement by Achievement Level Interaction.	32

CHAPTER I

INTRODUCTION

The role of reinforcement in learning has occupied a major portion of research efforts among psychologists for almost a century. As a result of the historical recognition of the importance of reinforcement in learning, numerous experimental articles and theoretical papers exist which define reinforcement as one of the primary variables in the learning process.

One of the first reinforcement theories was introduced by Edward L. Thorndike. Within his theory of learning existed several laws which were a result of theoretical explanations to his research findings. Thorndike's reinforcement theory was presented in his "law of effect" which stated that when a satisfying condition follows a response, the bond between the stimulus and response is strengthened, increasing the probability that the response would occur in the future when the same stimulus was presented. He also stated that the reverse would occur in the presence of annoying stimuli. Later Thorndike modified his reinforcement theory to include only the positive aspects.

Although Thorndike's theory of learning received heavy criticism under future experimentation, his influence on

educational philosophy and child-rearing practices still remain evident today. The intensity and widespread use of his work is exemplified by Edward Tolman, a popular learning theorist. Tolman (2, p. 15) states, "The psychology of animal learning, not to mention that of child learning, has been and still is primarily a matter of agreeing or disagreeing with Thorndike, or trying in minor ways to improve on him."

The adoption of the "law of effect" by parents and educators promoted a philosophy that rewards and successes further the learning of the rewarded behavior, whereas punishment or failure reduced the tendency to repeat the behavior leading to punishment or failure.

Recent investigations and studies using verbal stimulation suggest that such a generalized delivery of verbal statements of praise and reproof is less effective in influencing behavior than one which would be directed toward the success history of the child.

Certain propositions presented by Rotter (3) suggest that a child who has continually received praise expects to succeed; hence success and praise do not surprise him or raise him to new levels of performance. He does not expect to fail or be criticized; hence, when such things happen to him, the effect is great. The punishment is so severe that he doubles his effort to avoid encountering it again.

The failing child expects to fail and receive criticism so that it has little effect on him except to confirm his beliefs and reduce his effort. But an experience of praise or reward is so striking that he works doubly hard to encounter such a state of affairs again.

In 1958 Gewirtz and Baer (1) tested a similar theory using first and second grade children. They theorized that a child who has received substantial amounts of social approval should have had his need fully satisfied and under such conditions social approval as a means of promoting learning would be less effective.

The children involved were divided into three groups. One group was isolated from all sources of stimulation before performing the discrimination task. The second group was taken from the regular class and started immediately on the task. The third group was exposed to a period of high social stimulation immediately prior to the task. The latter was accomplished by providing a period of play in which everything the child did was praised and admired by the experimenter in order to induce a state of satiation with respect to social approval.

The hypothesis was stated that the satiated state would reduce the effectiveness of social approval in modifying behavior. The results of the experiment were as expected. Those deprived of social approval showed much greater tendency to modify their behavior as a result of praise. The

group satiated with social approval showed the least modification of behavior as a result of the comments of the experimenter.

The theories and research introduced by Gewirtz and Baer (1) and the propositions stated by Rotter (3) suggest that a generalized delivery of praise or reproof may not be the most effective way to modify behavior through social stimulation. Instead, they theorize that the effect of social stimulation is dependent on the amount and direction of prior social reinforcement.

The present study is an effort to investigate applications of these same principles in an academic setting. Many past studies have attempted to evaluate the effects of verbal reinforcers, but the present study is unique in that the achievement history of the subjects was a controlled variable.

The principal problem of the present research was to determine the relative effects of two major variables, nature of verbal reinforcement and achievement history, upon the performance of elementary school children on a relatively simple learning task. The following sub-problems stemmed from the major one.

1. To determine the extent to which children of different achievement backgrounds, successful and unsuccessful, perform differently on a digit symbol task.

2. To determine the relative merits of reinforcement, praise and reproof, upon performance of the task.

3. To determine the degree to which praise and reproof affect successful and unsuccessful subjects differently.

Based on the previously stated theoretical background and the stated purposes, the present study tested the following hypotheses:

Hypothesis 1.--There will be a significant interaction between achievement level and nature of reinforcement. More specifically, it was hypothesized that children with a successful achievement history would produce significantly higher mean scores under a reproof treatment than under a praise treatment, while children having an unsuccessful achievement history would perform significantly better under a treatment of praise than under a treatment of reproof.

Hypothesis 2.--Elementary children having successful achievement histories will obtain significantly higher mean scores on a digit symbol task than will children having unsuccessful achievement histories.

Hypothesis 3.--Children praised verbally during the learning task will achieve significantly higher mean scores on a digit symbol task than will children reproofed during the learning task.

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CHAPTER II

REVIEW OF THE LITERATURE

A review of related literature is presented in three sections: (a) investigations in which praise or reproof were the manipulated variables, (b) investigations in which induced success or failure were the manipulated variables, and (c) synthesis of the various sections.

Studies Relating the Effects of Praise and Reproof

Two of the earliest and most popular studies evaluating the effects of verbal incentives were conducted by Elizabeth Hurlock. She has provided much understanding of the role of verbal reinforcement and its effects on elementary children.

