The Effects of Extrinsic Reinforcement Upon the Motor Performance of Learning Disabled Children on a Selected Motor Task

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THE EFFECTS OF EXTRINSIC REINFORCEMENT UPON THE MOTOR PERFORMANCE OF LEARNING DISABLED CHILDREN ON A SELECTED MOTOR TASK

A Thesis
Presented to
the Faculty of the Graduate School
State University College, Brockport, New York

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
in Education (Physical Education)

by
Daniel Lee Zachofsky
August 1974
STATE UNIVERSITY COLLEGE OF NEW YORK
BROCKPORT, N.Y.

Graduate Committee of Physical Education

Title of Thesis:
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THE MOTOR PERFORMANCE OF LEARNING
DISABLED CHILDREN ON A SELECTED MOTOR TASK

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Date

Coordinator of Graduate Study
This thesis is dedicated

   to my wife, Gail

iii
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ABSTRACT OF THE THESIS

The Effects of Extrinsic Reinforcement Upon
The Motor Performance of Learning
Disabled Children On A Selected Motor Task

by

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Master of Science in Education
State University College, Brockport, New York

Professor Ronald French, Chairman

The present investigation was conducted to study the effects of extrinsic reinforcement upon the motor performance of learning disabled children on a selected motor task. Subjects selected were sixty-eight learning disabled children.

The sample was randomly divided into a Reinforcement, Non-Reinforcement, and Control group and administered a pre-test and posttest on a specific motor task. A five week physical education program was provided to the Reinforcement and Non-Reinforcement groups, with no treatment provided to the Control group. Only the Reinforcement group received the experimental treatment of tangible items such as candy bars, balls, and frisbees.

It was the contention of the experimenter that the inclusion of extrinsic reinforcement would improve the motor performance by learning disabled children on a selected motor task. The subjects were administered a softball throw test to measure the variables Distance, Accuracy, and Total Score.
The Total Score was measured by taking the highest value of
the three trials when the Accuracy score was subtracted from
the Distance score. The scores were subjected to a two-way
Analysis of Variance with repeated measurements. The Rein­
forcement group made improvements on all variables over
testings. On the same variables, the Non-Reinforcement and
Control groups decreased over testings. The improvements
made over testings by the Reinforcement group was attributed
to the inclusion of extrinsic reinforcement and/or the phy­
sical education program.

No significant relationship was found between the
amount of check marks a subject received and the improvements
made over testings on all three variables. The check mark
system approach was based on the quality of each individual's
task accomplishment and appropriate functioning. The amount
of check marks a subject received was not the essential factor
of this approach. While the findings may indicate that
extrinsic reinforcement and/or the physical education program
improved the motor performance of learning disabled children,
it can only be generalized to a male population and a specific
motor task. Caution should be used in generalizing the
findings.
CHAPTER I
INTRODUCTION

In recent years, special educators have become concerned with the principles of behavioral control for children with learning disabilities. These educators are responding to both their needs as well as those of concerned parents, and are providing special classes for children with learning disabilities (Quay, 1963). Special classes provide the child with a social and emotional environment that encourages the development of appropriate attitudes and learning, and eliminates anxiety involved in competition (Johnson, 1962). To encourage healthy emotional development for these children, it is imperative that special educators control maladaptive behaviors. One approach that has been utilized to control and alter maladaptive behaviors has been referred to as behavior modification (Ullman & Krasner, 1965). This approach may be utilized to extinguish behaviors exhibited by the learning disabled child that interfere with the learning process. Behavior modifiers are not primarily concerned with the causative factors related to maladaptive behaviors but rather with what behaviors are considered maladaptive. The behavior modification approach considers maladaptive behaviors to be acquired, and it is necessary for special educators to modify these behaviors so learning can be facilitated. Quay (1963) reported that academic
material should be presented in a unique manner only after behavioral control has been established. Such an approach in educating the learning disabled child to learn academic and motor skills was developed by Hewett (1968).

Hewett proposed a developmental sequence of educational goals which focuses on teaching the child the necessary behaviors for successful learning. This developmental sequence has been utilized in this study and will be introduced with a brief discussion of each level.

Attention. Before learning can begin, a child must become aware of some relevant stimuli in the environment. The ability to attend to something is dependent on the child's development of his senses. A child who attends to some environmental stimuli will associate it with events that are pleasant or unpleasant, and will acquire knowledge of the environment around him.

Response. While becoming aware of something initiates the learning process, the child must do something, (that is, form a response), in order to learn. When the child has noticed something which in turn has led him to respond, he has become a participant in the learning process.

Order. While the child attends to some stimuli and responds to it, this does not guarantee that learning will take place. It is necessary that the child follow instructions and develop order in his attending and responding.

Exploratory. The more the child attends to his environment the more he responds, and the more he learns
about his environment. Children are active and find out through exploration that objects have distinct physical characteristics (i.e. smooth, coarse, heavy, and light).

Social. The first four task levels focus largely on the child as an individual prepared to learn. Much of the child's experiences with others during the attention, response, exploratory, and order levels were influenced by what he was shown, what he did, and what parents and other individuals told him to do. While social attention was not a consequence of the response level, the social level is concerned with the child gaining social approval and avoiding displeasure.

Mastery. This level is concerned with displaying basic skills and with the acquisition of a fund of information about the environment which will enable the child to function independently and successfully within the limits of his abilities. When a child can execute a task with a degree of precision, he will have attained a level of mastery.

Achievement. This level is concerned with the development of self-motivation in learning and seeking to accomplish intellectual skills as well as improving the physical skills of swinging, jumping, throwing, and catching. This developmental sequence of educational goals is illustrated in Appendix A, page 59.

Having established the developmental sequence of educational goals, Hewett (1968) has developed a teaching
methodology that is concerned with preparing the child to be ready to be in school while he is actually there. It has been postulated that if the teacher can provide learning disabled children with three elements in a learning program, there is no learning disabled child who cannot be taught something. These three elements may be considered to be the sides of a triangle, the central position of which is occupied by the student. But, the elements of the learning triangle are as important for the teacher, who occupies a central position here as well. The learning triangle is illustrated in Appendix A, page 60.

**Task.** The task is any activity or lesson given to a child which is directed toward assisting him in attaining one or more goals on the developmental sequence. The teacher must use a progression in the assignment of tasks so that the end goal can be met with success.

**Reward.** Rewards are positive consequences which tend to maintain or increase the strength of behavior. Rewards are associated with the child accomplishing tasks related to the achievement of educational goals on the developmental sequence. These rewards may range from teacher recognition to extrinsic rewards for acquiring knowledge or a skill.

**Structure.** The structure is concerned with the limits the teacher or the school will attach to the tasks assigned to the child, thereby determining whether or not he will be rewarded. The degree of teacher control by which a child must abide will determine the conditions under which a
reward will be provided.

There is evidence from studies (Azrin & Lindsley, 1956; Whelan & Haring, 1966; Zimmerman & Zimmerman, 1962) that maladaptive behavior can be modified by a behavior modification approach which manipulates a response with a reinforcement. Special educators have been able to modify behaviors by the use of extrinsic reinforcers. These educators found that traditional rewards, such as grades and teacher approval were ineffective for certain learning disabled children in an attempt to modify their behavior. In attempts to utilize more appropriate rewards for learning disabled children who failed to respond to the more traditional ones, special educators have utilized extrinsic reinforcers (candy, check marks, tokens) with success. In a structured classroom with precise expectations and rewards it was reported that learning disabled children improved in the acquisition of academic skills (Haring & Phillips, 1962). Hewett (1964) and MacMillan and Forness (1970) suggested that candy, tokens, and check marks be utilized to get children to read, sit in their seats, and develop other behavior appropriate to school. While past research has dealt with the control of maladaptive behaviors in the classroom setting, limited research has been conducted in the field of physical education.

The limited amount of literature in physical education for learning disabled children may be the result of the lack of an instructional physical education program.
Since physical education activities creates a setting in which there is increased noise and aggressive behavior, the classroom teacher may be unable to control maladaptive behaviors exhibited by learning disabled children during such activities. Specific examples of behaviors of learning disabled children in playground activities were presented by Wargo (1962, p. 100):

1. A learning disabled child will quit and join activities until he has attracted attention.
2. The learning disabled child does not usually have the coordination skills and reactions of the normal child.
3. The learning disabled child cannot participate as easily as a normal child because of temper flares.
4. The learning disabled child wants his way all of the time.
5. The learning disabled child is very aggressive in all recreation situations.
6. Many times a learning disabled child will not play the game for fun; he is trying to prove something.
7. Learning disabled children are usually bad sports if they lose a game by a close score, but not if beaten badly.

In many schools an unstructured physical education program may also be attributed to the limited instructional material written on physical education for learning disabled children. Haring and Phillips (1962) found that learning disabled children failed to abide by rules in a daily physical education program and as a result, the physical education program was reduced to one period weekly. The physical education period served only as a reward for these children. Glavin and Witt (1969) reported that an unstructured recreation program led to little behavioral
improvement and little skill learning with learning disabled children. A structured program with clear step by step intervention procedures, and clearly defined behavior limits, helped to shape and maintain their behavior.

It is apparent that an instructional physical education program for learning disabled children is necessary. Physical education is concerned with imparting a large number of responses and shaping these responses to improve the performance of the students (Rushall & Siedentop, 1972). As a group, learning disabled children have deficiencies in physical skills and motor performance (Glavin & Witt, 1969; Mahler, 1966; Poindexter, 1968; Wargo, 1962). In addition to the improvement of physical skills and motor performance, a physical education program for learning disabled children may help them gain self-confidence, a sense of belonging and recognition when they cannot gain it in the classroom (Edson, 1969).

A new method utilized in teaching physical education, which has reported some success in modifying maladaptive behavior, has been referred to as movement exploration (Fletcher, 1972). This method of motor skill instruction eliminates competition, waiting for turns, encourages creative thinking and there is no teacher demonstration. Taylor and Sherrill (1969, p. 11) have reported limitations in movement exploration for learning disabled children:

1. Many learning disabled children may be unable to ignore the movements of the other children which may hinder
the child's ability to concentrate. These children cannot benefit from group instruction in movement exploration.

2. The children must receive individualized instruction in a structured environment.

Behavior modification is another method which attempts to control maladaptive behavior in physical education. A rule to apply for rewarding behaviors is to immediately reinforce the behavior being learned, or it will eventually become extinct (Arnheim & Pestolesi, 1973). It is the responsibility of physical educators to provide an educational process that enables the acquisition of skills and promotes desirable behavior. It is the contention of this researcher that a behavior modification approach can control maladaptive behavior, and that improvement in a selected motor skill will result.

Statement of The Problem

It is the purpose of this study to investigate the effects of extrinsic reinforcement upon the motor performance of learning disabled children on a selected motor task.

Definition of Terms

Learning Disabled Child. In this study, a learning disabled child refers to a child with a learning disability in academic and other subjects resulting from a psychological condition caused by neurological impairment and/or behavior disorders (Kirk & Bateman, 1962).
Behavior Modification. In this study, behavior modification refers to the shaping of maladaptive behavior into socially acceptable behavior.

