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THE USE OF 8mm FILM FOR INDIVIDUALIZED INSTRUCTION
OF FIRST AND FOURTH GRADE CHILDREN IN THE
OVERARM THROW AND THE SKIP

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree of Doctor of Philosophy in the Graduate
School of The Ohio State University

By
Heidie C. Mitchell, B.S., M.A.

The Ohio State University
1972

Approved by
Lewis A. Hulse
Adviser
School of Health, Physical Education and Recreation
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"Upgrading Elementary School Physical Education," Physical Education Newsletter, XII, No. 16, April, 1968.

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CHAPTER I

INTRODUCTION

The mere presentation, by photograph, drawing, models, or the live exhibition of things to be studied does not guarantee a thoughtful grasp of the subject. Pictures and films will be aids only if they meet the requirement of visual thinking. The unity of perception and conception suggests that intelligent understanding takes place within the realm of the image itself, but only if it is shaped in such a way as to interpret the relevant features visually.

—Rudolf Arnheim in *Visual Thinking*

The past decade in physical education was characterized by an increased interest in elementary school physical education. Several nationally sponsored projects were undertaken in an effort to learn more about the movement patterns of the young child. In 1964 the Skill Progressions Committee was appointed by the American Association for Health, Physical Education, and Recreation, whose aim was to write guidelines which could be used by the elementary classroom teacher in the teaching of fundamental skills.¹

In the course of collecting and analyzing data for skill guidelines this author, as a member of the committee, took over six thousand feet of 8mm film of children, grades K-4, demonstrating the skills of walking, running, skipping, hopping, jumping, leaping, sliding, galloping, throwing, catching, striking and kicking. A panel of judges was appointed to analyze the films. Criteria established prior to the final viewing of the films, were used to rate each subject's fundamental skills on a three point scale ranging from inefficient to excellent. The judges independently rated each subject's performance in each skill. The ratings were tabulated by skill, age, and sex. Based on these ratings, the panel made several generalizations about the skill development of the young child.

It was observed by the panel that the children in the study tended to move skillfully only that part of the body primarily responsible for the execution of the skill. For example, it was observed that the children tended to move using only the feet in skipping, with little use of the arms which assist the forward movement of the body. It was observed that the children tended to move primarily the throwing arm in the overarm throw, with little use of the hand and foot opposition, or trunk rotation. The movement of the arm alone was the propelling force for throwing a ball.
Analysis by the panel of all twelve skills studied revealed a tendency for the children to limit body movement to the part or parts of the body primarily involved with specific intention of the movement. In locomotor movement, children moved primarily with the feet; in manipulative skills, with the part of the body giving impetus to the object. As a result of these observations, the panel questioned whether the children themselves might have benefited from seeing themselves move, since their lack of total body use was very apparent.

Methods geared to individualized instruction and an emphasis on human movement as the emerging content of elementary school physical education are repeatedly emphasized as promising practices in a recent publication by the American Association for Health, Physical Education, and Recreation. Elementary school physical education programs today are, however, dominated by much mass

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instruction and games. The use of technology in education: films, video tape, and teaching machines, has been rated as one of the ten most important developments of the 1960's, and yet the use of such technology is rare, if not altogether absent, in elementary school physical education programs. Very few visual aids are available for use with elementary school children. One such aid is a film loop series developed by the Ealing Corporation and another is a television series developed by the National Instructional Television Center. Both of the series show children in movement and were designed for use with children. The Ealing production, super 8mm silent loop films, shows children in various activities such as basic movement, and fundamental skills. The television series by the National Instructional Television Center, "Ready, Set, Go," employs closed circuit television, and is available to large school systems on a subscription basis. A survey of films revealed that most of the films which show children in movement are designed for use with college classes in methods of teaching elementary school.

---

Research in the use of such media as the slow motion loop films, video tape, training films, and educational television in physical education is limited almost entirely to an evaluation of the effectiveness of visual aids for instruction at the college level. Furthermore, the bulk of the studies deals with the use of prepared visuals depicting the ideal performance. Studies in which the student, at the elementary level, views his own performance are apparently non-existent.