In one of Hurlock's studies (8), she investigated the effects of types of reinforcement, using school children as subjects and praise and reproof as positive and negative reinforcers. She formed three groups of subjects from a large group of elementary children. Each group was matched for intelligence, chronological age, and the number of colored and white subjects within the group. The subjects were given an intelligence test on two different occasions with praise, reproof, or neutral instructions given between

the trials. In her results she indicated that the reproof treatment improved the scores on the intelligence test to a greater extent than praise or neutral instructions.

In a second study, Hurlock (9) administered addition problems to four groups of fourth and fifth grade children. The four groups were matched for sex, age, and initial ability on addition problems. One group received neutral instructions throughout the testing, a second was praised, and the third was reproofed, and the fourth received neutral instructions but were in the presence of those children receiving praise and reproof. She found that praise produced the greatest improvement in the scores, while the control group score was lower than on the first trial.

A study designed to evaluate the effects of verbal reinforcement on visual and motor tasks was conducted by Gates and Risland (4). Each of the eighty college subjects used in the study was given two trials on a coordination test and a color naming task. They reported that on the coordination test the improvement was greater for those praised than those reproofed or given neutral instructions. In the color naming task the effects of verbal stimulation were found not to be significant.

Wood (21) designed an experiment to test the effects of praise and reproof on a memorization task. Three groups of college freshmen were matched for sex, intelligence, and

chronological age. Each subject was given two sessions to memorize a list of nonsense syllables with praise, reproof, or neutral instructions given between sessions. The subjects criticized between sessions showed a greater improvement than subjects praised. The control subjects showed the least amount of change.

In an experiment involving a test of memory and judgment, Briggs (1) used matched groups of seventh and eighth grade children. Between the first and second session one group was criticized, the other was praised. It was found that 87 per cent of the subjects made better scores after praise. The criticized subjects showed no significant difference in their scores.

Brenner (2) designed an experiment to determine the effects of immediate and delayed praise and reproof. He used six matched groups of third grade children. The subjects were shown a list of difficult words for four minutes and then given two minutes to write all they recalled. The immediate praise group was praised after two minutes and the delayed praise group after one day. There was also an immediate reproof group and a delayed reproof group. There were eight repetitions of the procedure for each group. The control group showed a drop in performance. The praised and reproved groups showed an initial rise followed by a decline. The decline appeared first in the delayed praise and delayed

reproof groups and last in the immediate praise and immediate reproof groups. The results indicated that the immediacy of the reinforcement was a factor in its effectiveness.

In their study, Forlano and Axelrod (3) used fifth grade subjects and the Woodworth-Wells Number Cancellation Test. A two-minute test period was followed by the grading of score sheets as good or bad. The control group received no grading. This was followed by a second two-minute practice period, further grading, and a third two-minute practice period. They found that reproof produced a greater increase in score than praise or control conditions.

In a similar study, Thompson and Honnicutt (19) used a cancellation task with fifth grade subjects. It was found that praise and reproof were significantly more effective in increasing work output than control conditions. There was not an overall difference between praise and reproof.

Schmidt (14) tested a total of 574 fifth and sixth grade subjects using a code substitution. Five trials of two-minutes duration were given to the subjects, with praise, reproof, or neutral instructions given between trials. His general conclusions were that "Neither praise nor reproof can be singled out as being more effective, the one over the other."

Two forms of the Stanford-Binet were used by Gordon and Durea (6) to evaluate the effects of verbal reinforcement on

intelligence tests. Two groups of third grade children were given Form L of the 1937 revision of the Stanford-Binet. One group was retested with the Form M under conditions of discouragement. The other group was given Form M under the normal, prescribed conditions. The results indicated that discouragement had a significantly depressing effect on performance.

One of the most recent and pertinent studies to the present study was conducted by Gewirtz and Baer (5). As in most experimental studies the learning task was much simpler than those ordinarily encountered in daily life or school. The children were given a game to play which involved inserting marbles in one of two holes in a box. The marbles fell down inside the equipment and then rolled out of the machine at the bottom. The children were free to decide into which hole to place the marbles. However, whenever the child inserted the marble into a predetermined hole, the experimenter provided social approval by saying, "fine," "good," or "hm hmmm."

The elementary children involved were divided into three groups. One group was isolated from all sources of stimulation before the game. The second group was taken from the regular class and started immediately on the game. The third group was exposed to a period of high social approval immediately prior to the game. The results of the study were in

accordance with expectation. Those deprived of social approval showed a much greater tendency to put marbles in the hole associated with a comment of approval. The group satiated with social approval showed least modification of behavior as a result of the comments of the experimenter.

Silberman (16) studied the effects of praise and reproof in a non-laboratory situation. Forty-nine teachers of grades three through six were visited twelve times during a school year, and their verbal behavior was categorized and tallied according to the amount and direction of social reinforcers. The results indicated that no correlations existed between reading growth and praise, or reading growth and reproof.

Mandler and Sarason (11) gave their fourth and fifth grade subjects six trials on the Kohs Block Design No. 13 and the Digit Symbol subtest of the Wechsler-Bellevue Intelligence Test. The subjects were then told that they had done very well, very badly, or were told to go on to the next part. In the second part all subjects were given six trials each on the Kohls Block Design No. 16 and a comparable variation of the Digit Symbol Test. The instruction did not produce overall significant effects for either of the tests.

