

TASK PERSISTENCE AS A FUNCTION OF VERBAL  
REINFORCEMENT AND SOCIO-ECONOMIC  
STATUS

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## CHAPTER I

### THE RESEARCH PROBLEM

#### Introduction

It is recognized by educators that the student's capacity to persist at a task is of importance in facilitation of learning. Research has been undertaken in the past which attempted to determine and isolate factors which affect this capacity.

The purpose of the present study was to determine the relationship among reinforcements given, socio-economic status, and persistence on a selected task.

#### Significance of the Problem

The persistence of a child at a task is of importance to teachers. In the past, several variables have been examined as they related to the persistence of children. It would seem that if the researcher can effectively isolate some specific factors which influence the persistability of a student, this information should be of value to the educator. Several studies have considered reinforcement and persistence; however, much of this research has been limited to scope and methodology (Wolf, 1938; Wyer, 1968; Crowley, 1968). A recent trend in educational research has been a consideration of the effects of various organismic variables such as sex, age, and socio-economic status and their effects upon various dependent measures (Spence and Dunton, 1968;



Rosenhan and Greenwald, 1966; etc.). Although these variables are not under direct control of the experimenter they have been shown to be important components in many recent experiments. Socio-economic background of students has been shown to be related in several ways to school learning (Spence and Dunton, 1968; Olson, Bibelheimer, and Stevenson, 1967; Marshall, 1969), thus it is possible that it may also be related to persistability of students. The majority of studies have considered the variable of socio-economic status as it related to the dependent variable of discrimination learning (Unikel, Strain and Adams, 1969; Lighthall and Cernius, 1967; Olson, Bibelheimer, and Stevenson, 1967) rather than to the persistability of students. Mode of reinforcement has been shown to be differentially effective in promoting persistence (Berkowitz, Butterfield and Zigler, 1965; Wolf, 1938); and socio-economic status has been linked with various factors of learning. Thus, it is possible that a combination of these two components may be related to the inhibition or facilitation of persisting behaviors in students. This study will examine these two variables and their relationship to persistence on a puzzle task.

#### Statement of the Problem

This study will be concerned with the possible separate and interactive effects of reinforcement and socio-economic status upon the task persistence of a group of fifth grade children.

#### Research Questions

The following questions will be examined by the present study:

Question 1: Does the type of verbal reinforcement given (positive,

negative, or no) effect the persistence of subjects on a prescribed task?

Question 2: Does the socio-economic status of a subject effect his persistence on a prescribed task?

Question 3: Does a particular type of reinforcement differentially effect the persistence of subjects of different socio-economic backgrounds?

### Operational Definitions

1. Task - The task is a 15 piece jigsaw puzzle. When completed the hollow area in the center section of the puzzle will reveal a specific shape (Appendix C).

2. Persistence - The duration of time for which the subject works at the task, with his interest or attention directed primarily at that task is measured as persistence. Termination of persisting behavior is assumed when the subject leaves the task or pursues extraneous activity for a period of one minute.

3. Positive reinforcement - Verbal comments by the experimenter, to the subject, indicating that the subject's performance on the task is in the direction of successful completion is positive reinforcement. The experimenter gives verbal approval to the subject by stating "good".

4. Negative reinforcement - Verbal comments by the experimenter, to the subject, indicating that the subject's performance is in the direction of failure is negative reinforcement. The experimenter indicates disapproval of the subject's performance by stating "You're not doing well on this puzzle".

5. No reinforcement - The absence of verbal response by the

experimenter to the subject regarding his performance on the task is considered no reinforcement.

6. Low socio-economic status - A socio-economic category which is determined by a score on the Home Index Scale of two or more points below a computed local mean and a teacher rating of the child as low socio-economic status. Subjects were required to meet both these requirements to be included in the final sample.

7. Middle socio-economic status - A socio-economic category which is determined by a score on the Home Index Scale of two or more points above the mean and a teacher rating of the child as middle socio-economic status. Subjects were required to meet both these criteria to be included in the final sample.

8. Home Index Scale - An index of socio-economic status developed by Harrison Gough, Institute of Personality Assessment and Research and Department of Psychology, University of California, Berkeley, California. This instrument was designed for use in determining socio-economic status of children in grades four through twelve.

### Hypotheses

The hypotheses of this study, stated in null form are as follows:

H1: Differences in reinforcement given subjects concerning their task performance will not significantly influence their level of persistence on the task.

H2: Differences in socio-economic status will not significantly influence task persistence.

H3: Task persistence will not be significantly influenced by the

interaction of socio-economic status and the type of reinforcement given subjects concerning their task performance.

#### Limitations of the Study

There are certain limitations which must be considered inherent in this study. It is recognized that the findings of this study are limited in generalization to the area from which the sample was drawn. It is also recognized that the removal of the subject from the classroom during the course of this study established a situation that is different from a true classroom setting, and thus, the findings are not directly generalizable to the classroom. Finally, it must be recognized that the task itself is not specifically a school related task. This will also serve to limit the generalization possible from the present study. In conclusion it should be noted that socio-economic status was determined on the basis of a local norm, therefore, the results cannot be directly compared to other groups of low and middle socio-economic status.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

#### Introduction

It is the purpose of this section to provide a review of the literature associated with the variables involved in the development of this study. A sample of scientific contributions to the body of knowledge related to the major concepts of the present study will be presented. This section will be divided into three major parts. To facilitate the comprehension of the information presented each part will be followed by a short summary. The major divisions of this review are: 1) factors related to persistence; 2) reinforcement and socio-economic status; and 3) a final summary.

#### Factors Related to Persistence

Persistence of students has been the subject of research studies undertaken as early as the 1920's. During the time between these early studies and the present, several variables have been examined as they relate to persistent behavior. It is the purpose of this section to provide an overview of representative research examining factors related to persistence.