Through an investigation of the effectiveness of using 8mm films in teaching elementary school children to skip and to throw, it is hoped that some insight can be gained concerning the use of this medium as a means of individualizing skill instruction for elementary school children.

**STATEMENT OF THE PROBLEM**

This study focused on the question of whether

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children can improve their overall movement performance as a result of seeing and analyzing their own movement patterns more than children who are taught without such an individualized approach.

PROCEDURES

The general design of the experiment was to measure the proficiency of throwing and skipping skills for a select group of first and fourth grade children; to administer a program of instruction; and to evaluate the proficiency of each child's skill to determine the effects of instruction. Instruction for one group of children included viewing and analyzing 8mm films of their own skills. All film viewing was private, with only the experimenter present to guide the child in his analysis.

Subjects were all the children from one first grade and one fourth grade class in Walls School, a public school in Kent, Ohio. Walls School is located in a middle class neighborhood in Kent, Ohio. All of the children in the study, for whom data were reported were normal in physical and mental attributes. Seventeen first graders and twenty-six fourth graders participated in the experimental study in place of their regularly scheduled physical education class, two one half hour periods a week for twelve weeks.
The primary factor for selecting first and fourth grade children for the age groups to be studied was the past experience of the children. It was felt that the first graders would possess the neuromuscular coordination necessary to learn the skills of skipping and throwing, and that for them the experience of specific instruction in skipping and throwing would be a new experience. It was the belief of the writer that the fourth graders, in addition to possessing the coordination necessary to execute the skills of skipping and throwing, were assumed to have some knowledge of how the skills were to be performed. The writer felt that a significant improvement by the fourth grade children would be evidence of impressive value of any type of instruction which might bring about such change.

The AAHPER ball throw test was administered to both groups at the beginning and at the conclusion of the twelve-week instructional program, to measure throwing ability. Films of the children skipping were also taken at the beginning and at the conclusion of the experiment. They were evaluated by a panel of judges to assess skipping ability.

The panel was comprised of three experienced physical education teachers. Each member of the panel had both public school and college teaching experience. In addition, one member was a former elementary school
physical education teacher, and another member a former junior high school gymnastics coach. All members of the panel were well qualified judges.

Based on the scores of the ball throw test, the children were paired and assigned either to the experimental or control group. The scores of the children were ranked, by grade and sex, from the highest distance score to the lowest, and every other child assigned either to the experimental or control group.

The initial films of the subjects skipping and throwing were used in the instructional program for the experimental subjects. Each experimental subject experienced seeing his own films privately assisted by the experimenter. Other than the viewing period for the experimental subjects, both experimental and control subjects received identical instruction. Every effort was made to vary the instructional program from day to day. Yet, at the same time, instruction was limited to the skills of skipping and throwing.

The instructional program was handled by the experimenter. The first and fourth grade children participated in the study as part of their regularly scheduled program of physical education. Each grade met with the experimenter for two, one half hour periods per week for a total of twelve weeks. Testing and filming took place during the class time. The individual viewing
periods for the experimental subjects were scheduled in addition to their regular classes. This period was one half hour for each child.

Following the conclusion of the program the subjects were retested with the ball throw test and refilmed in the skill of skipping.

Pre to post scores derived from the ball throw for distance and from the judges' ratings of the overall performance for skipping were compared by means of a "t-test" of correlated samples.

The "t-test" was also applied using scores in skipping and throwing to measure the difference, if any, between the experimental and control groups due to the type of instruction received.

The conclusions and recommendations are based on the analysis of data.

A review of the literature related to motor skills, feedback, and visual aids, will be presented in Chapter II. The details of the research design are presented in Chapter III. Data were analyzed by a computer. The statistical results are presented in Chapter IV. Chapter V presents a summary, conclusions and recommendations.

DEFINITION OF TERMS

1. Traditional program of physical education refers to
any program of physical education which consists predominantly of mass instruction of games or sports and dance.