In summary, studies of verbal reinforcement and their effect on performance are, in general, in keeping with the rationale underlying the concept of reinforcement. That is, praise appears to be superior to reproof in modifying human behavior.

Although the majority of the studies cited (1, 4, 5, 6, 8) support such a conclusion, studies revealing contradictory results also exist (3, 9, 21). Much of the disagreement in the findings of these studies can be accounted for through the examination of the experimental designs. It appears that the basis for the discrepancies lies in design differences, such as differences in experimental task, differences in ages of subjects, and differences in types of incentives.

A comparison of various studies suggests that an interaction may exist between task difficulty and reproof. It appears that reproof improves performance on simple tasks, but interferes with performance on complex tasks.

One study suggests that the time of delivery influences the effectiveness of verbal reinforcers, with immediate praise and reproof being more effective than delayed praise and reproof.

The present study is primarily concerned with the literature relating studies determining the effects of praise and reproof on performance. But the effects of such social stimulation imply directly or indirectly success or failure for the subject. Such conditions make studies of success and failure a related and very pertinent area of investigation for the present study.

Studies Relating the Effects of Success and Failure

A study relating the interfering effects of previous failure was conducted by Sullivan (18). Sullivan administered two series of eight nonsense syllables to fifteen- and sixteen-year-old subjects. When success instructions were given between series, there was a decrease in the time taken to learn the second series. Failure instructions resulted in an increased time required to learn the second series. The effect of the success instructions was greater than those of failure.

The visual discrimination of horizontal lengths was the task used by Hamilton (7) in his study with college students. There were five groups: (a) a reward group--a bell rang for each successful discrimination; (b) a punishment group--a bell rang for each wrong response; (c) a group punished with the bell and in which the subjects also had to guess the direction of error; (d) a punishment group that was also told the direction of error; (e) a group given knowledge of results; and, (f) a control group. For the control group the average errors through successive series of five trials started at 102 per cent and increased to 127 per cent. The corresponding figures for the punishment group were 107-27 per cent; reward 79-26 per cent; punishment along with guessing 75-15 per cent; punishment with knowledge of error 102-20 per cent; and, knowledge of results 98-45 per cent. Both reward and

punishment produced a decrease in the amount of errors. Knowledge along with punishment did not produce a greater change than punishment alone. Knowledge of results did not produce as great a change as reward or punishment.

College undergraduates and educated adults were used in a study by Thorndike and Woodyard (20). The tasks used were rhymes, word completion, anagrams, opposites, and equations. The tasks were designed to give the subjects many chances of success, a moderate chance of success, and few chances of success. The results indicated that this variation in chances for success had little or no effect on the performance of the subjects.

Sears (15) used a timed card sorting task to create a competitive activity among the subjects. Half the subjects were allowed to succeed and the other half were forced to fail on the task. Twenty college freshmen were used in the study. The learning of a series of nonsense syllables, before and after the card sorting, was used as a second activity to measure interfering effects of success and failure. Those subjects succeeding on the card sorting task required less time to learn the syllables than those who failed on the card sorting task.

In an experiment designed to investigate the effects of different degrees of failure at various points in time following the failure, Russell and Farber (12) tested forty college

freshmen with paired associates task. The subjects were informed that they had to reach a certain criterion score before the results could be of any use to the examiner. After nine trials the subjects were told that the scheduled time had elapsed and that they failed to reach the criterion. The subjects were then divided into two groups on the basis of scores on trial nine. Group A was told that they had come very close to the criterion, but had failed to reach it by one point. This was followed by two more trials. The subjects in Group B were told that they had failed to come even close to the criterion and then were given two more trials. One week later the performance of Group B was better than that of Group A, although the difference between the groups was not significant.

Steisel and Cohen (17) assigned their forty third-grade subjects to one of two groups: a mild failure group and a severe failure group. Simple arithmetic problems were used, and the subjects were given twelve trials of which the third, sixth, and ninth involved failure. The third trial involved moderate failure for both groups, each subject being stopped five to six problems prior to his expressed goal by the announcement that the time was up. At the sixth and ninth trials subjects under the mild failure group were stopped just one to two problems short of their goals; whereas the corresponding figures for the severe failure group were ten

to twelve problems short. Taking the results from the first twenty problems in each trial, it was found that severe failure produced an increase in performance time and mild failure produced no significant difference.

Undergraduate students were used as subjects in a study conducted by Lucas (10). Six series of ten consonants each were presented to the subjects for immediate memory; the consonants were exposed for one second at one-second intervals. Group A was given a report of failure after every series, Group B after the last four series, Group C after the last two series, and Group D was a control group. The subjects were then given three series of ten consonants. In an analysis of variance failure was found not to be a significant source of variance.

In a study conducted by Sarason, Mandler, and Craighill (13), one group of college freshmen was told that they were expected to finish a modification of the Wechsler-Bellevue Digit Symbol subtest within the time given. The other group was told that they could not be expected to finish. Five trials were given. The induced failure resulted in a significant increase in variance from trial one to trial five.

In summary, the effects of induced success and failure on performance appear to be related to the complexity of the task. Failure instructions hinder the performance on complex tasks, but improve the performance on simple tasks.

Several studies (15, 17) have revealed that failure instructions have interfering effects on future tasks.

