AN EXPERIMENTAL STUDY OF THE DIFFERENTIAL RESPONSE PATTERNS OF ELEMENTARY SCHOOL TEACHERS TOWARD THEIR STUDENTS

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ABSTRACT

AN EXPERIMENTAL STUDY OF THE
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By

George G. Janzen

This investigation was an attempt to identify aspects of the teacher-expectancy behavior in the interaction of elementary school students and their teachers. The study does not attempt to determine whether Rosenthal's Pygmalion phenomenon is real or illusory, but whether supportive or reinforcement responses on the part of teachers are differentially applied to students of varying achievement levels. It is assumed that teacher-expectancy behavior does exist in some form, and that the expectancy a teacher holds may systematically influence his responses to his students, and that the behavioral demand characteristics of the classroom situation, particularly the teacher's responses to students' correct or incorrect choices and answers, provide an appropriate context for the measurement of teacher expectations.

The experimental two-choice uncertain-outcome situation was used to elicit teacher responses in a teacher-student reciprocal-

choice setting. Each of twelve teachers interacted with three of her students. The students were chosen by the teachers as representative of high, average and low achievers in their classrooms.

Teacher and student were seated opposite each other at a table divided by a partition which formed a ledge at the top. The teacher's activity was to place a small disc in one of two containers and set them on the ledge. The student's activity was to choose the container which he thought held the disc. The student was shielded from his classmates by a screen, but the teacher was permitted to maintain surveilance of classroom activities. The table partition was adjustable to enable the student to see his teacher's face but not the activity of her hands.

Three experimental conditions were employed, two of which (Conditions B and C) provided opportunities for the teacher to support a student's correct choice, while the other (Condition A) was used to reinforce the idea that this study was an attempt to measure elementary-school childrens' probability learning ability. All experimental conditions were run for 50 trials. Conditions A and B had assigned frequencies of $\pi = .75$, with Condition B requiring the teacher to select a prize from three levels of reward, for each student following a correct choice. Condition C required the teacher to spontaneously select events from trial to trial without the aid of a prepared chart. In the latter two conditions teachers were also instructed to use the rewards or choices to motivate the student to try for the maximum number of correct choices.

The experimenter hypothesized that the higher the achievement level of the student, the greater the number of supportive responses by the teacher. Supportive responses identified by sub-hypotheses are: a higher level of rewards for correct choices, a larger π value, fewer runs, and fewer changes of event alternatives following a student's correct choice.

The assumption that teacher's supportive responses would vary according to the student's achievement level, was not supported by the data. This experimenter believes that the testing of the hypotheses was accomplished with sufficient precision to make the results valid and to warrant stating as the conclusion, that according to the results of this study, differential treatment of students by their teachers, does not exist.

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INTRODUCTION

This investigation focuses on the characteristics of the elementary school teacher's differential response pattern as exhibited in her reinforcement of students' activities. This phenomenon, which has been the subject of considerable discussion during the past two decades, is receiving increasingly greater attention. This study was stimulated primarily by the findings of Rosenthal[1] using the "self-fulfilling prophecy" model to demonstrate the effect of teacher expectations on students' performances. Although the results of his experimental investigations should be considered tentative because some of the sample sizes used to achieve statistically significant results were quite large, there are some positive elements in his investigations. The existence of the "self-fulfilling" teacher expectations is supported by many scholars who are involved in the investigation of the characteristics of interpersonal communication, particularly those engaged in the investigation of superior-subordinate relationships. There are, e.g., Goffman's analyses of social relationships which describe expectancy effects in everyday life,[2] MacKinnon's studies of creativity in children which suggest that positive

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[1]Rosenthal, Robert and Jacobsen, Lenore. Pygmalion in the Classroom: Teacher Expectations and Pupils' Intellectual Development. New York: Holt, Rinehart and Winston, 1968.

[2]Goffman, Erving. The Presentation of Self in Everyday Life. Garden City, New York: Doubleday, 1959.

expectations on the part of teachers increases creative responses to a task,[3] and Clark's view of deprived children as the victims of an educational self-fulfilling prophecy,[4] supporting the notion that such a dynamic process exists in human relationships. Nevertheless the validity of data obtained from large samples, in order to achieve statistical significance, should be considered cautiously.[5] Evidence of differences in behavior may be statistical artifact in such cases.