Wolf (1938) investigated persistence and type of incentive in five different tasks ranging from high interest quality to low interest. The tasks included building a tinker toy model, tossing rings at animal

figures, placing pegs in a pegboard with tweezers, cancelling specified items on mimeographed sheets, and dropping marbles into a box. The effectiveness of praise in promoting persistence was compared with that of a competitive situation and with a no incentive control group. She found greatest persistence in a group of kindergartners which had the competitive situation. The second longest persistence times came from a group which received verbal praise, and ranking third was a group in which no external incentive was emphasized. The results of the study were cited as median persistence times and no statistical analysis was done on the differences. She found that median persistence times also tended to vary with the nature of the task. The tinker toy task, with a goal inherent in the task itself, showed longer persistence times under the no incentive conditions while the other tasks showed longest times in the competitive situation.

Another variable found to have a relationship to persistence is that of success or failure on a previous task. Wyer and Bednar (1967) manipulated subjects' success or failure on an achievement activity prior to an experimental task to determine the relationship between previous success or failure and task perseverance. Prior to the experimental situation all subjects were exposed to a button pushing task, in which the experimenter could control their success or failure or give them no indication of success or failure. By random assignment a designated set of subjects failed, succeeded, or gained no feedback (control) on a preliminary task. These subjects were assigned to one of two experimental tasks, one determined by objective means as being difficult and the other as being easy. The groups assigned to the objectively easy or difficult experimental tasks were further subdivided into

alleged conditions. Half of each group was told that their task had been very easy for other children and half were told their task had been very difficult for others. The mean number of minutes spent on a task was analyzed by means of an analysis of variance technique. Persistence times were significantly greater on the objectively difficult task when compared with the objectively easy task. A significant interaction of actual task difficulty and level of previous success indicated that subjects persisted longer on an objectively difficult task following previous success. The interaction of alleged difficulty and prior success/failure approached significance also.

In a followup study Wyer (1968) added the variable of social reinforcement (approval or disapproval) to the task reinforcement and task difficulty used in the previous study. Subjects' success or failure in a preliminary task was manipulated as before, but this time they were also given verbal approval or disapproval during their initial performance. The results of this study were similar to those of the previously cited work by Wyer and Bednar (1967). The results of the interaction of objective difficulty and previous success or failure replicated those of the earlier study. Closer examination of this interaction indicated the highest interaction to be among those subjects who received disapproval but negligible among those subjects receiving approval. This finding indicated that verbal approval by the experimenter virtually eliminated the effects of prior success or failure on previous tasks.

The subjects of research on persisting behavior have for the most part been young children but a few studies have examined persistence in older children and young adults. The determinants of persistence in college students may differ markedly from those of younger children or

perhaps they may be quite similar in nature. The next section will examine a sample of the research dealing with the persistent behaviors of older students.

Crowley (1968) studied the effects of varied types and schedules of social reinforcement upon the persistence of college students. He used praise, blame, and no reinforcement conditions on a continuous schedule using only blame, praise or no reinforcement. Other subjects were on a partial schedule using praise-blame, praise-no, and blame-no as the reinforcement conditions. The task chosen was insoluble. The results showed greater persistence on all partial schedules across all types of reinforcement. The praise-blame condition elicited longer persistence times than any of the other conditions. No significant sex differences were found.

The results of a program to train teachers in reinforcement techniques were reported by Krumboltz and Goodwin (1966). Teachers were trained in reinforcement techniques which had previously been found by the researcher to increase task-oriented behaviors. After training, an experiment was run in which one group of teachers only used reinforcers for attentive behavior and the other group used their normal techniques of reinforcement. The results showed no significant difference in the attentive behaviors of the two groups of subjects. The authors suggested that the inefficiency of the preliminary training program might possibly be responsible for the results of their study.

Knopf (1968) reported the results of five experiments which investigated the effects of several variables on attention of elementary school children. Some of the variables considered were reward preference, learning strategy, and socio-economic level. Sixty kindergartners



were subjects in an experiment dealing with expectancy of reinforcement, socio-economic level and attending behavior. It was found that low socio-economic level children stopped attending when the expected reinforcement did not occur while the high socio-economic level subjects maintained the appropriate level of attention without the occurrence of the expected reinforcement. Another section of this report showed a significant difference in attention times of low and high socio-economic subjects on the variable of consistency of reinforcement. Low socio-economic students showed a significantly greater preference for consistent reinforcement than high socio-economic students.

The use of a verbal reinforcement technique to increase attending behaviors of a first grade boy in a counseling setting and later to examine this increase as it transferred to the classroom was found in one case report. Behavior modification techniques of this kind have been found to be successful in the past but there often seems to be a problem when the amount of transfer from the counseling setting to the classroom is considered. Kennedy and Thompson (1967) reported a case study of a boy's attending behaviors and examined the degree of transfer that could be found to a classroom arithmetic situation. Pre- and post-measures of attentiveness in the classroom were kept in order to measure the amount of transfer. The results showed that there was an increase in the classroom attentiveness following the counseling sessions.

Motives to achieve and to avoid failure and their relationship to task persistence were investigated by Feather (1961). Feather's hypotheses were based on formulations by Atkinson (1957) on need achievement. Feather hypothesized that high need achievers would persist longer when their probability of success was high while those motivated by avoidance

of failure would persist longer when probability of success was lower. He also hypothesized that when the initial probability of success is high those with strong need to achieve will persist longer than those with motives to avoid failure. The results of his study showed all of his hypotheses to be significantly confirmed.

Shacter (1933) attempted to measure sustained attention in pre-school children: three; four; and five years of age. The subjects were tested in both simple and complex task situations. The results of her study showed no significant differences in the length of attentive behavior in the three age groups tested. She did find a significant difference in the attention span of boys and girls with girls sustaining attention for significantly longer periods of time than boys. These differences in sexes decreased with an increase in the age of the subjects.