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CHAPTER III

METHOD

The present chapter gives in detail the methods and procedures used in the present study, which was an attempt to determine the relative effects of two kinds of verbal reinforcement (praise and reproof) on third and fourth grade children having successful and unsuccessful academic histories in response to a digit symbol learning task.

Experimental Design

The basic design was a 2 X 2 factorial analysis of variance in which the two main treatments and their respective conditions were as follows:

Achievement level--successful, unsuccessful

Nature of reinforcement--praise, reproof

Two methods were employed in establishing the four treatment combinations. First, the systematic observation of previous academic achievement records served as the basis for selection of subjects into the two conditions of the main variable, achievement level. Second, the nature of reinforcement to be received by the subjects was determined by randomly drawing the names from a container. A more

comprehensive explanation of this randomization process is given later in the chapter.

The criterion score employed as the dependent variable was the average number of correct responses on a digit symbol task in ten trials. The number of correct responses was taken as evidence of the effects of praise or reproof.

A schematic presentation of the basic experimental design is presented in Figure 1. Numbers in the cells represent the number of subjects assigned to that treatment combination.

	Praise	Reproof
Successful	N = 10	N = 10
Unsuccessful	N = 10	N = 10

Fig. 1--Experimental design model

Description of Subjects

Subjects used in the present study were forty third- and fourth-grade elementary children enrolled in a large, southwestern school. All subjects had been administered the Metropolitan Readiness Test upon entering the first grade. Selection of the subjects to be used in the study was limited to those scoring above average on the readiness test.

The majority of the subjects were from particular urban areas served by the school. Factors such as socio-economic status of family, number of siblings, order of birth, sex, etc., were controlled by means of randomized assignment to treatment groups to be described.

The subjects ranged in chronological age from six years, eight months, to nine years, three months. The records of all children were investigated to assure that no visual or motor handicaps existed which would impair their performance. All subjects used in the study evidenced no such handicaps.

Assignment of Subjects to Groups

Constituting the success levels.--The forty subjects represented two levels of academic achievement as defined by previous school attainments. The two levels of achievement were determined by calculating the averages of the subjects' curricula, which consisted of reading, English, spelling, mathematics, handwriting, history, geography, and science.

Twenty children were chosen with A and B averages and were called successful. Another twenty children were chosen with C and D averages and were called unsuccessful. The numerical averages associated with the letter grades were as follows: A (93-100), B (86-92), C (76-85), and D (70-75).

Controlling the ability levels.--Forty subjects were selected to be used in the experiment on the basis of their performance on a readiness test. The purpose of such a selection was an attempt to control the ability levels of the subjects. Unless such a control existed it would not be possible to state that the criterion scores were a result of the reinforcement treatment.

Constituting groups to receive different reinforcement.--Ten subjects were assigned from each of the two achievement levels to one of the two reinforcement treatments (praise or reproof) by drawing the names randomly from a container. This randomization was an effort to assure that each subject had an equal chance of being assigned to any one of the two reinforcement conditions. More specifically, the assignment consisted of placing the names of the successful achievement subjects into a container and drawing them randomly, assigning the first subject to the praise treatment and the second to the reproof treatment. This pattern was continued until all subjects were assigned to a reinforcement treatment. The unsuccessful achievement subjects were assigned reinforcement

treatment according to the same procedures. At this stage the assignment of subjects was completed. The subjects had been divided into four subgroups with ten subjects assigned to each treatment. They represented a two-dimensional design with the dimensions being (a) achievement level, and (b) nature of reinforcement.

Task

The task consisted of a digit symbol test constructed by the experimenter. The test, as presented to the subjects, was produced on standard 8" X 11" sheets of mimeograph paper. The sheet contained six rows of ten vertical rectangles which were divided horizontally. The upper half of the rectangle contained a number ranging from one to ten, while the lower half remained blank. The object of the test was to match the number in the upper box with the appropriate symbol presented in the key at the top of the paper, and write it in the lower box. Performance on the task was determined by the number of right correct matchings within a one minute period. A specimen of the task is found in the Appendix.

Procedure

Each child was called to the experimental room from the home room by the use of an intercom system. No contact was made with the subjects until the time of testing. Each child was seated in front of the experimenter and was instructed

how to perform the task. The standard instructions given every subject were as follows:

Today we are going to play a number game. The game is not difficult and you can do it easily. We play the same game ten times in a row. I will give you two pencils to play the game, in case one should break or become dull. Here is the paper on which you will play the game. Look at these boxes. You can see that each number has a mark below it, and each one has a different mark. Now look here (pointing to the samples in key) where the upper boxes have numbers but the box below have no marks. You are to put in each of these boxes the mark that should go there, like this (point to key, then to sample). Here is a two, so you would put in this mark. Here is a one, so you put in this mark. Here is a three so you put in this mark. Now, when I tell you to begin, start here and fill in as many boxes as you can without skipping any. Are you ready? Start!

Dispensing the praise statements.--After the completion of each one-minute trial the experimenter picked up the subject's paper and made the following statements. "Let's see how you have done this time. Oh! This is very good. You have done much better than the other children have done. You have done very fine work. Now let's try it again and see if you can keep up such good work."

Dispensing the reproof statements.--The subjects assigned to the reproof treatment received the following statements after the completion of each one minute trial. "This is not very good. You should have done much better than this; all the other children have done much better work than this. Now, let's try it again and see if you can't do better this time."