2. Modern program of physical education refers to any program in which the basic body of knowledge about human movement is introduced at the lowest level of instruction and is carried throughout the program as a control core. The knowledge includes (a) The elements of movement: force, flow, time and space, (b) The principles of human movement: objective focus, total assembly, opposition and follow through and (c) Laws of Motion.

3. Fundamental skills referred to in this study are the locomotor and manipulative skills of: walk, run, skip, hop, jump, leap, slide, gallop, throw, catch, kick, and strike.

4. Control group refers to the children in the first and fourth grade who received instruction in the skills of throwing and skipping, but who did not view films of their own skills.

5. Experimental group refers to the children in the first and fourth grades who received instruction in the skills of throwing and skipping, and in addition viewed films of their own skills.

6. Instructional program refers to the regularly scheduled physical education classes for the first and fourth grade, experimental and control subjects.
7. Viewing program refers to the special treatment received by the experimental subjects, private viewing of 8mm film and guided analysis of their own skill.

8. Guided analysis refers to the verbal interaction, during the viewing program, between the subject and the experimenter concerning the performance of the subject in the skills of throwing and skipping.

9. Visual aids refers to those teaching aids which rely on vision as the primary perceptual mode. Visual aids in the study refers to films, film loops, and videotape.

10. Feedback refers to the knowledge of results of performance.

11. Augmented feedback as used in this study refers both to the verbal analysis of skill and the viewing of 8mm films of the subject’s own performance.

LIMITATIONS OF THE STUDY

1. The selection of the subjects is limited to two classes within one school.

2. The skill rating for the skip is limited to a subjective rating by a panel of judges.

3. There is no way to control the total amount of practice in which each child might engage.

4. The viewing and analysis was conducted in one period for fourth grade subjects, and divided into two segments for first grade subjects.
CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Authorities in both the fields of child development and physical education tend to agree that there is a difference between maturation and the learning of physical skills. Certain types of movement such as grasping, reaching, creeping and crawling have been found to develop without any special training. Such movements are maturational in nature, and are referred to in the literature as phylogenetic movements. Ontogenetic movement, including skills such as skipping and throwing, is dependent upon training and experience for its development. 7

Glassow, Halverson and Rarick reviewed the literature on skills in infancy and childhood. They concluded that by age three, children have the basic coordination of the skills of running, jumping and throwing. They suggest that "investigations beyond this age should be di-

rected to the product and process of performance to measures of outcomes of coordination."

The purpose of this investigation was to study the effects of using guided analysis of 8mm movies of the subjects' own movements on the acquisition of the skills of throwing and skipping among first and fourth grade boys and girls. The literature that is reviewed, includes: (1) studies of skilled movement, specifically those dealing with skipping and throwing, (2) feedback mechanisms involved in learning motor skills, and (3) studies about the use of films in the learning of motor skills. The review will present each of these topics separately.

Studies about Skilled Movement

Research on the skill development of children is scarce. Perhaps the scarcity of research reflects the seeming lack of interest among educators for experimental research about how children learn skilled movement. This review of the few scattered studies from 1930 through 1971, deals primarily with two topics, development through maturation, and development through learning.

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Several normative studies provide information on the development of throwing ability. Three of these studies: Wild,^9 Seils,^10 and Glassow and Kruse^11 hypothesized that the development of physical skills parallels the total maturation of the child.

Wild^12 (1938) observed the development of children age two to twelve years. Her very definitive study described the throwing ability of children from two years to twelve years of age. She analyzed films of children's throwing for distance and developed tracings of positions of body, arm and hand at various stages of the throw. In addition, she provided an "age-stage" description which is recognized in current literature as being an

---


^10 Leroy Seils, "The Relationship Between Measures of Physical Growth and Gross Motor Performance of Primary Grade School Children", Research Quarterly, XXII (May, 1951), 244-60/


^12 Wild, loc. cit.
accurate description of the development of this motor pattern. 13

Thirty-two children were studied by Wild to determine their throwing ability. A boy and a girl were selected at six month intervals for the two to seven year age group, and at one year intervals for the seven to twelve year age group. All were judged to be normal in respect to physical, mental, motor and personality development. All of the children were right handed.