Needless to say, children's behavioral styles do have an effect on teachers' expectations of students, particularly on their estimations of the student's intellectual ability. This is illustrated by the investigations of Gordon and Thomas, which focus on the relationship between the teachers' estimates of intelligence levels and their appraisals of the quality of the student's class participation. Children who unhesitatingly jumped into new situations were judged as more intelligent than those who tended to withdraw from new situations.[6] Replications and expansions of this study are needed, such as extensive investigations of the relationship of a student's behavioral style and the teacher's perception and evaluation of academic progress. The discussion of this material concentrates on how the

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[3]MacKinnon, D. W., "The Nature and Nurture of Creative Talent," American Psychologist, Vol. 17, 1962, pp. 484-495.

[4]Clark, K. B., "Educational Stimulation of Racially Disadvantaged Children," in A. H. Passow (Ed.), Education in Depressed Areas. New York: Teachers College, Columbia University, 1963, pp. 142-162.

[5]Bakan, David. On Method: Toward a Reconstruction of Psychological Investigation. San Francisco: Jossey-Bass, 1967, pp. 1-29.

[6]Gordon, Edward M. and Thomas, Alexander, "Children's Behavioral Style and the Teacher's Appraisal of their Intelligence," Journal of School Psychology, Vol. 5, No. 4, Summer 1967, pp. 292-300.

student influences the teacher's behavior, while the goal of the present investigation is the further exposure of characteristics of teachers' differential responses to students.

The investigation of student-teacher interaction must proceed beyond attempts to demonstrate the existence of the "self-fulfilling" prophecy phenomenon. It is necessary to identify those behaviors of the teacher which communicate his expectations of a student, to that student. If differential expectations do exist, causing lower-class children, poor achievers, or children of discriminated against minorities to perceive themselves as those who are not expected to do well, it is necessary to establish which patterns of interaction are the primary communicative channels of such discriminatory practices, regardless of whether they are consciously or unconsciously motivated at the outset.

The teacher-student relationship may be viewed as a superior-subordinate form of interdependence, assuming the existence of influence or control characteristics for the teaching position and of receptive role characteristics for the student position. It can be assumed that the above definition of this relationship has been, at least for most middle class Americans, accepted at the start of each individual's school experience. The type of communicative behavior, however, which characterizes specific relationships, is possibly the result of subsequent modifications of the definition based on each individual's appraisal of the other. Every message[7]

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[7]Although this style of communication analysis can be linked to Erving Goffman, the specific model referred to here is presented by Jay Haley in Strategies of Psychotherapy. New York: Grune and Stratton 1963, pp. 6-8.

they interchange, according to this form of interaction analysis, by its very existence either reinforces a specific line of communication which separates what is and what is not to take place in a relationship, or suggests a shift to include some new kind of message. The range of reinforcing stimuli which maintain a specific line of communication, are contingent on the original definition of the relationship, as it was agreed on by the teacher and student of each interchange unit, and the subsequent choices or response selections permitted within the definition. This investigation attempts to gather some information about the patterns of interpersonal response selections by viewing them within the context of a probability selection task.

THEORETICAL BACKGROUND AND FRAMEWORK

In the study of learning, psychologists commonly observe choice behavior. The nature of choices may range from patterns of unconscious preference to complex decisions in which motivational factors are exploited to increase or maximize the subjective value of the outcome for the subjects being observed. It should be noted that psychophysical scaling proceeds on the basis of observations of choices made by a subject in his attempt to detect or discriminate stimuli. This type of choice behavior is observed in studies of motivation, perception, and other psychological phenomena. Theoretical analyses and experimental work directed toward the understanding and explanation of choice behavior per se, appear to get the most attention in the investigation of decision making. Much of the data of psychology consists of choices made by subjects at stated decision points.