Maladaptive Behavior. Maladaptive behaviors refer to behaviors that are inappropriate in a playground and that interfere with a child's ability to learn necessary skills.

Extrinsic Reinforcement. Extrinsic reinforcement is the utilization of tangible rewards to enhance motivation (MacMillan & Forness, 1970). In this study, extrinsic reinforcers in the form of check marks exchangeable for candy will be provided to the subjects after they elicit positive responses.

Non-Reinforcement. Non-reinforcement refers to the absence of the use of tangible rewards for motivation. In this study, non-reinforcement refers to the failure to give candy rewards for eliciting a response.

Selected Motor Skill Performance. A selected motor skill performance is a measure of a child's skill on a distinct motor task. In this study, a selected motor skill performance refers to a child's ability to throw a softball for distance and with accuracy.

Limitations

1. This study is limited to sixty-eight subjects from the Board of Cooperative Educational Services, First Supervisory District of Monroe County, Fairport, New York.

2. This study is limited to learning disabled children whose chronological age ranges from seven to
fourteen years.

3. This study is limited to males.

4. This study is limited to the performance of one motor skill.

5. This study is limited to two scheduled physical education classes per week for a five week experimental period.
CHAPTER II
REVIEW OF LITERATURE

This chapter presents a review of literature relevant to the variables being investigated in this study: (1) literature concerned with the use of a behavior modification approach of extrinsic reinforcement; (2) literature relevant to the effects of reinforcement on learning disabled children; and (3) the literature concerned with the motor performance of learning disabled children. A summary is included after each section of this chapter to discuss implications of the reviewed literature. The concluding section of this chapter provides a summary of the need for this investigation.

Behavior Modification Literature

Azrin and Lindsley (1956) conducted a study to determine if cooperative behavior between children could be developed, maintained, and eliminated by the presentation or non-presentation of an extrinsic reinforcer, following each cooperative response. Twenty children who were seven to twelve years of age were placed into ten cooperative teams of two children each, and were matched by age and sex. The two children of each team were placed at opposite sides of a table that had three holes and a stylus was placed in front of each child. They were then given
instructions to place both sticks (styli) in all three of their holes. A jelly bean was released into a cup when both subjects placed the sticks into all of the opposite holes. During the first reinforcement period the subjects' cooperative response was reinforced for fifteen minutes. An extinction period followed the first reinforcement period in which the subjects cooperative responses were not reinforced for over fifteen minutes. A second reinforcement period was utilized and the subjects were reinforced for cooperative responses. The results of the study indicated that all subjects learned to cooperate within ten minutes during the first reinforcement period. Cooperation gradually declined during the extinction period, but a significant increase in the rate of response occurred following the first reinforcement of the second reinforcement period. It was concluded that cooperative behavior can be developed and maintained by the use of extrinsic reinforcers. Cooperative behaviors increased in frequency with reinforcement, but decreased in frequency when not reinforced.

In a classroom setting with the use of social and extrinsic reinforcement, O'Leary, Becker, Evans, and Saudargas (1969) studied the behaviors of several disruptive second graders from a class of twenty-one students and found that rules, educational structure, and praise for appropriate behavior while ignoring disruptive behavior had no effect on the reduction of disruptive behavior. A combination of these three merely eliminated disruptive behavior in one
child, while a token reinforcement program eliminated the frequency of disruptive behavior in five of the remaining six children.

Shores (1969) conducted a study to investigate the differences in the effectiveness of tangible and intangible reinforcement on the learning behavior among the social classes of academically achieving and underachieving children. A three size discrimination task was administered to eighty fourth graders of normal intelligence who were divided equally into four groups on the basis of social class and academic achievement. Normal achievers were the students who scored on the achievement tests at or above grade level, while underachievers scored one or more years below grade level. Each group was randomly divided into two subgroups of ten subjects each making a total of eight subgroups of ten subjects each. Four of the subgroups received confirmation of a response (intangible reward) and the other four subgroups received tangible rewards contingent upon correct responses during their performance on the three size discrimination task. The most adequate performance by the middle class children was reported. The middle class normal achieving groups performed adequately under intangible rewards of verbal responses while the middle class underachieving group performed better with tangible rewards. Lower class children of the underachieving group performed better than the lower class normal achievers under intangible rewards, but not under tangible rewards. The results of
the present study indicated that children with learning problems seem to be affected differently than normal learning children on the type of reinforcement utilized.

McKenzie, Clark, Wolf, Kothera and Benson (1968) conducted a study to assess whether a token reinforcement program exchanging grades for money could increase academic behavior to levels higher than those achieved with usual school incentives. The subjects selected for the study were ten students in a learning disabilities class, eight boys and two girls whose ages ranged from ten to thirteen. Concluding data were presented on eight of the ten students, since two students returned to regular classes. During a baseline period the children received the available school incentives of recess, free time activities, special privileges, and teacher attention when they completed all their assigned work. Weekly grades of "A", "B", "C", and "incomplete" were given to the children to take home to their parents. At the end of the baseline period the parents agreed to reward their children with money on the basis of the children's grades for all subject areas. The results indicated a significant increase from the baseline period to the pay period. Overall medians increased from 68 percent in the baseline period to 86 percent in the pay period. This study demonstrated that extrinsic reinforcers of money can increase academic behavior beyond those reinforcers used ordinarily in a school.

In another program that utilized extrinsic reinforcement
(Nolen, Kunzelmann, & Haring, 1967) the academic and social behavior of junior high school children with a variety of disorders were investigated. Eight students, twelve to sixteen years in age, were enrolled in the same class with achievement levels ranging from pre-school to sixth grade. The classification of the students included a variety of emotional and learning disorders as well as mental retardation. A behavior modification program focused on the diagnosis of the children by reading and mathematics problems rather than by physical or psychological deficits. Following the identification of both skill sequences and the student's functioning level at some point in the sequence, individual programs were designed. The major concern of the program centered on extrinsic reinforcement. The classroom teacher allotted points, which were exchangeable for enriching reinforcers most preferred by the students, for completion of a number of academic tasks. After a period of 100 days a significant gain in mathematics and reading was found. To test the effectiveness of the reinforcement, a control period provided rewards not contingent upon accuracy or rate of responding. This control period produced a significant decrease in appropriate academic behavior and a subsequent rise in the same during the reinstatement of the response-reinforcement contingency. Follow-up studies of three of the students who were transferred from this classroom indicated that the rate of their responses were not maintained under traditional classroom reinforcement procedures. However,
their work performance was still superior to other students in their new class.

A similar study concerned with the utilization of extrinsic reinforcement was conducted by Clark, Lachowicz, and Wolf (1968). This study was directed toward improving the academic skills of school dropouts by means of extrinsic reinforcement. Subjects for this study were two groups of five girls who were matched according to differences between their number of years of formal education, and their scores on the California Achievement Test. All of the subjects were between sixteen and twenty-one years old. One group was designated as the classroom group and received an education program with extrinsic reinforcement. The second group was labeled the job group and received job placement. Although rewards of money were provided for both groups, the classroom group was rewarded on the basis of their performance on instructional materials. At the termination of the program the California Achievement Test was again administered to both groups. The pretest and posttest results for both groups indicated that the overall program was effective in significantly increasing the academic skills of the students in a short period of time. The employment program of the job group led to only a slight increase in their academic skills.

In summary, a behavior modification approach of extrinsic reinforcement has been utilized successfully to shape behaviors. Specifically, extrinsic reinforcement has
eliminated the frequency of disruptive behaviors, and shaped behaviors necessary for the procurement of learning skills. This review of literature has indicated that for children with learning problems extrinsic reinforcers are more effective in bringing about desirable changes in maladaptive and academic behaviors than for children who are academic achievers.

**The Literature of Extrinsic Reinforcement on Learning Disabled Children**

Hewett (1964) utilized a reinforcement program to teach reading and writing to a thirteen year old autistic boy who had not developed speech. An educational program that utilized extrinsic rewards as a motivator was designed to initiate the acquisition of reading and writing skills. Beginning with concrete objects matched to picture cards, the subject was taught to match picture cards to their appropriate work symbol. By pairing a reward of candy to an appropriate response the subject increased his vocabulary as well as an understanding of various objects and the letters of the alphabet. As the subject became familiarized with the letters of the alphabet, the development of written skills was undertaken. Once the subject mastered the written reproduction of the alphabet, he was taught to write simple phrases. The acquisition of reading and writing skills enabled the subject to become aware of his environment and accessible to self-control.

In a similar investigation, Patterson (1965) devised
a token reinforcement program to control behaviors of a learning disabled child. A nine year old boy in the second grade was selected to be studied because of marked hyperactive behavior and academic retardation. Baseline observations were recorded prior to each conditioning session to establish the occurrence of undesirable behaviors. Conditioning sessions were initiated in the classroom under the influence of extrinsic rewards of candy and social rewards of student approval when the subject attended to school work at ten second intervals. The results of the study were significant as the undesirable behavior of the subject decreased with the use of extrinsic and social rewards.

An extension of the Patterson (1965) study was conducted by Quay, Werry, McQueen, and Sprague (1966). Five learning disabled children were observed for fifteen ten second intervals to determine a baseline of attending behavior. Observations were carried out over a period of twelve days in which a baseline rate of attending behavior indicated 41 percent success. After the baseline period each student was given a box containing a light which could be flashed on following attending behaviors of a fixed duration. The subjects were given extrinsic rewards for each light flash. The results following the reinforcement period indicated an increase in the attending behavior of the subjects. Attending behavior increased from 41 percent during the baseline to 71 percent during the last twenty days of the reinforcement period.
O’Leary and Becker (1967) conducted a study to devise a token reinforcement program which could be implemented by a teacher in the classroom and later be withdrawn in favor of teacher attention, praise, and grades without an increase in maladaptive behavior. The subjects selected for this study were seventeen nine year old children classified as learning disabled. The token reinforcement designed for the entire class focused mainly on the eight most disruptive children. Two trained student observers randomly selected four students to observe making observations on a twenty second observe/ten second record basis. Observations of maladaptive behaviors were recorded during a base period in which no reinforcement was utilized and during a token reinforcement period. Ratings in the form of tokens exchangeable for extrinsic rewards of candy and money were provided when the children followed instructions. The number of tokens needed to obtain a reward increased at two, three, and four day intervals. The results of this study indicated significant differences between the means of the time sample scores of maladaptive behavior during the base and token reinforcement periods. The means of maladaptive behavior during the token reinforcement period ranged from 3 to 32 percent while during the base period these ranged from 66 to 91 percent. The average of maladaptive behavior for all children during the base period was 76 percent as contrasted with 10 percent during the token period. It was estimated that the token reinforcement program accounted for 96 percent of the variance of the observed
maladaptive behavior.