Data collection was made through motion pictures, using a distance scale and an electric clock in the throwing field. The film was analyzed by the following methods:

(1) film measurement to secure distances traversed by the ball in the recorded time intervals;
(2) translation of visual representation of a throw into verbal descriptions;
(3) tracing of position of body, arm and hand at various stages of the throw. 14


14 Wild, op. cit., p. 21.
A list of the movement characteristics of each age interval revealed a composite picture of the movement characteristics for each successive age. The same procedure was followed for all data on the speed of throwing. The throw was analyzed in phases as well as in the whole. Items such as speed and pattern were combined on a scattergram and each child's performance level was classified by this method.

Some of her pertinent statements regarding skill acquisition are summarized below:

1. Initial velocity increases with age.

2. The optimum point of release is in a nearly horizontal path. This characteristic is found among older children.

3. All movement and time features demonstrated an age series of patterns.

4. Four stage patterns emerged which were assigned to an age schedule suggesting a developmental sequence summarized briefly as:

Stage I is assigned to age two to three or four. The throw is characterized by antero-posterior movement of the body and arm. The body faces the direction of the throw all of the time with the arm as the initiating factor.

Stage II is marked by body and arm movements in the horizontal plane, and is assigned to ages three and one-half to five years. The arm continues to be the initiating factor, the body rotating right then left over the stationary feet. Release is forward and downward.

Stage III is marked by the introduction of stepping on the right foot. This pattern was found to be typical of children of age five to six by Wild. Early turning of the whole body to
face to the left accompanies trunk flexion forward. Release is forward and downward.

Stage IV is characterized by many elements of timing and movement of the mature pattern, i.e. the use of opposition with trunk rotation. Wild reported this pattern to be found among all of her male subjects from six and one-half years of age and older.

(5) The outstanding change in movement type was found to be the change from movements in the anteroposterior to movements in the horizontal plane, and from an unchanging base to a step with opposition of hand and foot.

(6) Comparison of the patterns of girls and boys revealed sex similarities in terms of growth pattern, and sex differences in the performance level of that pattern within each age range.

(7) The path of the throwing hand progresses with age, from a curved arc to a flattened one.

(8) Speed of arm movement increases with age, as does an earlier release. 15

Wild's concluding remarks are as relevant today as when they were written:

The genetic history of the hard overhand throw and the panorama of change in the movement and timing features of successive stages in throwing behavior afford a valuable background for the solution of problems arising in respect to throwing plays and games of children—problems which involve program planning, provision for appropriate play space, allotment of time, methods of instruction, and group organization. 16

She also stated a belief that after the age of six, teaching could enhance the refining of physical skills.\textsuperscript{17}

Seils' (1951)\textsuperscript{18} studied the relationship between measures of physical growth and gross motor performance of primary grade children. Throwing for distance was among the skills examined by Seils.

Seils hypothesized that "the sequence of physical growth and the sequence of development in gross motor performance are concurrent development phenomena."\textsuperscript{19} The purpose of his study was to determine the relationship, if any, between measures of physical growth and maturity of primary school children and their proficiency in performing gross motor skills.

Criteria for the selection of test items in the investigation were: the safety of the child, the flexibility of scoring, a high index of discrimination, ease of administration, simplicity of equipment, ease of performance and reliability.

A preliminary investigation was conducted for test selection. For the ball throwing test for distance,

\begin{itemize}
\item \textsuperscript{17}Ibid.
\item \textsuperscript{18}Seils, loc. cit.
\item \textsuperscript{19}Ibid., p. 244.
\end{itemize}
which was one method of testing gross motor performance, various sized balls were used to determine which ball might best be used with small children. These included: (1) baseball, (2) twelve inch softball, (3) tennis ball. The reliability for each ball, as determined by correlating first and second trials was:

1) baseball: .970  
2) 12" softball .953  
3) tennisball: .980  

The tennis ball was the ball selected to be used by Seils for the distance throw.  