After the completion of the tenth trial each subject in the reproof treatment group was given special treatment. The number of matchings completed after the one minute trial was observed and recorded without interrupting the subject. The child was allowed to continue for an extended period of time. The subject was then praised and rewarded for his excellent last trial.

CHAPTER IV

RESULTS

The results obtained and a statistical analysis of those results are given in the present chapter. The treatment effects were measured in terms of the differences in the mean scores of the subjects' average (mean) performance for the ten trials. The basic interest was in calculating and comparing the mean scores of correct responses for the various treatment combinations. A correct response was defined as the matching of the correct symbol with its appropriately keyed numeral.

Analysis of variance was utilized as the major statistical operation to determine the acceptability or unacceptability of the various working hypotheses and to determine the manner in which treatment conditions interacted.

Table I contains the means and standard deviations of correct responses made by the ten subjects assigned to each particular treatment combination. The ten separate trial scores and the mean scores of the ten trials are presented for each subject in the Appendix.

In addition to the means and standard deviations for each of the four treatment combinations, Table I also contains

(in the margins) the means and standard deviations for each level of the two main treatments. The cells in the extreme right hand column of Table I, labeled "Combined Verbal Treatment Scores" contain (a) the mean number of correct responses under each reinforcement level, disregarding the achievement level; and (b) the corresponding standard deviation of the scores.

TABLE I
MEANS AND STANDARD DEVIATIONS OF CORRECT RESPONSES
FOR THE TREATMENT COMBINATIONS

Nature of Reinforcement	Achievement History				Combined Verbal Treatment	
	Successful		Unsuccessful		M	SD
	M	SD	M	SD		
Praise	30.86	5.76	27.91	4.25	29.38	1.66
Reproof	29.29	7.87	25.87	4.11	27.58	3.75
Combined Levels of Achievement	30.08	4.53	26.89	4.45		

The cells in the bottom row of Table I labeled "Combined Levels of Achievement" contain (a) the mean number of correct responses obtained under each achievement level, disregarding the nature of reinforcement, and (b) the corresponding standard deviations of the scores.

It will be recalled that the various working hypotheses given in Chapter I included specific predictions about the

relative magnitudes of the means shown in Table I. In the following paragraphs each hypothesis is repeated and is accompanied by the presentation of the appropriate test of statistical significance. Since all working hypotheses were tested statistically by the analysis of variance technique, the summary table of the analysis precedes the consideration of each individual hypothesis. Shown in Table II is the summary of the analysis of variance results. As each hypothesis is presented subsequently, appropriate references to Tables I and II will be made.

TABLE II
SUMMARY TABLE OF THE ACHIEVEMENT LEVEL X NATURE
OF REINFORCEMENT ANALYSIS OF VARIANCE

Source of Variation	df	Sum of Squares	Mean Square	F-Ratio
Achievement Level	1	101.442	101.442	4.908*
Nature of Reinforcement	1	32.580	32.580	1.576
Within Cells	36	744.126	20.670	
Achievement Level X Nature of Reinforcement	1	.553	.553	<1.00
Total	39	878.698		

*Statistically significant at $p \leq .05$.

Hypothesis 1 of the study stated that there would be a significant interaction between achievement level and nature of reinforcement. More specifically, it was stated that for

successful students a reproof treatment would be more effective than the praise treatment; whereas for unsuccessful students it was predicted that praise would be more effective than reproof.

Initial evidence appropriate to Hypothesis 1 was obtained by testing the statistical significance of the Achievement X Nature of Reinforcement interaction. The F-ratio column in Table II reveals statistically nonsignificant results for the interaction (F was 1.00). The interaction results indicated that the relative effects of reinforcement treatments were not significantly different for the two achievement levels. On the basis of these results, Hypothesis 1 was rejected.

The nonsignificant interaction effects may be observed by comparing the four treatment combination means presented in the main body of Table I. In the interest of clarity the appropriate cell means are presented in Figure 2. An analysis of Figure 2 indicated that praise and reproof had approximately similar effects on the two levels of achievement, as evidenced by the two closely parallel lines. The reproof treatment appeared to hinder slightly the performance of the subjects regardless of achievement background, while the praise treatment appeared to promote slightly the performance of the subjects.

