THE EFFECTS OF CONTINGENCY MANAGEMENT TECHNIQUES BY TEACHERS ON CLASSROOM BEHAVIORS OF INSTITUTIONALIZED DELINQUENT ADOLESCENT BOYS

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PREFACE

This dissertation is concerned with the modification of behavior vis a vis contingency management techniques from known principles of operant conditioning. The study was conducted with fourteen boys incarcerated in the Helena State School for Boys, and ably assisted by two teachers within the school system.

I take pleasure in expressing my appreciation to my major advisor, Dr. Richard P. Jungers, whose kindness, encouragement, and patience stimulated continuous effort. I give special thanks to the other members of my committee: Dr. Kenneth St. Clair, Dr. James B. Appleberry, and Dr. Larry M. Perkins, for their counsel and guidance through the doctoral program; for their critique on treatment procedures; and for their genuine interest and sincerity of purpose. A special thanks is also extended to a former member, Dr. Richard F. Purnell, for his aid in planning, structuring, and clarification of procedural treatments.

I wish to express my appreciation to Dr. Jim Overfelt of the Oklahoma Department of Public Welfare for obtaining permission for me to conduct this experiment. Finally, I offer thanks to Marilyn Opitz and Mike Hamilton for assisting.

To my wife, Dolores, and my sons, David, Randall, and Kirk, I express my appreciation for their encouragement and sacrifice.

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CHAPTER I

THE PROBLEM

Introduction

Most theories of learning emphasize reinforcement as a necessary determinant of behavior. This is essentially true of the instrumental theories which emphasize the role which reinforcement plays in behavior.[1] Here, reinforcement refers to the technique for increasing the frequency of an activity by following it with a special consequence.[2] The organism acts and the subsequent frequency of this activity increases because of past reactions from the environment.[3] This is in contrast to other behavioristic theories which are more concerned with the role which reinforcement plays in the theory itself.[4]

Educational psychology has long been dominated by association theory with an emphasis on contiguity and practice. However, in recent years, reinforcement theory has played a greater role than other

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[1]Judy F. Rosenblith and Wesley Allinsmith, The Causes of Behavior II (Boston, 1966), p. 87.

[2]C. B. Ferster and Marion DeMyer, "A Method for the Experimental Analysis of the Behavior of Autistic Children," Amer. J. Orthopsychiat., 1962, XXXII, p. 89.

[3]Ibid.

[4]Rosenblith and Allinsmith, p. 87.

conceptions of the learning process in stimulating research in child psychology.[5]

Behavioristic theories in the connectionist tradition agree in treating learning as a matter of connections between stimuli and response where a response may be any item for behavior and a stimulus may be any sensation.[6] These theorists assume that all responses are elicited by stimuli.[7]

Thorndike was a reinforcement theorist, and his primary law of learning was the "law of effect" which stated that the stamping in of stimulus-response connections depended, not simply on the fact that the stimulus and response occurred together, but on the effects that followed the response.[8] If a stimulus was followed by a response and then by a satisfier, the stimulus-response connection was strengthened. If, however, this connection was followed by an annoyer, it was weakened. Thus, satisfying and annoying effects of responses determined whether the stimulus-response connections were to be stamped in or stamped out.[9] Thorndike placed much more emphasis on the satisfier; his law of effect can best be stated simply as "satisfying consequences serve to reinforce stimulus-response bonds therefore strengthening the probability that the response will occur again in the presence of the same stimulus."[10]

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[5]Ibid.

[6]Winfred F. Hill, Learning (San Francisco, 1963), p. 27-28.

[7]Ibid., p. 28.

[8]Ibid., p. 58.

[9]Ernest R. Hilgard, Theories of Learning (New York, 1948), p. 24.

[10]Ibid., p. 24-25.

A distinctive characteristic of respondent behavior is that it is in response to stimuli.[11] Skinner,[12] however, has maintained that most behavior is of the operant kind which is best described as behavior that operates on the environment. He maintained there is no stimulus that will consistently elicit an operant response, but that operant behavior is emitted by the organism rather than elicited by stimuli. This does not mean to say that operant behavior is not influenced by stimuli, because much of Skinner's analysis of behavior is concerned with ways in which operant behavior is brought under the control of stimuli.[13] The learning of operant behavior is known as conditioning in Skinner's system.[14]

It takes several years of graduate study to train an operant conditioner.[15] The student must learn about operant conditioning apparatus, stimulus control, reinforcement schedules, and combinations of schedules.[16] The operant conditioner must learn how to discover new variables and relationships between variables of which behavior is a function. In other words, he is supposed to learn how to be a scientist.[17]

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[11]Wendel I. Smith and William Moore, Conditioning and Instrumental Learning (New York, 1966), p. 15.

[12]B. F. Skinner, Behavior of Organisms (New York, 1938), p. 21-22.

[13]Hill, p. 61.

[14]Ibid., p. 62.

[15]Lloyd Homme, "Contingency Management," Educational Technology Monographs, Vol. II, No. 2, 1969, p. 1

[16]C. B. Ferster and B. F. Skinner, Schedules of Reinforcement (New York, 1957), p. 5-12.

[17]Homme, p. 1.

Those teachers and parents who deal with great amounts of behavior of children in our society have neither the time nor the inclination to learn operant conditioning, and it is here that the technology of contingency management is introduced. Contingency management is the management of operant behavior and is based on the principle that when reward is dependent on certain behavior, the probability that the behavior will occur is strengthened. It is important to emphasize that operant conditioning and contingency management are not the same thing. Contingency management is a technology derived from operant conditioning.[18] It is the management of what events are contingent upon what behavior, and is based upon the principle that when reinforcing events are contingent upon a given behavior, the behavior will increase in strength; when they are not, the behavior will decrease in strength.[19] Since this technology deals with the ability to manage reinforcers, one must know the type of behaviors desired and to know what reinforcers are available. It is possible to be a contingency manager and not know very much about stimulus control, but the reverse of this statement is definitely not true. For one to bring behavior under stimulus control, contingencies must be properly managed. Being trained in this area would place one in the field of behavioral engineering.[20] This study was concerned with only the one area of behavioral engineering, that of contingency management.

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[18] Ibid., p. 1.

[19] Lloyd Homme et al., "What Behavioral Engineering Is," Psychological Record, 1968, XVIII, p. 426.

[20] Ibid., p. 425-427.

Purpose of Study

The purpose of this study was to investigate the effects of contingency management techniques on classroom behaviors of a class of delinquent boys incarcerated in a state institution applied by teachers trained in the area of contingency management technology. Research has demonstrated that a contingency manager does not need to know all the aspects of operant conditioning.[21] Evidence was sought to further substantiate this finding by demonstrating that a classroom teacher, unschooled in the area of operant conditioning, need not have this behavioral repertoire to successfully manage operant behavior.

A further purpose of this study was to seek additional evidence that a classroom teacher can be trained as a contingency manager in a relatively short period of time. The realization that one does not need to know all the aspects of operant conditioning has made it possible for others to show that a contingency manager can be trained in a short time.[22, 23, 24, 25] Even a trained fifth grade student has

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[21] Homme, p. 1-2.

[22] K. E. Allen et al., "Effects of Social Reinforcement on Isolate Behavior of a Nursery School Child," Child Development, 1964, XXXV, p. 511-518.

[23] T. Ayllon and J. Michael, "The Psychiatric Nurse as a Behavioral Engineer," Journal of Experimental Analysis of Behavior, 1959, II, p. 323-334.

[24] G. C. Davison, "The Training of Undergraduates as Social Reinforcers for Autistic Children," Case Studies in Behavior Modification, eds, L. P. Ullman, and L. Krasner (New York, 1965), p. 146-148.

[25] E. S. Sulzer, "Behavior Modification in Adult Psychiatric Patients," Journal of Counseling Psychology, 1962, IX, p. 271-276.

modified the maladjustive behaviors of four first graders.[26]

It is well known that behavior modification principles that work well with problem children also offer fruitful application for teachers in normal conditions.[27] While it is not the purpose of this study to extend the application of behavior modification techniques to typical public school classrooms, it is expected that the reader who makes a serious effort to understand clearly the principles of contingency management to be applied, may find them both helpful and rewarding.

Need for Study

Much has been said and written about delinquency. Perhaps the most realistic conclusion one can form is that there are as many definitions for delinquency as there are boys and girls. Regardless of which definition one uses, it is clear that boys committed to the corrective institution at Helena, Oklahoma, have been judged delinquent by the courts of Oklahoma.

The institution operates on the principle that the unmet needs of these boys can be classified into four broad categories: educational, emotional, physical, and environmental. These unmet needs tend to foster responses, usually destructive and self-defeating in nature, that are not acceptable to the social order. Since local resources have failed to meet his needs, the juvenile is committed to the Helena

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[26] P. R. Surratt, R. E. Ulrich, and R. P. Hawkins, "An Elementary Student as a Behavioral Engineer," Journal of Applied Behavior Analysis, 1969, II, p. 85-92.

[27] R. F. Purnell, "On a Technology for Modifying the Behavior of Adolescents." Adolescents and the American High School, ed. R. F. Purnell (New York, 1970), p. 2.

State School for Boys. He comes to the school with feelings of hostility, hopelessness, suspicion, low self-esteem, and worthlessness, and feels that he is a failure which serves only to reinforce his feeling of guilt.[28] Because he is unable to verbalize his true feelings, breaking the law often becomes a twisted way for the juvenile delinquent to find someone he can relate to or identify with such as a probation officer or a corrective institution.[29] It is necessary for classroom teachers to be aware of various techniques affecting student behavior in classrooms located in the institution.

Oklahoma corrective institutions for juveniles are a part of the school district in which they are located, and the local school district has the responsibility of operating an accredited school for the incarcerated juveniles. The classroom setting is very similar to that which one would find in any public school. All teachers are certified by the Oklahoma State Department of Education, and many have public school experience.

As the review of selected literature shows, effective techniques utilizing behavior modification principles of operant conditioning have been explored by various investigators for dealing with behavioral problems caused by maladjustive students, but these have occurred in highly controlled laboratory situations. This study is needed to show the effects of contingency management techniques in a classroom that is neither highly controlled nor a laboratory situation. It is significant because it was conducted in a classroom situation similar to any

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[28] Oklahoma Department of Public Welfare, Handbook for Employees, 1969, p. 1-4.

[29] W. Glasser, Schools Without Failure (New York, 1969), p. 15-16.

public school; however, all the participants were maladjusted adolescent boys.

Definition of Terms

For the purposes of this study, the following definitions were used:

Reinforcement. In instrumental conditioning, the presenting or terminating of any stimulus event which will strengthen a class of responses. There are two types:

(1) Positive - Rewarding stimulus is presented to the student.

(2) Negative - Noxious stimulus is withdrawn from the student.

Behavior. The decorous or improper conduct of classroom students that is considered appropriate or improper in relation to the standards of the school social system and to the classroom teacher.

Emitted Behavior. Behavior which the student can and does carry out without difficulty and is considered to be under his control.

Elicited Behavior. Behavior that is under the control of a stimulus.

Respondent Behavior. Behavior in which reinforcement, preceding the response, is temporally associated or correlated with a stimulus.

Operant Behavior. Behavior in which reinforcement follows the response and is contingent upon (dependent upon) this response.

Maladjustive Behavior. Behavior by an individual which does not lead to success, and is deemed unacceptable by the society of which he is a part.

Operant Conditioning. The process by which a given emitted behavior of the student becomes more frequent in a given situation as

a result of the behavior being followed by some kind of reward (i.e., habit formation).

Contingency Management. The management of operant behavior, and is based on the principle that, when reward is dependent on certain behavior, the probability that the behavior will occur is strengthened.

Time on Task Behavior (TOT). Student time on task (TOT) refers to the amount of time the pupil spent on educationally relevant tasks.

Disrcrete Educationally Relevant Behaviors. This categorization refers to: asking questions, answers, comments, pupil-pupil interactions, and handraising. To be educationally relevant, these responses had to be relevant to the stimulus task, discussion, or lesson at hand.

Digressive Verbal and Motor Behaviors. This category includes behaviors designed to distract such as: sleeping or gazing, out of seat without permission, chair rocking, gross movement such as waving arms or exaggerated stretching, turning, jerking, stomping feet, clapping hands, and dropping book, irrelevant talking, and shouting, singing, and loud laughter.

Agressive Verbal and Motor Behaviors. This final category includes the behaviors that the teachers wanted eliminated such as: hitting and pushing whether angry or joking, threatening gestures, throwing things, threats, rudeness, and loud retorts to other students or the teacher.

Control Teacher. For the purpose of this study, refers to classroom teachers who apply traditional corrective techniques for controlling maladjustive classroom behaviors.

Experimental Teacher. For the purpose of this study, refers to the classroom teacher trained in the application and utilization of

verbal and non-verbal reinforcement techniques or, as defined above, a contingency manager.

Statement of Problem

Techniques must be developed for use by classroom teachers that will interest and contribute to the success of the individual who does not read, who is rebellious, unmotivated, withdrawn, and apathethetic. To blame economic and cultural deprivation, racial discrimination, mental retardation, and physical impairment is to remove the responsibility of our schools for contributing to the failure of the delinquent child.[30] Punishment has been shown to be very inadequate as a technique in dealing with maladjustive behaviors in delinquent children. Besides producing undesirable side effects of avoidance and escape behaviors, punishment, in suppressing undesirable behaviors, may also suppress desirable behaviors.[31] The literature suggests that aversive stimuli may elicit aggression toward the person dispensing the punishment and toward other classmates and objects as well. The corollary is that punishment may increase rather than eliminate maladjustive behaviors. Virtually every summary account of recent literature dealing with aggressive behavior of delinquent children appends a warning, for these reasons, that punishment be contraindicated when dealing with the behavioral problems of these youth.

The trend appears to be to adapt behavior modification techniques in such a way that individual classroom teachers can apply them

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[30] Glasser, p. 4-8.