The method of testing for the distance throw was to measure the total distance of three throws to the nearest half-foot. The data presented correlated ball throwing ability with measures of physical growth at each successive grade level. When the comparison was made between throwing performance and age, height and weight, it was found to be insignificant. However, Seils reported correlations of +.42 for the boys and +.38 for the girls between throwing performance and the measure of skeletal maturity as determined by carpal bone x-rays. He concluded that while the relationship between the performance and the measure of skeletal maturity of the children was not statistically significant, it might be of greater

20 Ibid., p. 249.
importance than the other considerations since of all the comparisons, these correlations were the highest.

Seils took seven measures of motor ability: running, balance, agility, jumping, striking, catching, and throwing. The results of all the comparisons, according to the author, indicate the existence of some relationships between measures of maturity and performance of gross motor skills. However, the relationship between skeletal maturity and motor skill was found to be the more significant.\textsuperscript{21}

Glassow and Kruse examined general motor ability as a factor in motor performance. Achievement scores for girls age six to fourteen years, for the thirty yard run, the standing broad jump and the overarm throw were collected over a three year period for a group of one hundred twenty-five girls.\textsuperscript{22}

Analysis of data revealed that each individual remained in the same relative position in her grade especially with regard to running and jumping. The data on throwing showed that fewer girls retained their relative position. In discussing their findings, the

\textsuperscript{21}Ibid., p. 620.

\textsuperscript{22}Glassow and Kruse, loc. cit.
authors gave two possible explanations for the indication that girls tend to maintain the same relative position within the group. "It may be that early development of motor coordination is essential for later success or that an inherent mature motor ability may determine the limit of achievement during the growing years."\textsuperscript{23}

A description of the physical education facilities, staff and program was included in the report. The physical education facilities were described as "fair". "The outdoor play space was ample; there was no gymnasium; a ground floor auditorium, one story in height were available for indoor activity."\textsuperscript{24}

The ball used by Glassow and Kruse was a regulation hard baseball, and in all probability, the girls' physical education program did not include indoor practice or instruction in throwing such a ball because the room imposed certain restrictions. In addition, reference in a later study by Glassow, refers to the former program as "traditional".\textsuperscript{25} The later study

\textsuperscript{23}Ibid.
\textsuperscript{24}Ibid., p. 427.
\textsuperscript{25}Glassow, Halverson and Rarick, p. 1.
provided specific instruction in the skills of running, jumping and throwing. It is the opinion of this writer that the traditional program consisted primarily of games and that lack of opportunity to practice throwing for distance might account for the fact that the girls did not retain their relative position in ball throwing.

One might speculate that the size of the indoor play space might have an effect on the type of activities presented. This writer knows this school to be the identical school used by Glassow for subsequent studies of the same skills. The later study by Glassow, Halverson and Rarick gives the exact dimensions of the indoor auditorium to be fifty-eight feet by thirty-three feet. The space requirements for the overarm throw for elementary school children are at least two times the size of the room used by Glassow and Kruse.

Keogh (1965) studied the motor performance of children during the elementary school years in the skills of running, jumping, throwing, hopping, balance and several other motor skill tasks. His purpose was to provide normative data for children age six to ten.

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26 Ibid., p. 15.

His subjects were children K-6 in elementary schools in Santa Monica, California. A total of 1,174 children were included in the study.

For each of the five basic skills: running, jumping, throwing, hopping and balance, Keogh selected two tests. Throwing was measured by a throw for distance and a throw for accuracy. A twelve inch softball was used for the test for the overhand throw for distance. The best of three throws, with no preliminary run permitted, was recorded as the child's score. In throwing for accuracy, the children were tested at two distances. These distances varied according to the age and sex of the subject.\textsuperscript{28}

Keogh compared his data for the ball throw for distance with data from several other studies. Much of the data was missing and this made the comparisons almost meaningless. In addition, the data reported were collected using different procedures and different size balls.\textsuperscript{29}

\textsuperscript{28}\textit{Ibid.}, p. 47.