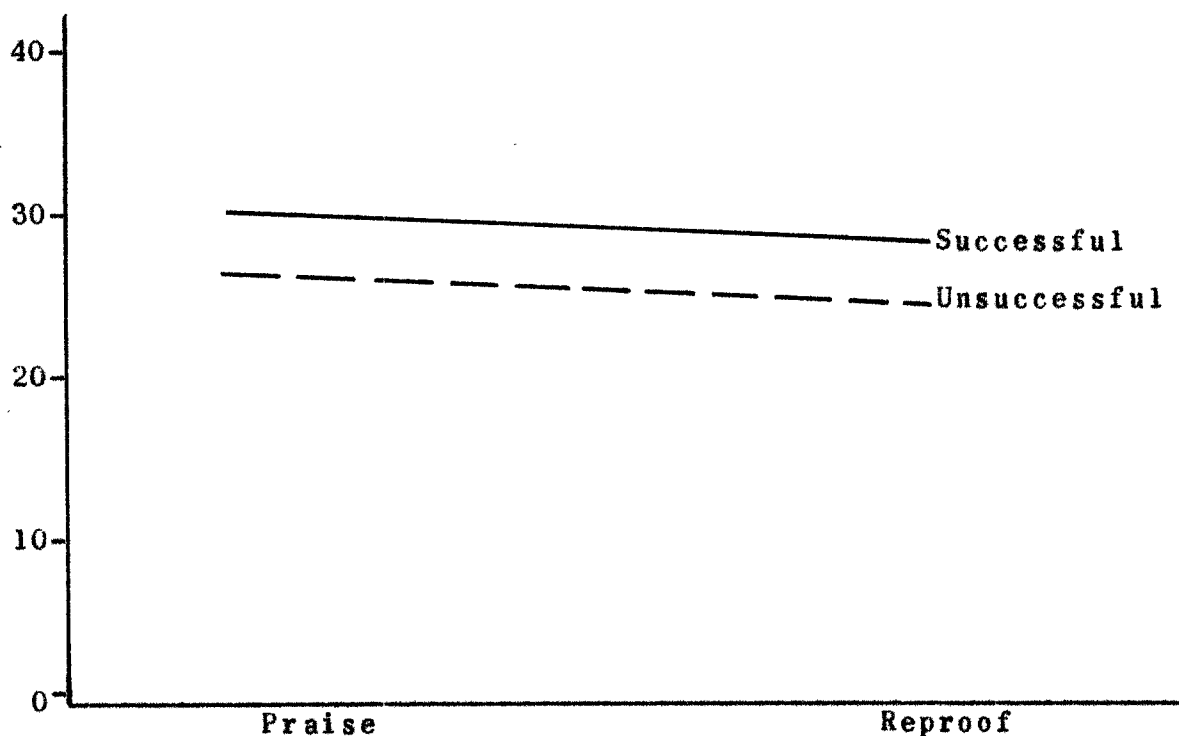


Fig. 2--Nature of reinforcement by achievement level interaction.

Hypothesis 2 stated that elementary children having successful achievement histories would obtain significantly higher mean scores on a digit symbol task than would children having unsuccessful achievement histories.

The main effect mean scores for the two achievement levels (Successful = 30.08 and Unsuccessful = 26.89) are presented in the row entitled "Combined Achievement Levels" in Table I. A preliminary examination of the scores revealed a mean difference in the direction predicted by the hypothesis. The statistical significance of the difference between the means ($30.08 - 26.89 = 3.19$) is presented in Table II; the

Achievement level F-ratio of 4.908 (df = 1:36) was statistically significant at a level of probability less than .05. On the basis of this statistical analysis Hypothesis 2 was accepted as reasonable.

Hypothesis 3 of the study stated that children praised verbally during the learning task would perform at significantly higher mean level than children reproved during the learning task.

The mean scores related to the present hypothesis are presented in the "Combined Verbal Treatment" column of Table I. Consideration of the mean scores in relation to the hypothesis revealed a trend toward the predicted results, that is, the Praise mean of 29.38 exceeded the Reproof mean of 25.58 by a value of 1.80. The statistical test of the significance of the mean difference of 1.80 is presented in Table II. The obtained F-ratio of 1.576 for "Nature of Reinforcement" factor was nonsignificant; therefore, the working Hypothesis 3 was not substantiated. In other words, the evidence indicated that it was unreasonable to suppose that a true difference existed between the relative effects of the two reinforcement treatments.

CHAPTER V

DISCUSSION

The present chapter includes a comparison of the results obtained in the present study with those of previous research, and an interpretation of the results from the standpoint of practice and theory. The three main sections to follow include (a) Interaction Effects between Achievement Levels and Nature of Reinforcement, (b) Effects of Different Achievement Levels on Performance, (c) Effects of Nature of Reinforcement on Performance.

Interaction Effects between Achievement Levels and Nature of Reinforcement

Hypothesis 1 stated there would be a significant interaction between nature of reinforcement and achievement level. This hypothesis was based on the expectation that children with a successful achievement history would produce significantly higher mean scores under a reproof treatment than under a praise treatment while children having an unsuccessful achievement history would perform significantly better under a treatment of praise than under a treatment of reproof.

This hypothesis was based on results obtained by Gewirtz and Baer and theories presented by Rotter which suggested that the amount and direction of previous social stimulation would

influence the effectiveness of present stimulation. The F-ratio for the interaction as recorded in Table II was not large enough to substantiate the hypothesis. The interaction effects were graphically presented in Figure 2, which displayed the similar effects of the two verbal treatments on the two achievement levels. Praise statements increased the performance of each achievement level, while reproof statements appeared to hinder the performance of each achievement level. The hypothesized differences were not demonstrated by the evidence obtained in the present study.

The nonsignificant interaction effects of nature of reinforcement and achievement level may have resulted from the use of the Metropolitan Readiness Test as a basis for controlling the mental ability levels of the subjects. To amplify, the predicted interaction might have occurred had mental ability levels been based on an intelligence test at the fourth grade level rather than on the Metropolitan obtained just prior to the first grade.

