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The Effects of Selected Motivational Rewards on Intelligence Test Performance of Middle School Students

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THE EFFECTS OF SELECTED MOTIVATIONAL REWARDS ON INTELLIGENCE TEST PERFORMANCE OF MIDDLE SCHOOL STUDENTS

East Tennessee State University ED.D. 1981

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THE EFFECTS OF SELECTED MOTIVATIONAL REWARDS ON INTELLIGENCE TEST PERFORMANCE OF MIDDLE SCHOOL STUDENTS

A Dissertation

Presented to

the Faculty of the Department of Supervision and Administration

East Tennessee State University

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

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by

Janice Brice Miller

August, 1981

APPROVAL

This is to certify that the Advanced Graduate Committee of

JANICE BRICE MILLER

met on the

7th day of July, 1981.

The committee read and examined her dissertation, supervised her defense of it in an oral examination, and decided to recommend that her study be submitted to the Graduate Council and the Dean of the School of Graduate Studies in partial fulfillment of the requirements for the degree Doctor of Education.

Chairman, Advanced Graduate Committee

Signed on behalf of
the Graduate Council

Dean, School of Graduate Studies

Abstract

THE EFFECTS OF SELECTED MOTIVATIONAL REWARDS ON

INTELLIGENCE TEST PERFORMANCE OF

MIDDLE SCHOOL STUDENTS

by

Janice Brice Miller

The purpose of this study was that of determining if intelligence quotient mean test scores of middle school students of different races, sexes, and socioeconomic classes could be significantly increased through the use of tangible and intangible rewards of money and praise.

One hundred and thirty-five students from lower and middle socioeconomic classes were randomly assigned to three groups. The stratified groups, two experimental and one control, contained approximately the same numbers of male and female students. The students were identified as lower and middle socioeconomic class whites and lower socioeconomic blacks.

A counterbalanced design was employed for the study. Two treatments were used, a spoken verbal praise treatment, and a money treatment. All members of the groups were tested three times using the Otis-Lennon Mental Ability Test, Forms J and K. All three groups were pretested with Form J. One week later, before the administration of the second test, Form K, one-half of the experimental test subjects was promised $2 for each improved test score. The other half of the experimental test subjects were administered the spoken verbal praise treatment as an incentive to improve their test scores. One month later, during the third and final testing, the money and praise treatments were alternately administered to the first and second halves of the experimental groups. The experimental groups which received the praise treatment first was administered the money treatment, and the experimental group that received the money treatment first was then administered the praise treatment. Form J of the Otis-Lennon Mental Ability Test was used for the third and final test.

Ten study hypotheses were tested at the .05 level of statistical significance. After analyzing the data, the following findings seemed especially important:

1. Significant increases in the intelligence quotient test scores of lower class blacks were dependent upon monetary reward.

2. Significant increases in the intelligence quotient test scores of middle and lower class whites occurred when spoken verbal praise was administered.

3. The sequencing of money first and praise second led to significant increases in the scores of lower and middle class white females and middle class males.

EAST TENNESSEE STATE UNIVERSITY
JOHNSON CITY, TENNESSEE 37601

COLLEGE OF MEDICINE
Department of Pediatrics

April 9, 1979

Ms. Janice B. Brice
603 Holston Avenue
Elizabethton, Tennessee

Dear Ms. Brice:

The Subcommittee of the Institutional Review Board has reviewed your project, "The Effects of Selected Motivational Rewards on Intelligence Test Performance of Middle School Students", and has recommended approval of the project to the Institutional Review Board. We find the study acceptable in all aspects of protection of subject confidentiality. If any untoward events do occur to the subjects during the conduct of the study, we request that you inform the Institutional Review Board of such.

The Institutional Review Board would like to remind you as principal investigator that participation of subjects under age 18 years requires parental signature on the informed consent statement.

If you have any questions, please feel free to call me at 928-6426, extension 222. Recommendations for approval of the project will be made to the Institutional Review Board at its meeting on April 23, 1979.

Sincerely yours,

Frank M. Shepard, M.D.

Frank M. Shepard, M.D.
Professor and Chairman
Department of Pediatrics
Chairman, Institutional
Review Board

FMS/dlb

DEDICATION

Dedicated to

My Mother, Louise Moffitt

ACKNOWLEDGEMENTS

I wish to express my gratitude to Dr. William Evernden for serving as committee chairman and for giving of his time and energy during the writing of this study. I would also like to thank Dr. Ben Eller, Dr. Floyd Edwards, Dr. J. Howard Bowers and Dr. William Acuff for their encouragement and assistance.

I would like to extend a special acknowledgement of appreciation to my husband, J. Clyde Miller, for his caring and encouragement.

Finally, I wish to express my appreciation to my children, Jan-Alesa, Bobby, and Chera, for their loving understanding and tolerance while this dissertation was being written.

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Chapter 1

INTRODUCTION

Reinforcement is an important, though often underestimated, social influence. Psychologist B. F. Skinner's research concerning human behavior has demonstrated that reinforcement plays a distinctive role in student motivation (Cronbach, 1977). Reinforcement may be primarily intangible, as is the case with praise, or it may be tangible, as with money. Research has shown that suitable use of reinforcement may differ for each student (Stevenson & Snyder, 1961). The student's sex, socio-economic status, and race may be factors which often help to determine what can serve as a reinforcer for a person.

Previous studies have shown that effective use of reinforcers will raise students' standardized test scores (Allyon & Kelly, 1972; Clingman & Fowler, 1976). Calvin Edlund (1972) attempted to determine which groups gained the most from candy reinforcers. He found that his test sample, Head Start children with a mean intelligence quotient well below 100, experienced notable increase in intelligence quotient scores because of candy reinforcers. The results of these findings have raised a critical question: How may educators most effectively motivate students to raise their intelligence quotient test scores?

High or low test scores may be used to permanently categorize students as educable mentally retarded, capable or accelerated, vocational, or some other classification (Fine, 1975). If intelligence quotient scores are to be used to make such critical decisions, they

should accurately reflect students' capabilities. The influence of student motivation in the taking of intelligence quotient tests is an area for in-depth investigation--a concern of administrators, teachers, students, and parents.

According to Benjamin Fine (1975), the intelligence quotient test scores of an individual may vary a great deal in test-retest situations. This possible variation has been the focus of considerable research and experimentation. Many school officials believe that excessive reliance has been placed on intelligence quotient test scores in categorizing some children (Fine, 1975). Administrators could well benefit from research to identify variables which influence the intelligence test scores of students. Definitive research into the effectiveness of particular reinforcers, such as money and praise, appears to be lacking. Knowledge of the outcomes of such studies could aid administrators in the making of decisions related to curriculum and instruction.

The Problem

Statement of the Problem

The problem of this study was to determine if intelligence quotient mean test scores of middle school students of different races, sexes, and socioeconomic classes could be significantly increased through the use of tangible and intangible rewards of money and praise.

Hypotheses

The following hypotheses, which were tested at the .05 level of statistical significance, were formulated for this study:

1. There will be a significant difference between the intelligence

quotient mean test scores of the control group and the combined experimental groups.

2. There will be a significant difference between the intelligence quotient mean test scores of the control group and the experimental groups--by race, sex, and socioeconomic class--when money is offered as a reward.

3. There will be a significant difference between the intelligence quotient mean test scores of the control group and the experimental groups--by race, sex, and socioeconomic class--when praise is used as a reward.

4. There will be a significant difference between the pre- and posttest intelligence quotient mean scores of the experimental group--by race, sex, and socioeconomic class--when money is offered first as a reward.

5. There will be a significant difference between the pre- and posttest intelligence quotient mean scores of the experimental group--by race, sex, and socioeconomic class--when praise is used first as a reward.

6. There will be a significant difference between intelligence quotient mean test scores of the experimental groups--by race, sex, and socioeconomic class--when comparing money and praise as rewards.

7. There will be a significant difference between the pre- and middle-test intelligence quotient mean scores of the experimental group--by race, sex, and socioeconomic class--when money is offered as a reward.

8. There will be a significant difference between the pre- and middle-test intelligence quotient mean scores of the experimental group--by race, sex, and socioeconomic class--when praise is used as a reward.

9. There will be a significant difference between the middle and posttest intelligence quotient mean scores of the experimental group--by race, sex, and socioeconomic class--when money is offered as a reward before the middle test and when praise is used as a reward before the posttest.

10. There will be a significant difference between the middle and posttest intelligence quotient mean scores of the experimental group--by race, sex, and socioeconomic class--when praise is used as a reward before the middle test and when money is offered as a reward before the posttest.

Significance of the Study

An examination of the literature has revealed a lack of research on the use of money and praise as reinforcers in the middle school in group intelligence quotient testing. Use of financial incentives and spoken verbal praise for motivation might do much to raise the intelligence quotient test scores of certain students (Sweet, 1969; Wienges, 1971). Suitable reinforcers of these types may be important influences in motivating some students to higher performances on intelligence quotient tests (Wienges, 1971).

Some administrators, other educators, and psychologists indicate that some children from lower socioeconomic classes appear to be more intelligent than their test scores imply. Possibly, "being more intelligent" simply implies that some children perform better on intelligence quotient tests than do others. The possibility exists that many lower socioeconomic class children are just as intelligent as their

middle class peers but do not do as well generally on intelligence quotient tests (Sweet, 1969). Further research to discover possible relationships between types of reinforcement and students' intelligence quotient test performances is needed. The school principal could use this type of research in curriculum decisionmaking.

The importance of the principal's role in the administration of public education is difficult to overestimate (Knezevich, 1975; Laabs, 1968). According to Jean Hawkins and others, the principal is most often the only person in a position to initiate and carry through meaningful and lasting educational change (Hawkins, 1977; Swick & Driggers, 1975). The public school administrator is responsible for the total educational offerings of the school: instruction, placement, curriculum, pupil motivation, expert guidance, and discipline (Brain & Pullen, 1966). The discovery and initiation of more potent student motivators is vitally important to the educational leader of the school (Fletcher, 1978; Ready, 1976; Cereghino, 1971). The administrator is expected to energetically seek and discover ways to encourage and facilitate all areas of pupil achievement. If principals are to successfully assume this responsibility, conclusive research into cause and effect relationships pertaining to learning is required (Matthews & Brown, 1976; Cobb, 1975). The overall task of public educators is to educate; the major task of administrators is to create and maintain an organizational climate conducive to both teaching and learning (Jensen & Clark, 1964; Lipham & Hoeh, 1974).