Although this investigation is not designed to contribute to the formal analysis of choice behavior, applications of some general assumptions of "choice" and "utility theory" are made. The theoretical model underlying the type of task chosen to observe reinforcement sequences, is the two-choice probability learning task. This type of task was chosen because it appears to be descriptive of interpersonal influence exchanges, and yields quantitative data for statistical analysis.

The general position taken assumes that human behavior can be analyzed from a decision-making perspective, regardless of variations in content, social context and the idiosyncratic characteristics of subjects' behavior patterns. In all decisions, whether it is a personal, "nonsocial" choice, or a social decision, an individual is forced to choose a particular element from a set of alternatives, and it is assumed that he makes his decisions in a manner which will maximize his expected utility or the value of the reward associated with each alternative. This assumption is basic to Siegel's model,[8] using Humphreys' classical two-choice uncertain-outcome experimental situation.[9]

In the experimental two-choice situation it is necessary to consider the expected utility of a given choice, since the reward associated with an alternative is realized only if the choice is correct for that trial. Siegel has suggested two sources of utility in the Humphreys' light-guessing experiment.[10] The first is the utility of the reward received for correctly predicting which light will illuminate on a given trial, and the second source is that of choice variability resulting from the intrinsic boredom of a pure strategy (choosing the same light constantly), as well as from the

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[8]Siegel, Sidney, "Theoretical Models of Choice and Strategy Behavior: Stable-State Behavior in the Two-Choice Uncertain-Outcome Situation," in S. Messick and A. H. Brayfield (Eds.), Decision and Choice. New York: McGraw-Hill, 1964, pp. 147-169.

[9]Humphreys, L. G., "Acquisition and Extinction of Verbal Expectations in a Situation Analagous to Conditioning," Journal of Experimental Psychology, Vol. 25, 1939, pp. 294-301.

[10]Siegel, Sidney; Siegel, A. E.; and Andrews, J. M. Choice, Strategy and Utility. New York: McGraw-Hill, 1964, pp. 63-64.

satisfaction connected with the ability to occasionally predict the less frequent light correctly. Studies by Siegel and Goldstein[11] provide support for the existence of the latter, by indicating the tendency of a periodic selection of the less frequently reinforced light. Goodnow[12] reports that some subjects were able to follow pure strategy only by inventing games such as changing the hand used to operate the response key. Though the marginal utility choice variability is not being studied directly here, the above assumptions concerning utility and Siegel's view that "utility" functions as reinforcement, increasing the probability of correct prediction as the rewards (positive utility) and the costs (negative utility) are increased, are the primary basis for the present assumption that teachers' selections of events in a two-choice uncertain-outcome situation constitute a reinforcement schedule.[13] With the utility of a correct choice being given considerable support in Siegel's experiments, the provision of positive utility through the greater frequency on one event, the length of runs, and the continuation of the selection of an event following a correct choice, are viewed as reinforcement.

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[11]Siegel, Sidney and Goldstein, D. A., "Decision-Making in a Two-Choice Uncertain-Outcome Situation," in Journal of Experimental Psychology, Vol. 57, 1959, pp. 37-42.

[12]Goodnow, J. J., "Determinants of Choice Distributions in Two-Choice Probability Situations," American Journal of Psychology, Vol. 68, 1955, pp. 106-116.

[13]Siegel, S., "Theoretical Models of Choice and Strategy Behavior: Stable-State Behavior in the Two-Choice Uncertain-Outcome Situation," Psychometrika, Vol. 24, 1959, pp. 303-316.

RESEARCH DESIGN

The design of this experiment is based largely on Siegel's assumptions that human behavior can be analyzed from a decision-making perspective, regardless of variations in the content of the material, the social context and individual characteristics.[14] His testing of these basic assumptions is not questioned at this point, but each of the above variables is regarded as having a potential influence on the results of this investigation and is, therefore, controlled as much as possible to minimize its intervention in the experimental process. Testing of the validity of these assumptions is not the concern of this investigation.

Procedure:

The two-choice uncertain-outcome situation was presented to an elementary-school child, by his teacher, in the form of a game in which he predicted, for a series of trials, which of two identical containers placed before him contained an object. After each prediction the contents of the chosen container were revealed to the child. He was allowed to dump the contents, if there were any, into a box placed in front of him. The objects used were counting discs frequently employed by kindergarten and first grade teachers in their instructional program.