[31] Ibid.

effectively. The present study describes the application of contingency management techniques designed to reduce digressive motor and verbal behaviors, along with aggressive motor and verbal behaviors, while increasing discrete educationally relevant behaviors in the classroom. The subjects were a class of seventh grade boys incarcerated in an institution for delinquent boys in Helena, Oklahoma.

Limitations

This study was limited by the inherent weakness of an exploratory study. The findings must be limited to the seventh grade class of the Helena State School for Boys, a correctional and rehabilitory institution operated by the Oklahoma State Department of Public Welfare for delinquent boys.

A limitation existed because the subjects were aware that they were part of an experimental study; the results could have been affected by the Hawthorne effect even though extensive efforts were made to desensitize the participants.

This study was limited because the target subjects represented only males. No inferences can be made to a female population significantly similar to the population employed in this study.

All conclusions and analyses made are approximate (as are all inferences drawn from empirical observations). All findings must be limited to the modification of observable behaviors in relation to the responses desired by the target experimental teachers and the application of available reinforcers.

Basic Hypotheses and Rationale

An individual's learning history affects his current susceptibility to reinforcement. Bandura and Walters have briefly summarized the effect of the relationship between subject, examiner, and situational factors on student's susceptibility to influence.

> ...behavior can be both more easily elicited and more strongly reinforced in children in whom strong dependency habits have been built up. Children who have had a history of failure, including negative reinforcement of independence behavior, are more likely to match the behavior of others and to be influenced by the social reinforcers they dispense (Gelfand, 1962; Lesser & Abelson, 1959). Experiences associated with institutionalization appear also to increase the responsiveness of children to social reinforcers (Stevenson & Cruse, 1961; Stevenson & Fahel, 1961; Zigler, Hodgden, & Stevenson, 1958). ...Moreover, reinforcement procedures are more effective when the agent of reward is a high-prestige person than when the reinforcers are dispensed by a person of low prestige (Prince, 1962).... A reinforcer is, in addition, more effective if it represents a class of events that is highly valued (or greatly disvalued) in the recipients' reference group (Zigler & Kanzer, 1962).
>
> The effectiveness of a reinforcer in changing the behavior of a given individual may vary from time to time. It may be enhanced if the individual has been deprived, for some time before its introduction, of reinforcers of this class; it may be reduced if reinforcers of the same class have been freely dispensed for some time preceding its presentation (Gewirtz & Baer, 1958a, 1958b). Deprivation may also result in increased initiative behavior (Rosenblith, 1961)....[32]

Another important variable in assessing reinforcement with students

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[32] A. Bandura and R. H. Walters, Social Learning and Personality Development (New York, 1963), p. 10-11.

is their socioeconomic background. Zigler and Kanzer[33] found that "praise" ("good," "fine") reinforcers were more effective with lower- than with middle-class children. They also discovered that "correct" ("right," "correct") reinforcers were more effective with middle- than with lower-class children. Other researchers have shown that "tangible" ("candy," "gum," "etc.,") reinforcers are more effective with deprived children than they are with privileged children.[34, 35] All of these studies point to the importance of the type of reinforcement used by teachers. The degree of deprivation that a student has experienced has been established as a factor in selecting reinforcers.

Tangilbe reinforcers were selected for use in the current study. The above research indicates their value as reinforcing agents to deprived youth. A procedure was developed to reward the participants for desirable behaviors (contingencies), while undesirable behaviors were to be ignored. The application of this procedure was based upon Premack's generalization of reinforcement which states: "For any pair of responses, the more probable one will reinforce the less probable one."[36] When a person's probability of choosing between any two

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[33]E. F. Zigler and P. Kanzer, "The Effectiveness of Two Classes of Verbal Reinforcers on the Performance of Middle- and Lower-Class Children," Journal of Personality, 1962, XXX, p. 157-163.

[34]E. F. Zigler and J. de Labry, "Concept-Switching in Middle-Class, Lower-Class, and Retarded Children," Journal of Abnormal Social Psychology, 1962, LXV, p. 267-273.

[35]G. Terrell, Jr., K. Durkin, and M. Wiesley, "Social Class and the Nature of the Incentive in Discrimination Learning," Journal of Abnormal Social Psychology, 1959, LIX, p. 270-272.

[36]D. Premack, "Toward Empirical Behavior Laws: I. Positive Reinforcement," Psychological Review, 1959, LXVI, p. 219-233.

responses is known, one can increase the frequency of the less probable response. This is accomplished by making the availability of the more probable response contingent upon the prior occurence of the less probable response.[37] To test the above procedure, the following hypotheses were formulated.

Hypothesis One. The use of contingency management techniques by a teacher in a classroom of delinquent boys will result in an increase in the frequency of discrete educationally relevant behaviors such as: asking questions, answers, relevant comments, pupil-pupil interaction, and handraising.

Hypothesis Two. The use of contingency management techniques by a teacher in a classroom of delinquent boys will result in an increase of time-on-task (TOT) which refers to the amount of time students spend on educationally relevant or desirable tasks.

Hypothesis Three. The use of contingency management techniques by a teacher in a classroom of delinquent boys will result in a decrease of digressive motor and verbal behaviors.

Hypothesis Four. The use of contingency management techniques by a teacher in a classroom of delinquent boys will result in a decrease of aggressive motor and verbal behaviors.

For exploratory purposes, the experimenter was interested in assessing the importance of the subjects' experiences with the experimental teacher (T_1) and the reaction to the control teacher (T_2). The literature suggests that the students should continue to respond to the same contingencies that existed under T_1 even though tangible

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[37] D. Premack, "Reinforcement Theory," In D. Levine (Ed.). Nebraska Symposium on Motivation (Lincoln, 1965).

reinforcers were not available under T_2 (i.e. habit formation). To test this statement, the following hypothesis was formulated.

Hypothesis Five. An increase in frequency of desired pupil behaviors within the experimental group will result in an increase of the same desirable behaviors within the same group under the control teacher.

Summary

Contingency management is a technology derived from operant conditioning. It takes several years of graduate study to train an operant conditioner. Teachers seem to have neither the time nor the inclination to learn about operant conditioning. Researchers have demonstrated that a contingency manager does not need to learn all of the aspects of operant conditioning. It has been demonstrated repeatedly that a person can be trained in the application of contingency management techniques in a relatively short period of time.

The major purpose of this study was to investigate the effects of contingency management techniques, applied by teachers, on the classroom behaviors of boys incarcerated in a state institution. A further purpose of this investigation was to seek additional evidence that a teacher can be trained as a contingency manager in a short period of time.

Effective techniques, utilizing operant conditioning principles, have been explored in highly controlled laboratory situations. This study is needed to show the effects of contingency management principles on the behaviors of an entire class of maladjusted youth. The classroom setting was similar to that which one would find in a public

school; however, all the participants were boys.

The present study describes the application of reinforcement techniques designed to increase the frequency of discrete educationally relevant behaviors. The same techniques were designed to reduce digressive motor and verbal behaviors, along with aggressive motor and verbal behaviors.

CHAPTER II

REVIEW OF SELECTED LITERATURE

Introduction

In recent years, research efforts have exhibited a continued interest in the disruptive behavioral problems of students that exist in the public school classroom. These efforts have contributed little evidence leading toward a general solution or approach in modifying disruptive classroom behaviors. This lack may be attributed to the magnitude of social, cultural, and environmental differences that exist in our schools, making it difficult to develop a scientific approach to the variability of human behavior in such a diverse system. Culturally and socially deprived children are already at an academic disadvantage when they begin school. When these children demonstrate resisting behavior, an emphasis on control further handicaps them.

This chapter includes a review of selected research pertaining to modifying the behaviors of culturally, socially, and maladjusted children. This research tends to show that these children respond to the same contingencies that operate successfully with other children. The major variables of interest (other than reinforcement procedures) include the physical setting, maladjustive children, and the teacher's ability in applying contingency management techniques.

Review of Selected Literature

Many behavior modification studies have been conducted in a classroom setting; most focus upon the assessment of treatment applied to individual class members and teacher behaviors. The effects of teacher behaviors on the classroom behaviors of children were investigated by Thomas, Becker and Armstrong.[1] The results demonstrated that approving teacher responses (praise, smiles, contact, etc.) served as a positive reinforcing function in maintaining appropriate classroom behaviors of a class of middle-primary public school children. The frequency of relevant pupil behaviors was high when approving teacher behavior followed relevant pupil behaviors, and decreased when approving teacher behaviors were discontinued. The authors found that teachers can create problem behaviors by the way in which they respond to their pupils.

A study by Becker et al.[2] recorded the behaviors of two children in each of five classrooms and related them to experimentally controlled changes in teacher behaviors. The teachers were instructed and guided to follow a program which involved making classroom rules explicit, ignoring disruptive behaviors unless someone was getting hurt, and praising appropriate classroom behaviors. Under this program most of the severely maladjusted children under study showed remarkable

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[1]Don R. Thomas, Wesley C. Becker, and Marianne Armstrong, "Production and Elimination of Disruptive Classroom Behavior by Systematically Varying Teacher's Behavior," Journal of Applied Behavior Analysis, 1968, I, p. 35.

[2]W. C. Becker et al., "The Contingent Use of Teacher Attention and Praise in Reducing Classroom Behavior Problems," Journal of Special Education, 1967, I, p. 287.

improvements in classroom behavior. Madsen, Becker, and Thomas[3] did a replication and refinement of the preceding study, thus adding confidence to the assertion that teachers can be taught systematic procedures in contingency management. Too, they may use them to increase the frequency of desirable student behaviors. Their main conclusions were that rules alone exerted little effect on classroom behavior, and that ignoring inappropriate behavior and showing approval of appropriate behavior were very effective in achieving better classroom behavior.

While applications of reinforcement methods are encouraging, Ward and Baker[4] raised the questions of what the effects would be on other non-target children in the classroom when the teacher concentrates on the treatment of deviant behaviors of one or two specific children. Also, when a child's disruptive behavior is successfully reduced, what are the effects on other observable behaviors and on psychological test functioning? Psychological tests revealed no adverse changes after treatment in the target children who showed a significant improvement in behavior; observation measures showed no changes in the behaviors of other members of the class. Wasik et al.[5] used a classification system that provided for continuous categorization in observing and coding the classroom behaviors of two second grade negro children in a

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[3]Charles H. Madsen, Jr., Wesley C. Becker, and Don R. Thomas, "Rules, Praise, and Ignoring: Elements of Elementary Classroom Control," Journal of Applied Behavior Analysis, 1968, I, p. 139.

[4]Michael H. Ward and Bruce L. Baker, "Reinforcement Therapy in the Classroom," Journal of Applied Behavior Analysis, 1968, I, p. 323.

[5]Barbara H. Wasik et al., "Behavior Modification with Culturally Deprived School Children: Two Case Studies," Journal of Applied Behavior Analysis, 1969, II, p. 181.

demonstration school for culturally deprived children. Positive social reinforcement of attention and approval contingent upon desirable classroom behavior were the treatment variables. This study concludes that culturally deprived children respond to the same contingencies that operate successfully with other children, and that a teacher can be used effectively as a social reinforcer. These results were also demonstrated in an experiment by Hall, Lund, and Jackson.[6]

Zimmerman and Zimmerman,[7] in removing the consequences of maladjustive behaviors in the classroom, and by using the teacher as a social reinforcer, eliminated the disruptive behaviors of two emotionally disturbed boys. In exploring the techniques for altering classroom behaviors, the preceding studies emphasized that it is not as pertinent to question the development of these behaviors as it is to recognize that the behaviors desired can be maintained within the classroom by social reinforcement or verbal reinforcement from the teacher.

Researchers have assessed the effectiveness of a variety of behavioral procedures in the management of disruptive classroom behaviors. It is possible that a teacher may not have sufficient social reinforcers in her repertoire, as disclosed by Hall et al.[8] In the

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[6]R. V. Hall, D. Lund, and D. Jackson, "Effects of Teacher Attention on Study Behavior," Journal of Applied Behavior Analysis, 1968, I, p. 1.

[7]E. H. Zimmerman and J. Zimmerman, "The Alteration of Behavior in a Special Classroom Stiuation," Journal of Experimental Analysis of Behavior, 1962, V, p. 59.

[8]Hall et al., p. 1.

light of this evidence, Barrish, Saunders, and Wolf[9] investigated a technique designed to reduce disruptive behavior through a game involving competition for privileges available in almost every classroom. A contingency was arranged for the inappropriate behavior of each child while the consequence (possible loss of privileges) of the child's behavior was shared by all members of this team as a group. The individual contingencies for the group consequences were successfully applied to a regular fourth-grade class that included several problem children.

In Osborne's study,[10] granting of free time from school work was shown to be an effective reinforcer in the management of classroom behavior in a class of six subjects at a school for the deaf. Another investigation regarding the effect of free time on behaviors in a noisy public school involved granting two minute breaks for every unbroken ten minute quiet period. The study was done by Schmidt and Ulrich,[11] and they found the technique to be effective in the suppression and control of sound intensity as measured by a decibel meter. The procedure was also effective in reducing out-of-seat behavior.

There is evidence to show that timeout, which involves the

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[9]Harriet H. Barrish, Muriel Saunders, and Montrose Wolf, "Good Behavior Game: Effects of Individual Contingencies for Group Consequences on Disruptive Behavior in a Classroom," Journal of Applied Behavior Analysis, 1969, II, p. 119.

[10]J. Grayson Osborne, "Free-Time as a Reinforcer in the Management of Classroom Behavior," Journal of Applied Behavior Analysis, 1969, II, p. 119.

[11]Gilbert W. Schmidt and Roger F. Ulrich, "Effects of Group Contingent Events upon Classroom Noise," Journal of Applied Behavior Analysis, 1969, II, p. 171.

temporary suspension of usual activity, is effective in eliminating severe problem behaviors in applied settings. Wolf, Risley, and Mees,[12] demonstrated that tantrums and self-destructive behavior in an autistic child could be controlled by isolating him when the behavior occurred and reinstating him only when the tantrums subsided. Tyler and Brown[13] put delinquents who resided in an institutional setting in timeout for fifteen minutes for each act of misbehavior around a pool table, and found the technique successful in reducing undesirable behavior.