Kuypers, Becker, and O'Leary (1968) conducted an experiment to reduce the disruptive behaviors of learning disabled children through the use of a token reinforcement program and reported results similar to those obtained by O'Leary and Becker (1967). Subjects for this study were six third grade and six fourth grade learning disabled children. The six most disruptive children were investigated and given tokens (which could be exchanged for back-up rewards) when they demonstrated appropriate classroom behaviors. The results indicated that deviant behavior decreased from a baseline to a reinforcement period, however, the results were reported to be less impressive than those obtained by O'Leary and Becker (1967).

In a study to determine the more effective type of reinforcement, Broden, Hall, Dunlap, and Clark (1970) conducted two experiments to demonstrate the effects of teacher attention and token rewards on the disruptive behavior of a junior high school special education class for the learning disabled. Daily observations were made by an observer who recorded at five second intervals the study and non-study behavior of the subjects.

In the first experiment, a baseline period in which the teacher provided attention to both study and non-study behaviors were observed and recorded with the mean rate of study behavior at 29 percent. Following the baseline period, social reinforcement was provided only for study behavior.
The observers recorded an increase in study behavior to a mean rate of 57 percent. The continued use of social reinforcement with the introduction of extrinsic rewards increased the mean study rate (74 percent).

In the second experiment the original thirteen subjects were observed in five other class periods. During the baseline period and from the observer's recordings the mean study behavior was low (39 percent). A token reinforcement system proceeded the baseline period in which the subjects earned points for appropriate behavior. Observations made during the first day of the use of the token reinforcement system indicated a mean of class study behavior to be 83 percent, and this behavior was maintained at high levels throughout the experiment.

This study demonstrated that teacher attention increased study levels but was limited in its effect. For most of the pupils, token reinforcement with a back-up reward was more effective than teacher attention for motivating desired behavior.

In summary, the literature on reinforcement of the behaviors of learning disabled children has disclosed that the behavior modification approach of reinforcement has been effective in controlling the maladaptive behaviors exhibited by these children. Furthermore, Broden, Hall, Dunlap, and Clark (1970) have indicated that extrinsic reinforcement has been more beneficial as a positive motivator than social reinforcement with learning disabled children. Social
reinforcers such as teacher praise and approval have been ineffective in controlling these deviant behaviors. Hewett (1964) and Patterson (1965) have facilitated learning with learning disabled children by implementing a behavior modification approach of extrinsic reinforcement. Kuypers, Becker, and O'Leary (1968), and O'Leary and Becker (1967) have found that extrinsic reinforcement is capable of transferring the subjects from responding to tangible rewards to other conditioned rewards such as teacher praise and grades.

Motor Performance Literature of Learning Disabled Children

Limited research on the motor performance of learning disabled children has been conducted. This section presents several studies that have applied the basic reinforcement principles for (1) the development of motor skills in a preschool child; (2) the development of motor skills for learning disabled children in a recreation program.

Harris, Johnston, Kelley and Wolf (1964) conducted a study to determine (1) whether the presentation of positive social reinforcement could help a three year old utilize her well established walking behavior more frequently; (2) if positive social reinforcement increased walking behavior, whether withdrawing such reinforcement would weaken the behavior; and (3) whether reinstating social reinforcement would re-establish walking behavior. Prior to the initial reinforcement period it was determined that the subject exhibited withdrawal behavior and regressed to a crawling stage. During the reinforcement phase of the experiment it
was decided that the teachers should withhold social reinforcement when the subject exhibited crawling behavior, and provide positive social reinforcement when walking behaviors were exhibited. After a two week period, both the recordings of the teachers and student volunteers indicated that social reinforcement of teacher attention improved the subject's social and walking behaviors.

The subject exhibited regressive crawling behavior when a reversal in reinforcement procedures was initiated. The teachers observed that reinforcing off-feet positions precipitated regressive crawling behavior. Furthermore, reinstating social reinforcement for appropriate walking and social behavior helped the subject to re-develop appropriate walking behaviors.

An extension of this study was conducted by Allen, Hart, Buell, Harris and Wolf (1964) to determine if positive social reinforcement could help a child who showed isolate behavior achieve and maintain play activities with peers. The subject's behavior consisted of isolating herself from children and indulging in activities to gain adult attention. The investigators instituted a plan to provide the subject with social reinforcement of adult attention only when the subject initiated play with another child. Before the social reinforcement procedure was initiated, baseline data were obtained of the actual time the subject spent with children, adults, and alone.

After the baseline data had been secured, the teach-
ers provided social reinforcement only when the subject interacted with other children. To substantiate whether the behavior changes could be effected by social reinforcement, a reversal period was utilized. The subject was disregarded by the teachers when she interacted with children during the reversal period. After this reversal social reinforcement was reinstated.

The results indicated that during the baseline period the subject spent 10 percent of the time interacting with children and 40 percent with adults. When the subject was provided with social reinforcement, she spent increasing time interacting in play with other children (60 percent). When procedures were reversed the subject's isolate play behavior reappeared. During the period when social reinforcement was reinstated, play behavior with other children increased to its original high rate (60 percent). Subsequent follow-ups confirmed that social reinforcement procedures increased and maintained the subject's appropriate play behavior.

In another effort to improve the physical activity of a pre-school child, (Johnston, Kelley, & Harris, 1966) social reinforcement was used to motivate an inactive three year old to participate in physical activity. The procedure that was used to motivate this pre-school child consisted of teacher social praise and approval contingent upon the child's use of a climbing frame. Observations were recorded during a baseline, first reinforcement, reversal, second reinforcement and generalization period. Motor skill performance
of climbing frame behavior was continuously socially reinforced during the first and second reinforcement period, while no reinforcement was provided in the baseline period. A reversal period between the first and second reinforcement period provided social rewards to the child for participation in all activities and withheld social approval to climbing frame behaviors. A generalization period intermittently rewarded climbing frame behaviors and participation in all other physical activities.

The results indicated limited motor activity in the baseline phase, an increase in climbing frame behavior in response to continuous reinforcement, decreased motor performance in the reversal phase, while motor performance increased in the generalization phase. It was concluded that social reinforcement can develop motor skills that may be generalized to other activities.

The study of the motor skill development of learning disabled children in a recreation program was undertaken by Glavin and Witt (1969). This program was conducted to develop socially acceptable behaviors and specific motor skills. Twelve boys with conduct disorders, whose ages ranged from eight to eleven years, participated in a noon hour recreation program. It was determined at the beginning of the program that the children lacked basic physical skills and social competence. Initial attempts to provide an unstructured, free play program reinforced maladaptive behaviors and led to a lack of motor skill learning. The investigators revised
the recreation program into a structured program with defined behavior limits in order to maintain appropriate behavior. With the introduction of the structured program, the boys were taught skills of throwing, running, kicking, jumping, and combinations of these skills. The investigators concluded that their structured recreation program not only developed physical and social skills, but successfully modified maladaptive behaviors.

Studies on the effects of reinforcement upon the motor skill performance of pre-school and learning disabled children have supplied evidence that rewarding appropriate behaviors may improve motor skills in play activities. It is imperative to reward the behaviors being learned, or they will eventually become extinct. The social approval and attention learning disabled children received in a recreation program not only modified their maladaptive behaviors but also strengthened their motor skills. These studies infer that a behavior modification approach of reinforcement can be utilized in activities that require motor skill performance.

Summary

The importance of an investigation of the effects of extrinsic reinforcement on selected motor skill performance of learning disabled children has been suggested by the effective use of reinforcement in the classroom. Research in education has demonstrated that inappropriate classroom behaviors have become modified so the learning of academics
can be facilitated. The research in physical education has not encouraged a behavior modification approach in teaching motor performance skills to learning disabled children. Despite this limitation, with this study it is hypothesized that maladaptive behaviors can be shaped in a structured physical education program and as a consequence motor skill performance will be refined. Furthermore, it is the responsibility of educators to develop an approach in teaching that can be implemented by other academicians in the field of physical education.
CHAPTER III

METHODS AND PROCEDURES

This chapter consists of six parts. In the first part a discussion of the design is presented. The second part deals with the selection of subjects and assignment to treatment groups. Part three provides information on the motor task selected for this study. In part four a discussion of the testing procedures is provided. Part five provides information on the treatment given. The final part explains the statistical analysis of the data collected.

Design

To investigate the effects of extrinsic reinforcement on the motor skill performance of learning disabled children, a pretest-posttest Control group design involving three groups has been selected. A design of this nature calls for a two-way Analysis of Variance (Campbell & Stanley, 1966). Prior to the treatment and formal testing of the subjects, a pretest was administered individually to three groups, each group receiving the same motor skill test but separately from each other. The purpose of the pretest was to determine the present ability of the three groups prior to the experimental treatment. Three groups of subjects were assigned to either a Reinforcement, Non-Reinforcement
or a Control group. Subjects from the Reinforcement and Non-Reinforcement groups were informed that they were selected for a physical education program for thirty-minute sessions, two days weekly over a five week period. The only difference between the two groups was the factor of extrinsic reinforcement utilized to motivate the subjects' performance in the Reinforcement group.

Selection of Subjects and Assignment To Treatment Groups

Subjects for this study were selected from the classes of the Board of Cooperative Educational Services, First Supervisory District of Monroe County, Fairport, New York. The subjects were selected from classes combined with children classified as learning disabled and emotionally disturbed. There were a total of six classes available with chronological ages of the pupils ranging from seven to fourteen. The chronological age of the subjects investigated in this study ranged from seven years and one month of age to fourteen and ten months of age. A total of sixty-eight subjects from this age group were selected from the available six classes. The subjects in this population consisted of only males.

The investigator selected subjects by gathering the class rosters of the six classes, whereby age range and sex were criteria for this study. The mean of the subjects' ages to the nearest month was determined in all six classes. Since it was impossible to assign the subjects from the six intact classes to one of three treatment groups, the classes
were paired according to the mean chronological age. As a result of this pairing, three groups of paired classes were obtained. Each of the three paired classes was randomly assigned to one of three treatment groups (i.e. the Reinforcement, Non-Reinforcement and the Control group). The mean age of the Reinforcement group which consisted of twenty-two subjects was 11.0 years; the Non-Reinforcement group consisted of twenty-one subjects was 11.5 years; and the Control group which consisted of twenty-five subjects was 11.7 years. The school administrators and the physical education staff consented to allow the children to participate in this investigation.

Motor Task

The motor task selected for this study was a motor skill task that required the subjects to throw a softball for Distance and Accuracy. The subjects were instructed to move forward and throw the ball overhand from within a two yard area as far as they could. They were administered one trial of three throws for Distance and Accuracy, all three of the throws were recorded to the nearest foot.

Several reasons for selecting a motor task have been considered in this study. First, learning disabled children have been noted to be deficient in motor skill development (Poindexter, 1969). Secondly, the softball throw as a motor task involves skill and coordination.