In another study of young children Shacter (1933) attempted to assess the relationship between intelligence and sustained attentive behavior. She used three intelligence measures: the Stanford Binet; the Merrill-Palmer Performance Scale; and the Detroit Kindergarten Test. When subjects were considered as a group a  $+0.33$  correlation was found between intelligence scores and sustained attention time. She concluded that after allowance for an error term the differences in mental ability could not be said to account for persistence time differences.

In summary, the literature dealing specifically with persistence has examined several independent variables as they related to the persistence of students at particular tasks. Some of the variables cited which have been found to relate to persistence are success and/or failure on a previous task, achievement motivation, types of reinforcements,

incentives, and interactions of the experimenter and the subject. It should be noted that the majority of the subjects of the studies presented were of preschool age.

#### Reinforcement and Socio-Economic Status

It can be seen from the preceding section of this review that the relationship between reinforcement and persistence has been the subject of research, however the literature points to no conclusive relationship between these two variables. A trend in recent research has been to consider the possible effects of organismic variables. This section of the literature review will present a sample of studies which have examined the organismic variable of socio-economic status and its relationship to the variable of reinforcement.

Lackner (1970) investigated the effects of certain reinforcement conditions and social class upon the spelling achievement of students. A total of thirty-six second and third grade classes provided subjects for the experiment. There was random assignment to the treatment conditions. Reinforcement condition I consisted of only a letter grade, condition II consisted of a letter grade and positive verbal teacher comment, and condition III consisted of a letter grade and a small cash reward. Social class and reinforcement showed main effect significance ( $p < .01$ ). Middle class children were found to have higher mean spelling scores than lower class children, and the cash reward condition resulted in the highest spelling performance scores. The interaction component was also found to be significant. The two experimental conditions which involved more than the traditional routine of letter grades were generally more effective for middle class students at both grade

levels than were grades alone.

School learning is the main dependent variable which has been considered in research regarding the relationships between socio-economic status and reinforcement. The relationship between four reinforcement conditions and arithmetic achievement was examined by Hollander (1968). The subjects for her study were fifth and sixth grade students with low socio-economic background. Reinforcement conditions employed were verbal praise, verbal reproof, material reward (candy), and no reinforcement. Results indicated that faster work occurred in the material reinforcement condition but most accuracy occurred in the group with verbal praise as the reinforcer. Errors were prominent and fewer items were attempted by those subjects in the verbal reproof condition. From these results it would seem that type of reinforcement differentially effected accuracy and speed while reproof was, in general, detrimental to the students' performance.

Discrimination learning has been considered as the dependent variable in studies of reinforcement and socio-economic status. In a 1967 study, Olson, Bibelheimer, and Stevenson investigated the effects of percentage of reinforcement, level of incentive, and social class on discrimination learning tasks. The percentage of reinforcement was given in one of two ways: 100-0-0 or 72-25-0 and the level of incentive was based on the value of the reinforcement -- high (trinkets) and low (beans). The results indicated that middle class children performed at a significantly higher level than lower class children. No interaction was found to be significant. There was no significant incentive level effect found in this discrimination task.

In a similar study Spence and Dunton (1968) examined verbal and

nonverbal reinforcement combinations and their effect upon discrimination learning in middle and lower class preschoolers. In the three verbal reinforcement conditions, the experimenter said "right" after correct responses and nothing after incorrect responses (right-blank), said "wrong" after incorrect responses and nothing after correct ones (wrong-blank), or reinforced both responses (right-wrong). In the non-verbal condition the experimenter gave a piece of candy for right responses (candy-blank), sounded a buzzer after an incorrect response (sound-blank), or reinforced both (candy-sound). Their results showed that candy-blank conditions produced poorer performance in lower as well as middle class groups than either the wrong-blank or right-wrong conditions.

New Zealand children were the subjects of a study done by Storm, Anthony, and Porsolt (1965) which considered the effects of reinforcement, social class and ethnic origin on task performance. The subjects were divided into two ethnic groups and two age groups (5-6 years and 10-11 years) and were randomly assigned to either a material or non-material reward condition. They were then tested on a manipulatory task. The results indicated a significant interaction between ethnic background and type of reinforcement for the younger group but not for the older group. When the total group results were analyzed, however, there was a failure to achieve a significant interaction between ethnic background, reinforcement condition and age as would have been expected.

Rosenhan and Greenwald (1965) considered the variables sex, age, and socio-economic status and types of reinforcement as they related to performance on a marble-in-the-hole task. Their subjects were sixty second grade students divided by socio-economic status. The conditions

of verbal reinforcement were person-oriented or task-oriented. Results showed no significant main effects, however, both the sex by socio-economic status and sex by treatment interactions were found to be significant.

Marshall (1969) studied one hundred and six kindergarten children of middle and lower socio-economic status. She compared their learning rates while varying different task interest and reinforcement conditions. She used five reinforcement conditions: knowledge of results; immediate verbal; delayed verbal; material; and combination of immediate and delayed verbal. She found immediate verbal reinforcement effective in facilitating learning in both socio-economic groups, but delayed verbal reinforcement proved to be detrimental to the lower group. Material reinforcement was found to hinder learning in both groups.

Shigeaki (1968) compared socio-economic and ethnic groups in their preference for three types of reinforcement. The reinforcement conditions were verbal praise, pennies, and candy. He found in all groups a low but not significant preference for verbal praise as opposed to material reinforcement. He concluded that the preference might have been significant if the verbal reinforcement had been from the experimenter in person rather than a taped voice.

The controversy of material versus verbal reinforcer effectiveness has been a topic of consideration with adolescents as well as younger children. Fang (1966) examined the effects of type of incentive, complexity of task and social class on the performance of a concept identification task. The incentive conditions were monetary, symbolic or verbal, and no response. The subjects were 180 junior high students from high and low socio-economic areas. The high socio-economic students

were found to have significantly higher performance scores than the low socio-economic group. There was no significant difference in performance between incentive conditions and no significant interaction between socio-economic level and incentive condition.