Instructional supervision of the school program is the most important duty of the school principal (Cobb, 1975). Part of this responsibility concerns pupil evaluation. The school administrator, who is held

accountable by the general public for demonstrable results, may use test data as a basis for decisionmaking (Levenson, 1970; Rudman, 1976; Laughland, 1975). Besides the usual evaluative chores related to student testing, administrators have the task of identifying the potentially gifted (Greeson & Carter, 1977). Principals ordinarily use standardized tests to determine the students' learning or achievement levels, provide competent student guidance and placement, and report test results to both students and parents (Jacobson, Longsdon, & Wiegman, 1973; Herman, 1973). Because the school leader is responsible for curriculum and instruction (Weischadle, 1974), and because testing has such a lasting impact on students' lives, progressive administrators will make special efforts to foster the discovery of the most effective student motivators. Identification of the most potent test motivators for various types of students is in the best interest of students, principals, and parents. Administrators should be aware of the latest research which is related to testing and pupil motivation.

Definitions of Terms

The following definitions were used for this study:

Monetary Reward

Monetary reward was the $2 offered to the pupils in the experimental groups.

Motivation

Motivation was need satisfaction and goal-seeking behavior (Hilgard, Atkinson, & Atkinson, 1975).

Reinforcement

Reinforcement was a stimulus which produced an increased probability of the continuance of a behavior (Cronbach, 1977).

Socioeconomic Class

Socioeconomic class was determined by family income and the Hollingshead Two-Factor Index of Social Position which included occupational and educational levels of heads of households.

Verbal Praise

Verbal praise was oral expressions of approval (Webster, 1973). The spoken verbal script served as verbal praise.

Limitations

The following limitations were placed on this study:

1. The sample was limited to 135 black and white students assigned to two upper East Tennessee public middle schools.

2. The population sampled was taken from lower and middle socio-economic class students as determined by the Hollingshead Two-Factor Index of Social Position, and family income.

3. Only those students with written parental permission participated in the study.

4. No distinction was made between sixth, seventh, and eighth grade students and their ages when analyzing test results.

Assumptions

The following assumptions were made for this study:

1. The student participants followed directions and prescribed test-taking procedures.

2. By using alternate forms of the Otis-Lennon Mental Ability Test, and by having a time lapse of 1 week between the pre- and middle test and 4 weeks between the middle and posttest, the effects of memory were minimized.

3. The praise script (see Appendix A) represented spoken verbal praise and was received as such by all experimental subjects.

Organization of the Study

Chapter 1 consisted of the introduction, statement of the problem, hypotheses, significance of the study, definitions of terms, limitations, assumptions, and study organization.

Chapter 2 was a review of related literature.

Chapter 3 was a description of study methods and procedures.

Chapter 4 was a summation of study results and discussions of study data.

Chapter 5 comprised the study summary, conclusions, and recommendations.

Chapter 2

REVIEW OF RELATED LITERATURE

Introduction

The review of related literature revealed a limited number of studies relating to the effects of tangible and intangible rewards on intelligence quotient test performances of different races, sexes, and socioeconomic classes. It was apparent that little research had been conducted on the effects of money and praise on the intelligence quotient test performances of middle school students.

The purpose of the review of related literature was that of identifying and summarizing the most important studies which related to tangible and intangible rewards used in education, particularly in intelligence quotient testing. Certain other issues and research, such as cultural bias in testing, test-wiseness as an influence on testing outcomes, and cultural divergencies as an influence on testing were also examined.

Reinforcement and Performance

Many forms of reinforcement and reward are an integral part of human societies. The influence of reinforcement is evident in many current educational practices. The reinforcement or reward most often encountered in the classroom, spoken verbal praise, ordinarily elicits "correct responses" from students (Smith, 1967). Researchers have demonstrated that the efficiency of reinforcement varies considerably

among individuals (Stevenson & Snyder, 1961). Sex, race, socioeconomic levels, and traditions influence and determine the effectiveness of specific motivational reinforcers (Havighurst, 1970).

If educators depend too greatly on but one reinforcer, spoken verbal praise, the results may be unfortunate because this motivator may be useful for but one socioeconomic class, group, or race (Wienges, 1971). Robert Havighurst (1970) implied that test performances of lower socioeconomic class children should improve when reinforced with tangible explicit materialistic rewards. Havighurst believed that test performances of middle class children were superior when reinforcement was primarily symbolic and intangible. S. F. Klugman (1944) discovered that test scores of black pupils were elevated when money was employed instead of the usual spoken verbal praise. He determined that scores of white, middle class students were most effectively raised by the use of spoken verbal praise. Lorene C. Quay (1975) suggested that one reason for the relatively poor intelligence quotient test performances of lower class children was the inappropriateness of motivational techniques. Quay cited the need for research into the possible motivational effects of material and nonmaterial rewards (spoken verbal praise) on students of variant socioeconomic backgrounds. Edward Zigler, Willa Abelson, and Victoria Seitz (1973) stated that the test scores of lower socioeconomic class students would be relatively low, even if cultural biases could be eliminated, because of motivational deficiencies. One traditional explanation for the comparatively low test scores of members of the lower socioeconomic classes has been student indifference toward academic trappings and other activities having little immediacy of "payoff" or tangible reward.

Literature on Human Reinforcement through Tangible and Intangible Rewards

Some of the motivational effects of spoken verbal praise have been observed and recorded by Mary A. Wienges (1971) and other researchers. Wienges gave spoken verbal rewards to certain test subjects by using the statements "That's good," and "You're doing very well." She discovered that spoken verbal praise was ordinarily a more effective motivator for black test subjects than for whites. Edward Trautmen (1977) verbally encouraged his test subjects by using "You are doing unusually well," and ". . . you have done exceptionally well." In investigating possible variances in motivational efficiency between spoken verbal encouragement and certain forms of nonverbal encouragement in kindergarten test subjects, Mary Fenn (1976) employed the expressions "Very good," "Good work," "Tell me more," "Go on," and "Keep up the good work" as spoken verbal praise. While studying middle and lower class subjects, Joseph Tramontana (1972) administered "You're doing fine," "Very good," and "Good" as spoken verbal praise. Klugman (1944), Dreger and Miller (1960), and Pettigrew (1963) found spoken verbal praise to be a generally more potent motivator for middle class whites than for blacks and for most lower socioeconomic class persons.

Tramontana (1972) studied motivational aspects of social rewards (spoken verbal praise), edible rewards (candy), and a no reward condition. Thirty-six middle and 36 lower class Caucasians were examined under each of three testing conditions. There were 51 boys and 21 girls who had been evaluated within 2 years of the testing at the University of Tennessee Child Development Center. Each subject possessed the

following qualifications: a chronological age of 4 years, 11 months to 10 years, 11 months; set levels of intellectual functioning as measured by the Wechsler Intelligence Scale for Children or the Stanford Binet Intelligence Scale; and, enough physiological proficiency or ability to complete the required motor tasks. By use of conferences with the children's parents, the testers learned if the pupils liked candy. Subgroups of 24 members each were selected at three levels of intellectual ability: average, mildly retarded, and severely retarded. In each of the three groups, subjects were further divided into two groups of 12 members each based on membership in middle or lower class. The major criteria for determination of socioeconomic class were education of parents of the children, parents' jobs, and parents' income sources. The two socioeconomic classes at the three intelligence quotient levels comprised six groups.

Social rewards (spoken verbal praise) were found to be not significantly less effective for the retarded than for the average subjects. Praise was less effective than candy for the severely retarded, but the difference lessened as the inherent intelligence levels of the subjects increased. Candy was identified as the most potent motivational influence regardless of the mental capabilities of test subjects. Candy was significantly more effective than either praise or no rewards, and praise was significantly more effective than no reinforcement. For all groups, candy rewards were more effective than verbal rewards, and verbal rewards exceeded the no reward condition in efficiency. For pupils of the average group, candy and verbal rewards were not significantly different. Candy rewards differed significantly from no reward,

and verbal rewards and no reward did not significantly differ. For the mildly and severely retarded subjects, candy was significantly better than praise and no reward whereas verbal rewards and no rewards were not significantly different. Finally, candy was more effective than no reward for all group members, and in no group did praise significantly differ from the no reward situation.

Tramontana recommended extensions of the study, particularly with more discrete socioeconomic groups. He called for research into the effects of order of rewards presentation on performances of test subjects in testing situations.

Wienges (1971) administered the Doppelt form of the Wechsler Intelligence Scale for Children to 120 youngsters of four racial and socioeconomic groups: blacks, whites, lower, and middle classes; traditional (standardized testing procedure), verbal, and material reinforcements were utilized. The research showed that socioeconomic levels exert general effects on intelligence quotient test scores; that race is a less pervasive determinant of test performances than socio-economic status; and, that immediacy of verbal or material rewards during the testing elevates the scores of some lower class children. The most generally effective motivator was material reward given immediately after each correct answer. Material reward was a significantly more efficient stimulator for black lower class subjects than for those of the white middle class. Lower class group members who received traditional reinforcements showed higher intelligence quotient scores than the middle class subjects. Members of the black lower class showed highest intelligence quotient scores under traditional rewards. Verbal reward

or reinforcement exerted a more positive effect on black test subjects than on whites. Wienges' conclusions were that race and class affect not only individuals' performances on written intelligence quotient tests, but also responses to various reinforcers.