It has been shown that the combination of timeout for disruptive and aggressive behaviors, and positive social reinforcement for appropriate behaviors can be effective. This technique was used with two retarded patients in a state hospital ward setting for modification and reduction of aggressive behaviors by Bostown and Bailey.[14] Research by Holz, Azrin, and Ayllon[15] had earlier suggested that the positive reinforcement for desirable behavior might make the timeout

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[12]M. Wolf, T. Risley, and H. Mees, "Application of Operant Conditioning Procedures to the Behavior Problems of an Autistic Child," Behavior Research and Therapy, 1964, I, p. 305.

[13]V. O. Tyler and G. D. Brown, "The Use of Swift, Brief Isolation as a Group Control Device for Institutionalized Delinquents," Behavior Research and Therapy, 1967, V, p. 1.

[14]Darrell E. Bostow and J. B. Bailey, "Modification of Severe Disruptive and Aggressive Behavior Using Brief Timeout and Reinforcement Procedures," Journal of Applied Behavior Analysis, 1969, II, p. 31.

[15]W. C. Holz, N. H. Azrin, and T. Ayllon, "Elimination of Behavior of Mental Patients by Response--Produced Exinction," Journal of the Experimental Analysis of Behavior, 1963, VI, p. 407.

technique more effective. However, Risley [16] has shown that isolating a severely deviant girl in her room for ten minutes as a timeout technique for each autistic behavior of climbing in dangerous places, had no effect on her rate of climbing. It was only through the use of punishment by a mild electric shock that the child's severe autistic behaviors were brought under control.

Individual conditioning techniques, involving positive reinforcement strategies, were utilized by Walker and Buckley[17] in increasing the task-attending behavior of a bright nine year-old boy. He was an underachiever who exhibited a number of deviant behaviors that were incompatible with successful, task-oriented performance in his classroom. They demonstrated that, once the attending behaviors were measurably changed through the manipulation of reinforcing contingencies, transfer of control to the regular classroom was possible. The successful transfer was made after withdrawal of the treatment variable.

The reinforcement technique of praise and other environmental stimuli have been established as effective controllers of children's behaviors. However, when social reinforcement, social isolation, or censure is not effective, other techniques of reinforcement are available. The following research literature is to show that the application of tangible and token reinforcement principles has been successful in controlling behavior.

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[16] T. Risley, "The Effects and Side Effects of Punishing the Autistic Behaviors of a Deviant Child," Journal of Applied Behavior Analysis, 1968, I, p. 21.

[17] Hill M. Walker and Nancy K. Buckley, "The Use of Positive Reinforcement in Conditioning Attending Behavior," Journal of Applied Behavior Analysis, 1968, I, p. 245.

When the behavior of only one of seven disruptive children was modified in a class of twenty-two second graders by social reinforcers and adherence to educational rules and regulations, O'Leary et al.[18] introduced a token reinforcement system in their investigation. Points, awarded for desirable behavior, could be exchanged for tangible reinforcers of candy, toys, and etc. ranging in price from two to ten cents. This technique resulted in the decline in frequency of disruptive behaviors of five of the remaining six children. Withdrawal of token reinforcement and a return to social reinforcement increased disruptive behaviors in all five, while reinstatement of the token system again increased the frequency of desirable behaviors. Follow-up data indicated that the teacher was eventually able to transfer control from the token system to the reinforcers existing within the classroom. Orme and Purnell[19] did a similar study in an entire class of sixteen out-of-control third and fourth graders in a ghetto school in Boston. They partitioned the classroom, utilized two teachers, and demonstrated that control could be transferred from one teacher utilizing token reinforcement to the other using social reinforcement. However, the accumulation of points from the social reinforcer led to the opportunity to reenter classrooms where the pupil could expect more tangible feedback.

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[18] K. D. O'Leary et al., "A Token Reinforcement Program in a Public School: A Replication and Systematic Analysis," Journal of Applied Behavior Analysis, 1969, II, p. 3-13.

[19] M. E. J. Orme and R. F. Purnell, Behavior Modification and Transfer in an Out-of-Control Classroom, Center for Research and Development on Educational Differences, Monograph No. 5 (Cambridge, 1969), p. 1-34.

Another "group" study was done by Zimmerman, Zimmerman, and Russell,[20] with a group of seven retarded students who suffered "attentional deficits." They utilized a token reinforcement system which resulted in the increasing of instruction-following responses in six of the seven retardates tested.

Phillips[21] has shown that token reinforcement can be utilized to modify the behaviors of three pre-delinquent boys in a home style rehabilitation setting. Points, contingent upon appropriate behavior, were redeemable for tangible reinforcers. Inappropriate behavior resulted in a loss of points. The frequencies of aggressive statements and poor grammar decreased while tidiness, punctuality, and amount of homework completed increased.

Schwitzgebel[22] in his study of two adolescent male delinquents showed that punishment was not effective in reducing hostile statements. Positive reinforcement resulted in a significant increase of desirable behaviors of the two adolescent boys.

Schwitzgebel and Kolb[23] earlier had completed a study in which

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[20] E. H. Zimmerman, J. Zimmerman, and C. D. Russell, "Differential Effects of Token Reinforcement on Instruction Following Behavior in Retarded Students Instructed as a Group," Journal of Applied Behavior Analysis, 1969, II, p. 101-112.

[21] Elery L. Phillips, "Achievement Place: Token Reinforcement Procedures in a Home-Style Rehabilitation Setting for 'Pre-Delinquent' Boys," Journal of Applied Behavior Analysis, 1968, I, p. 213-223.

[22] R. L. Schwitzgebel, "Short-Term Operant Conditioning of Adolescent Offenders on Socially Relevant Variables," Journal of Abnormal Psychology, 1967, LXXII, p. 134-41.

[23] R. L. Schwitzgebel and D. A. Kolb, "Inducing Behavior Change in Adolescent Delinquents," Behavior Research and Therapy, 1964, VI, p. 297-304.

they attempted to identify the types of reinforcers that were the most effective in inducing behavioral changes in adolescent delinquents. They concluded that the recipient had to perceive the reinforcer as rewarding at the time whether it be food, money, or a particular brand of cigarettes; therefore, it is important for the experimenter to know the history of each individual.

Tyler and Brown[24] hypothesized that the academic performance of institutionalized delinquent boys with contingent reinforcement would be superior to performance with non-contingent reinforcement. Their hypothesis was substantiated through the use of token reinforcement; however, reward was indirectly contingent upon an out-of-class behavior (i.e. watching the evening news on television), since the news program was the criterion used in measuring academic progress.

Staats and Butterfield[25] successfully improved the reading ability of a culturally deprived juvenile delinquent with a token reinforcement system that was extended over a four and one-half month period. During the period which involved the emission of 64,307 single-word reading responses, the subject received $20.31. They gradually reduced the extrinsic reinforcement until reading became reinforcing itself.

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[24] V. O. Tyler, Jr. and G. D. Brown, "Token Reinforcement of academic Performance with Institutionalized Delinquent Boys," Journal of Educational Psychology, 1968, LIX (3), p. 164-168.

[25] A. W. Staats and W. H. Butterfield, "Treatment of Nonreading in a Culturally Deprived Juvenile Delinquent: An Application of Reinforcement Principles," Child Development, 1965, XXV, p. 925-942.

Clark and Walberg[26] applied the above technique to a group of adolescents in a classroom of potential urban school dropouts. Their object was to make the reinforcement positive with massive verbal rewards given by the teacher and tallied by each child. The children who were massively rewarded scored significantly higher on standardized reading tests.

The techniques of contingency management and the training of teachers have been discussed in a previous section. Further explorations and investigations of Hall et al.,[27] Lovitt and Curtiss,[28] and McMichael and Corey[29] substantiated the assumption of this study that a contingency manager with very little knowledge of stimulus control can be effective in controlling the behaviors of maladjusted students that are disruptive.

Summary

This chapter has reviewed selected research pertaining to modifying the behaviors of culturally deprived, socially deprived, and maladjusted children. Many of the behavior modification studies were

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[26] C. A. Clark and H. J. Walberg, "The Influence of Massive Rewards on Reading Achievement in Potential Urban School Dropouts," American Educational Research Journal, 1968, V(3), p. 305-310.

[27] R. V. Hall et al., "Instructing Beginning Teachers in Reinforcement Procedures Which Improve Classroom Control," Journal of Applied Behavior Analysis, 1969, II, p. 49-53.

[28] T. C. Lovitt and K. A. Curtiss, "Academic Response Rate as a Function of Teacher and Self-Imposed Contingencies," Journal of Applied Behavior Analysis, 1969, II, p. 49-53.

[29] J. S. McMichael and J. R. Corey, "Contingency Management in an Introductory Psychology Course Produces Better Learning," Journal of Applied Behavior Analysis, 1969, II, p. 79-83.

conducted in classroom settings. However, most of the researchers focused upon the assessment of treatment applied to individual class members or small groups. The literature revealed that the application of reinforcement techniques by teachers had no adverse effect on other non-target children in the classroom.

In exploring the various techniques for altering classroom behaviors, researchers have disclosed a variety of reinforcing procedures. These included: social and verbal reinforcing, timeout or temporary suspension from usual activity, loss of privileges, and isolation. When the above were not effective, the granting of rewards of a tangible nature were shown to be successful in modifying the behaviors of maladjusted children. The rewards were given in the form of tokens or points; redeemable for tangible items. The tangible items may be given as rewards. The selected research emphasizes that the recipient of reinforcement has to perceive the reinforcer as rewarding at the time, and associate it with the contingency. This is true whether it be praise, food, toys, or money. The teacher has been shown to be the manipulator of reinforcing events in the classroom. The literature indicates that a teacher does not need to know about stimulus control to be trained as a contingency manager. Of further importance, it has been shown that a variety of reinforcement techniques have been successful in modifying the behaviors of maladjusted children.

CHAPTER III

METHOD

Introduction

The Helena State School for Boys located in Helena, Oklahoma, was created by the Oklahoma State Legislature in 1909 and was called the Oklahoma State Institution for White Boys. Until 1961, the controlling agency was the State Board of Public Affairs. Due to the replacement of all members every four years by newly elected Governors and the scarcity of public funds, a continuous program of rehabilitation could not be maintained. Continuity of program was assured only when control of the institution was transferred to the Oklahoma Department of Public Welfare in 1961. It was not until 1965 that the name of the school was changed by the State Legislature to Helena State School for Boys, and it was July, 1965, before the first Negro boy was committed to the institution. At the time of this study, about thirty percent of the school population was Negro, and about ten percent consisted of other minority groups.

Although bed capacity of the institution is limited to 166, approximately 450 boys are committed annually. Therefore out of necessity, the turnover rate is rather high. As of September, 1969, only boys between the ages of fourteen and seventeen are committed to the Helena State School for Boys. Offenses range from truancy to more serious behaviors such as car theft, burglary, rape, vandalism, etc. The

recividism rate (percent of returnees) has dropped from a high of 61% in 1960 to a low of 27% in 1968.[1] This decline illustrates the effectiveness of shifting control of the institution to an agency of state government which can and will provide adequate financing for a program of rehabilitation.[2]

Teachers within the institution have grown to expect disruptive and malajustive behaviors in classrooms of incarcerated youth. The teachers had reported to the investigator that a majority of their students were apathetic, rebellious, and unmotivated; also, they were unable to alter the behaviors of a great many of these boys. After informal observations were made, the researcher determined that these boys might benefit from a behavior modification program. The procedure for data collection was arranged with the Oklahoma State Department of Public Welfare.

Subjects

The subjects for this study were fourteen members of the seventh grade class in the Helena State School for Boys. The entire class, randomly drawn from the total school population, originally consisted of twenty boys, but six were sent home on trial leave and did not complete the experiment. All observations were limited to the fourteen boys who were in attendance throughout the duration of the study. The students ranged in age from thirteen years, four months to fourteen

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[1] Oklahoma Department of Public Welfare, Handbook for Employees, 1969, p. 3-4.

[2] Ibid.

years, nine months.

Two teachers, a social studies teacher (T_1) and a mathematics teacher (T_2), volunteered to participate in the study. The first (T_1) had two years teaching experience and was a white female in her early thirties. The second (T_2) also had two years teaching experience and was a white male in his later twenties. The teaching experience of both teachers was limited to the institution. The social studies teacher (T_1) was selected by a flip of a coin as the experimental teacher, and the mathematics teacher (T_2) was designated as the control teacher. The classes were re-scheduled in order for the control teacher group to immediately follow the experimental teacher group during the prime teaching hours of mid-morning. All of the subjects were in both classes and each class was fifty-five minutes in duration.

Collection of Data

Fifteen minutes of each class session of both T_1 and T_2 were videotaped daily with the recording time divided into seven and one-half minute segments. No observations were recorded during the first five minutes of the last five minutes of the classes. The students were issued books, pencils, and instructional materials at the beginning of each class; these were returned at the end of the class period. The behavioral responses of the students during these two time periods were not relevant to the teaching technique being tested. The remaining forty-five minutes of each class session were divided into six segments of time. Each time segment was numbered one to six, and a schedule for videotaping was determined by the rolling of two dice. Each number on the two dice corresponded to one of the numbered recording segments.

If a double was rolled, one of the dice was rolled again until a different number appeared. The schedules for videotaping were recorded on forms divised by the experimenter (Appendix A).

A videotape camera, equipped with wide angle lens, was placed in position in one corner to the rear of the classroom enabling viewing of the teacher and entire group of subjects without moving the camera. A multi-directional microphone was suspended from the ceiling in the center of the room. All other equipment was located in an adjoining office. No observer was in the classroom, and neither the teachers nor the students were aware of those periods when the videotape deck was recording. The camera was on all of the time.