Lighthall and Cernius (1967) hypothesized that lower class boys would perform best for tangible (token) rather than intangible (verbal) rewards. The results of their study failed to show any significant differences in concept attainment as a result of type of reinforcement.

The relative effectiveness of tangible (material) and intangible (social) rewards upon performance of a discrimination task by lower class boys was the basis of a study by Unikel, Strain, and Adams (1969). Their results showed both tangible and intangible reinforcement significantly facilitating performance on the task, when compared with the no reward control. They concluded that both types of reinforcement were equally effective.

Zigler and Kanzer (1962) used a marble-in-the-hole task and two verbal reinforcement conditions (person-oriented and task-oriented) with middle and lower class eight year old boys. They found middle class boys performed better with task-oriented reinforcement while lower class boys performed best with person-oriented reinforcement.

Extensions of research dealing with socio-economic status and reinforcement have considered variables such as the manner in which reinforcement is administered, and the reinforcing value of the experimenter. The experimenter's voice inflection involved in the administration of the reinforcements with middle and low socio-economic children was done by Brooks, Brandt, and Wiener (1969). In selected instances the inflection and the actual word meanings were congruent while in others

the inflection and word meanings were not congruent. Their findings showed lower socio-economic class children responding to both positive and negative reinforcement, only when the word and the inflection were congruent. On the other hand, middle class children performed effectively when either words or the appropriate inflection was present.

The ability of the experimenter to reinforce effectively has also been a topic considered by studies of reinforcement.

Sgan (1967) examined the relationship between social reinforcement, socio-economic status and susceptibility to experimenter influence. The subjects were seventy-two first grade children who were divided into middle and low socio-economic status and by sex of subjects. A preliminary exposure of the subjects to the experimenter occurred under one of three reinforcement conditions: a positive contact, a half positive and half negative contact, and a neutral contact. Following the preliminary exposure an attempt was made by the experimenter to influence the response preference of each subject by means of suggestions. It was found that those subjects who had previous positive contact with the experimenter were significantly more influenced than those subjects whose previous contact had been half positive/half negative or neutral.

In summary, it can be seen that the range of experiments examining the relationship between reinforcement and socio-economic status is many and varied. It should be noted that these considerations of the relationship between various types of reinforcement and social status have yielded very different results. The literature contains several investigations of the material versus non-material reinforcement question and its relationship to social status; but there is only a limited amount of literature dealing with the effectiveness of various types of



verbal reinforcement and socio-economic background.

#### Summary

This review of literature reveals that the problem of persistence has been a topic of research consideration, particularly with young children. Numerous factors such as previous success and failures, reinforcement or approval, and interaction of the experimenter and the subject have been researched.

The reinforcement and socio-economic status literature presented in this review, in the main dealt with the relative effectiveness of the nonmaterial-material contingency as it related to socio-economic status. The results of the studies presented gave an ambiguous and uncertain picture of the relationship existing between these two variables. There has been no clear cut relationship defined between socio-economic level and most effective reinforcement, but there is support for the existence of a interactive relationship between these two variables. It is the intent of the present study to further clarify the interactive influence of reinforcement and socio-economic status on the persistence of upper elementary children.

## CHAPTER III

### METHODS AND PROCEDURES

#### Introduction

It was the purpose of the present study to compare the effects of three types of reinforcement and two socio-economic levels on the task persistence of fifth grade children. This chapter will contain a description of the method of subject selection, the procedures used in obtaining the data, the instruments used, the hypotheses tested, and a description of the statistical treatment of the data.

#### Selection of Subjects

The population for this study consisted of all fifth grade students enrolled in public schools in a community of approximately 10,000 in central Oklahoma (N = 146).

The experimenter administered the Home Index Scale to all students in the initial population. Prior to the administration of the Home Index the cooperating teachers were asked to designate on a form provided (Appendix D) whether each student was, in their opinion, of middle or low socio-economic status. The Home Index Scale was scored by standard procedures. Scores could range between 0 and 21 points for each subject tested. These scores were then combined and a local mean of 12 was computed. The students who were found to score two or more points above this local mean were classified as middle socio-economic.

status for purposes of the present study. Those students scoring two or more points below this local mean were classified as low socio-economic status. The results of this tabulation indicated that there were 54 students of low and 58 students of middle socio-economic status in the population.

The criterion for inclusion as a part of the final sample was agreement between the teacher's rating of the socio-economic status of the student and the score rating resulting from the Home Index Scale. Those subjects on which agreement was not found were dropped from the study (N = 12). This dropping process resulted in a group of 47 low and 53 middle socio-economic subjects (Table I).

After subjects were divided into two socio-economic groupings they were then randomly assigned to one of the three treatment conditions, with a final N of 90 subjects, 15 assigned to each treatment condition.

The random assignment was done by assigning a number to each subject in the sample (1 - 100). A similar sequence of numbers was placed in a box and drawn out one at a time. A subject was assigned to each of the three conditions in alternating order until all subjects were assigned. Drawing was ceased after 90 subjects had been selected. These final 90 subjects were drawn from seven separate elementary schools in the community (Table II).

#### Testing Procedure

In order to avoid a prolonged intrusion of the experimenter into the school's routine, all subjects from one specific elementary school were given the experimental treatment before moving to another school. Due to the fact that the subjects were worked with one school at a time,

TABLE I  
 SOCIO-ECONOMIC CLASSIFICATION OF STUDENTS BY HOME INDEX  
 RATING, TEACHER ESTIMATION OF STATUS, AND  
 AGREEMENT BETWEEN THE TWO MEASURES

	Low SES	Middle SES
<u>Home Index</u> Rating	54	58
Teacher Estimation	60	86
Agreement Between Teacher Estimation and <u>Home Index</u>	47	53

TABLE II  
 SOCIO-ECONOMIC CLASSIFICATION OF THE SAMPLE BY SCHOOLS

School	Low SES	Middle SES	Total
A	8	4	12
B	5	8	13
C	8	24	32
D	5	8	13
E	5	2	7
F	6	1	7
G	10	6	16
Total	<u>47</u>	<u>53</u>	<u>100</u>

the grouping of reinforcement types were arranged so as to avoid any effect of reinforcement order upon the resulting persistence times. An attempt was made to avoid an occurrence of two consecutive positive, negatives or no conditions and of any consistently reoccurring order of treatments.