Joy Moore Clingman (1977) analyzed the effects of candy, tokens, and social reinforcers (spoken verbal praise) on intelligence quotient test performances of children of above average intelligence. Thirty pupils from a private day school in central Virginia, ranging in ages from 10-3 to 12-6, were tested. The intelligence quotient test scores of the subjects ranged from 101 to 146, and the median intelligence quotient was 118.5. All of the subjects were white, middle, or upper class persons. Consequences of Clingman's work indicated that neither the candy or the social rewards were especially effective for these test subjects. The positive change in scores for those who received tokens was generally more pronounced than was the case for the recipients of the social rewards. Verbal feedback alone was not particularly effective in raising test scores. Candy reinforcers did not result in significant improvements in the scores of high intelligence quotient subjects. Clingman felt that scores of subjects of above average intellect might be enhanced if suitable motivators could be discovered and offered to the test subjects. Tokens with varied backup reinforcers could allow the subjects to choose their own most useful and efficient motivational reinforcers.

Literature on Human Reinforcement through Tangible Rewards

Joy Clingman and Robert Fowler (1976) used candy rewards, tangible reinforcement similar to money, in testing situations which involved students of average and below average achievement. They discovered that candy reinforcement increased the scores of the lower ability pupils while the scores of subjects of higher ability were not affected. Other researchers (Allyon & Kelly, 1972; Edlund, 1972; Sweet & Ringness, 1971) reached conclusions similar to those of Clingman and Fowler. Testing situations in which subjects could choose their own most potent reinforcer were conceived as a partial solution to the test motivation dilemma. Ernest Haggard (1954), in a study of 11-year-olds, found that the giving of movie passes led to general increases in test scores of subjects of variant abilities.

According to Allyon and Kelly (1972), the purpose of reinforcement is that of increasing the arousal level of the person being tested to insure that the test items will be successfully completed. They suggested that the performances of the child on standardized tests must be maximized or the results cannot be taken to represent the person's true abilities. Motivational deficits (Allyon & Kelly, 1972) are highly alike for normal children and for the trainable. Edlund (1972) felt that precise reinforcers need to be used in testing if an accurate summation of the learning or intelligence quotients of individuals is to be gained. Studies comparing samples from populations are needed to demonstrate important and consistent variances in standardized testing situations. Extensive research should be initiated for the identification

of maximal reinforcers for persons being tested (Allyon & Kelly, 1972).

Tokens as Reward

Carlos Alvarez (1974) studied student performances of academic tasks under two different environmental arrangements. Results were conditionally related in one setting to test performances of subjects. Environmental outcomes were administered independently of the test performances of the subjects in the second setting.

In the first of the two testing situations, eight first-graders were individually exposed daily to two different environmental conditions. The subjects were given tokens contingent on their correctness of responses to math problems. In the second condition of testing, tokens were administered irrespective of the correctness or incorrectness of student performances of identical tasks. Performance quality was rated according to response accuracy and improvement rate, if any. Productivity (frequency of problems attempted per session) was measured in terms of rates of problems attempted per session and rate of sequence over time. Tokens could be exchanged for various candies or toys. In the second experiment, seven first-graders were individually exposed daily to two different experimental environments. In one situation, tokens were given when subjects' responses to the math problems were incorrect. In a second experiment, token giving and withdrawal was done on a noncontingent basis.

No significant differences were found between the average accuracy rate of subjects' answers under contingent or noncontingent administration of tokens. Both experimental conditions caused a tendency toward improved accuracy of all participants in both experiments except for one

subject whose accuracy rate lowered under the noncontingent situation. Alvarez failed to reveal dramatic differences in differential effects created by contingent and noncontingent reinforcements. The subjects showed higher improvement rates over time when tokens were given or withdrawn noncontingent on task performances.

Candy as Reward

Research into motivation was conducted (Edlund, 1972) to determine possible effects of an explicit motivator (candy) which was given to students who responded correctly to items on an individual intelligence quotient test. Seventy-nine pupils of low middle and lower class backgrounds took part in the study. All of the subjects were enrolled in Project Headstart, kindergarten, or public school classes, and their ages ranged from 5 to 7 years. The revised Stanford Binet (Form L) test was administered to the experimental subjects after it was determined that each subject liked candy. Eleven pairs of test subjects were matched on the basis of intelligence quotient test scores, sex, age, liking for candy and the ability to properly digest it, and parental permission to accept the candy. The matched subjects pairs consisted of one pair of females and 10 pairs of males. One subject from each pair was randomly assigned to both the control and the experimental groups. All of the tests were given just before lunch to assure maximal levels of food deprivation.

The Revised Stanford Binet scales, Forms L and M, were used to determine the test scores of all of the test subjects. These scales were used because of their consistent similarity of measurement. A t-test for matched pairs was employed for the evaluation of mean test scores.

With but one exception, the experimental test subjects improved their scores on the second test. Scores of most members of the control group were but minimally improved, and five members of the control group scored lower on the second test. The median gain for the experimental subjects was 12 intelligence quotient points while there was a median gain of but 1 point for the control group. Edlund pointed out that the selective reinforcer candy may motivate certain students to improved test performances. With but one exception, subjects whose correct answers were reinforced with candy scored higher on the second test than did those who did not receive reinforcement.

Edlund suggested that testing reinforcement conditions between tester and the person being tested demanded careful consideration if true intelligence quotients were to be attained. Some practical consequences of this study relate directly to educational administrators who employ intelligence test scores for administrative reasons. Edlund concluded that definite reinforcement in testing is an integral part of correct analyses of test subjects' intelligence quotients. He called for more conclusive studies into pupils' motivations in intelligence quotient testing situations. Edlund believed that experimentation into the uses and efficiency of motivational rewards other than candy might prove beneficial to both educators and pupils.

The effectiveness of candy reinforcement in student motivation was explored by Clingman and Fowler (1976). In their study, the influences of contingent candy rewards, noncontingent candy rewards, and of no candy rewards on intelligence quotient test performances was examined and analyzed.

Seventy-two first and second-graders were chosen to engage in the study. Form A of the Peabody Picture Vocabulary Test was administered. The pupils were divided, according to test scores, into low, middle, and high levels. Subjects in each category were randomly assigned to contingent reward, noncontingent rewards, or no reward groups.

Clingman and Fowler showed that significant increases in test performances in subjects of low intelligence occurred when candy was given after each correct response to test questions. However, no effect on performances of the middle or high intelligence quotient subjects was noted. This corroborated Edlund's (1972) finding that contingent candy rewards based on correctness of responses significantly raised the test scores of lower class children. In Clingman and Fowler's study, only scores of the lower group students revealed significant gains. The experimenters inferred that the high and middle ability pupils were more highly motivated internally before the testing than were members of the lower group. Because of this, candy reinforcement altered the conditions of testing by elevating the motivational levels of members of the lower group.

Clingman and Fowler believed that motivation in the testing of human intellect is a fertile and arresting area for more inclusive research. If further studies into student motivations and intelligence quotient test performances yielded findings similar to those of Clingman and Fowler, systematic and suitable motivational reinforcement for all students who take intelligence quotient tests might significantly improve scores.

Motivation and Student Performance

Most teachers know that pupil motivation is crucial to learning, but far too few are aware of its complexity. Mark Greene and David Lepper (1974) proved that extrinsic tangible rewards can backfire and that children's natural interests can be blunted by too many externally-imposed rewards and controls. In four separate studies with preschool and elementary school subjects, they found that children who performed tasks primarily for external rewards usually later became more disinterested in the tasks than did the children who were not rewarded or who were unexpectedly rewarded. Knowledge that they were being observed, even when external rewards were not anticipated, decreased later intrinsic motivations of students. Greene and Lepper formulated the following guides for classroom motivation: long-term objectives should not be sacrificed for immediate ones; external rewards should be used sparingly, and only if other forms of motivation have failed; and, when extrinsic rewards must be employed, they should be just powerful enough to elicit desired behaviors. They should then be quickly phased out to avoid loss of intrinsic motivation.

James L. Landen and Arnold L. Willems (1979) found that desirable classroom activities, if required, could become undesirable to many children. Instead of always requiring activities, teachers should, whenever possible, encourage and allow pupils' choices. Some teachers are notably successful in "fooling" students into believing that classroom activities are fun. Varied curricula, which offer numbers of choices toward common goals, involve students in decisionmaking and eliminate the powerless feeling that school induces in many pupils. Landen and

Willems contended that extrinsic activities, whether by rewards systems or by coercion, were generally inferior to intrinsically-developed means of motivation.

Zigler, Abelson, and Seitz (1973) studied motivational factors in testing which involved disadvantaged youth. They developed the hypothesis that the exceptionally poor test performances of lower class children on the Peabody Picture Vocabulary Test were chiefly caused by poor motivation of students rather than specific linguistic deficiencies. The researchers argued that student fear and suspicion of test administrators, and of testing situations in general, led to poor test performances.

Ninety-six subjects, who ranged in ages from 3.8 to 5.5 years, were included in the study (Zigler et al., 1973), Half of the subjects were economically disadvantaged residents of New Haven, Connecticut. Most of the subjects were black, and all had been enrolled in Head Start centers for an average of 8 months.

The 48 members of the disadvantaged sample were students of two private tuition-supported New Haven, Connecticut nursery schools. Two of the test subjects were black and two were Oriental while the remainder were white. The average age of the children in the nondisadvantaged group was 4 years, 7 months. Half of the test subjects of both the disadvantaged and the nondisadvantaged groups were males and half were females.

All of the test subjects were tested twice on the Peabody Picture Vocabulary Test (Form B) with an inter-test interval of 1 to 2 weeks. Each subject was individually tested in a private room of the nursery school. In the second retest situation, one-half of the subjects were

retested by an experimenter who was unfamiliar to them.

All of the test analyses were performed on both raw and intelligence quotient test scores. One of the most useful study findings was that an increase of 10 intelligence quotient points was made by disadvantaged children who were retested within a 1 to 2 week period under ordinary testing conditions. Zigler, Abelson, and Seitz concluded that subjects' improved test performances resulted from elevated motivational levels rather than from improvements in cognitive abilities.

Literature on Issues Related to Testing

Cultural Differences

Cultural differences play a decisive part in academic success or lack of success, social interactions, and verbal abilities. Many studies offer descriptive documentation to the effect that blacks as a whole score an average of 12-15 points lower than their white peers on most standardized tests of intelligence quotients (Jensen, 1969; Dreger & Miller, 1960). Underlying most discussions of a black intelligence quotient deficit is the basic assumption that blacks' test performances differ in some dramatic way from those of whites. This idea pervades the thinking and attitudes of the great majority of classroom teachers and educational administrators. The general acceptance of a black intelligence quotient deficit should be a primary area of concern of educators and psychologists because of possible effects on the formation of pupils' self-images (Perney et al., 1977). Edward Zigler and Paul Kanzer (1963) discovered that middle class children responded far more positively to spoken verbal praise than did most lower class children.