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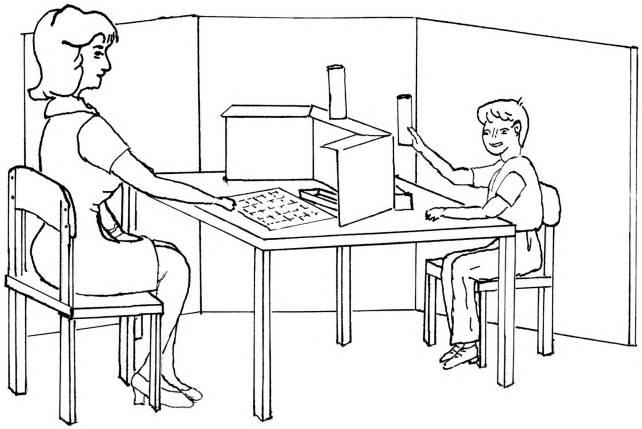
[14] Siegel, S., Choice, Strategy and Utility, pp. 2-3.

Each of the twelve teachers interacted with three of her students under three experimental conditions. In each case the students were told that they were going to play a guessing game in which they would have to choose which of two containers held a counting disc. The teachers were told that the experimenter wished to study the relationship of choice-behavior and academic achievement in the regular formal learning setting of the classroom. To accomplish this it would be necessary to maintain the teacher-student relationship and would require the active participation of the teacher. The setting for the game was the classroom of the teacher and student participants.

The basic apparatus included a wooden screen four feet high and four and one-half feet wide behind which the materials were placed on a card table. During pilot trials with three teachers it was found to be advantageous to have the teacher remain visible to the class, since it was not possible to have someone else accept responsibility for the classroom. The student participating in the game was hidden from the class behind the screen. On the table was another partition which could be raised or lowered to enable the student to view the teacher's face, but not the activity of her hands. The top of this partition formed a ledge on which the teacher placed the two containers, one of which the student was to select. The student was seated at a level which allowed him to reach the containers without rising from the chair. The containers were eight inches in height and two and one-half inches in diameter. On the teacher's side of the table-partition were materials necessary

Figure 1: Apparatus



for the experimental condition being followed, and on the student's side was an empty box of about one inch in depth.

Subjects:

The subjects were 36 students, 12 from each of the grades two, three and four, and twelve teachers, four from each of the above grades (I wish to thank the teachers and principals of the five elementary schools of the St. Johns Public Schools, St. Johns, Michigan, for their cooperation). The students were chosen by their teachers, each selected on the basis of high, average or low academic achievement. Each teacher was asked to select three students from her class who were representative of the levels mentioned. The above procedure was chosen in order to observe the responses of teachers toward students having varying levels of academic performance. Not only are certain students perceived by the teacher as being more capable or less capable of providing positive feedback to her communication, but the low achievers have possibly also adapted to a lower level of reward for correct responses (positive feedback) in the classroom. The selection of student subjects by the teacher is an attempt to provide teacher-student combinations which have developed and exhibit a pattern of differential interpersonal responses.

Experimental Conditions:

Three conditions of reinforcement were used. Two were comparable as low and high reward conditions, and contained the same proportions of event probabilities, the order of which was randomized according to two event sequences and checked for randomization of

distribution of runs. The more frequent event occurred 75% of the time. The low-reward condition (Condition A) included as reinforcement only the utility of correction prediction, while in the high-reward condition (Condition B) the teacher was asked to select from one of three levels of reward (lowest to highest) a peanut, a crayon, and a small toy or trinket. Toys for boys were small plastic automobiles or airplanes, while a variety of small plastic dishes were available for girls. The small plastic trinkets were appropriate for both boys and girls. These rewards were of the type which according to Bijou and Sturges have high reinforcement value for nursery-school-age children.[15] For purposes of confirming the above results, the experimenter randomly selected children and asked them to rate the rewards as to which they prefer most, second, and least. There were no deviations from the above gradation of rewards. For each trial in the high reward condition, therefore, there were two sources of utility, the possibility of receiving a prize, as well as the knowledge of the outcome of the prediction.