Each subject was taken individually from his classroom, by the experimenter, to a private room and asked to perform the experimental task, a 15 piece jigsaw puzzle. Upon arrival at the experimental room, the subject was seated at a table which held the puzzle pieces. Subjects were then given standardized instructions and simultaneously shown a picture outline of the completed puzzle shape (Appendix C). The instructions were as follows: "This is a picture of the way the puzzle will look when it is finished. I want you to look at this picture very carefully so that you can remember what the finished puzzle will look like". The subject was allowed to observe the outline for 10 seconds. At this time the picture was taken from the subject's view and he was instructed, "You may begin work on the puzzle now". The official persistence time was recorded by a stop watch and was considered to begin at the moment the subject was instructed to begin working. In order to avoid an unlimited intrusion into any student's school day of impossible length an upper limit of 90 minutes was arbitrarily set. Any child who reached 90 minutes of work was terminated by the experimenter.

The initial reinforcement was administered after the subject had worked on the task for a period of one minute. Additional reinforcement was administered every two minutes thereafter until the subject's persisting behavior ended. At that point the time was recorded by the experimenter. The subject was then returned to his home room.

As mentioned previously, the subjects were tested by schools. When all subjects in one school had been tested, the experimenter brought the total group together to show them the completed puzzle and to explain that the reinforcement given in no way reflected the actual performance of the subject. They were told that the type of reinforcement given to them had been determined prior to their work on the task and that this predetermined reinforcement was given no matter what their actual performance on the task.

Due to the absence of 5 subjects during the experiment the final sample resulted in 14 subjects in each treatment cell except middle socio-economic status with positive reinforcement. This cell contained 15 subjects. Prior to the experiment a second experimenter was trained to administer the instructions to subjects. This experimenter was a female college graduate who had previously worked with children in an educational setting. In addition to her training she participated in the pilot study and gained practice by administering the treatment to subjects at that time. After thorough training she assisted in administering the experimental treatment to the subjects.

#### Instrumentation

The Home Index Scale (Appendix A) was originated by Harrison Gough. It is a scale used to determine the socio-economic status of students in grades 4 through 12.

The form used in the present study has twenty-one items. The Home Index Scale score is obtained by counting 1 point for all "yes" responses and 0 points for all "no" responses. The total range of scores possible on the test is from 0 to 21. The reliability coefficient

calculated by the Kuder-Richardson method on a sample of two hundred fifty-two high school students was .74. It should be noted that the Home Index Scale also correlates highly with other status scales. Written permission to use the Home Index Scale was obtained from Harrison Gough (Appendix B).

The puzzle task consisted of a 15 piece cardboard jigsaw puzzle manufactured by Milton Bradley Company (Appendix C). It contained 15 interlocking pieces, each of which fits into every other piece. The final form of the puzzle reveals the outline of a specific shape or character. It should be noted that although there is a specifiable end design, the pieces will fit together into any of several continuous shapes.

A pilot study of fifth grade children was done in order to ascertain if the puzzle was difficult enough to be an effective task for this study. It was determined that the difficulty level of the puzzle was quite suitable for the task of this study, due to the fact that the children worked for an extended period of time and remained interested in the work.

#### Statistical Treatment

In order to test the hypotheses of the present study a 2 x 3 analysis of variance design was employed. A  $p < .05$  was the predetermined level required for the results of the study to be considered significant. When significant differences were determined a Duncan's Multiple Range test was employed.

### Summary

Chapter III has presented the method by which the sample for this study was determined. It has also presented a detailed description of the procedures used in the administration of the experimental task and a description of the instrumentation used in the study. Finally a description of the statistical procedures employed in the analysis of the results was given. Chapter IV will continue from this point by describing the findings resulting from the data analysis.



## CHAPTER IV

### RESULTS OF STATISTICAL ANALYSIS

#### Introduction

This study examined persistence times of fifth grade students on a jigsaw puzzle task, as a function of type of reinforcement given (positive, negative, or no) and socio-economic status level (middle or low). Students were assigned to socio-economic groups by agreement on a socio-economic rating scale and a teacher rating. Each of the subjects in the socio-economic groups was randomly assigned to one of the three treatment conditions. The persistence times were recorded in minutes. The mean and standard deviation of persistence times for each group are shown in Tables III and IV, respectively.

This chapter is devoted to the presentation of the results of the statistical analysis of the data. The three hypotheses were analyzed by means of a multiple analysis of variance technique (Popham, 1967). The selection of this statistical technique was based on three assumptions: 1) the sample was randomly drawn; 2) the scores represented an interval level of measurement; and 3) the variances within subgroups were homogeneous. The satisfaction of the first two assumptions has been indicated in previous chapters. The third assumption, homogeneity of variance, was checked by use of the Cochran's test described in Myers (1966). The computation of the Cochran  $c$  yielded a nonsignificant result so it can be concluded that the subgroup variances are

TABLE III  
MEAN PERSISTENCE SCORES IN MINUTES FOR REINFORCEMENT AND  
SOCIO-ECONOMIC STATUS GROUPS

	Positive Reinforcement	Negative Reinforcement	No Reinforcement	Combined
Low SES	32.57	27.35	35.35	31.75
Middle SES	30.27	38.50	52.07	40.27
Combined	31.41	32.92	43.71	36.01

TABLE IV  
STANDARD DEVIATIONS OF PERSISTENCE SCORES FOR REINFORCEMENT  
AND SOCIO-ECONOMIC STATUS GROUPS

	Positive Reinforcement	Negative Reinforcement	No Reinforcement
Low SES	20.92	14.39	19.75
Middle SES	17.18	24.03	22.58

homogeneous in nature.