Academic motivation has been found to relate to the quality of the cultural and familial setting (Havighurst, 1970; Edwards, 1968). Anne Anastasi (1954) concluded that lack of suitable motivation and reinforcements were key elements in lower test scores for blacks. Though the relatively poor performances of blacks on intelligence quotient tests has been extensively documented (Garrett, 1962; Dreger & Miller, 1960; Kaplan & Matkom, 1967; Selmer, 1966), the reasons for this poor performance remain controversial and unclear.

In addition to inferior educational opportunities given many blacks in urban schools, one of the reasons offered for poor test performances of blacks is "cultural bias." This means that the tests require values and skills which are consistent with the mainstream of the American middle and upper classes (McPhail, 1979).

Inferior Test-taking Abilities

Michael Erickson (1972) argued that inferior test-taking abilities should be considered in any assessment of the value of a standardized test result. Those who test should, according to Erickson, teach test-taking competencies to the students who are to be tested. It has been established (Slakter, Koehler, & Hampton, 1970) that population minorities--blacks, rural students, and so forth--generally score lower on tests of achievement, intelligence, and aptitude than does the general population. These researchers believe that efforts should be made to examine the role of test-wiseness in testing.

Thomas Oakland (1972), in a study of Head Start children, tested the idea that many youth lack the abilities required for success on standardized tests. He found that the experimental group, which was

instructed before being tested by their classroom teachers rather than by strangers, significantly improved their total scores; however, group differences were found to be insignificant when measured 4 months later. Researchers (Roberts & Oppenheim, 1966) have investigated the possibility that pupils who had been the recipients of less than adequate public school instruction might benefit from special instruction in testing situations. Gains observed in the experimental subjects were so insignificant that it did not seem reasonable to expect that short-term instruction (similar to that of the research) given on a wider scale would be of significant value to disadvantaged youth. Irving McPhail (1978) tried to see if groups of urban blacks and other minority high school students could be taught test-taking skills for standardized reading comprehension tests. He concluded that special instruction in test-taking skills might benefit some of these groups of students.

McPhail (1979) recommended that inferior student test-taking abilities be regarded as important in considering the value of any standardized test results. He felt that educators should attempt to prepare students for standardized tests. McPhail felt that pupils who are being tested should be taught to comprehend the questions by which levels of attainment are measured.

Summary

Reinforcement pervades all of society, but particularly education. Spoken verbal praise, plus the elicitation of correct answers to teachers' questions, is the usual educational method of reinforcement. Spoken verbal reinforcers may be significantly more powerful incentives for

middle class pupils than for those of the lower middle and lower classes.

Researchers have shown that the efficiency of reinforcement varies considerably among individuals. Sex, race, socioeconomic status, and traditions are but a few of the possible influences on the effectiveness of particular reinforcers. Possibly, too much stress has been placed on but one reinforcer--spoken verbal praise. Varied tangible rewards have been employed to elevate test scores of students: candy, tokens, toys, and other explicit materials of this type. Students from the lower socioeconomic classes seem to respond significantly better to explicit immediate tangible rewards than do those of the middle and upper socioeconomic classes. Several researchers discovered that spoken verbal praise was ordinarily a more effective motivator for middle class whites than for blacks generally.

Research in which retarded subjects were compared with normal individuals, spoken verbal praise was found to have been a less effective motivator than candy for the severely retarded; however, differences in performances lessened as the inherent intelligence levels of the subjects increased. For pupils of average abilities, candy and spoken verbal praise did not differ significantly as motivators. One researcher determined that race was a less important determinant of test performances than socioeconomic status. Thus was, however, contradicted by studies of other researchers who showed that race could be a major factor in test performances.

Researchers have repeatedly demonstrated the practicality and desirability of using varied motivational stimulators or reinforcers, and of tailoring the motivator to the requirements of the person being

tested. The concensus of many researchers seems to be that external, immediate reinforcements are usually most effective with lower middle and lower class children. Experimenters have called attention to the need for more definitive analyses of student motivation and behaviors in test-taking situations. Further studies of motivational reinforcements for lower class students would make education more effective because these are most often the persons who do not aspire to their potentialities on intelligence quotient tests.

Chapter 3

METHODS AND PROCEDURES

Introduction

This study was proposed in order to determine if intelligence quotient mean scores of middle school students of different races, sexes, and socioeconomic classes could be significantly increased through the uses of the tangible and intangible rewards of money and praise. The methods and procedures involved the study design, selection of the subjects, treatment, and procedures.

Methods

Subjects

Three groups of lower and middle class students were selected for the study. There were 44 white male and 42 white female study participants. An analysis of student populations revealed that sufficient numbers of middle class blacks (3) were not available for the study.[1] However, a significant number of lower class black males (12) and black females (19) met study criteria and were included in the study. The Hollingshead Two-Factor Index of Social Position, and family income, were used in identifying the pupils' socioeconomic classes.

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[1]Ideally, one would wish to test for a middle class black variable. However, analyses of the student population revealed that a sufficient sample for this variable was unavailable.

Two hundred and three students met the initial criteria for purposes of determining social class. Of these, 8 were identified as upper class, and 195 students were identified as middle and lower socioeconomic class. From these 195 students, a stratified sample of 135 students was chosen for the two experimental groups and for the one control group. All of the pupil test subjects were from two upper East Tennessee schools with a combined enrollment of 1,480. Randomization of students was carried out by use of a table of random numbers (Kerlinger, 1973). Data were analyzed for the 120 pupils who were tested all three times.

Design

A counterbalanced design in which treatments were alternated among groups was used in the study. This design controls for the effects of order, or for evident changes in the responses of subjects as the testing progresses (Tuckman, 1972). The study design is illustrated in the following figure:

Study Design

Group	Pretest	Treatment	Middle Test	Treatment	Posttest
Experimental A	0	X_1	0	X_2	0
Experimental B	0	X_2	0	X_1	0
Control C	0		0		0

Note. X_1: Money treatment; X_2: Praise treatment.

The study design testing order is given below:

Testing Order

Group	Experimental A	Experimental B	Control C
Pretest (First testing)	Otis-Lennon Mental Ability Test, Form J	Otis-Lennon Mental Ability Test, Form J	Otis-Lennon Mental Ability Test, Form J
Treatment	Money	Praise	None
Middle Test (Second test)	Otis-Lennon Mental Ability Test, Form K	Otis-Lennon Mental Ability Test, Form K	Otis-Lennon Mental Ability Test, Form K
Treatment	Praise	Money	None
Posttest (Third test)	Otis-Lennon Mental Ability Test, Form J	Otis-Lennon Mental Ability Test, Form J	Otis-Lennon Mental Ability Test, Form J

Treatment

All members of the two experimental and the control groups were tested three times. Before the administration of the second test, one-half of the experimental test subjects were promised $2 for each improved test score. The other half of the experimental group subjects was administered the spoken verbal praise treatment (see Appendix A) as an incentive to increase their test scores. During the third and final testing, the money and praise treatments were alternately administered to the first and second halves of the experimental groups. The experimental group that received the praise treatment first was administered the money treatment 1 month later; and, the experimental group that received the money treatment first was administered the praise treatment

1 month later.

Form J, of the Otis-Lennon Mental Ability Test, was initially administered to each of the two experimental groups and one control group. One week after the administration of the first test, an alternate form, Form K, of the Otis-Lennon Mental Ability Test was given to members of the two experimental groups and the control groups for minimization of testing contaminants (Tuckman, 1972). One month later, Form J, the initial form of the Otis-Lennon Mental Ability Test was again administered to all of the group subjects. Before administration of the test, the Otis-Lennon Mental Ability Test procedures and two oral scripts were read. One script consisted mainly of oral verbal praise (see Appendix A). The other script contained the promise of $2 for each improved test performance (see Appendix B).

Procedures

The following study procedures were employed. First, permission to conduct the study was given by appropriate officials of the two middle schools and the East Tennessee State University Institutional Review Board. Then, written parental permission for students to take part in the study was obtained. Educational levels and occupations of heads of households, as well as family incomes, were also secured. In establishing social class, family income and the Hollingshead Two-Factor Index of Social Position (based on occupation and educational levels of household heads) were used. Using the Hollingshead Index, which includes a weighted index, occupations and educational levels of parents were given scores ranging from a high of 1 to a low of 7. Education and occupation were

combined by weighting the scores of heads of households which were obtained from scaled positions. Weights for each factor were determined by a multiple correlation technique. The weights given each factor follow:

Factors and Weights

Factor	Factor Weight
Occupation	7
Education	4

In calculating the Hollingshead Two-Factor Index of Social Position for a household head, the scaled value for occupation was multiplied by weight factor assigned to occupation; and, the scaled value for educational level was multiplied by its weight factor. Family income was also used to establish socioeconomic classes of the test subjects. Income levels consisted of three different point values. Lower incomes were designated by 30 points; middle incomes were represented by 20 points; and, upper class incomes were represented by 10 points.

The following income classifications--low, middle, and upper--were based on 1977 United States Bureau of Census figures (U.S. Bureau of the Census, 1978). Lower class was designated by 1977 incomes of $6,191, or less, based on the poverty level income for a non-farm family of four. Middle incomes extended from $6,192 (just over the poverty level) to $49,999. According to sociologist W. Lloyd Warner, upper class people number about 3% of the United States population (Pounds & Bryner, 1973); therefore, in 1977, upper class incomes began at $50,000 (U.S. Bureau of the Census, 1978).

The score, a composite of the Hollingshead Two-Factor Index of Social Position and family income, was ranked on a scale ranging from a high of 21 to a low of 107. Using Warner's percentages for determination of social class stratification (Pounds & Bryner, 1973), the top 3% of the population were designated as upper socioeconomic class, the medial were identified (39%) as middle class, and the lower 58% were designated lower socioeconomic class. Only those students who were identified as middle or lower class were used in the study. All eligible black pupils were included in the study. The black and white subjects were randomly assigned from students within the lower and middle class groups. Approximately the same numbers of students were assigned to each of the two experimental groups and to the control group.