Testing Procedure

The testing procedure designed for this study
consisted of a pretest and posttest on a specific motor task. Each of the three groups of subjects was administered a pretest to determine a baseline rate for their throwing abilities. To carry out the testing procedure the equipment consisted of (1) a twelve inch softball; (2) two tape measures to measure the Distance and Accuracy of the throws; (3) three wooden stakes; and (4) a marked vertical line at five yard intervals extending from a restraining line to assist to measure Distance and Accuracy. The subjects were informed before the pretest that they were selected to participate in a physical education program of activities and games, and were unaware that they were the participants of an experiment. The investigator informed the subjects during the pretest that he was interested to see what they already knew about softball. The pretest was administered by the investigator with the assistance of one physical education teacher. Instructions on the softball throw informed the subjects that (1) only an overhand throw may be used; (2) three throws were allowed; and (3) throws had to be made from behind the restraining line with approaching movements allowed within the restraining area. The teacher-observer stood at the front of the restraining line to observe and disqualify a throw, if any of the subjects stepped over the line. The investigator measured the best of three throws and the Accuracy of the best throw. A score for Distance was determined by how far the softball traveled in flight from the restraining line to the point where it landed. An
Accuracy score was measured from the point where the ball landed, horizontally to a perpendicular line that extended from the restraining line (refer to Appendix B). The Total Score was measured by subtracting the Accuracy of the throw from the Distance score. The Distance and Accuracy score was determined by recording the better value of the three trials. The Total Score was assessed by taking the highest value of the three trials when the Accuracy score was subtracted from the Distance score. Scores for all of the subjects were recorded to the nearest foot. Posttest scores were measured in the same manner as the pretest scores.

Treatment

In this study the investigator provided a thirty minute activity program, two days weekly over a five week period. The activity program was administered to a Reinforcement and Non-Reinforcement group while no treatment was provided to the Control group. Both the Reinforcement and Non-Reinforcement groups received identical physical education activities and games, however, only the Reinforcement group was motivated through extrinsic rewards. A check mark scoring system approach adopted from that used by Hewett was utilized in this study (Hewett, 1968). The twenty-two subjects in the Reinforcement group received a Work Record Card with their names inscribed on the card during the first training session (refer to Appendix A, p. 61). For each subsequent period, as the children entered the gymnasium they were given check marks for their task
accomplishments and functioning. The check marks were exchangeable for extrinsic rewards such as candy and trinkets. A possible ten check marks were provided by the investigator or the physical education teacher following each ten minutes of play. Usually three minutes were spent giving check marks. This procedure allowed two ten minute play periods and two three minute check mark giving periods.

Five check marks were provided when the child initiated appropriate play at each level on the developmental sequence of educational goals. Five additional check marks were administered for being a student. Being a student refers to the student role of behaving in an appropriate manner. A bonus of ten check marks were administered when the older boys showered, and the younger ones washed themselves.

On the first day of the activity program, each child was handed a Work Record Card and instructed to sit on an assigned floor spot. After they were seated it was possible to receive five check marks for being on time, and five for finding their floor spot. The children were informed that they would receive candy and/or choice activities in exchange for a designated amount of check marks earned during the first week. Beginning the second week the subjects were informed that they had to have a designated increased (more check marks than during the first week) amount of check marks before exchanging it for a reward. During the remaining three weeks, the amount of check marks increased each week
to higher levels before it was exchanged for a reward. The check mark system was designed to meet the needs of each child at the level on the developmental sequence he was functioning at. Since each child was working at his own level, check marks were provided for different children for different reasons. Check marks were administered at the discretion of the investigator or the teacher when the child completed the goals of the developmental sequence.

Both the Reinforcement and the Non-Reinforcement groups participated in activities that were specifically chosen to develop throwing skills (refer to Appendix C). The investigator taught both groups throwing skills such as passing in football, and utilized exercises, relays and drills to increase their throwing skills. Games such as "Jail Dodge Ball", "Keep Away", "Bong Ball", and others were utilized (refer to Appendix D). The subjects in the Non-Reinforcement group received no motivation during the five week period. The investigator maintained as little interaction as possible with the Non-Reinforcement subjects. The relationship between the investigator and the reinforced subjects was maintained through a systematic approach of reinforcement.

**Statistical Analysis**

The scores of the various treatment groups on the Softball Throw Test were subjected to a two-way Analysis of Variance with repeated measurements to test the null-hypothesis of no differences among the groups (Factor 1) and
between the testings (Factor 2). For this analysis the RPEAT Computer Program was used, carried out on a high-speed IBM 1130 electronic computer. Significant differences were further analyzed through the Newman-Keuls Test.
CHAPTER IV
RESULTS

A pretest-posttest Control group design which involved three groups was selected to investigate the effects of extrinsic reinforcement upon the motor performance of learning disabled children. A softball throw pretest and posttest was administered to the subjects to measure the variables Distance, Accuracy, and Total Score. Both the Reinforcement and Non-Reinforcement groups received a five week physical education program, while no treatment was provided to the Control group. Only the Reinforcement group was motivated by extrinsic rewards.

In this chapter the results of this investigation will be statistically analyzed and presented in the following order: (1) a descriptive analysis of the three dependent variables; (2) Analyses of Variance to test for differences among the groups and between testings; and (3) correlational analysis between the amount of check marks received and the improvements found in the three dependent variables. The significance of all the following results was determined using the .05 level of significance. A discussion of the results will be presented in Chapter V.

DESCRIPTIVE ANALYSIS

Descriptive data for the dependent variables Distance,
Accuracy, and Total Score are reported below in that order for each of the three experimental groups. Table 1 lists the means and standard deviations of these variables for the pretest and posttest. On both the pretest and the posttest for the variable Distance, the Control group's mean was higher than the means of the two other groups, whereas its standard deviations were considerably lower. The mean of the Reinforcement group improved over testings by 5.09 feet, while the Non-Reinforcement and the Control group decreased by 2.81 and 1.24, respectively.

The Reinforcement group was most accurate on both testings and improved an average of 0.14 feet. The Non-Reinforcement group's mean Accuracy score increased by 1.19 and that of the Control group by 0.52. The increase in the variation of Accuracy scores over testing for the Control group is noteworthy.

For the variable Total Score, the descriptive data resemble those of the Distance variable, i.e. higher means and lower standard deviations in the Control group, improvement in the means of the Reinforcement group by 5.96 feet and decreases in the means of the Non-Reinforcement group (2.53) and Control group (2.36). The data are listed numerically in Table 1.

ANALYSES OF VARIANCE

To test the differences among the means of the groups and between testings for significance, a One-Factor Analysis
Table 1

Means and Standard Deviations of Pretest and Posttest Scores for Distance, Accuracy, and Total Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Pretest</th>
<th></th>
<th>Posttest</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Distance</td>
<td>Reinforcement</td>
<td>68.73</td>
<td>30.41</td>
<td>73.82</td>
<td>25.41</td>
</tr>
<tr>
<td></td>
<td>Non-Reinforcement</td>
<td>67.95</td>
<td>35.96</td>
<td>65.14</td>
<td>35.16</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>79.76</td>
<td>22.06</td>
<td>78.52</td>
<td>18.21</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Reinforcement</td>
<td>2.32</td>
<td>2.06</td>
<td>2.18</td>
<td>1.59</td>
</tr>
<tr>
<td></td>
<td>Non-Reinforcement</td>
<td>2.71</td>
<td>2.26</td>
<td>3.90</td>
<td>2.49</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.28</td>
<td>1.90</td>
<td>3.80</td>
<td>2.74</td>
</tr>
<tr>
<td>Total</td>
<td>Reinforcement</td>
<td>64.68</td>
<td>29.34</td>
<td>70.64</td>
<td>25.36</td>
</tr>
<tr>
<td></td>
<td>Non-Reinforcement</td>
<td>62.24</td>
<td>35.51</td>
<td>59.71</td>
<td>33.68</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>75.20</td>
<td>20.80</td>
<td>72.84</td>
<td>17.32</td>
</tr>
</tbody>
</table>

of Variance with repeated measurements was applied to the data on the three variables. In summary Tables 2, 3 and 4 presented in this chapter, a significant F ratio for the Groups main effect would indicate that at least one significant difference existed among the experimental groups at the .05 level of significance. A significant F for the Testing main effect would be interpreted as a genuine difference between the pretest and posttest. Significant F ratios for Interaction were interpreted by the use of graphs (Figure 1).

**Distance**

A significant Interaction effect (p<.05) was obtained
for the variable Distance (refer to Table 2). This interaction is graphically represented in Figure 1. The graph clearly expresses the difference between the Reinforcement group (increase) and both other groups (decrease). The main effects of Groups and Testings were statistically not significant, which indicates that the means of the groups, when pretests and posttests were combined, were not different, and that there was no difference in the pretest and posttest means of the groups combined.

Table 2
Summary of the Analysis of Variance (ANOVA) for Distance

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Mean Sq.</th>
<th>Error</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
<td>2.65</td>
<td>1875.50</td>
<td>1532.81</td>
<td>1.22</td>
</tr>
<tr>
<td>Testings</td>
<td>1.65</td>
<td>3.54</td>
<td>55.05</td>
<td>0.06</td>
</tr>
<tr>
<td>GxT</td>
<td>2.65</td>
<td>191.79</td>
<td>55.05</td>
<td>3.48*</td>
</tr>
</tbody>
</table>

*Significant at .05 level

Accuracy

The Analysis of Variance of the Accuracy scores resulted in a significant main effect of Groups at the .05 level of significance. A post-hoc analysis of the Newman-Keuls type (Ferguson, 1971) revealed that the Non-Reinforcement and Control group were significantly lower in Accuracy than the Reinforcement group, but not significantly different
from one another. The main effect of Testings and the Interaction effect were not significant (refer to Table 3).

Table 3
Summary of the Analysis of Variance (ANOVA) for Accuracy

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Mean Sq.</th>
<th>Error</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
<td>2,65</td>
<td>21.49</td>
<td>5.15</td>
<td>4.16*</td>
</tr>
<tr>
<td>Testings</td>
<td>1,65</td>
<td>9.00</td>
<td>4.61</td>
<td>1.95</td>
</tr>
<tr>
<td>GxT</td>
<td>2,65</td>
<td>4.72</td>
<td>4.61</td>
<td>1.02</td>
</tr>
</tbody>
</table>

*Significant at .05 level

Total Score

The results of the Analysis of Variance on the Total Scores were the same as those on the Distance scores: The main effects yielded non-significant F ratios, whereas the Interaction effect was significant at the .05 level (refer to Table 4).

Figure 1 demonstrates again that there was an increase in mean scores for the Reinforcement group, but a decrease for the Non-Reinforcement group and the Control group.