Experimental Procedure

The experimental procedure consisted of five steps: (1) Desensitization, (2) Phase I, (3) Phase II, (4) Phase III, and (5) Rating of Data. Data were collected over a seven week period during Phases I, II, and III.

Desensitization.

One week prior to the collection of any data, the investigator attempted to desensitize the participants to the presence of the camera, hopefully, to eliminate any Hawthorne effect. The camera, monitor, and tape deck were set up in the classroom for all to observe in operation. For many, it was their first contact with video equipment. All were recorded on tape; the class watched with great interest as it was played back to them.

They were told at this time only that they were part of an

experiment lasting approximately two months. The camera and microphone were to be located in the classroom during the course of the study. All students were emphatically assured that any disturbance, misbehavior, or gross conduct recorded on the videotape but undetected by the teachers at the time of occurrence would not be used against them at a later date.

Phase I.

This step of the study lasted two weeks, and consisted of gathering baseline information and initial training of the experimental teacher (T_1).

(a) Baseline: Data were recorded for two weeks according to the videotaping schedule to ascertain the nature and frequency of the behaviors of all subjects. The researcher also used the baseline data to determine the individual skills of T_1 and T_2 in weakening or strengthening such behaviors. A detailed account of the nature of behaviors observed is presented in the final step of the study, the Rating of Data. The frequency and analysis of the baseline information appears in Chapter IV.

(b) Training of T_1: During the second week of Phase I, the researcher conducted training sessions with T_1 in the application of contingency management techniques. T_1 was requested not to apply the reinforcement techniques until Phase II.

T_1 received instruction in verbal and tangible reinforcement procedures. Tangible reinforcers refers to consumable items used to satisfy a biological need such as: food, candy, gum, cigarettes, etc. Verbal reinforcement may also refer to statements of correctness such

as: right, you are correct, etc.

T_1 was instructed by the researcher in the principles of behavior changes through systematic control of the reinforcing consequences of the behaviors to be considered. A brief description of the behavior modification principles included in the training of T_1 were:

1. Contingency management was described as the management of what events are contingent upon what behavior.[3] When reinforcing events are contingent upon a given behavior, the behavior will increase in strength. The critical ingredient of a contingency manager is a willingness to "pay off" for desirable behavior.[4]

> One can make a pretty good case that, basically, there are only two things that a good contingency manager has to know and do: (a) to reinforce the behaviors he wants, and (b) to recognize and reinforce "approximations" to this behavior.[5]

2. Premack's Principle was discussed earlier in Chapter I. By utilizing his paradigm, one can arrange effective behavior modification contingencies on the premise that some responses are more probably than others.[6] T_1 was instructed on how to make available those behaviors that are more highly preferred by an individual. Handraising, if rewarded, may increase the probability of a student studying harder in order to be able to give the correct answer to a question.

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[3] L. Homme et al., "What Behavioral Engineering Is," Psychological Record, 1968, XVIII, p. 426.

[4] Ibid.

[5] Ibid.

[6] B. H. Wasik, "The Application of Premack's Generalization of Reinforcement to the Management of Classroom Behavior," Journal of Experimental Child Psychology, 1970, X, p. 41.

3. The immediacy of reinforcement was discussed by the investigator in the training sessions with T_1. The more quickly a reinforcing consequence occurred after a desirable behavior, the more effective that consequence was assumed to be in increasing the frequency of the behavior. The immediacy of reinforcement helped eliminate the possibility of a student not receiving a reward for a desirable behavior. If a desirable response was elicited, but before the teacher could apply reinforcement, the same student emitted an undesirable response; T_1 was instructed not to administer the reward. The principle of contiguous association would cause the student to associate the reward

the more recent behavior, and increase the probability of its reoccurrence.

4. In successive approximation, the teacher rewarded a student for performing at a low level, even though the level was below the student's ability. As the student began meeting the rewarded level consistently, the teacher was instructed to increase the performance level in small steps. This technique was repeated until the student performed at his ability level.

5. T_1 was trained in basic probing and methods of varying the stimulus situation. These techniques refer to verbal and nonverbal alternatives which the teacher could use to elicit attention and curiosity. This strategy was used in order to translate the principle of "shaping" into observable concrete teacher behavior and to elicit desirable pupil behavior, which could then be reinforced.

6. Techniques to prevent disruptive behavior, as opposed to corrective techniques, were discussed with the teacher by the researcher. If the presence of a particular stimulus was disruptive

to a student's behavior, the stimulus was to be removed. The stimulus was added gradually as the student was able to tolerate its presence. Specifically, the teacher was instructed to engineer desirable behaviors that were incompatible with disruptive behaviors. T_1 was told to ignore disruptive behaviors (except fighting) by concentrating her attention on an adjacent student modeling desirable behavior. The teacher was to give attention to a student when he was performing behavior she wanted to encourage; she was to ignore a student (if possible) when he was emitting behavior she wished to eliminate.

7. Chaining was described by the researcher as the completion of a sequence of small tasks, all of which were necessary for the completion of the final task. T_1 was instructed to begin rewarding the student very early in the chain, progressively lengthening the task chain required for reward until only the end task, correctly performed, was rewarded.

8. Attending behavior was explained as a sequence of looking and listening behaviors or a response chain. For example, in order for a student to answer a question from the teacher on information written on the chalk board, the student must "look" at the board, "read" what is written there, "listen" to the teacher's question, then "answer" it. T_1 was instructed to reward unresponsive students early in the chain until only the question, correctly answered, was rewarded.

Successful training of contingency managers utilizing the behavior modification principles described to T_1 have been reported by

Homme,[7] Orme,[8] and Homme et al.[9]

The next task in the training of T_1 was the establishment of contingencies or the behaviors to be desired. These were determined in terms of educational relevancy as specified by goals of instruction in terms of pupil behavior, reinforcement of student time-on-task behavior, relevant handraising, cooperation, comments, questions and answers, and student attending to another student discussing lesson content. Baseline videotapes from the previous week were analyzed in sessions with T_1. The researcher pointed out desirable student behaviors to be reinforced and undesirable behaviors that were to be ignored. He explained to T_1 that a teacher has available a series of alternatives in responding to categories of student responses. These sessions were designed to build on the teacher's strengths identified by the researcher in viewing videotapes previously recorded. The investigator verbally reinforced T_1 during the training sessions in an effort to extend her present skills. The experimental teacher (T_1) received five of these one hour training sessions during the second week of Phase I.

The control teacher (T_2) during Phase II was to also be trained in behavior modification principles for application during Phase III. T_1 and T_2, on Saturday after Phase I, were given a copy of a modified version of the Coping Analysis Schedule for Educational Settings (CASES)

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[7]Lloyd Homme, "Contiguity Theory and Contingency Management," Psychological Record, 1966, XVI, p. 233-241.

[8]Michael E. J. Orme, "Instructions to Interns on Varying the Stimulus Situation," Unpublished Manuscript (1965), and Raters Manual, Stanford R. & D. Center, 1966.

[9]L. Homme et al., p. 425-434.

by Spaulding[10] which list desirable and undesirable classroom behaviors. Modifications of this categorization system have been used successfully in behavior modification studies as reported by Sibley, Abbot, and Cooper,[11] and Wasik et al.[12] These researchers show that all observed behaviors of students can be exhaustively recorded into one of several categories (Appendix B).

In a three hour session, T_1 and T_2 were instructed to delineate only those behaviors from CASES that they considered to be desirable and wanted increased or maintained at a high level. They were also instructed to specify the inappropriate behaviors whose frequency they wished to be decreased, and to list the unacceptable behaviors that they wanted eliminated. Agreement was reached by both teachers as to the categorization of behaviors in relation to their own goals for the students' classroom behaviors. The researcher was not involved in the resolving of differences in reaching agreement between the two teachers.

Since only the frequency and nature of classroom behaviors were to be recorded in this study, and no coding of the intensity was to be classified, the investigator devised his own scheme for recording the frequency of those behaviors from CASES that the two teachers wanted modified (Appendix C). A detailed list of these behaviors are

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[10] R. L. Spaulding, "Introduction to the Use of the Coping Analysis Schedule for Educational Settings (CASES)," Education Improvement Program, Duke University, Durham, North Carolina, 1967.

[11] S. A. Sibley, M. S. Abbot, and B. P. Cooper, "Modification of the Classroom Behavior of a Disadvantaged Kindergarten Boy by Social Reinforcement and Isolation," Journal of Experimental Child Psychology, 1969, VII, p. 203-219.

[12] B. H. Wasik et al., p. 181-194.

categorized in the final step of the study, the Rating of Data.

Phase II.

This step of the experimental procedure lasted three weeks and consisted of a tangible reinforcement system during the third hour of the morning by the experimental teacher (T_1) based on contingency management techniques. The control teacher (T_2) continued to teach the fourteen participants during the fourth hour in the same manner that he had in Phase I. The experimental procedure was to observe any behavioral changes of students under T_1 from Phase I (Baseline) to Phase II (Reinforcement). This procedure also allowed the researcher to observe any changes in behavior of the fourteen subjects from T_1 to T_2 during Phase II, and to test their relations to the reinforcement techniques being applied by T_1.

(a) The Tangible Reinforcement Program: The fourteen subjects had been asked to select tangible items from a prepared list of eligible reinforcers, cleared through the Department of Public Welfare, during the last day of Phase I. Surprisingly only three were selected, and these were: tootsie roll and bubble gum each valued at one cent, and single cigarettes valued at two cents. No legal question was involved in using a cigarette as a tangible reinforcer because smoking was permitted by the institution. A reinforcer must be perceived as a reward by the recipient, and the cigarette was the item most desired by all fourteen students.

On the first day of Phase II, the three items were placed on the teacher's desk. The researcher explained to the students that they could "earn" points by emitting certain behaviors. T_1 then asked for

suggestions as to what behaviors should be rewarded. As she listed each student's suggestion on the chalk board, favorable comments and handraising were reinforced verbally, and nonverbally with points valued at one cent each. The teacher had been trained to emit verbal reinforcement along with points on the assumption that her reinforcing value would increase through contiguous association with the point system. She was told to reinforce only when the response was desirable or approximated the terminal pupil behavior (successive approximation) included in the list of desirable behaviors to be modified. Since the students were not being rewarded for undesirable behaviors, these behaviors were never specified to them.

The earned points could be used to purchase any of the three items. A student asked if he could accumulate points for the purpose of purchasing cokes or larger candy bars. T_1 advised the student that he could purchase cokes or candy bars by letting her know in advance in order for her to bring these other items to class with her. Although many of the students accumulated points, the three items, mentioned earlier, were the only tangible reinforcers that were ever purchased.

Upon initial exposure to the behavior modification system, all students were given five points to spend. This was done to impress upon them the value of a point so they could equate it with the tangible reward. T_1 told the students that they could now purchase one of the eligible items displayed and still have points left over. The realization by the students of being able to purchase items and have points left was an attempt to maintain a high incentive level.

Each student's name was placed on a chart at the front of the room. A tab with squares corresponding to the names was placed by it

daily for recording points earned and points accumulated. The recording and awarding of points were under the direct control of the teacher at all times. Pictures of eligible reinforcers were placed on the bulletin board and the rewards were kept in the teacher's desk to be dispensed during the last five minutes of the class period.

The training of T_1 was continued during the first week of Phase II. The experimenter conducted sessions with T_1 on the second and fifth day viewing the videotapes of the previous day. He verbally reinforced T_1 on desirable contingency management techniques, and pointed out undesirable student behaviors that she should have ignored. The ignoring of unacceptable behaviors proved to be one behavior on the part of T_1 which, while reduced, was never quite eliminated.

The control teacher (T_2) continued to teach as he had in the past. The experimenter was interested in assessing the relative importance of the students' experiences with T_1 and their reaction to T_2. It had been hypothesized that the students would continue to respond to the same contingencies that existed under T_1 even though no tangible reinforcers were available under T_2. If this hypothesis proved viable, then the pupils would continue to emit, under T_2, some of those behaviors that would have gained them points in the preceding class.

(b) Training of T_2: The training of the control teacher (T_2) in the application of contingency management techniques began during the last week of Phase II. The training sessions with T_2 tended to be shorter and less intensive than those with T_1. He was highly responsive, and appeared to grasp the contingency management principles rapidly. The experimenter was prone to speculate that either T_2 was very observant during Phase II, or conversation with T_1 had given him

more of an insight as to the underlying motives of the reinforcement principles emphasized.

Only three training sessions of thirty minutes duration, and one conference with the experimenter viewing the first day's videotape of Phase III were necessary for the initial training of T_2. He was exposed to the same behavior modification techniques that had been used with T_1.

Phase III.

This step lasted for two weeks and emphasized continued contingency management techniques utilizing tangible reinforcers by T_1, and application of the same techniques by T_2.

This experimental procedure was chosen to allow observation of student behavioral changes under T_2 from Phase II to Phase III to further investigate the effectiveness of tangible reinforcers modifying the behaviors of the fourteen subjects. Also, it was desired by the experimenter to check for any student behavioral changes under T_1 since T_2 was now applying the same reinforcement techniques.

(a) The Tangible Reinforcement Program: T_2 utilized the same tangible reinforcers as T_1. Contingencies had been determined earlier by both teachers and points were awarded for these desirable behaviors in identical manner. The student's names were already on the chart, and T_2 placed his own tab opposite the names to daily record earned points and their accumulation. The subjects were not allowed to transfer points from one teacher to the other because of the negative effects it could have had on the reinforcement value of the teacher originally awarding the points.

Rating of Data.

The fifth and final step of the study involved measurement procedures, training of independent raters for subsequent analysis of the videotapes, and checking for interrater agreement.