The Otis-Lennon Mental Ability Test, Forms J and K, was administered to all of the test subjects. After the tests were scored, students in the monetary reward group who increased their test scores 1 point or more were given $2.

The analysis of variance and the *t*-test for non-independent samples were used to analyze the study data at the .05 level of statistical significance. The ANOVA for Hypothesis 3 was further analyzed by the Newman-Keuls statistical procedure (at the .05 level of statistical significance) to determine the pairwise significant differences for the eight group means. Data were analyzed for the 120 pupils who were tested all three times.

Summary

One hundred thirty-five students of the lower and middle socio-economic classes were selected and randomly assigned to three groups. The groups, two experimental and one control, contained approximately the same numbers of white males and white females. An analysis of the student population revealed that sufficient numbers of middle class blacks were not available to test for the black middle class variable. However, a sufficient number of lower socioeconomic class black males and black females met the study criteria and were included in the study. The Hollingshead Two-Factor Index of Social Position, and family incomes, were used to identify pupils' socioeconomic classes. Data were analyzed for the 120 students who were tested all three times. A counterbalanced design in which treatments were alternated among groups was used for the study.

All members of the two experimental groups and the one control group were tested three times using the Otis-Lennon Mental Ability Test, Forms J and K. All three groups were pretested with Form J. One week later, before the administration of the second test, one-half of the experimental test subjects were promised $2 for each improved test score. The other half of the experimental test subjects were administered the spoken verbal praise treatment (see Appendix A) as an incentive to improve their test scores. One month later, during the third and final testing, the money and praise treatments were alternately administered to the first and second halves of the experimental groups. The experimental group that received the praise treatment first was administered the money treatment; and, the experimental group that received the money treatment

first was administered the praise treatment. Form J of the Otis-Lennon Mental Ability Test was used for the third test.

The analysis of variance, the t-test for non-independent samples, and the Newman-Keuls statistical procedure were used to analyze the study data at the .05 level of statistical significance.

Chapter 4

RESULTS AND ANALYSIS

Introduction

The study problem was that of determining if intelligence quotient mean test scores of middle school students of different races, sexes, and socioeconomic classes could be significantly increased through use of tangible and intangible monetary and praise rewards. Ten hypotheses were formed and tested at the .05 level of statistical significance using analysis of variance (ANOVA) and t-tests. Data analyses were based on the testing of 120 students. A t-test was used to determine homogeneity of variance of the pretest means of the three groups. Analysis of the population showed that there were too few middle class blacks to test for the black middle class variable.

Hypotheses

Hypothesis 1

There will be a significant difference between the intelligence quotient mean test scores of the control group and the mean test scores of the combined experimental groups.

An analysis of variance was used to analyze test scores. The ANOVA indicated no significant differences between the mean posttest scores of the combined experimental groups and the control group. An F score of 3.94 at the .05 level of confidence was needed for the difference to be significant, but the value yielded $F\ (1,118) = .618$ (see Appendix D, Table 8). Therefore, Hypothesis 1 was rejected.

Hypothesis 2

There will be a significant difference between the intelligence quotient mean test scores of the control group and the experimental groups--by race, sex, and socioeconomic class--when money is offered as a reward.

An analysis of variance was used to test Hypothesis 2. When the money treatment was administered for the middle test, the ANOVA indicated no significant differences between the mean test scores of all subjects of the experimental group and the control group. An F score of 3.98 at the .05 level of confidence was needed for the difference to be significant, but the value yielded F (1,68) = 1.489. No significant differences were found for the various sub-groups (see Appendix D, Table 9). When the money treatment was administered 1 month after the praise treatment, (sequencing of praise and money treatments), the ANOVA indicated no significant differences between the mean test scores of all test subjects of the experimental group and the control group. An F score of 3.98 at the .05 level of confidence was needed to show significance, but the value yielded F (1,67) = .848. No significant differences were found for the various sub-groups (see Appendix D, Table 10). Therefore, Hypothesis 2 was rejected.

Hypothesis 3

There will be a significant difference between the intelligence quotient mean test scores of the control group and experimental groups--by race, sex, and socioeconomic class--when praise is used as a reward.

An analysis of variance was used to test Hypothesis 3. When the praise treatment was administered before the middle test, the ANOVA

indicated no significant differences between the mean test scores of all test subjects of the experimental group and the control group. An F score of 3.98 at the .05 level of confidence was needed for the difference to be significant, but the value yielded F (1,67) = .200. No significant differences were found for the various sub-groups (see Appendix D, Table 11). When the praise treatment was administered 1 month after the money treatment (sequencing of money and praise treatments), the ANOVA indicated no significant differences for all test subjects of the experimental group and the control group. An F score of 3.98 at the .05 level of confidence was needed for the difference to be significant, but the value yielded F (1,68) = 1.083. No significant differences were found for two-way interactions (see Appendix D, Table 12). Significant differences were found for group, race, and for sex in three-way interactions. An F score of 3.98 at the .05 level of confidence was needed for the differences to be significant. The F ratio in this interaction was F (1,68) = 5.208 (see Appendix D, Table 12). The Newman-Keuls statistical measure was used to further analyze these significant differences. There were no significant differences between total groups, but there were significant differences between two sets of sub-groups, namely, between control black males and experimental white males, and between control black males and experimental white females (see Appendix D, Table 5). Therefore, Hypothesis 3 was accepted for combinations of variables as shown in Table 1, page 38.

Hypothesis 4

There will be a significant difference between the pre- and posttest intelligence quotient mean test scores of the experimental group--by

Table 1

Newman-Keuls Table of Ordered Posttest Means of Experimental Group A and Control Group C--Group, Race, and Sex
($K = 8$, N_{MIN}, $MS_W = .173.7291$)

Groups	Means	Cont. B Male	Exp. B Female	Cont. B Female	Exp. B Male	Cont. W Male	Exp. W Male	Cont. W Female	Exp. W Female	$q.95(r,56)$	$(S_{\bar{x}})q.95(r,56)$
		83.2500	96.7143	98.3750	104.6000	113.1176	114.8571	115.0000	115.4615		
Cont. B Male	83.2500		13.4643	15.1250	21.3500*	29.8676*	31.6071*	31.7500*	32.2115*	4.41	20.5506
Exp. B Female	96.7143			1.6607	7.8857	16.4033	18.2857	18.2857	18.7472	4.29	19.9914
Cont. B Female	98.3750				6.225	14.7426	16.4821	16.625	17.0865	4.14	19.2924
Exp. B Male	104.6000					8.5176	10.2571	10.400	10.8615	3.95	18.4070
Cont. W Male	113.1176						1.7395	1.8824	2.3439	3.72	17.3352
Exp. W Male	114.8571							.1429	0.6044	3.38	15.7508
Cont. W Female	115.0000								0.4615	2.83	13.1878
Exp. W Female	115.4615										

*$p < .05$

race, sex, and socioeconomic class--when money is used first as a reward.

A t-test for non-independent samples was used to test Hypothesis 4. When money was administered before the middle test, and praise was administered before the posttest (sequencing of money and praise treatments), significant differences at the .05 level of confidence were found for all test subjects, all whites, all females, all males, white middle class, white females, lower class females, white lower class females, white middle class females, and white middle class males. The t values needed at the .05 level of confidence for these groups to differ significantly were respectively, 2.042, 2.056, 2.093, 2.101, 2.179, 2.160, 2.201, 2.447, 2.571, and 2.447. The t values yielded for these groups were, respectively, 3.94, 3.71, 3.26, 2.36, 3.90, 4.45, 2.30, 2.59, 2.73, and 3.56 (see Appendix D, Table 13). Therefore, Hypothesis 4 was accepted for combinations of variables as shown in Table 2.

Hypothesis 5

There will be a significant difference between the pre- and posttest intelligence quotient mean test scores of the experimental group--by race, sex, and socioeconomic class--when praise is used first as a reward.

A t-test for non-independent samples was used to test the data for Hypothesis 5. When praise was administered before the middle test, and money was administered before the posttest (sequencing of praise and money treatments), significant differences were found in all test subjects. Significant differences at the .05 level of statistical significance were also found for all whites, lower class, all males, all females, white lower class, white middle class, white females, white males, lower class females, lower class males, white lower class females, white lower class

males, white middle class males, and white middle class females. The t values needed at the .05 level of confidence for these groups to be significantly different were respectively, 2.042, 2.052, 2.069, 2.120, 2.086, 2.145, 2.179, 2.145, 2.179, 2.160, 2.262, 2.365, 2.447, 2.447, and 2.447. The t values yielded for these groups were, respectively, 6.37, 6.85, 4.45, 4.98, 4.28, 4.66, 4.89, 5.68, 4.73, 2.90, 3.70, 5.14, 3.13, 3.42, and 3.35 (see Appendix D, Table 14). Therefore, Hypothesis 5 was accepted for combinations of variables as shown in Table 3.

Table 2

Combinations of Variables for Which Significant Differences Were Found Between Pre- and Posttest I.Q. Mean Test Scores of Experimental Group When Money Was Used Before Praise as Reward

				Female	Male	Middle Class	Lower Class
All				A	A		R
A	R	Black	Female	R		NT	R
			Male		R	NT	R
			Lower Class				R
	A	White	Female	A		A	A
			Male		A	A	R
			Middle Class			A	
			Lower Class				R
			Female				A
			Male				R

A - Accepted; R - Rejected; NT - Not Tested.

Table 3

Combinations of Variables for Which Significant Differences Were Found Between Pre- and Posttest I.Q. Mean Test Scores of Experimental Group When Praise Was Used Before Money as Reward

				Females	Males	Middle Class	Lower Class
All				A	A		A
A	R	Black	Females	R		NT	R
			Males		R	NT	R
			Lower Class				A
	A	White	Females	A		A	A
			Males		A	A	A
			Middle Class			A	
			Lower Class				A
			Females				A
			Males				A

A - Accepted; R - Rejected; NT - Not Tested.