Change Indices

The results of the Analyses of Variance presented above must be interpreted with caution. The distribution of scores in all three variables was markedly skewed, and
Table 4
Summary of the Analysis of Variance (ANOVA) for Total Score

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Mean Sq.</th>
<th>Error</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
<td>2,65</td>
<td>1944.25</td>
<td>1438.17</td>
<td>1.35</td>
</tr>
<tr>
<td>Testings</td>
<td>1,65</td>
<td>2.67</td>
<td>55.38</td>
<td>0.04</td>
</tr>
<tr>
<td>GxT</td>
<td>2,65</td>
<td>261.91</td>
<td>55.38</td>
<td>4.72*</td>
</tr>
</tbody>
</table>

*Significant at .05 level

In tests for homogeneity of variance, significant F ratios were obtained in the variables Distance and Total Score. Gross departure from the normal distribution and from the homogeneity of variance are violations of basic assumptions underlying the Analysis of Variance, and may lead to results that are in error (Ferguson, 1971). A non-parametric equivalent to the Analysis of Variance seemed appropriate to check the outcome of the above reported analysis. However, no application of such a test as the Friedman Two-way Analysis of Variance by ranks to a repeated measurements design has been developed to this investigator's knowledge.

To subject the data to further analysis, the Change Indices, defined as the difference between pretest and posttest scores with a constant of 100 added for practical purposes, were computed for all of the subjects on the three variables. The distribution of these scores did not depart appreciably from the normal curve, and the tests for homo-
Figure 1

Testing Means of the Experimental Groups for Distance, Accuracy, and Total Score

<table>
<thead>
<tr>
<th>Distance</th>
<th>Accuracy</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Posttest</td>
<td>Pretest</td>
</tr>
<tr>
<td>80 feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

- - - Reinforcement Group
- - - Non-Reinforcement Group
- - - Control Group
geneity of variance yielded no F values at the .05 level of confidence. Only two F values in the comparison of the variables of the Non-Reinforcement group and the Control group for the Distance variable, and those of the Reinforcement group and the Control group for the Accuracy variable, were significant at the .10 level of confidence. These slight deviations from homogeneity should not affect the outcome of the Analyses of Variance. A one-way Analysis of Variance was applied to the Change Indices and the results will be presented below (refer to Table 5).

Descriptive Analysis of the Change Indices. The means and standard deviations of the Change Indices on Distance, Accuracy, and Total Score are presented in Table 5. The mean scores of the Reinforcement group were above 100 in all three variables, denoting an average improvement, and was below 100 for the Non-Reinforcement group and Control group, corresponding with the earlier reported average decrease in these groups. Comparisons with Table 1 reveal that the transformation of the data into Change Indices reduced the size of the standard deviations and also the differences in standard deviations among the groups.

Analysis of Variance of the Change Indices. The results of the one-way Analysis of Variance on the Change Indices support the outcome of the analyses of the actual scores. In the variables Distance and Total Score, a significant F value was found (p<.05). Post-hoc analysis (Newman-Keuls) indicated that in both variables the
Table 5
Means and Standard Deviations of Change Indices on Distance, Accuracy, and Total Score

<table>
<thead>
<tr>
<th></th>
<th>Distance</th>
<th></th>
<th>Accuracy</th>
<th></th>
<th>Total Score</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>105.09</td>
<td>10.26</td>
<td>100.19</td>
<td>2.23</td>
<td>105.95</td>
<td>9.18</td>
</tr>
<tr>
<td>Non-Reinforcement</td>
<td>97.19</td>
<td>8.17</td>
<td>98.14</td>
<td>3.15</td>
<td>97.48</td>
<td>9.63</td>
</tr>
<tr>
<td>Control</td>
<td>98.76</td>
<td>12.27</td>
<td>99.48</td>
<td>3.23</td>
<td>97.64</td>
<td>12.22</td>
</tr>
</tbody>
</table>

Reinforcement group was significantly different from the Non-Reinforcement group and the Control group. The latter two were not significantly different. In the variable Accuracy the F value was not significant, which indicated that the Change Indices of the three groups were not different from each other (refer to Table 6).

CORRELATIONAL ANALYSIS

To investigate whether there was a relationship between the number of check marks received and the improvements found in the three dependent variables, Pearson Product-Moment coefficients of correlation were computed between check marks expressed as a ratio of actually received check marks over the total possible number of check marks that could be received by the subject in view of his attendance record, and the Change Indices on Distance, Accuracy, and Total Score of the Reinforcement group. The coefficients found
Table 6
Summary Analyses of Variance on Change Indices for Distance, Accuracy, and Total Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>Source</th>
<th>SS.</th>
<th>DF</th>
<th>MS.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Between</td>
<td>767.27</td>
<td>2</td>
<td>383.64</td>
<td>3.48*</td>
</tr>
<tr>
<td>Distance</td>
<td>Within</td>
<td>7,157.62</td>
<td>65</td>
<td>110.12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7,924.89</td>
<td>67</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Between</td>
<td>44.29</td>
<td>2</td>
<td>22.14</td>
<td>2.58</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Within</td>
<td>557.40</td>
<td>65</td>
<td>8.58</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>601.69</td>
<td>67</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Between</td>
<td>1,047.74</td>
<td>2</td>
<td>523.87</td>
<td>4.72*</td>
</tr>
<tr>
<td>Total Score</td>
<td>Within</td>
<td>7,199.95</td>
<td>65</td>
<td>110.77</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>8,247.69</td>
<td>67</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at .05 level

were low non-significant (Check Marks-Distance: r = -.16; Check Marks-Accuracy: r = -.08; Check Marks-Total Score: r = -.15). Therefore, there seems to be no association between the amount of check marks a subject received and his improvement on the three variables.
CHAPTER V
SUMMARY, DISCUSSION, CONCLUSIONS,
AND RECOMMENDATIONS

SUMMARY

The purpose of this study was to investigate the effects of extrinsic reinforcement upon the motor performance of learning disabled children on a selected motor task. Subjects were administered a pretest and posttest on a specific motor task which involved a softball throw. The subjects were measured on the variables Distance, Accuracy, and Total Score. The results of this study established improvements for the Reinforcement group. The Reinforcement group improved on the variables Distance, Accuracy, and Total Score, while the Non-Reinforcement and the Control groups decreased on all of these variables.

As was indicated in the Methods and Procedures section of this study, the subjects were randomly assigned to either a Reinforcement, Non-Reinforcement or a Control group. Subjects from the Reinforcement and Non-Reinforcement groups received a five week physical education program, while only the Reinforcement group was motivated by extrinsic reinforcement. The Control group received neither a physical education program nor extrinsic reinforcement from this investigator.
DISCUSSION

The improvements by the Reinforcement group on all of the variables may be in part attributed to the utilization of extrinsic reinforcement. The results of this investigation does not allow the separate analysis of the respective influences of the physical education program and the extrinsic reinforcement. Perhaps the combination of the physical education program and the extrinsic reinforcement in the Reinforcement group caused the improvement. In the Non-Reinforcement group, the effect of the physical education program was nullified by the subject's uncooperative attitude at the end of the experiment.

The trend toward decreased performance in the Non-Reinforcement group was attributed to negative motivation. After administration of the posttest, thirteen of twenty-one subjects decreased over testings on all of the variables. This investigator was aware that some subjects from the Non-Reinforcement group had learned that subjects from the Reinforcement group received extrinsic rewards. Consequently, during the posttest period, the subjects in the Non-Reinforcement group displayed negative motivation. It was found that the amount of time spent for throwing activities was less in the Non-Reinforcement group because some time had been given to discipline. Ten subjects had refused to submit to a posttest because they felt it was unjust that others received rewards and they didn’t. After a period of persuasion, these subjects agreed to take the posttest. It was found that these ten subjects decreased on all of the variables over testings.
It is possible to believe that negative motivation attributed to the decrease on all of the variables by the Non-Reinforcement group, however, it cannot be concluded that the physical education program had no effect.

The Control group received a program of track and field activities, excluding throwing activities from the physical education instructor. Every other week these subjects received choice activities, excluding throwing activities. The subjects seemed not to be aware that other subjects received extrinsic rewards, as no indication was given to the investigator. It may be inferred that the decreased performance of the Control group over testings was the result of not receiving the extrinsic reinforcement and/or the physical education program. The improvement over testings by the Reinforcement group was attributed to extrinsic reinforcement, but the physical education program could have been a factor as well.

Past investigations have indicated that extrinsic reinforcement improved the academic skills of learning disabled children in a classroom setting. For example, Hewett (1964) and MacMillan and Forness (1970) reported that extrinsic reinforcement improved the academic performance of learning disabled children. While special educators have perfected this classroom management technique, few have applied its principles to their physical education programs (Rushall & Siedentop, 1972). Glavin and Witt (1969) used behavior modification procedures in a recreational program.
and reported positive results. These findings in the classroom setting and on the playground have suggested that extrinsic reinforcement may improve the academic and/or the motor performance of learning disabled children.

The results of the correlational analysis indicated that there was no relationship between the amount of check marks a subject received and the improvements made over testings on all three variables. The amount of check marks a subject received was not exclusively connected with the throwing performance, but rather with the behaviors that contributed to adequate functioning in the educational setting. Therefore, improvement in throwing cannot be linked directly with receiving of check marks, but it can be maintained that the check marks served as an incentive for the improved attitude, which in turn, may have contributed to the improved performance on the motor task.

The check mark system utilized in this study was based on an approach developed by Hewett (1968). Based on his approach, check marks were administered only for task accomplishment and appropriate behavioral functioning. The essential feature of this approach was not the amount of check marks a subject received, but rather the attainment of educational goals on the developmental sequence.

The elements necessary to attain the educational goals on the developmental sequence are the sides of a triangle which consist of a task, a reward, and structure. The task was any activity given to a child which assisted him to
attain the goals on the developmental sequence. Throwing a ball overhand at a target or showering after class are examples of tasks used in this study. Rewards were positive consequences which were provided when the children accomplished tasks related to the developmental sequence of educational goals. The manner in which rewards were utilized differed for the younger and older subjects in the Reinforcement group. The younger boys preferred edibles, while the older boys preferred rewards such as frisbees, balls, and choice activities. The younger boys in the Reinforcement group demanded daily reinforcement, while the older boys accumulated check marks and held them over a period of a few days before exchanging them for rewards. The structure was the limits the investigator attached to the tasks assigned to the child, thereby determining whether or not he would be rewarded. In order to receive check marks, the subjects of the Reinforcement group were required to attend class on time, they had to sit on their floor spot, and shower or wash-up after each activity. The blending by the investigator of the three elements on the learning triangle for each child, may have attributed to the improvements by the Reinforcement group.

One of the elements of the learning triangle, rewards, consisted of bonus check marks. These bonus check marks were provided when the subjects in the Reinforcement group had showered or washed-up. In comparison with the Non-Reinforcement group, twenty of twenty-two subjects from the Reinforcement group had showered or washed-up after the daily activity,
during the five week period, while in the Non-Reinforcement group only three subjects had showered. The desired showering behavior may be attributed to the factor of extrinsic reinforcement.

CONCLUSIONS

In conclusion, there are indications that extrinsic reinforcement may have contributed to the improved motor performance of learning disabled children on a selected motor task. The effects of the physical education program may have also been a factor in the improvement. The improvement was not directly associated with the amount of check marks the subject received. In addition, the effects of the educational task, the meaningful rewards for learning and the structure of the physical environment may have accounted for this improvement.