Fifteen minutes were videotaped in two seven and one-half minute randomly drawn segments for every hour of class time during the seven weeks of the study. At the end of the experiment, eight and one-half hours of class time had been recorded for each of the two classes. The expensive rental of equipment and the costly nature of the rating procedure made it prohibitive for the experimenter to analyze the entire sample. A reduced sample was obtained by further reducing each videotaped class session into segments whereby the experimenter could obtain one hour of observation time (per student) in each class for each of the three phases. All Tables and graphs in Chapter IV are prepared on the basis of a reduced sample for T_1 and T_2 in each phase.

(a) Measurement Procedures: It was mentioned earlier that both teachers had reached agreement on the contingencies or desirable behaviors. These behaviors were those the teachers wanted increased or maintained at a high level, and were classified by the experimenter under two categories: time-on-task behaviors and discrete educationally relevant behaviors (Appendix C). The inappropriate behaviors were those the teacher wanted decreased, and were classified under the digressive verbal and motor behavior category; the unacceptable behaviors to be eliminated were classified under the aggressive verbal and motor category (Appendix C). The investigator utilized a scheme devised

earlier by Orme and Purnell[13] in classifying the behaviors, selected by T_1 and T_2 for modification, into the above categories.

(b) The Training of Raters: A team of three raters were trained by the experimenter to record the student behaviors to be modified as well as the contingency management techniques applied by the teachers. Two of the raters had master degrees in counseling, and the third rater had a bachelor's degree in elementary education. Initial training required approximately ten hours. Prepared material in the form of hand outs was given to each rater listing the behaviors to be recorded and the cues for identifying them properly were explained. This material was reviewed before each rating session.

The raters evaluated one pupil at a time. The relevant student behaviors were recorded on a Raters Recording Data Sheet devised by the experimenter (Appendix C). This recording sheet contains only those behaviors that were selected from CASES for modification by the two teachers participating in the experiment. The Recording Data Sheet contains space for the rating of fifteen one minute time intervals. Fifteen minutes of each class session had been videotaped. The ratings of the first minute of a videotape were recorded on line 1, the second minute on line 2, and etc. Recording by the raters was facilitated by the use of a timer with a twelve inch face. The large timer was easy to view by a rater without losing visual contact with the subject being observed on the television monitor. A buzzer on the timer

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[13] M. E. J. Orme and R. F. Purnell, Behavior Modification and Transfer in an Out-of-Control Classroom, Monograph No. 5, Cambridge, Mass.: Center for Research and Development on Educational Differences, Harvard University, 1968, p. 20-22.

sounded at one minute intervals which was a signal for the raters to proceed to the next line on the Recording Data Sheet to record their ratings of the subject's behavior. The minimum percentages of agreement among the three raters had been set by the researcher at eighty percent. Before the ratings of the videotapes could proceed, interrater agreement reliability had to be established on all student behaviors at the eighty percent level (Higher, if possible).

(c) Interrater Agreement. Interrater agreement for the three raters was based on independent ratings of three minute segments. Each rater evaluated the same subject on an identical behavior and recorded their ratings on the Data Recording Sheet. The ratings were then transposed to a Reliability Check for Interrater Agreement developed by the researcher (Appendix D). This procedure was repeated with a different three minute segment throughout the training of the raters until the established percentage of agreement had been reached for all of the behaviors listed on the Data Recording Sheet. Further checks were made throughout the rating procedure to insure that each rater was judging behaviors with a high percentage of continuity in relation to his own prior judgments. Agreement for all ratings of classroom behaviors recorded was determined by the following formula:[14]

$$\text{Percentage} = \frac{\text{Sum of Total Behaviors} - \text{Sum of Errors}}{\text{Sum of Total Behaviors}}$$

The Sum of Total Behaviors is the sum of the Total Column (Appendix D), The Sum of Errors refers to the sum of the Errors Column (Appendix D).

Data for interrater reliability and agreement checks are reported

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[14] Ibid., p. 24.

in Table I. When task-relevant stimuli were determined by the raters, they found it relatively easy to rate discrete pupil behaviors with a high percentage of agreement. Only five segments, viewing five different subjects, were required to establish the reliability of inter-rater agreement either at or above the eighty percent level on discrete behaviors.

Time on task responses and total time on task were difficult to rate with high agreement. The disadvantage of the procedure was that a student may appear to be orienting to a task-relevant stimulus, but could well be daydreaming. He may be staring into space or out the window, and concentrating on the lesson simultaneously. The raters were instructed to observe other cues such as body position and verbal responses, in addition to eye and gross body movements. It was possible for the subjects to exhibit gross body movements or aggressive behaviors, and still be completely orienting to the task-relevant situation. Time on task reliability checks were conducted prior to each phase. In all, a total of fifteen segments were viewed, focusing on seven different subjects. Recording procedures for time on task behavior were facilitated by the use of individual stop watches to record time of unattending behavior for each sixty second interval. This time was subtracted from the master control timer for each minute segment to arrive at total time on task.

Two of the raters were trained to rate teacher positive verbal and non-verbal reinforcement. Positive verbal reinforcements were compliments and statements of praise by the teachers. Positive non-verbal reinforcements were the awarding of points by the teachers. Interrater agreement for the two raters was based on independent ratings

TABLE I

INTERRATER AGREEMENT ON DISCRETE CLASSROOM BEHAVIOR ANALYSIS

Behavior Category	Percentage of Agreement Average
Pupil Behaviors:	
Time on Task (TOT)[1]	82
Discrete Educationally Relevant	93
a) Questions	100
b) Answers	90
c) Comments	80
d) Pupil-Pupil Interactions	95
e) Handraising	100
Digressive	82
a) Digressive Verbal	84
b) Digressive Motor	80
Aggressive	100
a) Aggressive Verbal	100
b) Aggressive Motor	100
Teacher Behaviors:	
Teacher Reinforcement	90
a) Positive Verbal	80
b) Positive Non-Verbal	100

[1]Percentage of Agreement was computed on the basis of fifteen rated segments. Interrater agreement on the rest of the discrete classroom behaviors was achieved on the basis of five segments.

of three minute segments. Each rater evaluated the same teacher on positive verbal reinforcement, and on tangible reinforcement. The raters recorded the frequencies of each teacher behavior on the Interrater Agreement Reliability Check for Teacher Reinforcement (Appendix E). This procedure was repeated with a different three minute segment until the established percentage of agreement had been reached for each teacher behavior. Further checks were made for reliability agreement during the rating of the videotapes to insure a high percentage of agreement.

This final step of the study, the Rating of Data, involved measurement procedures, training of independent raters, and checking for interrater agreement. The rating procedure was conducted over a four month period of time. The analysis of the data collected is presented in Chapter IV.

Summary

The subjects for the study were the seventh grade class, randomly selected from the Helena State School for Boys at Helena, Oklahoma. Two seventh grade teachers were selected to participate in the experiment. A procedure for collection of data, via videotape, was systematically developed by the investigator. The study was conducted over a seven week period and all observations were recorded on videotape.

Collection of data was divided into three phases. Baseline data were recorded during Phase I which lasted for two weeks. Preceding the three weeks of Phase II, the Experimental Teacher (T_1) received initial training in the use of contingency management techniques to apply during Phase II. The Control Teacher (T_2) was instructed to

continue teaching as before during the second phase. This procedure allowed the experimenter to observe any changes in behavior of the fourteen subjects from T_1 to T_2, and to test their relations to the reinforcement techniques being applied by T_1. The training of T_2 in behavior modification principles was initiated prior to Phase III. The experimental procedure, during the two weeks of Phase III, emphasized feedback from T_2 to T_1 for any behavioral changes and modification.

Raters were trained by the investigator to record the behaviors to be modified. The raters also evaluated the contingency management techniques applied by the teachers. They rated one pupil at a time, and recorded continuously on a Rater Recording Data Sheet devised by the experimenter. Interrater agreement reliability checks were utilized as training techniques. The process was continued throughout the rating procedure to insure that each rater was judging behaviors with a high percentage of continuity in relation to his own prior judgments.

CHAPTER IV

ANALYSIS OF DATA

Introduction

This chapter presents the data obtained from the rating of the videotapes by the investigational procedures described in Chapter III. The data obtained from these observations were used for the purpose of testing the following hypotheses:

Hypothesis One. The use of contingency management techniques by a teacher in a classroom of delinquent boys will result in an increase in the frequency of discrete educationally relevant behaviors such as: asking questions, answers, relevant comments, pupil-pupil interaction, and handraising.

Hypothesis Two. The use of contingency management techniques by a teacher in a classroom of delinquent boys will result in an increase of time-on-task (TOT) which refers to the amount of time students spend on educationally relevant or desirable tasks.

Hypothesis Three. The use of contingency management techniques by a teacher in a classroom of delinquent boys will result in a decrease of digressive motor and verbal behaviors.

Hypothesis Four. The use of contingency management techniques by a teacher in a classroom of delinquent boys will result in a decrease of aggressive motor and verbal behaviors.

Hypothesis Five. An increase in frequency of desired pupil behaviors with the experimental group will result in an increase of the same desirable behaviors within the same group under the control teacher.

All data were obtained by rating the behavioral responses of fourteen delinquent boys incarcerated in the Helena State School for Boys. The independent variables were the teaching techniques of contingency management applied by the teachers to produce the responses desired. The dependent variables were the behaviors the teachers wanted either increased, decreased, or eliminated.

In a sense, the experiment constituted a target study. It was conducted in an institution pre-selected by the investigator. The randomly drawn seventh grade class served as subjects, and the selection of teachers was determined by their interest, desire, and availability for participation in the study. Experimental procedures derived from well-established principles of learning were employed to test the above hypotheses. These included the manipulation and measurement of relevant variables, and the Wilcoxon Matched-Pairs Signed-Ranks Test from Siegel.[1]

The remaining portion of this chapter is devoted to presenting the procedures for analyzing the recorded observations of student behavior. The data are presented in tabular format with appropriate discussion of results.

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[1]Sidney Siegel, Nonparametric Statistics (New York, 1956), p. 75-83.

Analysis

Before evaluating the changes in behavioral responses of the fourteen subjects, it was important to analyze the rate of teacher reinforcement during each phase of the study.

Teacher Behavior: Table II gives a graphic presentation of the positive verbal and non-verbal reinforcement rates for each teacher during the different phases of the study. In addition, this rate is contrasted with the frequencies of Discrete Educationally Relevant Behaviors which each teacher wanted increased, and reflects the effectiveness of the contingency management techniques. This procedure of illustrating desirable behaviors has been effectively demonstrated by others.[2,3]

Relevant verbal responses included questions, answers, and task-relevant comments. The bottom half of Table II included, in addition to the above responses, the frequencies of task-relevant pupil-pupil interactions, and handraising. During Phase I, T_1 maintained a partial reinforcing rate of less than .25 which means she was only verbally reinforcing one out of four desired verbal responses. After initial training preceding Phase II, her reinforcement rate increased to .90, and the frequency of all desired responses doubled during Phase II, then tripled during Phase III. Disappointingly, T_1's reinforcing rate never

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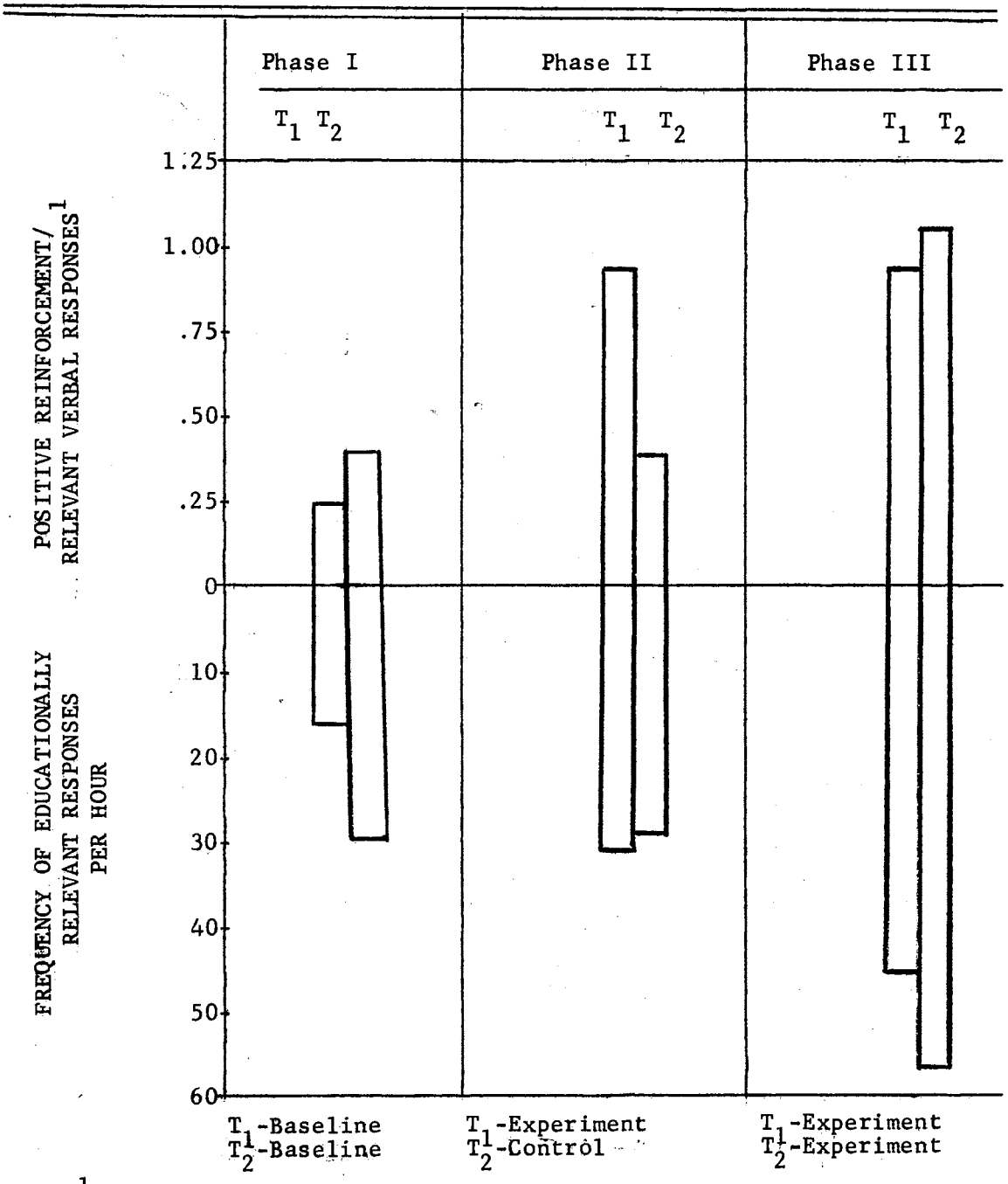
[2] B. H. Wasik, "The Application of Premack's Generalization on Reinforcement to the Management of Classroom Behavior," Journal of Experimental Psychology, 1970, X, p. 39.