The hypotheses and results of the data analysis for each will be examined individually in the remaining portion of this chapter.

#### Hypothesis One

H1: Differences in reinforcement given subjects concerning their task performance will not significantly influence their level of persistence on the task.

The results of the analysis of variance technique used for testing hypothesis one yielded an  $F = 3.175$  (Table V). This  $F$  is significant at the  $p < .05$ , thus hypothesis one may be rejected. These results indicated that there are in fact significant differences in persistence times when different types of reinforcement are given. In order to determine the subgroups which differed significantly a Duncan's Multiple Range technique was employed (Bruning and Kintz, 1968). The results of the Duncan's revealed that the non-reinforcement group persisted significantly longer than the positively reinforced group ( $p < .05$ ) or the negatively reinforced group ( $p < .05$ ). No significant differences could be found between the positively and negatively reinforced groups. These relationships can be seen more clearly in Table III.

#### Hypothesis Two

H2: Differences in socio-economic status will not significantly influence task persistence.

The data analysis testing hypothesis two for socio-economic status yielded an  $F = 3.629$ , a nonsignificant statistic at the preset significance level. Therefore, null hypothesis two must be accepted,

TABLE V  
SUMMARY DATA TABLE FOR THE ANALYSIS OF VARIANCE

Source	Degrees of Freedom	ss	MS	F
Treatments (Reinforcements)	2	2,549.41	1,275.70	3.175 **
Levels (SES)	1	1,458.29	1,458.29	3.629 *
Interaction (R x SES)	2	1,405.07	702.54	1.748
Error	79	31,741.05	401.78	
Total	84	37,153.81		

\* p < .10.

\*\* p < .05.

indicating that socio-economic status did not significantly effect the persistence times of the subjects. It should be noted, however, that the obtained F is significant at the  $p < .10$  and approaches significance at the  $p < .05$ .

### Hypothesis Three

H3: Task persistence will not be significantly influenced by the interaction of socio-economic status and type of reinforcement given subjects concerning their task performance.

The F ratio resulting from the analysis of the interaction hypothesis was 1.60, a nonsignificant statistic. Hypothesis three must be accepted and it can be concluded that the interaction of reinforcement and socio-economic status had no significant effect upon the persistence times of subjects.

From Table V it can be seen that reinforcement was found to have a significant effect upon persistence times ( $p < .05$ ) while socio-economic status or the interaction of reinforcement and socio-economic status did not have significant effects upon the persistence times of subjects. Figure 1 is provided in order to give visual representation to the trends in the differences which did occur. It can be seen from Figure 1 that those with no reinforcement persisted longer than subjects with either positive or negative reinforcement. It can also be seen that those of middle socio-economic status persisted longer than subjects of low socio-economic status.

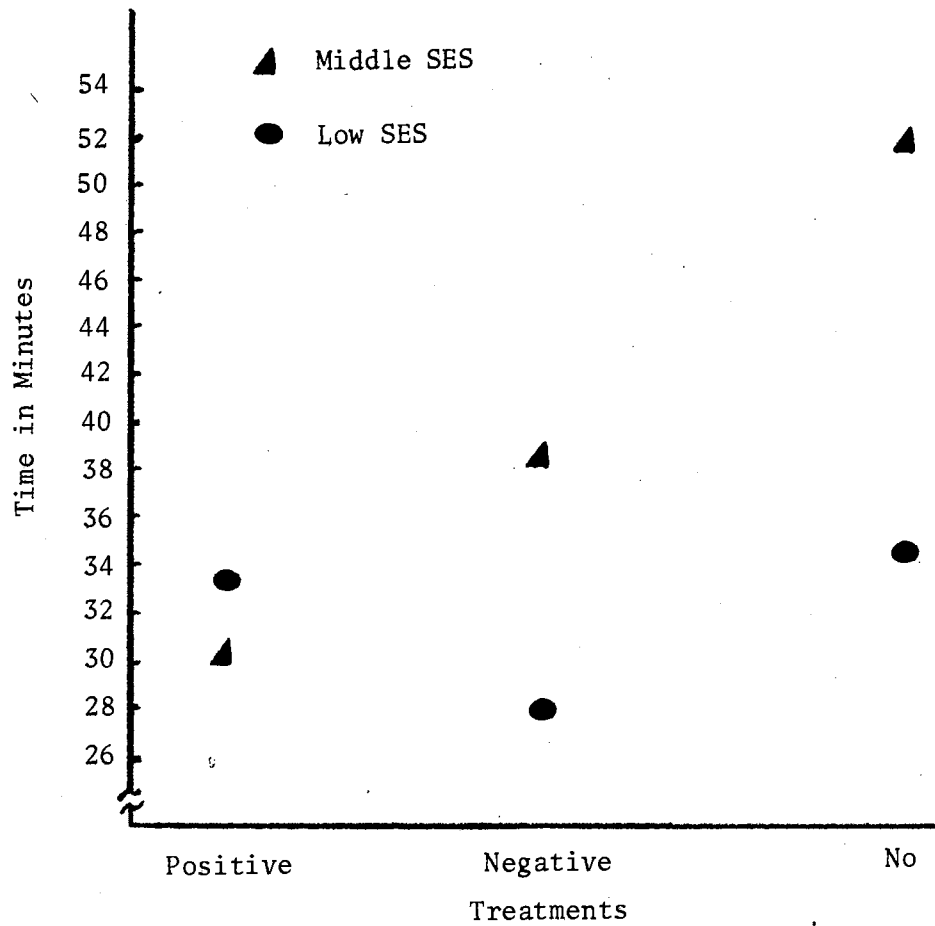


Figure 1. Mean Persistence Scores by Socio-Economic Status and Reinforcement Conditions

## Summary

Chapter IV has presented the results of the statistical analysis of the data. A discussion of the justification for the employment of a particular statistical technique was followed by an examination of the findings relating to each of the individual hypotheses.