The third condition (Condition C) required that the teacher spontaneously select events from trial to trial. All teachers were given instructions prior to this condition to help the student achieve the highest number of correct predictions possible. As in the low-reward condition, knowledge of the outcome of each trial, as verified by the presence or absence of a disc, was the primary experimental reinforcement. Comments by the teachers during the task

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[15]Bijou, S. W. and Sturges, P. T., "Positive Reinforcers for Experimental Studies with Children: Consumables and Manipulatables," Child Development, Vol. 30, 1959, pp. 151-170.

performance were viewed as appropriate, since they help maintain the teacher-student relationship. In all three conditions the teacher was asked to consider her task a teaching activity, although it was only in this third condition that she was able to control event sequences for this purpose.

Instructions:

An explanation of what was to take place was given to the entire class from which the three student participants were chosen. These instructions were as follows: "We are going to ask three students to play a game in which they will be asked to choose. Each of these students will have to choose in which of these two containers (experimenter displays containers) your teacher has placed a plastic counter (experimenter displays small disc). The person who is playing the game must pick up one of these two containers, when it is placed in front of him by his teacher, and dump whatever is inside into the box in front of him. If there is something in the container, he has guessed right."

Prior to the trials the teacher was asked to read the following instructions and was given the opportunity to go through the motions of placing the disc in the container and placing it before the student, and to study the event chart and the proper sequential event order for Conditions A and B. The experimenter then questioned the teacher as to her understanding of the procedures.

The written instructions to the teacher had the following preamble, which included the explanation of the experiment as given to the teacher at the time she was originally approached about the

possibility of scheduling sessions in her classroom. "We wish to study the students' patterns of choosing in a series of two-choice trials. One of the purposes of this experiment is to study choice behavior of elementary students in the classroom, in a 'guessing' game with their teachers. We wish that you, therefore, be the person presenting the containers (event alternatives) to the student for the purpose of requiring him to make a choice. The experimenter will provide you with charts for Conditions A and B, which indicate the specific order in which the events are to be presented to the student, and with an adequate supply of rewards for Condition B."

This preamble was followed by instructions concerning each condition. The instructions for each condition were reviewed prior to the initial trials in that condition. The following instructions were given:

Condition A: "Follow the chart which is presented to you. As you pick up the first disc in the first two you will observe the letter "R" or "L", indicating whether it should be placed in the container to the right or to the left of the student. After the student has selected, continue with the subsequent trial until 50 trials are completed. When placing the disc in the designated container, always set the containers on the table in front of you. If the student makes a wrong choice, make sure that you discard the disc in the box in front of you."

Condition B: "This procedure is the same as Condition A (read instructions to Condition A), with the addition of the request that you select from the three levels of prizes, such rewards as you think will improve the student's motivation to maximize his correct choices,

i.e., to try for the highest number of correct choices possible. When he makes a correct choice, give him a prize."

Condition C: "In this condition use your own judgment in placing the disc either the right or the left container. The object of this condition is to allow you to use your knowledge of the student in motivating him to try for the highest number of correct scores possible."

Design:

Each student was observed under all three conditions, which were randomly ordered. The students were then randomly assigned to the six ordered sequences of experimental conditions.

There were 50 trials in all conditions. For "Condition A" and "Condition B," the probability of the most frequent event, was equal to .74 (in a series of 50 trials, π's of .74 and .76 are the nearest possible estimates of .75).

Hypotheses:

The main hypothesis is that the higher the achievement level of a student, the greater will be the number of supportive responses by the teacher. The following sub-hypotheses were tested to determine if such differential treatment of students did in fact exist:

1. The teacher's choice of event probabilities under "Condition C" will produce a large π and consequently a smaller pq for the achieving child.

p.--proportion of times the object is placed in the right-hand container

q.--proportion of times the object is placed in the left-hand container

H_1: pq (high achievers) $<$ pq(of low achievers)

2. The teacher's choice of event probabilities will be such as to produce more runs in the run distribution for low achievers under the "Condition C" task assignment.