[3] M. E. J. Orme and R. F. Purnell, Behavior Modification and Transfer in an Out-of-Control Classroom, Center for Research and Development on Educational Differences, Monograph No. 5 (Cambridge, 1969), p. 27-28.

TABLE II

RATES OF POSITIVE REINFORCEMENT EMPLOYED BY T_1 AND T_2 CONTRASTED WITH THE FREQUENCIES OF EDUCATIONALLY RELEVANT BEHAVIORS PER HOUR



[1]Rate of Positive Reinforcement was computed by dividing the observed instances of teacher positive reinforcement by the observed number of relevant verbal responses of the subjects. A rate of more than 1.00 indicates that single responses were reinforced more than one time.

reached a continuous level of surpassing 1.00. At the same time during Phase I, the reinforcing rate of T_2 was observed to be .45, and the frequency of desirable behaviors almost doubled that of T_1. The rate of T_2 was relativesly unchanged from Phase I (Baseline) to Phase II (Control); the frequency of desirable behaviors of the participants remained relatively stable, also. The increase of relevant responses to T_1 by the subjects had no effect upon the same responses to T_2 during Phase II. This finding did not lend support to Hypothesis Five.

Preceding Phase III, T_2 received initial training in the application of contingency management techniques. His continuous reinforcement rate of over 1.12 produced an average of approximately fifty-seven desirable responses per hour for each student. This was double the number of responses during Phase I and II, thus lending further support for Hypothesis One.

It should be noted that the positive reinforcing rate for each teacher after initial training is low in relation to rates established by other investigators.[4,5] However, this study was designed to measure the effects of tangible reinforcers upon delinquent boys deprived of incidental items of monetary value. Verbal reinforcing was not emphasized in the training of teachers to the extent that one would expect in an experiment involving a more normal population.

Table III presents the frequencies of Discrete Educationally Relevant Behaviors for all fourteen subjects observed during each

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[4] Ibid., p. 27-28.

[5] K. D. O'Leary et al., "A Token Reinforcement Program in a Public School: A Replication and Systematic Analysis," Journal of Applied Behavior Analysis, 1969, II, p. 5-8.

TABLE III

FREQUENCY OF EDUCATIONALLY RELEVANT RESPONSES PER HOUR

Subject	Phase I		Phase II		Phase III	
	T_1	T_2	T_1	T_2	T_1	T_2
1	23	18	24	36	45	50
2	20	17	18	11	30	56
3	30	28	38	29	83	51
4	7	8	16	16	18	33
5	15	35	24	41	36	50
6	12	45	50	40	71	110
7	8	38	25	17	12	12
8	18	52	40	52	80	98
9	27	32	31	46	32	72
10	8	38	30	24	32	72
11	7	13	4	16	8	9
12	23	43	58	44	77	47
13	13	15	10	23	29	59
14	12	28	56	19	54	92
$\bar{X}$	15.9	29.3	30.3	29.6	43.4	56.6

phase of the experiment.

The frequencies of educationally relevant responses per hour for each of the fourteen subjects were tested for statistically significant increases utilizing the Wilcoxon Matched-Pairs Signed-Ranks Test. The changes between Phases I and II and Phases II and III were tested for each teacher. The data relevant to this test are summarized in Table IV. The increases in behaviors between Phase I and Phase II under T_1, and increases between Phase II and Phase III for each teacher have a $p < .005$ lending support to Hypothesis One. A $p > .025$ between Phase I and II for T_2 failed to support Hypothesis Five.

Pupil Time-on-Task Behavior: The average amount of time each student spent on Discrete Educationally Relevant Behaviors (TOT) is shown in Table V. TOT is contrasted with the average amount of unattending time with each teacher. Unattentiveness refers to sleeping or daydreaming and not to total time-off-task. It does not include time committing digressive or aggressive behaviors. It simply means time doing nothing.

Student Time-on-Task with T_2 during Phase I (Baseline) was surprisingly high. This could possibly have been attributed to independent variables over which the experimenter had no control. T_2 was a male as opposed to T_1 being a female. It is possible that a male-dominant figure could command more attention from delinquent boys, however, no evidence could be found to substantiate this conjecture. Also, the curriculum variable could have been responsible for the wide range of total TOT existing between T_1 and T_2 during Phase I. It should be recalled that T_1 was a social studies teacher, and T_2 was a mathematics teacher. Another independent variable considered was the

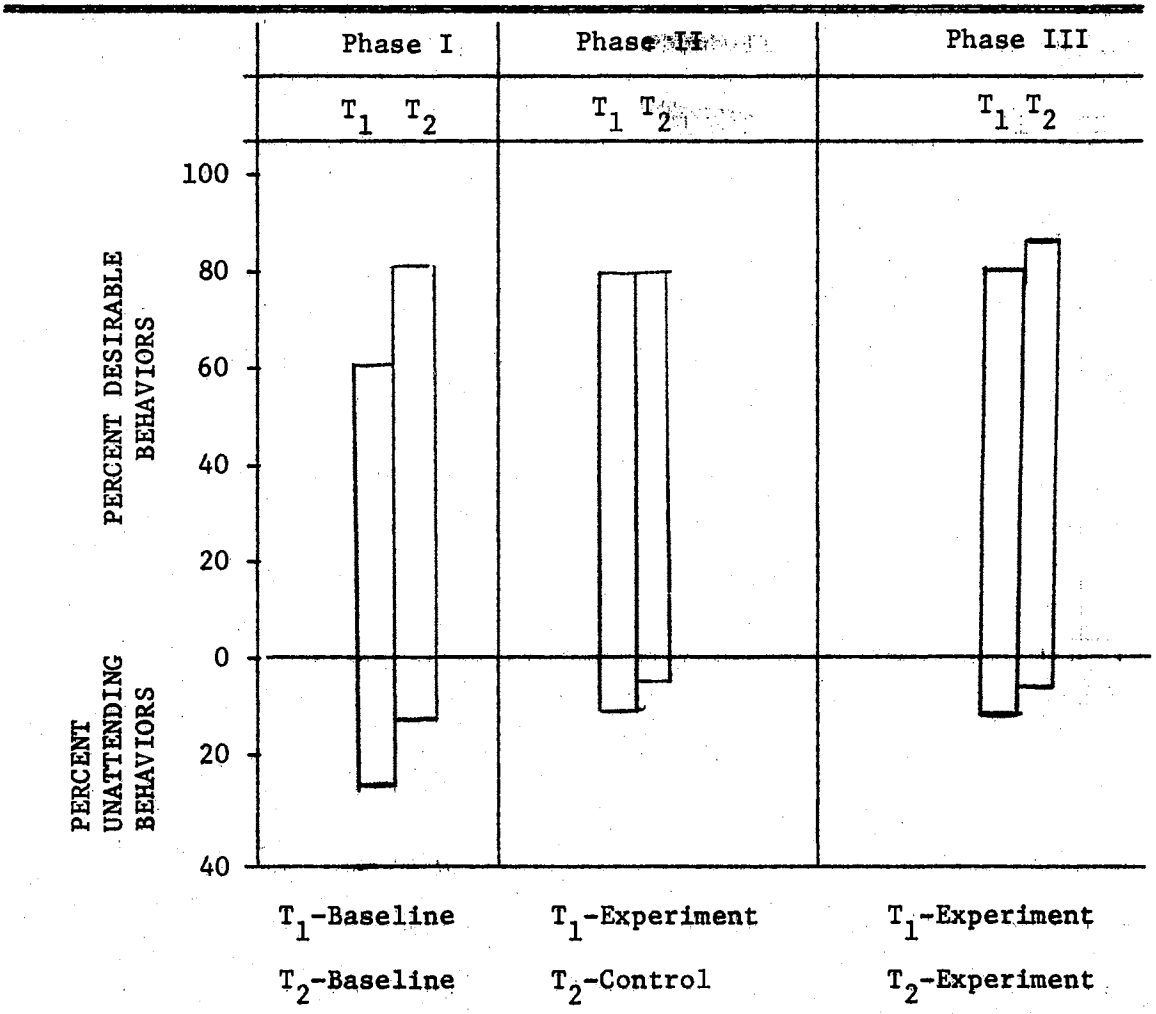
TABLE IV

COMPARISON OF EDUCATIONALLY RELEVANT RESPONSES PER HOUR

Teacher	Mean	Range	N	T	p
T_1					
Phase I	15.9	24	14	9	< .005
Phase II	30.3	55			
Phase II	30.3	55	14	11	< .005
Phase III	43.4	74			
T_2					
Phase I	29.3	45	13	42	> .025
Phase II	29.6	42			
Phase II	29.6	42	14	5	< .005
Phase III	59.6	102			

TABLE V

MEAN PERCENTAGE OF TIME IN DESIRABLE BEHAVIORS (TOT) CONTRASTED WITH MEAN PERCENTAGE OF TIME IN UNATTENDING BEHAVIORS



difference in positive reinforcing rate that existed between the two. Table II shows that the rate for T_2 was approximately double that of T_1.

Regardless of the reason, the wide range of total TOT between T_1 and T_2 seriously altered the investigator's efforts to show significance in gains during the following phases. Even so, substantial increase above the eighty percent level for T_2 was realized during Phase II, lending some support to Hypothesis Five. Following initial training of T_2, the total TOT average of all subjects increased to almost ninety-five percent as unattending behavior decreased to less than four percent throughout Phase III. TOT with T_1 had shown a sizable increase to eighty-five percent in Phase I and stabilized throughout the remainder of the experiment. As expected, increased TOT behavior caused a decline in the time each student spent in unattending behavior.

The average percentage of total Time-on-Task for each of the fourteen students is presented in Table VI. The greatest increase in total TOT with T_1 was realized with subjects ten and fourteen. Both increased over forty percent from Phase I to the end of the experiment. Subject six increased to one hundred percent during Phase III under T_2.

Subject seven experienced the only substantial decline in total TOT for either teacher from control to experiment. The subject exhibited a high degree of frustration from the middle of Phase II to the termination of the study. Empirical observations by the experimenter were not conclusive in determining if the student's frustration was caused by his failure in gaining rewards via the point system, or if unknown independent variables were influencing his behavior.

TABLE VI

PERCENTAGE OF TIME ON TASK

Subject	Phase I		Phase II		Phase III	
	T_1	T_2	T_1	T_2	T_1	T_2
1	49	67	85	84	74	87
2	67	82	95	88	94	95
3	75	89	70	89	98	98
4	49	89	84	88	81	98
5	62	87	88	97	89	95
6	48	82	89	82	86	100
7	87	90	88	89	69	91
8	60	84	75	86	93	96
9	67	87	84	89	90	90
10	39	70	90	86	80	93
11	57	83	87	94	86	95
12	76	82	89	79	93	93
13	64	72	86	81	94	96
14	45	71	86	77	90	99
X	60.6	81.0	85.4	86.4	86.2	94.7

Probing and successive approximation techniques by the teachers proved futile as both his total TOT and Discrete Educationally Relevant Behaviors successively declined under both teachers during Phase III. It was finally ascertained that the boy was experiencing serious social adjustment difficulty within the institution, and a social worker was requested to assist the boy in solving his personal problems. Tyler and Brown[6] and Schwitzgebel and Kolb[7] had disclosed in previous studies that contingency management techniques are not successful with all institutionalized delinquents because of other intervening variables beyond the control of classroom teachers.

The Wilcoxon Matched-Pairs Signed-Ranks Test was repeated on the percentage of total time-on-task per hour to determine if there was a significant increase for the fourteen subjects. The changes between Phases I and II and Phases II and III were again tested for each teacher. The $p > .025$ between Phase II and III under T_1 is interesting, but not necessarily a negative finding, since Phase III is a continuation of Phase II for T_1.

Digressive Verbal and Motor Behaviors: The mean frequency of these beahviors is contrasted with the mean frequency of Handraising in Table VIII. Handraising per se cannot be said to be intrinsically desirable in itself, but it was a response each teacher desired. They wanted the frequency of handraising increased because it is a precurrent behavior

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[6]V. O. Tyler and G. D. Brown, "Token Reinforcement of Academic Performance with Institutionalized Delinquent Boys," Journal of Educational Psychology, 1968, LIX(3), p. 170.

[7]R. L. Schwitzgebel and D. A. Kolb, "Inducing Behavior Change in Adolescent Delinquents," Behavior Research and Therapy, 1964, VI, p. 302.