Hypothesis 6

There will be a significant difference between intelligence quotient mean test scores of the experimental groups--by race, sex, and socio-economic class--when comparing money and praise as rewards.

An analysis of variance was used to test Hypothesis 6. No significant differences at the .05 level of significance were found in all subjects comparing posttest means of Experimental Group A (sequencing of

money and priase treatments) to posttest means of Experimental Group B (sequencing of praise and money). An F score of 4.00 was needed to indicate significant differences, but the value yielded F (1,63) = 0.011 (see Appendix D, Table 15). Therefore, Hypothesis 6 was rejected.

Hypothesis 7

There will be a significant difference between the pre- and middle test intelligence quotient mean test scores of the experimental group--by race, sex, and socioeconomic class--when money is used as a reward.

A t-test for non-independent samples was used to test the data for Hypothesis 7. When the money treatment was administered before the middle test, significant differences at the .05 level of significance were found in all test subjects, t = 2.24, and for lower class blacks, t = 2.35 (see Appendix D, Table 16). The t values needed for these groups to be significantly different were respectively, 2.042 and 2.228. Therefore, Hypothesis 7 was accepted for combinations of variables as shown in Table 4.

Hypothesis 8

There will be a significant difference between the pre- and middle test intelligence quotient mean scores of the experimental group--by race, sex, and socioeconomic class--when praise is used as a reward.

A t test for non-independent samples was used to test Hypothesis 8. When the praise treatment was administered before the middle test, significant differences were found in all test subjects. Significant differences were also found at the .05 level of statistical significance for all whites, all males, white females, white males, white lower class,

white middle class, white middle class females, white lower class males, and lower class males. The t values needed at the .05 level of statistical significance for these groups to be significantly different were respectively, 2.042, 2.032, 2.120, 2.145, 2.179, 2.145, 2.179, 2.447, 2.447, and 2.262. The t values yielded for these groups were, respectively, 3.52, 4.91, 3.10, 3.30, 3.67, 3.74, 3.14, 2.52, 3.38, and 3.39 (see Appendix D, Table 17). Therefore, Hypothesis 8 was accepted for combinations of variables as shown in Table 5.

Table 4

Combinations of Variables for Which Significant Differences Were Found Between Pre- and Middle Test I.Q. Mean Scores of Experimental Group When Money Was Used as Reward

				Female	Male	Middle Class	Lower Class
All				R	R		R
A	A	Black	Female	R		NT	R
			Male		R	NT	R
			Lower Class				A
	R	White	Female	R		R	R
			Male		R	R	R
			Middle Class			R	
			Lower Class				R
			Female				R
			Male				R

A - Accepted; R - Rejected; NT - Not Tested.

Table 5

Combinations of Variables for Which Significant Differences Were Found Between Pre- and Middle Test I.Q. Mean Scores of Experimental Group When Praise Was Used as Reward

				Female	Male	Middle Class	Lower Class
All				R	A		R
A	R	Black	Female	R		NT	R
			Male		R	NT	R
			Lower Class				R
	A	White	Female	A		A	R
			Male		A	R	A
			Middle Class			A	
			Lower Class				A
			Female				R
			Male				A

A - Accepted; R - Rejected; NT - Not Tested.

Hypothesis 9

There will be a significant difference between the middle and post-test intelligence quotient mean test scores of the experimental group--by race, sex, and socioeconomic class--when money is used as a reward before the middle test and when praise is used as a reward before the posttest.

A *t* test for non-independent samples was used to test Hypothesis 9. When the money treatment was administered before the middle test and the

praise treatment was administered before the posttest (sequencing of money and praise treatments), no significant differences were found in all the test subjects. However, significant differences were found at the .05 level of statistical significance for all whites, white females, white middle class, white middle class males, and white lower class females. The t values needed at the .05 level of statistical significance for these groups to be significantly different were respectively, 2.056, 2.179, 2.160, 2.571, and 2.447. The t values yielded for these groups were, respectively, 2.46, 2.62, 3.16, 3.23, and 4.43 (see Appendix D, Table 18). Therefore, Hypothesis 9 was accepted for combinations of variables as shown in Table 6.

Hypothesis 10

There will be a significant difference between the middle and the posttest intelligence quotient mean test scores of the experimental group--by race, sex, and socioeconomic class--when praise is used as a reward before the middle test and when money is offered as a reward before the posttest.

A t test for non-independent samples was used to test Hypothesis 10. When the praise treatment was administered before the middle test, and when money was administered before the posttest (sequencing of praise and money treatments), significant differences were found in all test subjects. Also, significant differences were found for all whites, all females, all males, lower socioeconomic class, black lower class, and lower class females. The t values needed at the .05 level of statistical difference for these groups to be significantly different were respectively, 2.042, 2.052, 2.086, 2.120, 2.069, 2.306, and 2.160. The t

values yielded for these groups were, respectively, 3.62, 2.57, 2.49, 2.58, 3.34, 2.96, and 2.39 (see Appendix D, Table 19). Therefore, Hypothesis 10 was accepted for combinations of variables as shown in Table 7.

Table 6

Combinations of Variables for Which Significant Differences Were Found Between Middle and Posttest I.Q. Mean Scores of Experimental Group When Money Was Used as Reward Before the Middle Test and Praise Was Used as Reward Before the Posttest

				Female	Male	Middle Class	Lower Class
All				R	R		R
R	R	Black	Female	R		NT	R
			Male		R	NT	R
			Lower Class				R
	A	White	Female	A		R	A
			Male		R	A	R
			Middle Class			A	
			Lower Class				R
			Female				R
			Male				R

A - Accepted; R - Rejected; NT - Not Tested.

Table 7

Combinations of Variables for Which Significant Differences Were Found Between Middle and Posttest I.Q. Mean Scores of Experimental Group When Praise Was Used as Reward Before the Middle Test and Money Was Used as Reward Before the Posttest

				Female	Male	Middle Class	Lower Class
All				A	A		A
A	A	Black	Female	R		NT	R
			Male		R	NT	R
			Lower Class				A
	A	White	Female	R		R	R
			Male		R	R	R
			Middle Class			R	
			Lower Class				R
			Female				A
			Male				R

A - Accepted; R - Rejected; NT - Not Tested.

Analysis

The primary result of this study was the findings that white middle class and white lower class test subjects responded most favorably to intangible rewards; blacks of the lower socioeconomic class generally responded most favorably to tangible rewards (money). The analysis of variance, the t-test for non-independent samples, and the Newman-Keuls

statistical measure were used to analyze the study data.

Analysis of variance was used to analyze Hypotheses 1, 2, 3, and 6. Hypothesis 3 was further analyzed by use of the Newman-Keuls statistical measure. The ANOVA of raw score data revealed no significant differences among the control and the experimental groups when money was offered as a reward (Hypothesis 2). The same situation existed when praise (Hypothesis 3) was used as a reward, with the exception of the sequencing of the praise treatment 1 month after the money treatment. In this situation (sequencing of money and praise treatments), the Newman-Keuls statistical measure indicated that scores of both white females and white males in the experimental groups were significantly higher than those of the black males of the control group. Also, the Newman-Keuls statistic revealed a significant difference between experimental black males and control black males. An examination of pre- and posttest means for the above groups indicated that all subjects scored significantly higher than the control black male group. Thus, the sequencing of money first and praise 1 month later increased the scores of black male students, and this sequencing was effective with both white males and white females when compared to control black males (see Table 1, page 38).

When comparing the combined experimental group to the control group (Hypothesis 1), the ANOVA yielded no significant differences. Thus, it appeared that when experimental groups receiving money and praise were compared to the control group (irrespective of the treatment), the rewards did not significantly affect the intelligence quotient mean test scores of these particular middle school students. In addition, Hypothesis 6

revealed no significant differences. Therefore, one treatment sequence was not favored over the other with this particular group of middle school students. The t-test for non-independent samples was used to analyze Hypotheses 4, 5, 7, 8, 9, and 10. These hypotheses, in which the effectiveness of money and praise were tested, dealt with the following conditions: pre- to middle test, middle to posttest, and pre- to posttest.

For the hypothesis that dealt with the sequencing of the money treatment first and the praise treatment second (Hypothesis 4), the t-test yielded significant differences between the pre- and posttests for the following groups: all whites, all females, all males, white females, white middle class, white middle class females, white middle class males, white lower class females, and lower class females (see Table 2, page 40). The t-test yielded a significant difference between the pre- and posttest means of all students regardless of race, sex, or socioeconomic class in Experimental Group A. The sequencing of money first and praise second appeared to be effective with both lower and middle class white females, and with white middle class males. This sequencing appeared to be most effective with members of the white race.

The hypothesis that dealt with the sequencing of the praise treatment first and the money treatment second (Hypothesis 5) was analyzed by use of the t-test, which identified significant differences between the pre- and posttest means for the following groups: whites, lower class, all males and all females, white lower class, white middle class, lower class females, lower class males, white females, white males, white lower class females, white lower class males, and white middle class

males (see Table 3, page 41). The t-test yielded significant differences between the pre- and posttest means of all students of Experimental Group B irrespective of race, sex, or socioeconomic class. The sequencing of the praise treatment first and the money treatment second was most effective with lower and middle class white males and with lower and middle class white females.

Hypothesis 7 stated that there would be a significant difference in pre- and middle intelligence quotient mean test scores when money was used as a reward. The money treatment was effective in increasing the intelligence quotient mean test scores of lower class black students (see Table 4, page 43). When analyzing the pre- and middle test mean scores of Experimental Group A, the t-test yielded a significant difference.

Hypothesis 8 stated that there would be a significant difference between the pre- and middle intelligence quotient mean test scores when praise was used as a reward. The praise treatment was effective in increasing the intelligence quotient mean test scores of the following groups: all whites, all males, white females, white males, white lower class, white middle class, white middle class females, white lower class, and lower class males (see Table 5, page 44). The t-test also revealed a significant difference for the entire group of test subjects in Experimental Group B.

The praise treatment was effective in increasing the test scores of white students from both the lower and middle socioeconomic groups. This finding supported the research of Klugman (1944); Dreger and Miller (1960); and Pettigrew (1963).