Another factor which may have accounted for the nonsignificant interaction was the possibility of the lack of a wide enough difference between the two achievement levels within the upper mental range subjects selected for the study. That is, the selection of subjects from third and fourth grade children scoring above average on the readiness test may not have created a wide enough range of success histories for the theories of Rotter to be applicable. As a basis for future

experimentation it is suggested that more extreme groups be used in designating the two success levels accompanied by control of intelligence.

The findings suggested that the relative effects of praise or positive reinforcement were superior (but not significantly so) to reproof for each of the two achievement levels. Although these findings were not in accord with the interactive predictions, they reveal the reinforcing qualities of verbal stimulation. Verbal stimulation is a most popular and natural method employed by parents and educators in molding the behavior of children. The results suggest the adoption and use of positive statements over negative statements.

Effects of Different Achievement Levels on Performance

One of the purposes of the present study was to determine whether elementary children who had experienced varying degrees of academic success would perform differently on a digit symbol task. Hypothesis 1 of the study stated that they would; namely, elementary children with successful academic histories will perform at a significantly higher mean level on a digit symbol task than elementary children with unsuccessful academic histories. The theories of Rotter presented in Chapter I suggested that such a variation of performance would exist. The implications from his theory were that the amount of prior success experienced by a subject

determines the effort, enthusiasm and ambition on future tasks. McCandless suggested that if success or failure patterns persist over long periods of time the effects of these patterns may be permanent. He also indicated that long time experience of success may result in increasing confidence and optimism and in redoubled effort, whereas persistently repeated failure may result in resignation, pessimism, and possibly, reduction of effort. The study by Sears which was presented earlier also revealed interfering effects of failure on later tasks.

The results of the present study indicated the probability of such an effect existing. The previously stated hypothesis was confirmed at a statistically significant level. That is, elementary children with successful academic histories as earlier defined obtained a significantly higher mean number of correct responses than did children with unsuccessful academic histories.

The selection of the task and the assignment of subjects to achievement levels is again presented to stress the importance of these two factors in confirming the hypothesis. The task was selected on the assumption that it presented a standard level of difficulty for each achievement level and was capable of maintaining the interest of the subjects for ten consecutive trials. In order to control the ability levels of the subjects, only those above average on the Metropolitan Readiness Test were used in the study. The

control of these two factors was necessary to state that the mean differences were a result of the achievement histories of the subjects.

A subjective interpretation of the practical implications of the results suggests the need for children to experience success in their daily routines, assuming of course a causal relationship between past and present success. In order that a child might experience various degrees of success, it is important that tasks be assigned which present a challenge, but which are not outside the ability range of the child.

Effects of Nature of Reinforcement on Performance

One of the principal variables investigated was the nature of reinforcement, praise and reproof, and its effects on performance. Hypothesis 2 predicted that elementary children praised would perform at significantly higher levels than children reproofed. Studies cited in Chapter II by Hurlock and Briggs, as well as a large number of other related studies, provided data and results supporting this hypothesis, as did the very rationale underlying the concept of reinforcement. Although the F-ratio as recorded in Table II was not large enough to warrant acceptance of the working hypothesis, the mean scores for the two reinforcement treatments were in the direction predicted. That is, praised subjects performed at a higher mean level than subjects who were reproofed. The

means may be ranked in such an order, but it must be emphasized that the obtained differences were too small to be statistically significant.

The hypothesized difference was not demonstrated by the empirical data of the present study. The possibility exists that the homogeneous background of all subjects did not produce as great a need for praise, as would have a heterogeneous group of subjects. There may be a greater need for praise at lower levels of general ability than at upper levels. Another possible explanation of the nonsignificant results is that reinforcement statements did not contain the desired negative and positive connotation. That is, the severity of the reproof statements and the gratifying effects of the praise statements are questionable.

The lack of sufficient evidence to confirm the superiority of praise statements as a method of influencing behavior should not promote or suggest the use of negative reinforcement as a better method. While negative reinforcement may produce efficient learning in some instances and appear to provide the desired results, the possibility of accompanying anxiety may have negative effects on other behaviors.

CHAPTER VI

SUMMARY

The present study was designed to determine the relative effects of two kinds of verbal reinforcement (praise and reproof) on third and fourth grade children having successful and unsuccessful academic histories in response to a digit symbol learning task.

The subjects were forty elementary children enrolled in a private school in a large city in the Southwest. Only third and fourth grade children scoring above average on the Metropolitan Readiness Test were employed. The children ranged in chronological age from six year, eight months, to nine years, three months. Factors such as socio-economic status of family, number of siblings, order of birth, sex, etc., were controlled by random assignment of subjects to the various treatments.

The basic design was a 2 X 2 factorial analysis of variance in which the two main treatments and their respective conditions were as follows: Achievement Level--successful and unsuccessful; Nature of Reinforcement--praise and reproof. Twenty subjects were assigned to each of the two achievement levels according to their academic histories.

Children with A (93-100) and B (86-92) averages were assigned to the success group. Those with C (76-85) and D (70-75) were assigned to the unsuccessful group. Ten subjects were then assigned randomly from each of the two achievement levels to receive either praise or reproof.

The task consisted of a digit symbol test constructed by the experimenter. The test provided sixty numbers to be matched with their corresponding symbol as presented in a key. The learning criterion score employed as the dependent variable was the average number of correct responses obtained over ten trials.