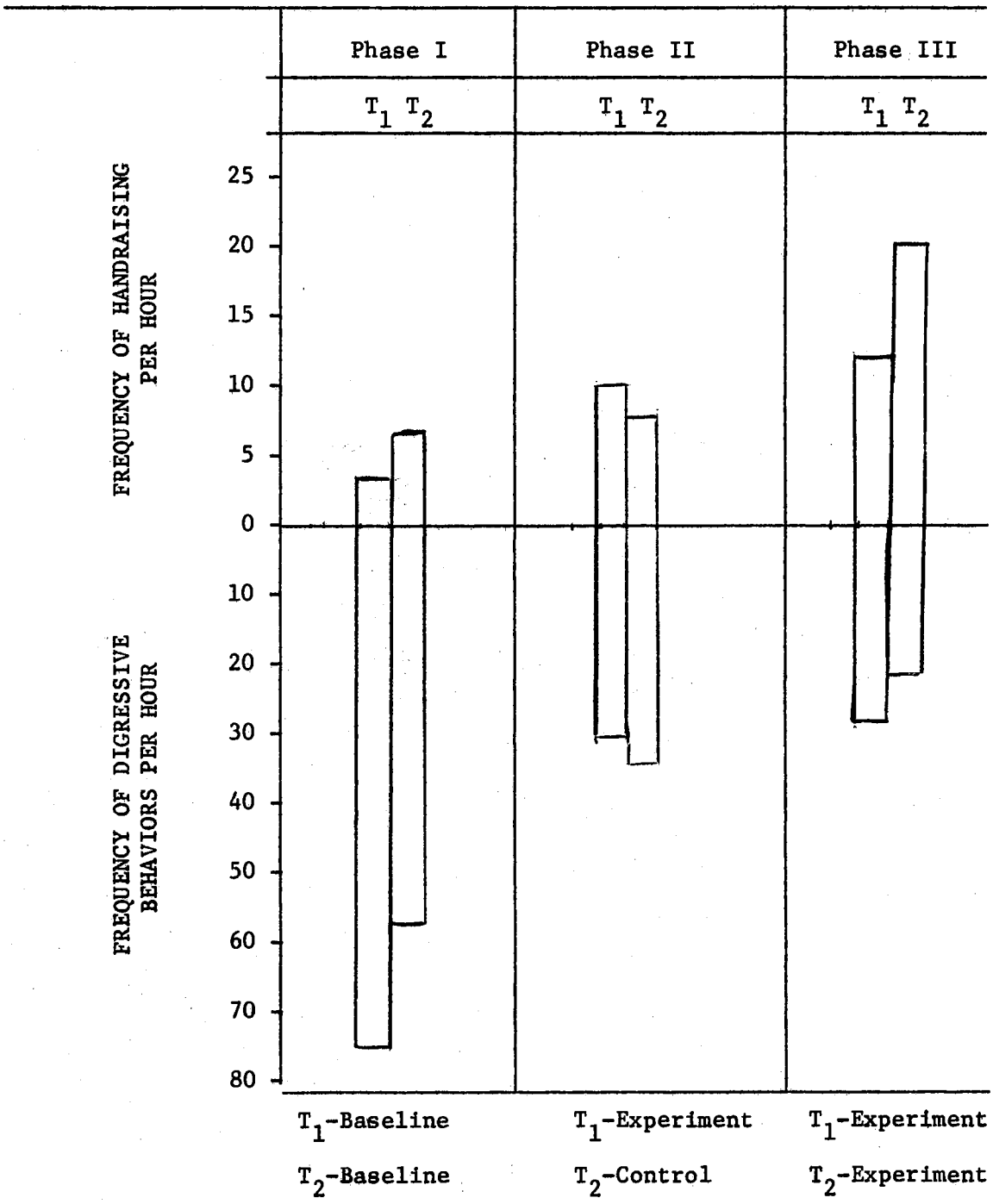
TABLE VII

COMPARISON OF PERCENTAGE OF TIME ON TASK

Teacher	Mean	Range	N	T	p
T_1					
Phase I	60.6	49	14	2	< .005
Phase II	85.4	26			
Phase II	85.4	26	14	48	> .025
Phase III	86.2	30			
T_2					
Phase I	81.0	24	12	8	< .01
Phase II	86.4	21			
Phase II	86.4	21	14	3	< .005
Phase III	94.7	14			

TABLE VIII

MEAN FREQUENCY OF HANDRAISING PER HOUR
COMPARED WITH MEAN FREQUENCY OF
DIGRESSIVE BEHAVIORS PER HOUR



that requires the student to be in the room, in his seat, and (most importantly) involved in the task-relevant activity. On the other hand, digressive behaviors are those behaviors designed to distract, disrupt, and interfere with other student attention. The investigator's rationale then, was: if a student is raising his hand for attention, he is involved and less likely to engage in digressive activity. The comparison of declining digressive behaviors throughout the phases of this study with the corresponding increase in frequency for handraising in Table VIII clearly supports this rationale.

Initially, the frequency of handraising under T_1 was approximately three times per hour for each student, and the number of digressive verbal and motor behaviors was extremely high (77). During Phase II, the frequency of handraising increased to over twelve and remained constant under T_1 for Phase III. At the same time, average digressive behaviors per student were drastically reduced to less than one-half for both phases. Meanwhile, the frequency of handraising under T_2 had remained constant for Phase I and Phase II, but the average digressive behaviors of each subject were reduced from fifty-seven to thirty-five during Phase II as T_1 administered the tangible reinforcers. While T_2 was also employing the same contingency techniques in Phase III, the frequency of undesirable digressive behaviors declined sharply to an average of twenty-one times per hour for each student. The same responses under T_1 remained rather constant.

The average frequency of all digressive behaviors per hour for each of the fourteen students is illustrated in Table IX. Subjects six, ten, and fourteen surpassed one hundred deviant behaviors per hour under T_1 in Phase I, and exhibited the greatest decrease during Phase

TABLE IX

FREQUENCY OF DIGRESSIVE BEHAVIORS PER HOUR

Subject	Phase I		Phase II		Phase III	
	T_1	T_2	T_1	T_2	T_1	T_2
1	80	30	18	25	26	17
2	42	42	14	19	32	8
3	77	40	59	22	12	6
4	67	40	31	30	9	26
5	72	32	22	20	35	15
6	113	68	47	50	59	30
7	37	40	29	18	17	11
8	93	75	83	52	35	26
9	93	65	29	56	33	44
10	110	70	24	40	60	38
11	47	52	13	19	11	5
12	85	87	31	46	30	29
13	55	57	11	30	14	18
14	102	108	37	72	45	21
$\bar{X}$ =	76.6	57.6	32.0	35.6	29.9	21.0

II. Subject seven who earlier regressed in TOT, also showed a decrease.

The Wilcoxon Matched-Pairs Signed-Ranks Test was again used to determine if there was a significant decrease in digressive behaviors for the fourteen students. The decreases in behaviors between Phases I and II for T_1 and between Phases II and III for T_2 have a $p < .005$ to clearly support Hypothesis Three. A $p > .025$ existing between Phase II and Phase III for T_1 is not a negative finding, since she was the experimental teacher during both phases. Data relevant to this test are summarized in Table X.

Aggressive Verbal and Motor Behaviors: This class of behavioral responses included hitting or pushing, threatening gestures, throwing things, and aggressive remarks to both students and teachers. The mean frequencies of aggressive behaviors per hour are presented in Table XI.

The frequency of aggressive behavior was higher under T_1 than T_2 throughout all three phases. The mean response for each student did decrease during Phase II for T_1, but reverted back to the original level in the last phase. For T_2, Phase II resulted in a slight increase over Phase I, however, after initial training, only two of the students under T_2 displayed any aggressive action during the final phase.

Table XII gives the frequency of aggressive behaviors for all of the participants. The greatest offenders during Phase I under T_1 were subjects three, six, ten, and fourteen.

The same four boys exhibited a noticeable decline in aggressive behaviors during Phase II under T_1. Subjects six and ten regressed considerably in the last phase as subject five displayed the highest number of aggressive behaviors for either group during Phase III. The

TABLE X

COMPARISON OF DIGRESSIVE VERBAL AND MOTOR BEHAVIORS PER HOUR

Teacher	Mean	Range	N	T	p
T_1					
Phase I	76.6	77	14	0	<.005
Phase II	32.0	73			
Phase II	32.0	73	14	57	>.025
Phase III	29.9	52			
T_2					
Phase I	57.6	79	14	0	<.005
Phase II	35.6	55			
Phase II	35.6	55	14	0	<.005
Phase III	21.0	40			

TABLE XI

MEAN FREQUENCY OF AGGRESSIVE VERBAL AND MOTOR BEHAVIORS PER HOUR

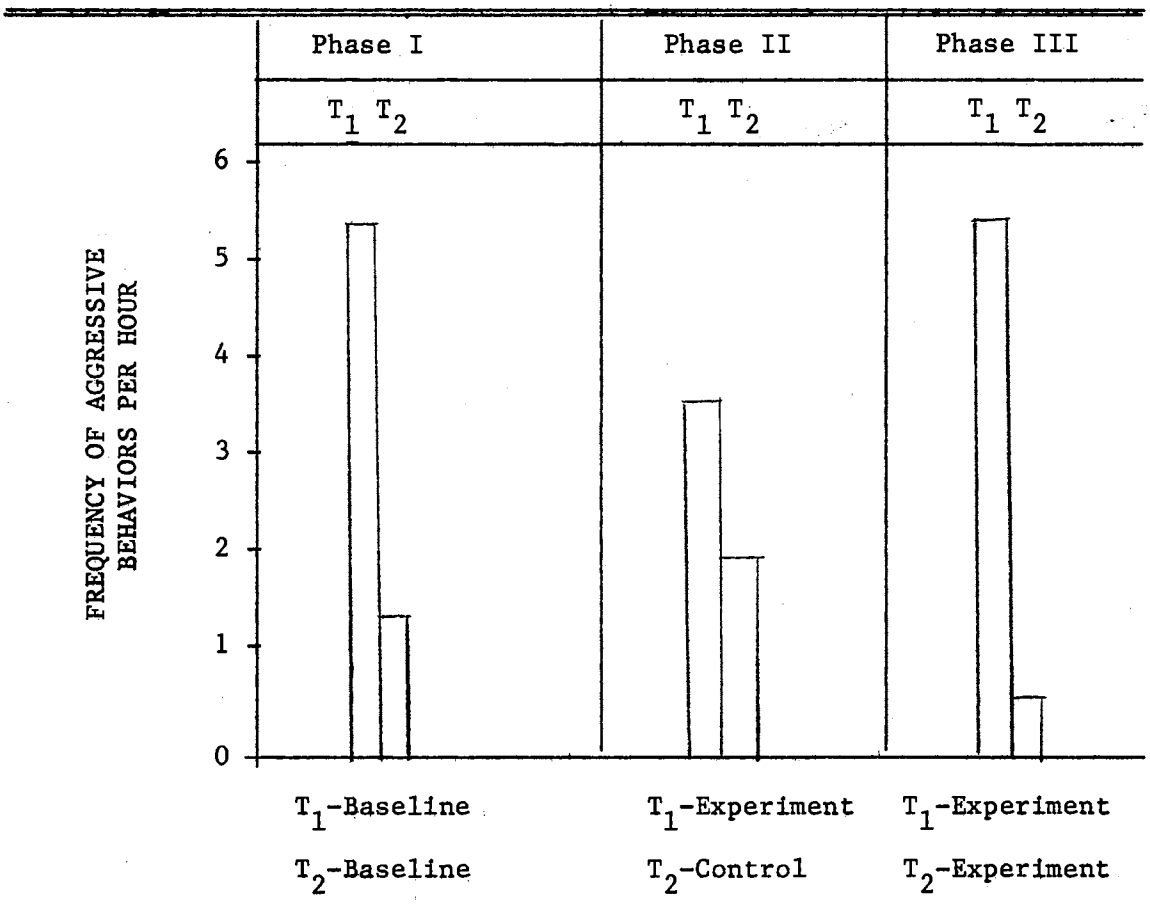


TABLE XII

FREQUENCY OF AGGRESSIVE BEHAVIORS PER HOUR

Subject	Phase I		Phase II		Phase III	
	T_1	T_2	T_1	T_2	T_1	T_2
1	2	3	5	5	2	5
2	2	0	0	0	0	0
3	10	3	6	7	0	0
4	2	0	1	1	5	0
5	7	7	1	0	18	0
6	10	0	1	2	17	0
7	2	0	7	6	3	0
8	7	0	8	0	6	0
9	3	0	8	0	0	2
10	13	5	2	1	15	0
11	0	0	0	0	0	0
12	3	0	4	2	2	0
13	0	0	5	0	0	0
14	12	2	1	4	5	0
$\bar{X}$	5.2	1.4	3.5	2.0	5.2	0.5

videotapes clearly indicated that subject six was the initiator of the majority of offenses. He was seated directly behind subject five and opposite subject ten. It can be noted from Table XII that none of the three students were guilty of any aggressive behavior under T_2 during the final phase of the study. By referring back to Table IX, the reader will find that the frequency of digressive behaviors for the same three boys under T_1 also shows a noticeable increase in the third and final phase of the experiment.

The regression of desirable behaviors and increase of undesirable ones mentioned above may in part be due to satiation effects produced by a surfeit or excess of tangible reinforcement. This means, that which is normally reinforcing can take on aversive qualities, and schedules of reinforcement require further investigation.

The same Wilcoxon Matched-Pairs Signed-Ranks Test was used to determine if there was a significant change between the groups. The value of the calculated T for the two related groups under T_1 was considerably higher, in both cases, than the critical values of T listed in Siegel.[8] The level of significance was well beyond the confidence level of .025 leading to the rejection of Hypothesis Four. A $p < .01$ for the level of significance between Phase II and Phase III for T_2 did not make the hypothesis tenable because of the extreme value of T for T_1 from Baseline to Experiment. The data germane to this test are summarized in Table XIII.

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[8] Ibid., p. 254.

TABLE XIII

COMPARISON OF AGGRESSIVE BEHAVIORS PER HOUR

Teacher	Mean	Range	N	T	P
T_1					
Phase I	5.2	14	13	33	>.025
Phase II	3.5	9			
Phase II	3.5	9	12	43	>.025
Phase III	5.2	19			
T_2					
Phase I	1.4	8	9	36	>.025
Phase II	2.0	8			
Phase II	2.0	8	8	2	<.01
Phase III	.5	6			

Summary

Chapter IV has presented the procedural analysis and statistical treatment of data in tabular form with appropriate discussion of results. Statistical confidence for the Wilcoxon Matched-Pairs Signed-Ranks Test was specified at the .025 level of confidence for a one-tailed test. Hypotheses One, Two, and Three were tenable. Hypothesis Four was partially rejected, and Hypothesis Five was rejected wholly.