U = number of runs in the run distribution of high achievers

U' = number of runs in the run distribution of low achievers

H_2: $U < U'$

3. The levels of reward presented to the child will be such as to favor the high achiever

a = 1 = lowest level of reward for high achiever

b = 2 = middle level of reward for high achiever

c = 3 = highest level of reward for high achiever

n_1 = number of correct choices by high achievers

d = 1 = lowest level of reward for low achiever

e = 2 = middle level of reward for low achiever

f = 3 = highest level of reward for low achiever

n_2 = number of correct choices for low achievers

H_3: $\frac{(a+b+c)}{n_1} > \frac{(d+e+f)}{n_2}$

4. The sequential characteristics of the data will indicate whether or not a teacher responds differentially to students and also the manner in which this is done. The teacher will initiate more error runs for the less bright than for the bright child.

A_1 = correct choice by the student

E_jE_k = change in event alternatives by the teacher following a student's correct choice

H_4: $\Pr(E_jE_k/A_1)$ for high achievers $< \Pr(E_jE_k/A_1)$ for low achievers

Each of the four sub-hypotheses stated above specifies one of the major variables identifying the teacher's response pattern

toward the student. For example, it is assumed that the teacher will also maximize the expected subjective value of outcomes for herself. The level of positive feedback and sense of achievement are generally greater in the interpersonal relationship with students high in achievement. The expected utility of reciprocated choice patterns for the teacher, in which the probability of correct responses does not vary directly according to achievement level, is viewed as a function of the relationships the teacher has established with her students. It is hypothesized that the responses of the teachers will be such as to reduce the probability of the low achieving student predicting the occurrence of the more frequent event, to a greater degree than the high achieving student predicting the occurrence of the more frequent event. All measurements are observations of the teacher's choices as specified in the four hypotheses above.

RESULTS

Event Probabilities:

The teacher's choices of events, although they favored the brighter children slightly, were not significantly different for the low achievers. The existence of differential treatment by the teachers received no support from this data. The chi-square test was applied to the mean frequencies of events assigned to each student category, resulting in a critical value significant only below the .1 level.

Table 1: Effect of Teachers' Choice on Event Probabilities

	Student Performance Level		
	High Achiever	Average Achiever	Low Achiever
The probability of the occurrence of the more frequent event	.56	.53	.53
	$x^2 = 3.28$	df = 2	

(x^2 of 5.99 required for significance at .05 level)

Distribution of Runs:

A comparative analysis of runs, based only on the group means for each of the three student academic performance levels, indicated that a differential response pattern toward high and low achievers, although present in the direction hypothesized, was not significant. The Z scores of runs shown in Table 2 are computed using the one

sample runs test.[16] This transformation of the data provides evidence of tendencies in the length of runs as well as a comparison of scores over treatment levels. The deviation of runs beyond plus one standard deviation from the mean indicated tendencies of teachers to produce short runs, shorter and hence numerically more than would normally appear in runs produced by a random selection process.

Table 2: Z Score Distribution of Runs

Order of Teacher According to Age	Student Performance Level		
	High Achievers	Average Achievers	Low Achievers
1	.97	-.53	.87
2	.24	2.88	2.63
3	1.42	3.44	3.16
4	.33	-.27	2.16
5	.29	1.79	-1.42
6	1.19	2.01	2.56
7	1.77	.48	1.77
8	1.44	5.15	1.36
9	3.16	1.84	3.16
10	.30	1.72	-.43
11	1.01	3.29	-.53
12	2.28	-.83	3.12

[16]Siegel, Sidney. Nonparametric Statistics for the Behavioral Sciences. New York: McGraw-Hill Book Company, 1956, p.52.

Table 3: Analysis of Variance Table
for
Z Score Distribution of Runs (one-way layout)

Source of Variation	d.f.	S.S.	M.S.	F-Ratio
Between	2	1.82	.91	.46
Within	33	65.2	1.97	
Total	35	67.02		

(F-Ratio of 2.88 required for variation to be significant at .05 level.)