\textsuperscript{29}\textit{Ibid.}, p. 49.
Regardless of these apparent procedural differences, Keogh concluded that in throwing for distance the ability to throw farther increases with age, and boys demonstrate a consistent two year advantage over girls at age six and as much as a three year advantage by age eleven.  

Keogh offered no explanation for the apparent difference between the throwing ability of boys and girls. However, developmental psychologists tend to agree that the longer forearm length and girth in boys gives them a mechanical and strength advantage in the propulsion of an object for distance.

Only one study, Sinclair (1971), was found which investigated skipping. Sinclair studied the movement patterns of children two to six years of age.  

Sinclair's study (1971) on the movement patterns of young children provides the only available data on skipping as well as additional information on throwing.

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30 Ibid., p. 48

31 Caroline Sinclair, Movement and Movement Patterns of Early Childhood, Division of Educational Research and Statistics, State Department of Education (Richmond, Virginia, 1971).
Subjects from two to four years of age were observed over a two year period and filmed three time a year in eighteen to twenty-five movement tasks.32

A checklist adapted from a form developed by Godfrey and Kephart was used to guide the observations of the investigation.33 The movement tasks which Sinclair evaluated were: ascending stairs, bouncing on board, bouncing a ball, carrying, catching, climbing, creeping, descending stairs, figure-eight run, forward roll, galloping, hanging, hitting, hopping, kicking, pulling, pushing, running, running high jump, skipping, sliding, standing broad jump, throwing, walking and walking on a beam.34

The description which was used to evaluate the tasks of skipping and throwing are pertinent to the present study because they are similar to those developed by this writer in 1970.35 Those descriptions are as

32Ibid.


34Sinclair, op. cit., p. 10.

35Naomi Allenbaugh and Heidie Mitchell, "Skill Progressions, K-4" (Kent State University, 1970), pp. 6-12. (Mimeographed).
follows:

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<tr>
<th>TASK</th>
<th>ELEMENTS OF TASK</th>
<th>SUCCESS AND MATURE PATTERN</th>
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<tbody>
<tr>
<td>Skipping</td>
<td>Covers the prescribed distance</td>
<td>Success: at least four successive skips</td>
</tr>
<tr>
<td></td>
<td>Alternates feet evenly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uses arms for balance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uses limbs in opposition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uses ball of foot</td>
<td>Mature Pattern: covers the prescribed distance</td>
</tr>
<tr>
<td></td>
<td>Moves in direct path</td>
<td>with steady, rhythmic skip</td>
</tr>
<tr>
<td></td>
<td>Rhythmic and steady</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shows no difference,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>right or left</td>
<td></td>
</tr>
<tr>
<td>Throwing</td>
<td>Projection of the ball</td>
<td>Success: projects ball forward</td>
</tr>
<tr>
<td></td>
<td>Sideward stance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Shifts weight in preparation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Uses body rotation</td>
<td>Mature Pattern:*</td>
</tr>
<tr>
<td></td>
<td>Throws with right hand (or left)</td>
<td>Success using two or more starred elements</td>
</tr>
<tr>
<td></td>
<td>Uses overarm throw</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is consistent in style</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Follows through</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cocks and uses wrist</td>
<td></td>
</tr>
</tbody>
</table>

For rating the performance of subjects, an overall success criteria was established. The number of observable successful elements was checked for each subject. A score was then assigned to each child for each of these eighteen to twenty-five tasks. The

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36 Sinclair, op. cit., p. 6.
system of scoring was:

5 = successful and all elements exhibited
4 = successful and all elements except one exhibited
3 = successful and conforming to mature pattern and movement
2 = successful, but not meeting standard
1 = partially and objectively successful and to a marked degree. 37

In reporting the results of her observations, Sinclair gave mean scores computed for the various age groups for six month intervals:

<table>
<thead>
<tr>
<th>Age</th>
<th>2</th>
<th>2.5</th>
<th>3</th>
<th>3.5</th>
<th>4</th>
<th>4.5</th>
<th>5</th>
<th>5.5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skipping</td>
<td>0</td>
<td>0.2</td>
<td>1.9</td>
<td>0.5</td>
<td>1.7</td>
<td>2.9</td>
<td>2.1</td>
<td>2.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Throwing</td>
<td>2.1</td>
<td>2.3</td>
<td>2.9</td>
<td>2.7</td>
<td>3.0</td>
<td>2.8</td>
<td>3.1</td>
<td>3.2</td>
<td>3.8</td>
</tr>
</tbody>
</table>

The score of zero for age two in skipping indicates that no child was successful in that skill at that age. 38

In addition to providing normative data on many movement patterns, Sinclair presents a method of describing the development of motor patterns by defining eight different movement characteristics. Her rationale for characteristics is that they are common to many movement tasks. Those characteristics which are common to skipping and throwing are described as follows:

37 Ibid., p. 8.

38 Sinclair, op. cit., p. 10.
1. Opposition (the synchronized use of opposite hand and foot in the upright position and cross-laterally in quadripedal movement)

2. Total body assembly (using the parts of the body as levers to acquire speed or force against resistance, or for power release in a combination of speed and force)

3. Rhythmic two part locomotion (as in gallop, slide, skip)

Sinclair's descriptions of the skills of throwing and skipping are here reproduced since very little age-stage descriptive data is available in research literature at this time.

Age Two: The subjects did not demonstrate effective total body assembly in hitting or throwing.

Age Three: Rhythmic two-part locomotion was demonstrated by 76 percent of the children in galloping, by 34 percent in sliding, and 12 percent in skipping.

Age Four: Inept in these tasks at age three, the four-year-olds were able to hit a stationary ball, slide, skip, and do the running high jump. The four-year-olds showed gains in speed in throwing (from 24 percent at age three to 48 percent at age four). Gains in rhythmic two-part locomotion were apparent in galloping (from 76 percent at age three to 92 percent at age four), in sliding (from 34 percent at age

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39 Ibid., p. 11
40 Sinclair, pp. 11-17.
three to 77 percent at age four), and in skipping (from 12 percent at age three to 52 percent at age four).

Age Five: Boys attained a major gain in the distance they threw a ball (a mean score of 44.63 feet) at five and a half years, while girls made lesser gain (a mean score of 25.07 feet). Small gains in rhythmic two-part locomotion were indicate by a 37 percent improvement in skipping.

Age Six: There were gains in opposition in running (from 91 percent at age 5 to 100 percent at age six). In skipping (from 16 percent at five to 44 percent at age six). 40

Several experimental studies examined the effects of training or practice in throwing: Hicks (1930)41 used two to seven year old subjects, throwing at a moving target; Dusenberry (1952)42 children age three to seven throwing for distance; Miller (1957)43 first grade children

40 Sinclair, pp. 11-17.
41 J. Allan Hicks, "The Acquisition of Motor Skill in Young Children. A Study of the Effects of Practice in Throwing at a Moving Target", Child Development, I (June, 1930), 90-105.
throwing for accuracy; Dohrmann (1961)\textsuperscript{44} eight year old boys and girls throwing for distance; and Glassow, Halverson and Rarick (1965)\textsuperscript{45} a longitudinal study of elementary school children which investigated their ball throwing ability using the speed of the ball at the point of release as the measure of proficiency.

Hicks studied children of age two years seven months to six years five months. After a ball throw test, subjects were assigned to either the experimental or to the control group. The experimental group practiced throwing at a moving target once a week for eight weeks, and each practice consisted of ten throws. The control group was given an initial test. No practice was provided for this group. At the conclusion of the program, both experimental and control subjects were re-tested. The analysis of data revealed that while both the experimental and control groups made gains in average scores from the initial test, the difference

\textsuperscript{44}Paul F. Dohrmann, "Throwing and Kicking Ability of Eight Year Old Boys and Girls" (unpublished Doctor's dissertation, State University of Iowa, 1961).

\textsuperscript{45}Glassow, Halverson and Rarick, loc cit.
in gains was not statistically significant.  