RECOMMENDATIONS

The recommendations of the present findings must be evaluated considering the methods and procedures utilized in this study. In order to control for contaminating variables, the selection of subjects for different treatment groups should be amassed from different populations. Possibly utilizing learning disabled children from different schools and randomly selecting equal number of subjects to various experimental groups should be undertaken.

Since the results can only be generalized to a male population, it is recommended that a further study be inclu-
sive of a male and female population. Further research should include a type of reinforcement different from extrinsic rewards, such as social reinforcement and include an older population.

A further recommendation of this study may be the need to utilize a less formal behavior modification program considering the economics involved. For the older children more substantial reinforcers are necessary to ensure their effectiveness. If each investigator or teacher has to finance the check mark reinforcement approach by himself, it may be impractical to continue to operate this approach. For a behavior modification program to become a more effective approach in learning, it is suggested that research of this nature be continued by an investigator with the assistance of a teacher or college student teachers. These individuals can help to effectively observe the correct behaviors on the developmental sequence of educational goals. Also, the assistance provided by these individuals decreases the amount of time to administer check marks, so more time can be spent on developing the motor skills of each child.

An additional investigation should be conducted to study the effects of appropriate placement of learning disabled children on the developmental sequence of educational goals. This study would provide the researcher an opportunity to carefully observe and provide check marks when the subjects attained the behaviors on the developmental sequence of educational goals.
BIBLIOGRAPHY

A. BOOKS


B. PERIODICALS


Fletcher, H. L. "Getting Results From Movement Exploration," Academic Therapy, 8:27-32, Fall, 1972.


APPENDIXES
APPENDIX A

1. DEVELOPMENTAL SEQUENCE OF EDUCATIONAL GOALS
2. LEARNING TRIANGLE
3. WORK RECORD CARDS
1. DEVELOPMENTAL SEQUENCE OF EDUCATIONAL GOALS*

1. The learning triangle (child)

**TASK**
Educational task related to attainment of goal on the developmental sequence

**REWARD**
Type of meaningful reward for learning

**STRUCTURE**
Teacher expectations associated with task assigned child which determine conditions under which reward will be provided

---

2. The learning triangle (teacher)

**TASK**
Rational for selecting suitable educational task to assign child

**REWARD**
Visible sign teaching efforts successful

**STRUCTURE**
A practical and understandable educational strategy

---

WORK RECORD CARDS

WORK RECORD CARD
NAME
CARD NUMBER

WORK RECORD CARD
NAME
CARD NUMBER

HOW TO EARN CHECK MARKS

Being on Time = 5 Check Marks
Sitting on Floor Spot = 5 Check Marks
Task Behavior = 5 Check Marks Each Play Period
Being a Student = 5 Check Marks Each Play Period
Showering or Washing-Up = 10 Check Marks
APPENDIX B

ILLUSTRATION TO DETERMINE ACCURACY SCORE
ILLUSTRATION TO DETERMINE ACCURACY SCORE

RESTRAINING LINE

\[ X \]

RESTRAINING AREA

\[ \]

\[ D \]

\[ Y \]

\[ 10' \]

\[ 15' \]

\[ 20' \]

\[ 25' \]

\[ 30' \]

\[ 35' \]

\[ 5' \]

\[ 10' \]

\[ 15' \]

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\[ 20' \]
APPENDIX C

EXPERIMENTAL LESSONS FOR THE REINFORCEMENT
AND NON-REINFORCEMENT GROUPS

1. WEEKLY

2. DAILY
Experimental Lessons for the Reinforcement and Non-Reinforcement Groups

1. Weekly

**Monday**

**First Week**

1. Exercise
   A) Arm-bend-elbow
2. One Hand, overhand baseball pass
   A) Practice in short area
   B) Throwing distance increased
3. Overhand pass relay

**Second Week**

1. Exercise
   A) Windmills
2. Overhand passing relays
   A) Throwing for accuracy
   B) Throwing for distance
3. Game - Jail Dodge Ball

**Third Week**

1. Exercise
   A) Arm flexion and extension with weights
2. Overhand football pass
   A) Practice throwing for short distance
   B) Increase throwing distance
3. Overhand pass drill

**Fourth Week**

1. Exercise
   A) Skin Diver
   B) Egg Beater
2. Throwing Circuit Course
   A) Knock Down Four Pins
   B) Throw a ball through tires
   C) Throw a ball at a rebounding wall
   D) Throw bean bags through tires

**Friday**

1. Exercise
   A) Steam Engine
2. One Hand, overhand pass practice against wall
3. Game - Bong Ball

1. Exercise
   A) Giant Circles
2. Overhand passing drills
   A) Knock Down Pins
   B) Hit tires on cargo net
3. Game Indian Dodge Ball

1. Exercise
   A) Arm flexion and extension with weights
2. Overhand football pass
   A) Two man passing drill
3. Game - Keep Away

1. Exercise
   A) Skin Diver
   B) Egg Beater
2. Throw Marathon
   A) Throw ball against wall for 10 minutes
3. Game - Pass Ball Baseball
<table>
<thead>
<tr>
<th>Fourth Week</th>
<th>Monday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ring toss</td>
<td>1. Practice Skills</td>
</tr>
<tr>
<td></td>
<td>E) One Hand over-hand throw and catch drill</td>
<td>2. Softball Game</td>
</tr>
<tr>
<td></td>
<td>3. Game - Throw Ball</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fifth Week</th>
<th>Monday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Exercise</td>
<td>Jumping Jacks</td>
<td></td>
</tr>
<tr>
<td>2. Introduction to Softball</td>
<td>Practice overhand throws</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Two man throwing drill</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Throwing relays</td>
<td></td>
</tr>
</tbody>
</table>
Experimental Lesson for the Reinforcement and Non-Reinforcement Groups

2. Daily

Activity: Overhand Baseball Pass
Behavioral Objective: To throw a ball a short and increased distance.
Developmental Goal: Flexibility, coordination, and endurance.
Space and Equipment: Rectangular court and rubber playground balls.
Time Allotment: 40 minutes

<table>
<thead>
<tr>
<th>Activities</th>
<th>Teacher Procedure</th>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 minutes Explained check mark system</td>
<td>Investigator explained to students how they can earn check marks and what they could be exchanged for. Administered check marks for being on time and sitting on floor spots.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>2 minutes *Warm-up</td>
<td>Investigator administered warm-up.</td>
<td>Extended Squad Formation</td>
</tr>
<tr>
<td>3 minutes Explained throwing skill</td>
<td>Explained and demonstrated skill.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>5 minutes Practiced throwing skill</td>
<td>Instructed students to throw ball properly in an overhand manner off a rebounding wall; provided individual help where needed.</td>
<td>***Shuttle Formation</td>
</tr>
<tr>
<td>3 minutes Gave out check marks</td>
<td>Administered check marks; investigator and assistant gave out check marks only to the Reinforcement group.</td>
<td>Children re* turned to squad spots</td>
</tr>
<tr>
<td>3 minutes **Explained overhand pass relay</td>
<td>Kept explanation and demonstration simple; divided class in half.</td>
<td>Squad Spot Formation</td>
</tr>
<tr>
<td>10 minutes Overhand pass drill and relay</td>
<td>Observed child's performance level and officiated relay.</td>
<td>Shuttle Formation</td>
</tr>
<tr>
<td>Activities</td>
<td>Teacher Procedure</td>
<td>Formations</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>9 minutes</td>
<td>Administered check marks, and discussed rewards with</td>
<td>Informal and</td>
</tr>
<tr>
<td>Reviewed lesson;</td>
<td>the Reinforcement group; evaluated the activity with</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>younger boys returned to floor</td>
<td>students.</td>
<td></td>
</tr>
<tr>
<td>spots and washed-up; all others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>took showers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Refer to Appendix D1
**Refer to Appendix D2
***Shuttle Formation

X = Students
T = Teacher
Experimental Lesson for the Reinforcement and Non-Reinforcement Groups

2. Daily

Activity: One hand overhand pass and game Bong Ball.
Behavioral Objective: To throw a ball accurately and properly.
Developmental Goal: Flexibility, endurance, and arm strength.
Space and Equipment: Rectangular court, rubber playground balls, and a cage ball.
Time Allotment: 40 minutes

<table>
<thead>
<tr>
<th>Activities</th>
<th>Teacher Procedure</th>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 minutes</td>
<td>Administered check marks for being on time and sitting on floor spots.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>Check mark period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 minutes</td>
<td>Administered warm-up.</td>
<td>Extended Squad Formation</td>
</tr>
<tr>
<td>*Warm-up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 minutes</td>
<td>Instructed students to throw ball properly off a rebounding wall; provided assistance where needed.</td>
<td>Shuttle Formation</td>
</tr>
<tr>
<td>Practiced</td>
<td></td>
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<tr>
<td>one hand,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>overhand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 minutes</td>
<td>Administered check marks with aid from assistant.</td>
<td>Students sat on squad spots</td>
</tr>
<tr>
<td>Check mark period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 minutes</td>
<td>Kept explanation simple; divided class into two teams.</td>
<td>Students sat on squad spots</td>
</tr>
<tr>
<td>*Explained</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bong Ball</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 minutes</td>
<td>Officiated game; observed each child's functioning level.</td>
<td>Horizontal Line Formation</td>
</tr>
<tr>
<td>Played Bong Ball</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 minutes</td>
<td>Administered check marks and went over rewards with the Reinforcement group; evaluated the activity with students.</td>
<td>Informal and Squad Formation</td>
</tr>
<tr>
<td>Reviewed lesson; younger boys returned to floor spots and washed-up; all others took showers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Refer to Appendix D1
**Refer to Appendix D2
Experimental Lesson for the Reinforcement and Non-Reinforcement Groups

2. Daily

Activity: One hand, overhead pass relay and game Jail Dodge Ball.

Behavioral Objective: To throw for distance and accuracy.

Developmental Goal: Flexibility, endurance, and arm strength.

Space and Equipment: Rectangular court, rubber playground balls, and two mats.

Time Allotment: 40 minutes

<table>
<thead>
<tr>
<th>Activities</th>
<th>Teacher Procedure</th>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 minutes Check mark period</td>
<td>Administered check marks for being on time and sitting on floor spots.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>2 minutes *Warm-up</td>
<td>Explained and demonstrated exercise.</td>
<td>Extended Squad Formation</td>
</tr>
<tr>
<td>3 minutes **Explained distance and accuracy throw relays</td>
<td>Kept explanation simple; divided class into two teams.</td>
<td>Relay Formation</td>
</tr>
<tr>
<td>8 minutes Distance and accuracy throw relays</td>
<td>Observed each child's performance level and officiated relays.</td>
<td>Relay Formation</td>
</tr>
<tr>
<td>2 minutes Check mark period</td>
<td>Administered check marks to Reinforcement group.</td>
<td>Students sat on squad floor spots</td>
</tr>
<tr>
<td>3 minutes **Explained Jail Dodge Ball rules</td>
<td>Explanation and demonstration was kept simple; divided class into two teams.</td>
<td>Squad Spot Formation</td>
</tr>
<tr>
<td>10 minutes Played Jail Dodge Ball</td>
<td>Officiated game and observed each child's functioning level.</td>
<td>***Scatter Formation</td>
</tr>
</tbody>
</table>

\[ \begin{array}{cccc}
X & X & X & X \\
Y & X & X & Y \\
\end{array} \]
<table>
<thead>
<tr>
<th>Activities</th>
<th>Teacher Procedure</th>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 minutes Reviewed lesson; younger boys returned to floor spots and washed-up; all others took showers</td>
<td>Administered check marks, only to the Reinforcement group.</td>
<td>Informal and Squad Formation</td>
</tr>
</tbody>
</table>

*Refer to Appendix D1
**Refer to Appendix D2
***Scatter Formation
  X = One Team
  Y = Second Team
Experimental Lesson for the Reinforcement and Non-Reinforcement Groups

2. Daily

Activity: One hand, overhand passing drills and game Indian Dodge Ball.