Based on the significant differences yielded by the t-test for Hypothesis 8, white middle class females responded favorably to spoken verbal praise, while white middle class males did not; furthermore, white lower class males responded favorably to spoken verbal praise, but white lower class females did not respond favorably. The favorable responses of the white middle class females to spoken verbal praise corroborated the findings of Dreger and Miller (1960) and Pettigrew (1963). The t-test showed a significant difference between the pre- and middle intelligence quotient mean test scores of all the test subjects of Experimental Group B, when praise was used as a reward. In addition, a significant difference was found for lower class males, but not for lower class females.

Hypothesis 9 indicated that there would be a significant difference between the middle and posttest intelligence quotient mean test scores when money was used as a reward before the middle test and praise was used before the posttest (sequencing of money and praise treatments). The t-test analysis for this data showed significant differences for the following groups: all whites, white females, white middle class, white lower class females, and white middle class males (see Table 6, page 46). Significant differences were found for all test subjects in Experimental Group A. The sequencing of the money and praise treatments was a generally more effective motivator for whites than for students of the black race. Sequencing of the money and praise treatments was effective for white middle class males, but it was not effective for white middle class females. This same situation existed for white lower class females, but not for white lower class males.

Hypothesis 10 stated that there would be a significant difference between the middle and posttest intelligence quotient mean test scores of the experimental group when praise was used as a reward before the middle test and when money was offered as a reward before the posttest (sequencing of praise and money treatments). The t-test revealed significant differences for the following groups: all whites, all females, all males, lower class, lower class blacks, and lower class females (see Table 7, page 47). The sequencing of praise and money rewards was effective with lower class blacks, but not with lower class whites; and, it was effective with lower class females, but not with lower class males.

Summary

The problem of this study was that of determining if intelligence quotient mean test scores of middle school students from different races, sexes, and socioeconomic classes could be significantly increased through the uses of tangible and intangible monetary and praise rewards. Ten hypotheses were formulated and tested at the .05 level of statistical significance. The study data were analyzed using the Aanlysis of Variance or the t-test. The Newman-Keuls statistical measure was employed to further analyze study data. Data were analyzed for 120 students who were tested all three times.

Hypotheses 1, 2, 3, and 6 were analyzed by using an Analysis of Variance. Hypothesis 3 was further analyzed by use of the Newman-Keuls statistical procedure. Hypotheses 4, 5, 7, 8, 9, and 10 were analyzed using a t-test for non-independent samples. The findings for the 10 hypotheses are summarized below:

1. Hypothesis 1: There will be a significant difference between the intelligence quotient mean test scores of the control group and the combined experimental groups.

   Rejected.

2. Hypothesis 2: There will be a significant difference between the intelligence quotient mean test scores of the control group and the experimental groups--by race, sex, and socioeconomic class--when money is offered as a reward.

   Rejected.

3. Hypothesis 3: There will be a significant difference between the intelligence quotient mean test scores of the control group and the experimental groups--by race, sex, and socio-economic class--when praise is used as a reward.

   Accepted for combinations of variables as shown in Table 1, page 38.

4. Hypothesis 4: There will be a significant difference between the pre- and posttest intelligence quotient mean test scores of the experimental group--by race, sex, and socioeconomic class--when money is offered as a reward.

   Accepted for combinations of variables as shown in Table 2, page 40.

5. Hypothesis 5: There will be a significant difference between the pre- and posttest intelligence quotient mean test scores of the experimental group--by race, sex, and socioeconomic class--when praise is used first as reward.

   Accepted for combinations of variables as shown in Table 3, page 41.

6. Hypothesis 6: There will be a significant difference between the intelligence quotient mean test scores of the experimental groups--by race, sex, and socioeconomic class--when comparing money and praise as rewards.

   Rejected.

7. Hypothesis 7: There will be a significant difference between the pre- and middle test intelligence quotient mean test scores of the experimental group--by race, sex, and socioeconomic class--when money is offered as reward.

   Accepted for combinations of variables as shown in Table 4, page 43.

8. Hypothesis 8: There will be a significant difference between the pre- and middle test intelligence quotient mean test scores of the experimental group--by race, sex, and socioeconomic class--when praise is used as a reward.

   Accepted for combinations of variables as shown in Table 5, page 44.

9. Hypothesis 9: There will be a significant difference between the middle and posttest intelligence quotient mean test scores of the experimental group--by race, sex, and socioeconomic class--when money is offered as a reward before the middle test and when praise is used as a reward before the posttest.

   Accepted for combinations of variables as shown in Table 6, page 46.

10. Hypothesis 10: There will be a significant difference between the middle and posttest intelligence quotient mean test scores of the experimental group--by race, sex, and socioeconomic class--when praise is used as a reward before the middle test and when money is offered as reward before the posttest.

    Accepted for combinations of variables as shown in Table 7, page 47.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of Findings

One hundred thirty-five students of the lower and middle socioeconomic classes were selected and randomly assigned to three groups. The groups, two experimental and one control, contained approximately the same numbers of white males and white females. An analysis of the student population revealed that sufficient numbers of middle class blacks were not available to test for the black middle class variable. However, a sufficient number of lower socioeconomic class black males and black females met the study criteria and were included in the study. The Hollingshead Two-Factor Index of Social Position, and family incomes, were used to identify pupils' socioeconomic classes. Data were analyzed for the 120 students who were tested all three times. A counterbalanced design in which treatments are alternated among groups was used for the study.

All members of the two experimental groups and the one control group were tested three times using the Otis-Lennon Mental Ability Test, Forms J and K. All three groups were pretested with Form J. One week later, before the administration of the second test, Form K, one-half of the experimental test subjects was promised $2 for each improved test score. The other half of the experimental test subjects was administered the spoken verbal praise treatment (see Appendix A) as an incentive to improve their test scores. One month later, during the third and final

testing, the money and praise treatments were alternately administered to the first and second halves of the experimental groups. The experimental group that received the praise treatment first was administered the money treatment; and, the experimental group that received the money treatment first was administered the praise treatment. Form J of the Otis-Lennon Mental Ability Test was used for the third test.

Ten study hypotheses were formulated and tested at the .05 level of statistical significance. The study data were analyzed by the use of a t-test for non-independent samples and the analysis of variance. The Newman-Keuls statistical measure was employed to further analyze study data.

Since the problem of this study was that of determining if the intelligence quotient mean test scores of middle school students of different races, sexes, and socioeconomic classes could be significantly increased through the use of tangible and intangible monetary and praise rewards, the following findings seemed particularly significant:

1. Significant increases in the intelligence quotient test scores of lower class blacks were associated with monetary reward.

2. Significant increases in the intelligence quotient test scores of middle and lower class whites occurred when spoken verbal praise was used.

3. The sequencing of money first and praise second was associated with significant increases in the scores of lower and middle class white females and middle class white males.

4. White middle class females responded favorably to spoken verbal praise, and white middle class males did not; white lower class males

responded favorably to spoken verbal praise, but white lower class females did not.

Conclusions

The students for this study were from two upper East Tennessee middle schools. The first three conclusions were reached for students of this particular study, and the last two conclusions were general conclusions.

1. Money was effective in increasing the intelligence quotient test scores of lower class blacks and spoken verbal praise was effective in increasing the intelligence quotient test scores of middle and lower class whites.

2. The giving of the money treatment first followed by the praise treatment 1 month later was effective in increasing the intelligence quotient test scores of lower and middle class white females and middle class white males.

3. Spoken verbal praise was effective in increasing the intelligence quotient test scores of white middle class females and white lower class males.

4. Educational decisions which affect or categorize students should be based on more than one testing instrument.

5. Study conclusions, as related to the instrument used in this study (the Otis-Lennon Mental Ability Test) would not necessarily replicate those of this study if another instrument were used.

Recommendations

The following recommendations were formulated as a result of the study:

1. The study should be replicated with students of different age levels and socioeconomic classes.

2. The study should be replicated in different geographic areas.

3. Further research is needed on the effects of various amounts of money on students' performances.

4. Further research is needed on the effects of money and spoken verbal praise in a one-to-one testing arrangement.

5. Administrators and other educators should exercise extreme care in the placement and categorization of students based on intelligence quotient test data alone.

6. Administrators and other educators should attempt to discover more effective motivators, and try to adapt the motivator to the child.

7. Administrators and other educators could use the findings of this study in selecting appropriate motivators prior to administration of standardized tests.

8. Similar types or related studies should be conducted using testing instruments other than the Otis-Lennon Mental Ability Test.

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APPENDICES

APPENDIX A

SCRIPT FOR PRAISE TREATMENT

Script for Students Who Are to Receive Spoken Verbal Praise

Hi! Remember me? I am Janice Miller. I am a student as you are, but with one particular difference. I attend East Tennessee State University. In my studies, I am doing some experiments in which I need your help. This is not part of your required school work and will not determine your grades in any of your classes.

As you remember, I gave you a test about _____ week(s) ago. I am very proud of you, because many of you did very well on that test. Now, I would like for you to help me with the next part of my experiment. I want to give you another test and see if you can do even better this time. You all know that when people really try to improve, they generally do. I am very proud of all of you. Remember, many of you did very well on the test I gave you before. Now, you will have a chance to do even better. I believe most of you can do it.

Doing well is a personal thing. Students, just say to yourselves, "I can do better. It is possible." Just make up your minds to improve your test scores. I believe you can do it!

APPENDIX B

SCRIPT FOR MONEY TREATMENT

Script for Students Who Are to Receive Money

Hi! Remember me? I am Janice Miller. I am a student as you are, but with one particular difference. I attend East Tennessee State University. As part of my studies, I am conducting experiments in which I need your help. This is not part of your required school work and will not determine your grades in any of your classes.

As you will remember, I gave you a test about _____ week(s) ago. Now, I would like for you to help me with the next part of my experiment. Today, I am going to give you another test. If you make a better score on this test than you did on the other one, you will receive $2. As soon as your tests are graded, I will give the money to those of you who raise your test scores.