Chapter V will present conclusions and recommendations for further research in areas related to this study.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Introductory Summary

This study was conceived and designed to explore the effects of contingency management techniques by teachers upon the behavioral responses in the classroom of institutionalized delinquent boys. The design emphasized the training of teachers in contingency management techniques including the determining of desirable behaviors of contingencies, the effective application of tangible reinforcers, and the use of a partial reinforcement schedule.

The independent variables were the reinforcement principles of operant conditioning, and the teachers' ability in applying reinforcement techniques for modification of behavioral responses. Thus, the focus was upon the teacher as a manipulator of reinforcing agents in controlling classroom behavior. The dependent variables were the behaviors to be modified.

A procedure for collection of data, via videotape, was systematically developed by the investigator. The subjects were the seventh grade class, randomly selected from the State School for Boys at Helena, Oklahoma. Two seventh grade teachers were selected to participate in the study. Collection of data was divided into three phases. Baseline data were recorded on videotape the first two weeks (Phase I).

During Phase I, T_1 received initial training in the use of contingency management techniques and applied these principles throughout Phase II. T_2 was instructed to continue teaching as he had in the past in order for the investigator to observe any feedback or changes in student behavior from the reinforcement techniques being applied by T_1. All observations were recorded on videotape during the three weeks of Phase II and the two weeks of Phase III. The training of T_2 in behavior modification principles was initiated prior to Phase III. The experimental procedure, during Phase III, allowed observation of student behavioral changes under T_2 to further investigate the effectiveness of tangible reinforcement. The procedure also allowed the investigator to check for any student behavioral changes under T_1 since T_2 was now applying the same reinforcement techniques.

The final stage of the study dealt with the training of three raters in order to achieve acceptable interrater agreement. Also accomplished were: recording and classification of data from the videotapes, and a systematic measurement of relevant variables.

Conclusions

The conclusions of the investigation upheld a majority of the hypotheses. The systematic application of tangible reinforcers led to relatively stable modification of student behavior. The findings considered to be the most important were as follows:

1) The Hypotheses One was supported. It stated: The use of contingency management techniques in a classroom of delinquent boys will result in an increase in the frequency of discrete educationally relevant behaviors such as: Asking questions, answers, relevant comments,

pupil-pupil interaction, and handraising.

The frequency of desirable responses doubled, then tripled for T_1 (cf. Table III), after application of contingency management techniques. These same behaviors had remained constant for the control teacher (T_2) in Phase II. These desirable responses were almost doubled under T_2 during Phase III by application of the experimental reinforcement techniques. On the basis of these observations, the hypothesis is tenable.

2) The Hypothesis Two was supported. It stated: The use of contingency management techniques by a teacher in a classroom of delinquent boys will result in an increase of time-on-task (TOT) which refers to the amount of time students spend on educationally relevent or desirable tasks.

The findings supporting this hypothesis were reported in Tables VI and VII. The fourteen subjects responded significantly to the techniques applied by T_1 (cf. Table VII) during Phase II, by increasing from an individual average of total TOT of sixty percent to eighty-six percent. This percentage held constant through Phase III. The percentage of total TOT with T_2 was surprisingly high during Baseline. However, a significant increase from eighty-one percent to ninety-four percent (cf. Table VII) was realized. Subject seven (cf. Table VI) was the only student regressing from Control to Experiment for either teacher. Another factor lending support to the Hypothesis Two, was the significant increases in the frequencies of desirable behaviors (cf. Table IV). These increases indicates that total TOT would also have to increase. On the basis of these observations, the hypothesis is tenable.

3) The Hypothesis Three was supported. It stated: The use of contingency management techniques by a teacher in a classroom of delinquent boys will result in a decrease of digressive motor and verbal behaviors.

The results are illustrated in Table X. The frequencies of digressive behavior declined successively through each stage. These behaviors under T_1 showed a much more sizeable decrease than T_2. T_2 also experienced a decrease during Phase II illustrating, to some extent, the effect of reinforcement by T_1. Each of the fourteen subjects exhibited a decrease in digressive behaviors from Baseline through the Experimental phases (cf. Table IX). On the basis of these observations, the hypothesis is tenable.

4) The Hypothesis Four was rejected. It stated: The use of contingency management techniques by a teacher in a classroom of delinquent boys will result in a decrease of aggressive motor and verbal behaviors.

Results reported in Table XIII shows that the frequencies of aggressive behaviors declined from Baseline to Experiment with both teachers, but the decrement was not significant for T_1. The frequencies of aggressive behavior reverted back to the original level for T_1 during Phase III, as only two students exhibited these behaviors under T_2. It should be noted that the majority of these behaviors under T_1 centered around three subjects (cf. Table XII) during the last phase. A majority of the subjects exhibited fewer aggressive behaviors after Phase I. As mentioned earlier, both teachers were instructed to ignore these behaviors, short of fighting. Even though the instructions were not completely followed, the atmosphere was conducive to this type of

behavior if other conflicting variables were introduced. On the basis of these observations, the hypothesis was rejected.

5) The Hypothesis Five was rejected. It stated: An increase in frequency of desired pupil behaviors within the experimental group will result in an increase of the same desirable behaviors within the same group under the control teacher.

The basis for rejecting this hypothesis is indicated in Table IV during Phase II while T_1 was the Experimental Teacher and T_2 was the Control Teacher. There was no significant change in the frequencies of educationally relevant responses of $p > .025$ under T_2. Support for this hypothesis can be noted in Table VII. There was a significant change in total TOT of $p < .01$ under T_2 during Phase II. A wide range of difference in total TOT existed between the two teachers during Phase I (Baseline). The slight increase in total TOT could not serve as the only basis for acceptance. From these observations, the hypothesis was rejected (partially).

6) Further conclusions of interest can be drawn from the recorded observations. It should be noted that the frequency of desirable behaviors did not decrease under T_2 during Phase II, suggesting that tangible reinforcement techniques can be applied by any teacher without adverse effect upon other teachers instructing the same group. Of further importance, the frequency of digressive behaviors (cf. Table X) indicates a significant decrease between Phase I and Phase II for T_2. Even though a decrement in desirable behavior failed to materialize in Phase II with T_2, the decline of undesirable behaviors suggests an area of further exploration. If students are involved less in degressive behaviors, the possibility that they are available for relevant

task-activity certainly exists.

7) On the basis of Hypothese One, Two, and Three being tenable, an effective contingency manager can be trained in a relatively short period of time.

8) The degree of deprivation of valued interests, activities, or items of monetary value determines the receptivity of students to rewards. All of the subjects were allowed $2.00 per month as an allowance to spend on tangible items. In unstructured interviews with the subjects, following the experiment, each stated flatly to the investigator that they placed a high value on the point system exchangeable for tangible rewards while they were deprived. Not one indicated any interest in such a reward if he were at home where these items were more plentiful.

9) A behavior modification program, utilizing tangible reinforcers, can serve as a determent for runaways in an institution for delinquent youth. The Helena State School for Boys experiences a high degree of runaways. Approximately twenty percent of the boys are absent without leave sometime during their incarceration within the school. Illustrative of the degree of importance they placed upon receiving the tangible rewards, not a single subject was reported absent without leave from the institutional grounds throughout the duration of the study. The same was true for incoming boys who, while not a part of the experiment, were assigned to the classes and still participated in the reward system.

10) A teaching technique was identified and demonstrated to be effective in modifying and controlling the behavioral responses of this particular experimental group of institutionalized delinquent adolescent

boys.

Recommendations for Further Research

1) The validity and the conclusions of this study should be substantiated through additional investigations utilizing more precise experimental control and a more sophisticated research design in order to obtain greater reliability by a scientific statistical analysis.

2) Further research should identify and explore salient teacher variables that affect the outcome of such a study. The degree of effectiveness of the teacher as a reinforcing agent should be determined in terms of personality, attitude, and curriculum. The degree of success of such a study should be measured not only by changes in the student's behavior, but also by changes in the teacher's behavior.

3) Further research should assess probability levels before establishing a contingency. Whether the contingency be increased academic performance, desired pupil responses or behaviors, or attitudinal change, a high probability level as opposed to a low probability level must be established before an effective contingency situation can be arranged. Contingencies must be established where all students, regardless of ability, can have equal chance to be reinforced to offset frustration on the part of slower performers.

4) Further work on the current data needs to be conducted pertaining to the differences existing within the group of fourteen subjects. Some considerations of the individual changes in behavior should be:

a) high versus low initial behavior

b) older versus younger students

c) economic, educational, and cultural background

d) ethnic groups

e) intelligence and academic achievement

Experimenters who become involved in the application of operant learning techniques in the classroom may eventually develop a new science of teaching.

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APPENDIX A

SAMPLE BEHAVIOR MODIFICATION

STUDY VIDEOTAPE SCHEDULE

BEHAVIOR MODIFICATION STUDY
VIDEOTAPE SCHEDULE

DATE _____ TO _____

TIME BLOCK	EXPERIMENTAL TEACHER					
	10:06 - 10-11	MON	TUES	WED	THURS	FRI
I	10:11 - 10-18½					
II	10:18½- 10:26					
III	10:26 - 10:33½					
IV	10:33½- 10:41					
V	10:41 - 10:48½					
VI	10:48½- 10:56					
	10:56 - 11:01					
	CONTROL TEACHER					
	11:04 - 11:09	MON	TUES	WED	THURS	FRI
I	11:09 - 11:16½					
II	11:16½- 11:24					
III	11:24 - 11:31½					
IV	11:31½- 11:39					
V	11:39 - 11:46½					
VI	11:46½- 11:54					
	11:54 - 11:59					
REMARKS						

APPENDIX B

A MODIFIED VERSION OF THE COPING ANALYSIS SCHEDULE FOR EDUCATIONAL SETTING

A MODIFIED VERSION OF THE COPING ANALYSIS SCHEDULE FOR EDUCATIONAL SETTING

DESIRABLE

3a. Manipulating and Directing Others; Manipulating, commanding, or directing others appropriately; enforcing rules.

5a. Self-Directed Activity: Working independently, such as reading, writing or constructing; continuing to work in the absence of immediate supervision.

7a. Sharing and Helping: Contributing ideas, interests, materials; helping others; initiating conversation.

8a. Social Interaction: Cooperative behavior, such as talking, studying, or playing with a peer.

9a. Seeking Support, Assistance, and Information: Asking teachers or peers for help, support, direction or explanation.

10. Following Directions Passively and Submissively: Following requests, answering direct questions, working only with teacher supervision.

INAPPROPRIATE

4a. Resisting Authority: More than a 10-sec delay in carrying out teacher's directions.

11. Observing Passively: Watching others work, "checking on" activities of adults or peers.

3b, 7b, 8b, and 9b. These categories have the same definitions as those with corresponding numbers under the Desirable heading, but are coded as inappropriate when they occur at other than the appropriate time or place.

UNACCEPTABLE

1. Aggressive Behavior: Direct attack on a child or teacher-grabbing, pushing, hitting, pulling, kicking, name-calling; destroying property.

2. Inappropriate Behavior-Getting Behavior: Activities which seem to result in attention from others such as annoying, bothering, belittling, or criticizing others; noise-making or loud talking.

4b. Resisting Authority: Physically resisting instructions or directions, for example-saying "I won't to it" and leaving the room.

APPENDIX C

SAMPLE RATER RECORDING DATA SHEET

RATER RECORDING DATA SHEET

REEL NO. _____ : DATE _____ RATER _____ : S _____

Aggressive Verbal and Motor Behaviors	Verbally To Teacher															
	Verbally To Pupil															
	Throwing Things															
	Threaten Gesture															
	Pushing, Hitting															
Digressive Verbal and Motor Behaviors	Shouting, Singing															
	Irrelevant Talk															
	Gross Movement															
	Chair Rocking															
	Out of Seat															
	Percent Sleeping, Gazing															
Discrete Educationally Relevant Behaviors	Handraising															
	Pupil-Pupil Interaction															
	Comments															
	Answers															
	Questions															
	Percent Time-on-Task															
	Minute Column	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

APPENDIX D

SAMPLE INTERRATER AGREEMENT RELIABILITY CHECK FOR STUDENT BEHAVIOR

INTERRATER AGREEMENT RELIABILITY[1]
CHECK FOR STUDENT BEHAVIOR

Student _____ Behavior _____

Minute	$Rater_1$	$Rater_2$	$Rater_3$	Total[2]	Absolute[3]	Errors[4]
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

1. Percentage = $\frac{\text{Sum of Total Col} - \text{Sum of Error Col}}{\text{Sum of Total Col}}$

2. Sum of all rater observations for each minute

3. Greatest number of behaviors that a majority observed

4. Total number of observations of all three raters above or below the absolute

APPENDIX E

SAMPLE INTERRATER AGREEMENT RELIABILITY CHECK FOR TEACHER REINFORCEMENT

INTERRATER AGREEMENT RELIABILITY[1]
CHECK FOR TEACHER REINFORCEMENT

Teacher _____ Reinforcement _____

Minute	Rater$_1$	Rater$_2$	Rater$_3$	Total[2]	Absolute[3]	Errors[4]
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

1. Percentage = $\frac{\text{Sum of Total Col - Sum of Error Col}}{\text{Sum of Total Col}}$

2. Sum of all rater observations for each minute

3. Greater number of reinforcements that a majority observed

4. Total number of observations of all three raters above or below the absolute.

VITA 2

Lloyd L. Kutch

Candidate for the Degree of

Doctor of Education

Thesis: THE EFFECTS OF CONTINGENCY MANAGEMENT TECHNIQUES BY TEACHERS ON CLASSROOM BEHAVIORS OF INSTITUTIONALIZED DELINQUENT ADOLESCENT BOYS

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