It was found that type of reinforcement significantly effected persistence times, with the nonreinforced condition producing significantly longer times than the positive or negative conditions. Socio-economic status alone or in interaction with reinforcement was not found to have a significant effect upon persistence times.

A more detailed discussion of the results and their implications will be found in Chapter V.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

#### Overview

It was the intent of this study to investigate the effects of reinforcement and socio-economic status on task persistence in children. Persistence was measured as the amount of time subjects worked on the experimental task, which was a jigsaw puzzle. The positive and negative reinforcements were given verbally by the experimenter to the subjects while the no reinforcement condition was defined as no verbal response by the experimenter to the subject.

Placement in one of the two socio-economic groups, middle or low, was based upon an agreement between teacher's rating of the child's status and his score on the Home Index Scale. The final forty-five subjects in each socio-economic group were randomly assigned to one of the three reinforcement conditions: positive; negative; and no.

Individually, subjects worked on the puzzle task under one of the predetermined reinforcement conditions. Initial reinforcements were administered after one minute of work. Additional reinforcement was administered every two minutes thereafter until the subject terminated his work on the puzzle. Persistence times were recorded as the criterion measure. The resulting data was analyzed by means of a multiple classification analysis of variance technique. The  $p < .05$  was selected as the level necessary for rejection of the null hypothesis.



## Findings and Conclusions

This study was designed to determine if a relationship exists between socio-economic status, reinforcement and task persistence. The findings resulting from the data analysis and suggested explanations of these findings will now be presented.

The hypothesis which stated that there would be no significant differences in persistence times due to different reinforcement conditions was rejected. The testing of this hypothesis yielded an  $F = 3.175$ , which is significant at  $p < .05$ . A Duncan's Multiple Range test was employed to determine exactly where the difference was occurring. The results of this test indicated that the nonreinforced group persisted significantly longer than either the positively or negatively reinforced groups. No significant difference in times was found between the positive and negative groups. One possible explanation for the no reinforcement condition being more effective than the positive condition is offered by previous research. Several studies (McCullers and Stevenson, 1960; Travers, 1964; Nickell and Travers, 1963; Hill and Moely, 1969) have investigated the relationship between age and effectiveness of verbal approval and criticism. In general, the results of these studies revealed that verbal approval was most effective in increasing desired behaviors with younger (5 - 7 years) rather than older (9 - 11 years) children. These results indicate that possibly verbal reinforcement is an inappropriate controller of behavior with the ten year old subjects of the present study. This might explain why the no reinforcement condition proved to be most effective. Allen (1966) studied three verbal reinforcement conditions: approval, criticism, and silence, with 90 kindergartners and 90 fourth and fifth grade students on a motor

task. She found the age by type of reinforcement interaction to be significant at the  $p < .001$  level. A closer examination of her results revealed praise to be most effective with the young children while criticism or silence yielded the highest performance scores with the older group.

The hypothesis stating that there would be no difference in persistence times between socio-economic status groups was accepted. The  $F = 3.629$  was nonsignificant at the  $p < .05$  level. It should be noted, however, that this value approaches significance at the desired level and is significant at the  $p < .10$ . Although the desired significance level was not achieved it can be seen from Figure 1 that there was a tendency for middle socio-economic subjects to persist longer than lower socio-economic students.

The third hypothesis which stated that there would be no significant interaction effect of socio-economic status and reinforcement on persistence was retained. The  $F = 1.748$  was a nonsignificant statistic.

#### Implications and Recommendations

It should be noted that any implications or recommendations drawn from the present findings are limited by several factors. The results of this study should not be generalized beyond the population from which the subjects were taken. The experimental situation differed from a normal classroom setting and thus the results are not directly generalizable to the classroom.

The results of this study tend to suggest that we need to examine more closely our use of verbal reinforcement with upper grade children; perhaps other methods of reinforcement are more effective with upper

grade and junior high children than the commonly used verbal approval or disapproval. It is possible that we may in fact hinder the performance of the ten year old when we given him an abundance of verbal reinforcement as he works. This study is by no means conclusive evidence but does suggest that teachers carefully examine the reinforcement contingencies used in their classrooms.

The tendency of middle socio-economic students to persist longer than lower socio-economic students should also raise a question for the teacher. It would seem beneficial if research could isolate factors which could help to equalize the differences in performance of the two groups. Although no significant interaction was found in the present study, it seems feasible that there is a differential effectiveness of certain types of reinforcers with different socio-economic groups. Perhaps the work of Zigler and Kanzer (1962) with person-oriented versus task-oriented reinforcers and their differential effectiveness with different social class groups could help to identify those contingencies differentially effected by socio-economic status. They found that middle class boys responded faster on the task when the reinforcement was task related while lower class boys responded faster to person-oriented reinforcements. Since the reinforcements in the present study were primarily task related this might possibly explain the lack of a significant interaction.

#### Recommendations for Further Research

Research studies are needed to examine more stringently the relationship existing between reinforcement, socio-economic status, and persistence. Several directions could be taken in an effort to clarify

this relationship. Some suggestions for further research follow in the concluding section.

(1) A study designed to examine the age by reinforcement interaction with socio-economic status as a consideration.

(2) A study to examine the relative effectiveness of task-oriented versus person-oriented reinforcement with the two socio-economic status groups on a persistence task.

(3) A study considering the effects of task-oriented and person-oriented reinforcements with different age levels and different socio-economic levels.

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APPENDIX A

THE HOME INDEX

## THE HOME INDEX

Name \_\_\_\_\_ Date \_\_\_\_\_

Age \_\_\_\_\_ Sex \_\_\_\_\_ Education (year in school) \_\_\_\_\_

School \_\_\_\_\_  
Name of School \_\_\_\_\_ City \_\_\_\_\_What is your father's occupation? \_\_\_\_\_  
\_\_\_\_\_

Directions: Mark your answer by putting an X in the proper box. For example, in the question, "Does your family have a car?" put an X in the box under YES if your family does have a car, and under NO if it does not. Be sure to answer all of the questions.