Behavioral Objective: To throw a ball accurately.

Developmental Goal: Flexibility, postural control, and arm strength.

Space and Equipment: Rectangular court, plastic containers, tires, and rubber playground balls.

Time Allotment: 40 minutes

<table>
<thead>
<tr>
<th>Activities</th>
<th>Teacher Procedure</th>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 minutes Check mark period</td>
<td>Administered check marks for being on time and sitting on floor spots.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>2 minutes *Warm-up</td>
<td>Explained and demonstrated exercise.</td>
<td>Extended Squad Formation</td>
</tr>
<tr>
<td>3 minutes Explained</td>
<td>Explanation was kept simple; divided students into two groups.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>8 minutes Practiced</td>
<td>Each child received five throws; one group threw at the pins, the other threw at the tires assembled on a cargo net. After each child had thrown both groups exchanged places. Assistance was provided where necessary.</td>
<td>Shuttle Formation</td>
</tr>
<tr>
<td>2 minutes Check mark period</td>
<td>Administered check marks to the Reinforcement group.</td>
<td>Children sat on their floor spots</td>
</tr>
<tr>
<td>3 minutes **Explained</td>
<td>Explanation and demonstration was kept simple; divided class into two teams.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>10 minutes Played Indian Dodge Ball</td>
<td>Officiated game and observed each child's functioning level.</td>
<td>Scatter Formation</td>
</tr>
<tr>
<td>Activities</td>
<td>Teacher Procedure</td>
<td>Formations</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>10 minutes</td>
<td>Administered check marks to the Reinforcement group.</td>
<td>Informal and Squad Formation</td>
</tr>
<tr>
<td>Reviewed lesson;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>younger boys re-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>turned to floor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>spots and washed-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>up; all others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>took showers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Refer to Appendix D1
**Refer to Appendix D2
Experimental Lesson for the Reinforcement and Non-Reinforcement Groups

2. Daily

Activity: One hand, overhand football pass.
Behavioral Objective: To throw a forward pass a short and increased distance.
Developmental Goal: Flexibility, endurance, and arm strength.
Space and Equipment: Rectangular court and footballs.
Time Allotment: 40 minutes

<table>
<thead>
<tr>
<th>Activities</th>
<th>Teacher Procedure</th>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 minutes Check mark period</td>
<td>Investigator and assistant administered check marks.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>5 minutes Warm-up</td>
<td>Investigator performed exercise with weights; each student was given the appropriate size weight to work with.</td>
<td>Extended Squad Formation</td>
</tr>
<tr>
<td>10 minutes Practiced</td>
<td>Investigator explained and demonstrated skill. Students worked in groups of twos. One group worked with the investigator, the other group worked with the assistant. Individual assistance was provided where necessary.</td>
<td>Horizontal Line Formation</td>
</tr>
<tr>
<td>2 minutes Check mark period</td>
<td>Administered check marks to the Reinforcement group.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>3 minutes Explained</td>
<td>The investigator explained and demonstrated the drill using the assistant as an example.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>8 minutes Football pass drill</td>
<td>The investigator divided the class into two groups. One group was designated as the passing group, the other group was the receiving group. The students alternated and utilized both groups. The investigator observed the students functioning level.</td>
<td>Relay Formation</td>
</tr>
<tr>
<td>Activities</td>
<td>Teacher Procedure</td>
<td>Formations</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>10 minutes Reviewed lesson; younger boys returned to floor spots and washed-up; all others took showers</td>
<td>Administered check marks to the Reinforcement group.</td>
<td>Informal and Squad Formation</td>
</tr>
</tbody>
</table>

*Refer to Appendix D1*
Experimental Lesson for the Reinforcement and Non-Reinforcement Groups

2. Daily

Activity: Overhand football pass and game Keep Away.
Behavioral Objective: To pass a football an increased distance and accurately.
Developmental Goal: Flexibility, endurance, and arm strength.
Space and Equipment: Rectangular court, tires, footballs, and weights.
Time Allotment: 40 minutes

<table>
<thead>
<tr>
<th>Activities</th>
<th>Teacher Procedure</th>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 minutes Check mark period</td>
<td>Administered check marks for being on time and sitting on floor spots.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td><strong>Warm-up</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 minutes</td>
<td>Investigator performed exercise with weights, and each student worked individually with the appropriate size weight.</td>
<td>Extended Squad Formation</td>
</tr>
<tr>
<td>10 minutes Practiced over-hand football pass-passing for distance and accuracy</td>
<td>Instructed children to pass football properly and throw passes a long distance; students worked in groups of twos and assistance was provided where necessary</td>
<td>Relay Formation</td>
</tr>
<tr>
<td>2 minutes Check mark period</td>
<td>Administered check marks to Reinforcement group.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td><strong>Explained</strong> game Keep Away</td>
<td>Explanation and demonstration was kept simple; class was divided into two equal teams.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>8 minutes Played game Keep Away</td>
<td>Officiated game; observed each child's functioning level.</td>
<td>Scatter Formation</td>
</tr>
<tr>
<td>Activities</td>
<td>Teacher Procedure</td>
<td>Formations</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>10 minutes</td>
<td>Administered check marks to the Reinforcement group and evaluated activity with class.</td>
<td>Informal and Squad Formation</td>
</tr>
<tr>
<td>Reviewed lesson; younger boys returned to floor spots and washed-up; all others took showers.</td>
<td>*Refer to Appendix D1 **Refer to Appendix D2</td>
<td></td>
</tr>
</tbody>
</table>
Experimental Lesson for the Reinforcement and Non-Reinforcement Groups

2. Daily

Activity: Throwing Circuit Course and game Throw Ball.
Behavioral Objective: To throw a ball an increased distance and accurately in an overhand manner.
Developmental Goal: Flexibility, endurance, and arm strength.
Space and Equipment: Rectangular court, plastic gallon containers, tires, beanbags, bases, and rubber playground balls.

Time Allotment: 40 minutes

<table>
<thead>
<tr>
<th>Activities</th>
<th>Teacher Procedure</th>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 minutes Check mark period</td>
<td>Administered check marks with aid from assistant.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>3 minutes *Warm-up**Explained Throwing Circuit Course</td>
<td>Explained and demonstrated regular exercise activity.</td>
<td>Extended Squad Formation</td>
</tr>
<tr>
<td>3 minutes **Explained Throwing Circuit Course</td>
<td>Explanation and demonstration was kept simple; placed students in pairs at different stations; practiced proper rotation.</td>
<td>***Circuit Formation</td>
</tr>
<tr>
<td>10 minutes Practiced throwing at activity station</td>
<td>Observed each child's functioning level and instructed the children to rotate properly.</td>
<td>Circuit Formation</td>
</tr>
<tr>
<td>2 minutes Check mark period</td>
<td>Administered check marks to the Reinforcement group (Non-Reinforcement group received a two minute rest period).</td>
<td>Children returned to squad floor spots</td>
</tr>
<tr>
<td>3 minutes **Explained Throw Ball rules</td>
<td>Explanation and demonstration was kept simple; students were divided into two equal teams.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>10 minutes Played Throw Ball</td>
<td>Officiated game and observed each child's functioning level.</td>
<td>Informal</td>
</tr>
</tbody>
</table>
### Activities

- 7 minutes
- Reviewed lesson; younger boys returned to floor spots and washed-up; all others took showers

### Teacher Procedure

- Evaluated the activity with the class; administered check marks to the Reinforcement group.

### Formations

- Informal and Squad Formation

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*Refer to Appendix D1

**Refer to Appendix D2

***Circuit Formation

XX = Two students at each station

1-5 = Station Areas
Experimental Lesson for the Reinforcement and Non-Reinforcement Groups

2. Daily

Activity: One hand, overhand Throw Marathon and game Pass Ball Baseball.

Behavioral Objective: To throw a ball with speed, accuracy, and power.

Developmental Goal: Flexibility, endurance, and arm strength.

Space and Equipment: Rectangular court, stop watches, and rubber playground balls.

Time Allotment: 40 minutes

<table>
<thead>
<tr>
<th>Activities</th>
<th>Teacher Procedure</th>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 minutes</td>
<td>Administered check marks to Reinforcement group.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>Check mark period</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Warm-up</strong> 3 minutes</td>
<td>Investigator administered regular warm-up activity.</td>
<td>Extended Squad Formation</td>
</tr>
<tr>
<td><em>Warm-up</em> 10 minutes</td>
<td>The class was divided into two groups; one group worked with the investigator, the other group worked with the assistant. The students threw overhand against a rebounding wall and were timed for ten minutes of non-stop throwing.</td>
<td>Informal</td>
</tr>
<tr>
<td><strong>Explain</strong> 2 minutes</td>
<td>Administered check marks.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>Check mark period</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Explain</strong> 3 minutes</td>
<td>Explanation and demonstration was kept simple; students were divided into two equal groups.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>Pass Ball Baseball rules</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 minutes</td>
<td>Officiated game and observed each child's functioning level.</td>
<td>Informal</td>
</tr>
<tr>
<td>Played Pass Ball Baseball</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activities</td>
<td>Teacher Procedure</td>
<td>Formations</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>10 minutes Reviewed lesson;</td>
<td>Administered check marks only to the Reinforcement group, and evaluated the activity with children.</td>
<td>Informal and Squad Formations</td>
</tr>
<tr>
<td>younger boys returned to floor spots and washed-up; all others took showers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Experimental Lesson for the Reinforcement and Non-Reinforcement Groups

2. Daily

Activity: One hand, overhand softball throw.
Behavioral Objective: To throw a softball overhand and with accuracy.
Developmental Goal: Flexibility, endurance, and arm strength.
Space and Equipment: Rectangular court, and regulation size softballs.
Time Allotment: 40 minutes

<table>
<thead>
<tr>
<th>Activities</th>
<th>Teacher Procedure</th>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 minutes Check mark period</td>
<td>Investigator and assistant administered check marks.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td><strong>Warm-up</strong></td>
<td>Explanation and demonstration of a four-count jumping jack exercise was provided.</td>
<td>Extended Squad Formation</td>
</tr>
<tr>
<td>3 minutes Explained the overhand softball throw</td>
<td>Explanation and demonstration of the proper throwing movement was provided.</td>
<td>Squad Spot Formation</td>
</tr>
<tr>
<td>8 minutes Two man throwing drill</td>
<td>Students were paired off and worked together as the investigator observed the proper body mechanics and provided assistance where necessary.</td>
<td>Horizontal Line Formation</td>
</tr>
<tr>
<td>2 minutes Check mark period</td>
<td>Investigator and assistant administered check marks to the Reinforcement group.</td>
<td>Squad Spot Formation</td>
</tr>
<tr>
<td><strong>Explained</strong> softball throwing relay</td>
<td>Explanation and demonstration of the activity was provided.</td>
<td>Shuttle Formation</td>
</tr>
<tr>
<td>10 minutes One hand, overhand softball throw relay</td>
<td>Officiated relay and observed each child's functioning level.</td>
<td>Shuttle Formation</td>
</tr>
<tr>
<td>Activities</td>
<td>Teacher Procedure</td>
<td>Formations</td>
</tr>
<tr>
<td>------------</td>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td>10 minutes</td>
<td>Administered check marks and evaluated activity with the students.</td>
<td>Informal and Squad Formation</td>
</tr>
<tr>
<td>Reviewed Lesson; younger boys returned to floor spots and washed-up; all others took showers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Refer to Appendix D1
**Refer to Appendix D2
Experimental Lesson for the Reinforcement and Non-Reinforcement Groups

2. Daily

Activity: One hand, overhand softball throw and Softball Game.