However, since certain teachers at times conformed to the common pattern of nonrandom sequences by producing an excess of long runs (minus Z scores),[17] which canceled out some of the excesses in short runs, the teachers were categorized according to such characteristics as age, years of teaching, parental socio-economic status, etc., in order to identify variables related to the excesses of short runs. Only one of these efforts of collapsing categories produced significant results. The teacher's perception of parental socio-economic status provided a set of categories which differed significantly in the length or runs. This data (shown in Table 4) suggests that socio-economic background influences teachers' response styles in this experimental situation. However, the social differences do not include differentiation of responses toward high and low achieving students. For the teachers with lower social class parents the t value was 2.09, (df = 6) which is significant only at the .1 level. Also since the experimenter failed to interview the teachers following the experimental activities, concerning the

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[17]Atkinson, R. C., Bower, G. H. Crothers. An Introduction to Mathematical Learning Theory. New York: John Wiley & Sons, Inc. 1965, p.6.

motivation or intent of each teacher in her presentation of events to the students, some valuable information was lost.

Table 4: Z Scores of Runs

Student Performance Level	Socio-Economic Status of Teachers' Parents: Middle	Lower
High Achievers	.74	2.01
Low Achievers	.75	3.04

t = 4.35 df = 20 *p .001

Table 5: Analysis of Variance Table

The Effect of Years of Teaching on the Distribution of Runs

Source of Variation	d.f.	S.S.	M.S.	F-Ratio
Between	2	2.98	1.49	.7430
Within	33	66.21	2.00	
Total	35	69.19		

Table 6: Analysis of Variance Table

The Effect of Teachers' Subject Preferences on the Distribution of Runs

Source of Variation	d.f.	S.S.	M.S.	F-Ratio
Between	4	3.62	.9	.521
Within	10	17.38	1.73	
Total	14	21.01		

(F-Ratio of 3.33 required for differences to be significant at the .05 level)

Rewards:

Several methods of combining the frequencies and types of rewards were attempted, including the use of weights as described in

hypothesis #3. None of these efforts resulted in a procedure for the identification of differential patterns of assigning rewards. Table 7 below indicates the accumulative weighted scores (Hypothesis 3#) as percentages of highest possible cumulative score for each student. The chi-square test, corrected for continuity was used.

Table 7: Weighted Reward Scores

	High Achievers	Average Achievers	Low Achievers
Means: Percentage of Highest Possible Cumulative Scores	76.61%	74.63%	72.32%
		$x^2 = 2.91$	df = 4

(x^2 of 9.49 required for differences to be significant at .05 level)

Sequential Characteristics:

The teachers' tendencies to shift alternatives when the student made a correct choice were not discriminatory. Differences in their treatment of high and low achievers were not significant.

Table 8: Sequential Teacher-Student Responses

	Student Performance Level		
	High Achievers	Average Achievers	Low Achievers
Means: Percent of time teachers changed alternatives following a student's correct choice	51.79	56.05	59.2
		t = .97	df = 22

(t = 2.82 required for significance at .05 level)

Table 9: Analysis of Variance Table

The Effect of Years of Teaching
on
Sequential Teacher-Student Responses

Source of Variation	d.f.	S.S.	M.S.	F-Ratio
Between	2	333.51	166.75	.39
Within	33	13832.05	419.15	
Total	35	14165.57		

The results of the analysis of "age of teacher" effects are essentially the same with an F-ratio of less than one at .39. Analysis of teacher preferences likewise produced an insignificant F-ratio.

Table 10: Analysis of Variance Table

The Effect of Preference for Teaching English
on
Sequential Teacher-Student Responses

Source of Variation	d.f.	S.S.	M.S.	F-Ratio
Between	2	461.42	230.71	.41
Within	18	9962.52	553.47	
Total	20	10423.94		

DISCUSSION AND CONCLUSION

This study attempted to explore the differential responses of teachers toward students with varying levels of achievement. The assumption that teachers' supportive responses to students would vary according to the student's achievement level, was not supported by the data. This experimenter believes that the testing of the stated hypotheses was accomplished with sufficient precision to make the results valid and to warrant stating as the conclusion, that according to the results of this study, differential treatment of students, by their teachers, does not exist.

LIST OF REFERENCES

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