- |  | YES                      | NO                       |
|--|--------------------------|--------------------------|
| 1. Is there an electric or gas refrigerator in your home?                                      | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Is there a telephone in your house?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Do you have a bathtub in your home?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Is your home heated with a central system, such as by a furnace in the basement?            | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Does your family have a car?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Did your mother go to high school?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Did your mother go to a college or university?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Did your father go to high school?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Did your father go to a college or university?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Do you have a fireplace in your home?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Do you have a piano in your home?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. Does your family have any servants, such as a cook or maid?                                | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. Does your family leave town every year for a vacation?                                     | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. Does your mother belong to any clubs, or organization, such as study, art, or civic clubs? | <input type="checkbox"/> | <input type="checkbox"/> |

- |  | YES                      | NO                       |
|--|--------------------------|--------------------------|
| 15. Does your father belong to any civic, study, service, or political clubs, such as the Lions Club, Chamber of Commerce, etc.? | <input type="checkbox"/> | <input type="checkbox"/> |
| 16. Have you ever had private lessons in music, dancing, art, etc., outside of school?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 17. Do you have your own room at home?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. Does your family take a daily newspaper?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. Do you belong to any clubs where you have to pay dues?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 20. Does your family have a phonograph (record player)?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 21. Does your family have more than 500 books?   | <input type="checkbox"/> | <input type="checkbox"/> |

APPENDIX B

LETTER FROM HARRISON GOUGH

## UNIVERSITY OF CALIFORNIA, BERKELEY

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SANTA BARBARA • SANTA CRUZ

INSTITUTE OF PERSONALITY ASSESSMENT  
AND RESEARCH2340 PIEDMONT AVENUE  
BERKELEY, CALIFORNIA 94720

August 10, 1970

Mrs. Judith L. Osborne  
Graduate Assistant  
Educational Psychology  
Classroom Building 414  
Oklahoma State University  
Stillwater, Oklahoma 74074

Dear Mrs. Osborne:

You are welcome to my permission to use the Home Index in your study. A copy of the current edition is enclosed. You may use this to make photocopied copies if you wish.

The Home Index is scored for four factors, and for total score. The factors are named and scored as follows:

Factor I, "Social Status," items 1 through 8.

Factor II, "Ownership," items 9 through 16.

Factor III, "Socio-Civic Involvement," items 17 through 20.

Factor IV, "Aesthetic Involvement," items 21 and 22.

An item is given a point of one if answered yes, and 0 if answered no. Total score can therefore range from 0 to 22, and each factor can range from 0 to the number of items included. Means and standard deviations on the normative samples are as follows: I, 2.55 and 1.74; II, 6.44 and 1.86; III, 2.46 and 1.16; IV, 0.92 and .82; and Total Score, 12.37 and 3.71.

The factor scores, incidentally, are for interest and convenience; many people using the Index disregard them and work only with the total score.

When your project is completed I would greatly appreciate hearing of the results and if you publish a report I'd like the bibliographic citation for inclusion in the bibliography for the Index.

Sincerely,

*Harrison Gough*  
Harrison Gough

HG:fc  
Encl.

APPENDIX C

PUZZLE OUTLINE



Figure 2. Puzzle Outline



APPENDIX D

TEACHER RATING FORM



APPENDIX E

RAW DATA

TABLE VI

RAW DATA

Positive Reinforcement			
Middle Socio-Economic Status		Low Socio-Economic Status	
Student	Time (Rounded to Nearest Minute)	Student	Time (Rounded to Nearest Minute)
1	52	1	19
2	67	2	34
3	7	3	41
4	30	4	11
5	18	5	67
6	28	6	45
7	12	7	30
8	37	8	53
9	36	9	7
10	52	10	34
11	12	11	24
12	27	12	70
13	25	13	3
14	13	14	18
15	38		

TABLE VI (Continued)

Negative Reinforcement			
Middle Socio-Economic Status		Low Socio-Economic Status	
Student	Time (Rounded to Nearest Minute)	Student	Time (Rounded to Nearest Minute)
1	22	1	10
2	8	2	17
3	41	3	15
4	61	4	20
5	45	5	35
6	40	6	41
7	14	7	36
8	10	8	27
9	37	9	29
10	41	10	19
11	76	11	40
12	28	12	58
13	90	13	90
14	26	14	35
No Reinforcement			
1	28	1	54
2	58	2	21
3	64	3	13
4	90	4	33
5	87	5	32
6	30	6	90
7	23	7	34
8	64	8	47
9	48	9	22
10	43	10	18
11	23	11	18
12	41	12	35
13	52	13	45
14	78	14	33

VITA<sup>S</sup>

Judith Lynn Osborne

Candidate for the Degree of

Doctor of Education

Thesis: TASK PERSISTENCE AS A FUNCTION OF VERBAL REINFORCEMENT AND SOCIO-ECONOMIC STATUS

Major Field: Educational Psychology

Biographical:

Personal Data: Born in Booneville, Missouri, June 15, 1945, the daughter of Mr. and Mrs. Clayton S. Holt.

Education: Attended elementary and high school in California, Missouri; attended University of Missouri, Columbia, Missouri from 1964-1966; received the Bachelor of Science degree from Oklahoma State University in June, 1968, with a major in Elementary Education; received a Master of Science degree from Oklahoma State University in 1969, with a major in Elementary Education; completed requirements for the Doctor of Education degree at Oklahoma State University in July, 1971.

Professional Experience: Elementary teacher at Lincoln School in Stillwater, Oklahoma, Spring, 1968; Graduate Teaching Assistant in Educational Psychology at Oklahoma State University, Stillwater, Oklahoma, 1970-1971.