Behavioral Objective: To throw a softball overhand, for distance and accuracy.

Developmental Goal: Flexibility, endurance, and arm strength.

Space and Equipment: Outdoor field, regulation size softball, bats, gloves, and bases.

Time Allotment: 40 minutes

<table>
<thead>
<tr>
<th>Activities</th>
<th>Teacher Procedure</th>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 minutes Check mark</td>
<td>Administered check marks to the Reinforcement group.</td>
<td>Squad Formation</td>
</tr>
<tr>
<td>period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 minutes Practiced</td>
<td>The students were assigned to work in pairs. The investigator observed each child's functioning level and provided assistance where necessary.</td>
<td>Horizontal Line Formation</td>
</tr>
<tr>
<td>one hand overhand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>softball throw</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 minutes Check mark</td>
<td>Investigator and assistant administered check marks to the Reinforcement group.</td>
<td>Horizontal Line Formation</td>
</tr>
<tr>
<td>period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 minutes **Explained</td>
<td>Explanation of the rules was kept simple and the students were divided into two equal teams.</td>
<td>Horizontal Line Formation</td>
</tr>
<tr>
<td>rules of Softball</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Game</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 minutes Softball</td>
<td>The investigator officiated the game and observed each child's performance level. Students had been given a fielding position and a batting order</td>
<td></td>
</tr>
<tr>
<td>Game</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 minutes Reviewed</td>
<td>Administered check marks only to the Reinforcement group and evaluated the activity with the students.</td>
<td>Informal Formation</td>
</tr>
<tr>
<td>lesson</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Refer to Appendix D2
APPENDIX D
DESCRIPTION OF EXPERIMENTAL ACTIVITIES

1. EXERCISES

2. ACTIVITIES
1. EXERCISES

Arm Bend. Both arms are extended forward with the palms supinated. The arms are brought to the chest with the elbow flexed. On the command "Bend", both arms are flexed. On the command "Extend", both arms are brought forward away from the chest.

Steam Engine. Starting with the right arm extended and the left arm flexed, both forward in a horizontal plane, the arms move in opposition. On the command "Right", the right arm is fully extended and the left arm is flexed. On the command "Left", the left arm is fully extended and the right arm is flexed.

Windmills. Starting with both arms laterally extended, the wings of an airplane, the right arm rotates to touch the left toe and the left arm rotates to touch the right toe. The command used is "Right down", "Right up", "Left down", "Left up", and so on.

Giant Circles. Both arms are laterally extended with the hands pronated. The arms are rotated forward and backward in a circular motion. The command used is "Small front", "Small back", "Large front", "Large back", and so on.

Weights—Arm Flexion and Extension. Grasping the weight with the palms supinated, the palms are brought to the chest as the elbow becomes flexed. From a flexed position, the arms
are extended away from the chest. The command used is "Arms flexed", "Arms extended", "Arms flexed", "Arms extended", and so on.

**Skin Diver.** Starting with both arms laterally extended, the arms are brought into the chest in a flexed motion, and laterally extended to complete the motion. The command used is "Bend", "Stroke", "Bend", "Stroke", and so on.

**Egg Beater.** Starting with both arms laterally extended and the palms supinated, the arms are brought above the head and touch, and are laterally extended downward to touch the thighs. The command used is "Swing up", "Swing down", "Swing up", "Swing down", and so on.

**Jumping Jacks.** Starting with the arms extended at the sides, the children jump with their legs apart and arms extended overhead and touching. The arms are extended downward to the sides as the legs return together to complete the motion. The command used is "arms together", "Arms apart", "Arms together", "Arms apart", and so on.
2. ACTIVITIES

Overhand Pass Relay. The students were divided into two equal teams, which were positioned a few feet apart in a straight line formation. One child from each team stood a few feet away in the center and perpendicular to his teammates. Each child passed the playground ball from left to right, in a manner in which the ball moved from the child in the center to the child on the straight line and back to the center child. After the last child on the straight line received the ball, he exchanged places with the child in the center, while all the other students rotated from left to right, across the straight line. Throws were only made overhand with one hand, and the team that performed fastest was the winning team.

Bong Ball. Two teams equally divided were positioned equidistant and facing each other in a parallel line formation. A cage ball was placed between both teams in order to be bombarded with a playground ball. Each child was given a playground ball to throw overhand with one hand, in the direction of the cage ball. By continually bombarding the cage ball with a playground ball, a point was scored when the cage ball was moved past a goal line. To prevent a point to be scored, a child could only throw a ball overhand at the cage ball.

Distance and Accuracy Throw Relays. The class was divided
into two equal groups, and positioned in a relay formation. The children were instructed to run forward to a restraining line with a playground ball, and to throw the ball overhand a far distance at a wall target. After striking the wall target, a point was given, and the ball was retrieved by the throwing child. The ball was brought to the front of the line and given to the next child on the line. The team to complete the relay fastest received one point. The team with the most total points was the winning team.

The accuracy throw relay utilized the identical relay formation as the previous relay. Each child was instructed to run with the playground ball to a restraining line, and to throw overhand at a container (pin) a few feet away from the restraining line. A point was given when the container was successfully knocked over, and the ball properly returned to the next child on the line. The containers were properly placed upright by the investigator and his assistant. A point was given to the team that completed the relay fastest, and the team with the most total points was the winning team.

**Jail Dodge Ball.** Two teams equally divided were positioned equidistant and facing each other in a parallel line formation. A gym mat was placed a few feet behind each team and designated the jail. The children were instructed to throw overhand from behind the restraining center line. When a child was stricken and the ball was not caught, he went to the jail opposite his team. To be freed from jail,
a child would have to catch the ball thrown in flight from his teammate. If the ball was intercepted and caught by the opposing player, the throwing child was placed in jail. If the ball was dropped, the opposing player had gone to jail. When a team had all of their players in jail they became the losing team.

**Indian Dodge Ball.** Two teams equally divided were positioned equidistant and facing each other in a parallel line formation. A plastic container was placed in front of each team, which was guarded by one child from each team. The children were instructed to throw a playground ball overhand at their opponent, from behind a restraining center line, and to attempt to knock over the stationary container. To win a team either eliminated their opponents by striking them with the ball, or the plastic container was knocked over by the throwing child. It was explained that knocking the container over was equivalent to striking all the players on the same team.

**Keep Away.** Two teams equally divided were positioned in a scatter formation. With the toss of a coin, one team was given the football and designated the passing team, while the other became the defending team. The children on the passing team were instructed to have the football thrown and caught by at least three different teammates before a point could be scored. The children on the defending team were instructed to prevent the passes to be thrown and caught by guarding and blocking the thrown passes with their
hands. After a point was scored or the defending team intercepted the football, they received possession of the football and became the passing team.

**Throwing Circuit Course.** The throwing circuit course was designed around a baseball diamond, with four bases and a pitcher and catcher composing a five station circuit. The children worked in groups of twos and changed every two minutes to a new station area. The following activities were included at each station area.

**First Base.** The children were instructed to throw a playground ball overhand at one of four hanging containers assembled on a line or rope connected to two poles.

**Second Base.** The children were instructed to throw a playground ball overhand through one of two tires assembled on a cargo net.

**Third Base.** The children were instructed to throw a playground ball overhand off a rebounding wall for two minutes without stopping.

**Home Plate.** Two tires were positioned ten feet apart and facing each other vertically. Behind each tire a child was placed, and one child was instructed to toss overhand ten bean bags, one at a time, into the opposite tire. After the throwing child completed his ten tosses, the other child collected the ten bean bags and took his turn at throwing.

**Pitcher and Catcher.** A pitcher's mound and home plate was designed for two children. One child stood at
the mound while the other stood behind home plate. Both children tossed the playground ball back and forth for two minutes.

**Throw Ball.** The children were equally divided into two baseball teams, one of which was running and the other throwing. Both teams alternated between running and throwing. The children who were running were instructed to run from home plate and touch all four bases, while the children on the throwing team were given positions on all four bases, and instructed to toss the playground ball overhand from the catcher to the first baseman to the second baseman, to the third baseman and back to the catcher before the running child could reach home plate. When the running child reached home plate ahead of the throw his team received one run. After all children on the same team had a chance at running, both teams exchanged places. The runners became the throwers, and the throwers became the runners.

**Pass Ball Baseball.** The children were equally divided into two teams, one of which was running and the other throwing. Both teams alternated between running and throwing. The children who were running were instructed to throw the playground ball overhand in any direction and run from home plate diagonally to second base and back to home plate, while the children who were throwing had been instructed to have the ball passed and caught by at least three different teammates prior to throwing at the running child. When the running child reached home plate without being hit by
the throwing child, a run was scored. When the ball struck
the runner prior to his return to home plate, no run was
scored. After all children had a chance at running they
exchanged places with the children who were throwing.

**Softball Throw Relay.** The students were divided into two
equal teams which were positioned a few feet apart in a
straight line formation. One child from each team stood
a few feet away in the center and perpendicular to his team-
mates. Each child passed a softball from left to right, in
a manner in which the ball moved from the child in the cen-
ter to the child on the straight line and back to the center
child. After the last child on the straight line received
the ball, he exchanged places with the child in the center,
while all other students rotated from left to right across
the straight line. Throws were only made overhand with
one hand, and the team that performed fastest was the
winning team.

**Softball Game.** The children were divided equally into two
teams and participated actively in a two inning softball
game. The investigator and the assistant pitched underhand,
while the students threw the softball in an overhand manner.
Each team was given three outs and each batter received
three swings.