The experimenter administered ten one-minute trials to each subject. Between each trial the appropriate verbal treatment was given to the subjects. The praise treatment consisted of statements such as, "This is very good," "You have done very fine work," and other similar statements. The reproof statements consisted of "This is not very good work," "You should do better than this," and other negative type phrases.

After the completion of the tenth trial each subject in the reproof group was given special positive treatment to eliminate possible ill-effects due to the preceding negative experience. More specifically, the number of matchings completed after the one-minute trial was observed and recorded without interrupting the subject. The child was then allowed

to continue for an extended period of time under the positive treatment condition.

The hypotheses tested and the results obtained are presented in the following paragraphs.

Hypothesis 1 stated that there would be a significant interaction between achievement level and nature of reinforcement. This hypothesis was based on the expectation that subjects with a successful achievement history would produce significantly higher mean scores under a reproof treatment than under a praise treatment, while children having an unsuccessful achievement history would perform significantly better under a treatment of praise than under a treatment of reproof.

An investigation of the mean scores of the four treatment combination means and a statistical analysis of these means yielded results suggesting a rejection of the stated empirical hypothesis.

Hypothesis 2 stated that elementary children having successful achievement histories will obtain significantly higher mean scores on a digit symbol task than will children having unsuccessful achievement histories.

The statistical test applied to the main effect mean scores provided significant results. On the basis of these results Hypothesis 2 was accepted.

Hypothesis 3 stated that children praised during the learning task will perform significantly higher mean scores on a digit symbol task than will children reproved during the learning task.

While differences in the mean scores made by the two groups were such that they favored the acceptance of the above hypothesis, the differences were not great enough to be statistically significant. On the basis of the results, Hypothesis 3 was rejected.

INDIVIDUAL SUBJECTS' RAW SCORES AND MEANS ON THE
DIGIT SYMBOL TASK--UNSUCCESSFUL, PRAISE GROUP

	Trials										Mean
	2	3	4	5	6	7	8	9	10		
1	28	29	31	30	30	34	30	35	33	30.60	
17	19	24	25	26	27	28	30	29	30	25.50	
26	31	28	29	33	34	34	36	36	36	32.30	
24	24	27	27	28	32	29	34	33	33	29.10	
29	32	35	35	33	36	37	40	40	38	35.50	
18	19	21	23	24	27	24	26	27	27	23.60	
17	20	18	19	20	22	22	21	21	20	20.00	
25	25	27	28	30	30	30	32	30	33	29.00	
21	21	23	23	25	24	27	29	30	29	25.20	
23	25	29	30	31	30	30	31	28	26	28.30	

INDIVIDUAL SUBJECTS' RAW SCORES AND MEANS ON THE
DIGIT SYMBOL TASK---SUCCESSFUL, PRAISE GROUP

		Trials										
		1	2	3	4	5	6	7	8	9	10	Mean
1												
16		18	18	18	25	25	28	27	28	27	31	24.30
27		25	24	24	29	31	32	35	31	36	31	29.50
33		37	40	40	40	43	42	33	45	45	42	40.00
25		28	33	33	35	33	40	38	34	32	30	32.80
16		17	19	19	19	23	18	20	24	21	19	19.60
30		32	35	35	35	35	35	35	39	37	39	35.20
26		26	26	26	25	25	26	28	29	30	31	27.20
31		35	35	35	35	35	36	40	45	42	37	37.10
23		30	27	27	36	30	33	32	29	34	34	30.10
27		31	30	30	35	34	32	34	34	33	31	32.10

INDIVIDUAL SUBJECTS' RAW SCORES AND MEANS ON THE
DIGIT SYMBOL TASK--SUCCESSFUL, REPROOF GROUP

	Trials										Mean
	1	2	3	4	5	6	7	8	9	10	
28	30	30	32	30	35	34	30	33	32	32	31.60
25	27	29	29	28	27	27	29	29	29	31	26.10
23	24	27	27	28	27	27	27	29	28	29	26.90
23	26	26	26	29	28	29	29	31	27	32	28.00
27	30	29	29	28	32	31	35	26	29	35	30.40
23	29	30	30	34	32	32	36	35	36	34	32.10
25	29	30	30	29	32	25	33	34	40	34	31.10
27	29	29	29	32	30	35	33	35	33	33	31.60
18	18	25	25	25	22	25	23	27	27	28	23.80
27	26	26	26	32	32	29	27	28	31	33	29.30

INDIVIDUAL SUBJECTS' RAW SCORES AND MEANS ON THE
DIGIT SYMBOL TASK--UNSUCCESSFUL, REPROOF GROUP

Trials

	1	2	3	4	5	6	7	8	9	10	Mean
21	22	25	25	23	25	27	24	27	22	24.10	
24	26	32	32	30	33	32	33	31	35	30.80	
29	26	27	28	29	35	35	35	36	36	31.60	
25	29	30	30	30	31	30	30	35	30	30.00	
14	18	17	18	19	19	22	25	22	22	19.60	
20	22	25	28	24	27	28	26	25	29	25.40	
23	25	27	30	28	29	31	32	32	33	29.00	
21	24	22	27	25	23	24	23	25	25	23.90	
22	25	24	25	26	25	22	23	25	28	24.50	
16	20	21	19	15	20	24	16	23	22	19.80	

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