APPENDIX C

PARENTAL PERMISSION LETTER

Letter of Parental Permission to Release Information

I, _____, understand that my child may
(Signature of head of household)

be selected to participate in a doctoral educational research project which involves intelligence quotient testing. I grant permission for my child to be tested and for release of the scores and information related to the student's grade level, race, and sex to a researcher of East Tennessee State University. I understand that pupils' names will be kept confidential and will not be used in the research paper.

Request for Additional Information from Parents

The following information is needed for the research project and report. Names of all pupils and parents will be kept confidential.

Please check the blank below which applies most directly to you:

Annual Family Income

( ) Under $3,000

( ) $3,000 - $6,191

( ) $6,192 - $7,191

( ) $7,192 - $9,999

( ) $10,000 - $14,999

( ) $15,000 - $24,999

( ) $25,000 - $34,999

( ) $35,000 - $49,999

( ) $50,000 or above

Education Level

( ) Completion of 6th grade or less

( ) Completion of 7th, 8th or 9th grades

( ) Completion of 10th or 11th grades

( ) High school graduate

( ) One to 3 years of college

( ) Completion of 4 years of college

( ) Completion of advanced graduate degree (Masters, or above)

Occupation of head of household _____

APPENDIX D

TABLES

Table 8

Summary of Analysis of Variance of Posttest Means of Combined Experimental Groups A and B and Control Group C

Source	df	SS	MS	F
Between groups	1	140.707	140.707	.618
Within groups	118	26872.102	227.730	
Total	119	27012.809		

Critical F value at .05 = 3.94

Table 9

Summary of Analysis of Variance of Middle Test Means of Experimental Group A and Control Group C (1 and 68 df)

Source	SS	MS	F
Groups (A, C)	300.223	300.223	1.489
Groups (A, C) - Race	390.297	390.297	1.963
Groups (A, C) - Sex	395.781	395.781	1.963
Groups (A, C) - Class	260.629	260.629	1.293

Critical F value at .05 = 3.98

Table 10

Summary of Analysis of Variance of Posttest Means of Experimental Group B and Control Group C-- Money Administered 1 Month After Praise (1 and 67 df)

Source	SS	MS	F
Groups (B, C)	93.481	93.481	0.848
Groups (B, C) - Race	42.994	42.994	0.390
Groups (B, C) - Sex	141.936	141.936	1.287
Groups (B, C) - Class	72.556	72.556	0.658

Critical F value at .05 = 3.98

Table 11

Summary of Analysis of Variance Middle Test Means of Experimental Group B and Control Group C (1 and 67 df)

Source	SS	MS	F
Groups (B, C)	31.705	31.705	0.200
Groups (B, C) - Race	7.390	7.390	0.047
Groups (B, C) - Sex	161.227	161.227	1.019
Groups (B, C) - Class	330.636	330.636	2.090

Critical F value at .05 = 3.98

Table 12

Summary of Analysis of Variance of Posttest Means of Experimental Group A and Control Group C--Praise Administered 1 Month After Money (1 and 68 df)

Source	SS	MS	F
Groups (A, C)	157.524	157.524	1.083
Two-way interactions			
Groups (A, C) - Race	339.353	339.353	2.334
Groups (A, C) - Sex	292.537	292.537	2.014
Groups (A, C) - Class	197.156	197.156	1.356
Race-Sex	85.310	85.310	0.587
Race-Class	444.137	444.137	3.054
Sex-Class	347.523	347.523	2.390
Three-way interactions			
Groups (A, C) - Race-Sex	757.331	757.331	5.208*
Groups (A, C) - Race-Class	4.862	4.862	0.033
Groups (A, C) - Sex-Class	270.890	270.890	2.551

* $p < .05$

Critical F value at .05 = 3.98

Table 13

t-test Table for Comparison of Experimental Group A Pre- and Posttest Mean Test Scores When Money Was Used Before Praise

Group	Mean	SD	df	*t*
All Subjects				
Pre	106.7436	14.789	38	3.94*
Post	110.4872	16.720		
Whites				
Pre	110.5555	14.364	26	3.71*
Post	115.1481	16.129		
Females				
Pre	105.0500	13.040	19	3.26*
Post	108.9000	14.045		
Males				
Pre	108.5263	16.604	18	2.36*
Post	112.1579	19.397		
White Females				
Pre	109.8461	10.754	12	3.90*
Post	115.4615	10.556		
White Middle Class				
Pre	115.0714	9.286	13	4.45*
Post	121.6429	10.515		
White Middle Class Females				
Pre	111.1429	6.669	6	2.59*
Post	116.7143	8.341		
White Middle Class Males				
Pre	119.0000	10.312	6	3.56*
Post	126.5714	10.644		
White Lower Class Females				
Pre	108.3333	14.801	5	2.73*
Post	114.0000	13.387		
Lower Class Females				
Pre	100.6667	14.693	11	2.30*
Post	104.0000	15.368		

* $p < .05$

Table 14

t-test Table for Comparison of Experimental Group B Pre- and Posttest Mean Test Scores When Praise Was Used Before Money

Group	Mean	SD	df	*t*
All Subjects				
Pre	102.5000	12.361	37	6.37*
Post	110.4474	14.337		
Whites				
Pre	105.8214	12.120	27	6.85*
Post	115.5357	12.485		
Lower Class				
Pre	97.5833	11.033	23	4.45*
Post	104.7500	13.424		
Males				
Pre	101.7647	13.535	16	4.98*
Post	112.1765	13.347		
Females				
Pre	103.0952	11.631	20	4.28*
Post	109.0476	15.269		
White Lower Class				
Pre	100.4667	11.862	14	4.66*
Post	110.0000	13.104		
White Middle Class				
Pre	112.0000	9.443	12	4.89*
Post	121.9231	8.241		
White Females				
Pre	106.8667	13.986	14	5.68*
Post	114.6000	11.395		
White Males				
Pre	104.6154	13.270	12	4.73*
Post	116.6154	10.989		
Lower Class Females				
Pre	99.0000	10.834	13	2.90*
Post	103.6429	14.616		

Table 14 (Continued)

Group	Mean	SD	df	t
Lower Class Males				
Pre	95.6000	11.576	9	3.70*
Post	106.3000	12.139		
White Lower Class Females				
Pre	103.000	12.456	7	5.14*
Post	110.000	15.630		
White Lower Class Males				
Pre	97.5714	11.356	6	3.13*
Post	110.000	10.755		
White Middle Class Males				
Pre	112.8333	10.834	6	3.42*
Post	124.3333	4.274		
White Middle Class Females				
Pre	111.2857	8.902	6	3.35*
Post	119.8571	10.479		

* $p < .05$

Table 15

Summary of Analysis of Variance of Posttest Means
Comparing Experimental Group A to
Experimental Group B
(1, 63, df)

Source	SS	MS	F
Groups (A, B)	1.711	1.711	0.011
Groups (A, B) - Race	128.096	128.096	1.141
Groups (A, B) - Sex	1.239	1.239	0.008
Groups (A, B) - Class	63.817	63.817	0.400

Critical F value at .05 = 4.00

Table 16

t-test Table for Comparison of Experimental Group A
Pre- and Middle Test Mean Test Scores When
Money Was Used as a Reward

Group	Mean	SD	df	t
All Subjects				
Pre	106.7436	14.789	38	2.24*
Middle	108.8718	15.548		
Black Lower Class				
Pre	96.6364	11.673	10	2.35*
Middle	100.5454	12.941		

* $p < .05$

Table 17 .

t-test Table for Comparison of Experimental Group B Pre- and Middle Test Mean Test Scores When Praise Was Used as a Reward

Group	Mean	SD	df	t
All Subjects				
Pre	102.5000	12.361	37	3.52*
Middle	106.8158	15.189		
Whites				
Pre	105.8214	12.120	27	4.91*
Middle	112.4643	12.562		
Males				
Pre	101.7647	13.535	16	3.10*
Middle	107.9412	15.192		
White Females				
Pre	106.8667	11.395	14	3.30*
Middle	112.0667	13.339		
White Males				
Pre	104.6151	13.270	12	3.67*
Middle	112.9231	12.128		
White Lower Class				
Pre	100.4667	11.862	14	3.74*
Middle	106.7333	14.134		
White Middle Class				
Pre	112.0000	9.443	12	3.14*
Middle	119.0769	5.795		
White Middle Class Females				
Pre	111.2857	8.902	6	2.52*
Middle	118.0000	5.416		
White Lower Class Males				
Pre	97.5714	11.356	6	3.38*
Middle	106.5714	12.541		
Lower Class Males				
Pre	95.6000	11.578	9	2.39*
Middle	101.5000	15.087		

* $p < .05$

Table 18

t-test Table for Comparison of Experimental Group A Middle and Posttest Mean Test Scores When Praise Was Used as a Reward

Group	Mean	SD	df	*t*
Whites				
Middle	111.9259	15.709	26	2.46*
Post	115.1481	16.129		
White Females				
Middle	111.6923	12.809	12	2.62*
Post	115.4615	10.556		
White Middle Class				
Middle	117.0000	9.157	13	3.16*
Post	121.6429	10.515		
White Lower Class Females				
Middle	107.6667	14.787	5	3.23*
Post	114.0000	13.387		
White Middle Class Females				
Middle	118.8571	7.603	6	4.43*
Post	126.5714	10.644		

* $p < .05$

Table 19

t-test Table for Comparison of Experimental Group B Middle and Posttest Mean Test Scores When Money Was Used as a Reward

Group	Mean	SD	df	*t*
All Subjects				
Middle	106.8158	15.198	37	3.62*
Post	110.4474	14.337		
Whites				
Middle	112.4643	12.562	27	2.57*
Post	115.5357	12.485		
Females				
Middle	105.9048	15.514	20	2.49*
Post	109.0476	15.269		
Males				
Middle	107.9412	15.192	16	2.58*
Post	112.1765	13.347		
Lower Class				
Middle	100.5417	14.987	23	3.34*
Post	104.7500	13.424		
Lower Class Blacks				
Middle	90.2222	10.220	8	2.96*
Post	96.0000	8.930		
Lower Class Females				
Middle	99.8571	15.446	13	2.39*
Post	103.6429	14.616		

* $p < .05$

VITA

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