Dusenberry's research revolved around throwing for distance. Her subjects were from a nursery school and day care center, made up of boys and girls three to seven years of age. Based on initial ball throw tests for distance, two groups were equated on the basis of age, sex and race. One group received practice and instruction in throwing for two periods a week for three weeks. The control group received no instruction. While small gains were made by the control subjects, they were not significant. The average gain for control boys was 12.8 percent, for experimental boys it was 25 percent. For control girls, the average gain was 2.1 percent, and for experimental girls it was 12.7 percent.  

The training program for the experimental group was extensive. Instruction was given whenever necessary. The experimenter demonstrated and gave assistance on such points as: shifting body weight, rotation of the trunk and releasing the ball. Younger children were actually positioned in a side-to-target body alignment and helped

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46Hicks, loc. cit.

47Dusenberry, op. cit., p. 11.
manually to move through the sequence properly. In addition to the training, candy and praise were given as rewards for improvement.

Miller studied a group of first grade children to determine if instruction in the skill of throwing would improve their performance over and above their performance due to maturation. His experimental subjects, twenty-one first grade boys and eighteen first grade girls, received twenty-six twenty minute periods of instruction on throwing for accuracy. The control subjects, fifteen first grade boys and twenty-three first grade girls, participated in twenty-six twenty minute periods of play using games which involved throwing a ball, but they received no instruction on how to throw. The children were tested at the beginning and at the conclusion of the study.

In summarizing his findings, Miller concluded that instruction of first grade children in throwing for accuracy did not improve the skill over and above what is expected to occur by practice without instruction.

It would appear that the results of these three studies offer conflicting evidence as to the worth of practice and instruction in throwing. Perhaps the difference in results can be explained by Dusenberry's

Miller, loc. cit.
seemingly greater attention to instruction. One point stressed by Dusenberry was that she actually positioned subjects to bring about trunk rotation. The use of hand and foot opposition to permit trunk rotation was cited by Wild as the most significant change in the movement pattern that characterized the throw as being the mature stage. Dusenberry reported that the most marked change in throwing style due to training was found in the stance. 49

Dohrmann examined the effects of training on the throwing and kicking ability of two hundred eight year old boys and girls. 50 At the beginning of the school year, subjects were assigned to either the fall training group, or the spring training group. Both groups were tested for initial distance in throwing and kicking. Immediately after testing, the fall training group began their nine week training program, in addition to their regular program of physical education. Their regular program consisted of a daily twenty minute period of instruction by the physical education instructor, and a fifteen minute play period supervised by the classroom teacher.

49 Dusenberry, op. cit., p.12.
50 Dohrmann, loc. cit.
During this nine week period the fall training group was tested every three weeks using the initial tests. The spring training group participated only in their regular physical education program, and were tested at the beginning of the experiment and at the end of the nine week period. Both groups participated in regular physical education programs until spring. Then, again, these same procedures were used to give the special training to the spring training group. Testing followed the same pattern as for fall.

All tests were administered by the experimenter with the assistance of his wife. The subjects were measured individually in the throw for distance, using a twelve inch softball. In the initial throwing test, the subject was given four trials, with the instruction, "Throw as far as you can." After the fourth trial, the subject was coached in the mechanics of throwing. A demonstration by the experimenter was followed by two practice throws by the subject. Six more trials were recorded, and the best distance out of ten trials was recorded as the subject's initial score.

The training periods were conducted by the physical education instructor at each school. Mimeographed

\[51\text{Dohrmann, p. 49.}\]
instructions were given to each teacher. Information about the experiment, the plan for the training periods, and coaching points which the author wanted stressed were provided. The experimenter specified that training for throwing and kicking was to be given on alternate days. Twenty practice throws, or twenty practice kicks, were to be provided for each child during one practice period. The children were to be coached individually according to the following guidelines:

a) Stance—open (sideways to direction of throw) trunk inclined backward causing weight to rock back onto rear foot. Rear leg slightly flexed at the knee.

b) Step forward onto the front foot, pointing it in the direction of the throw.

c) Rotate the trunk about the hips so as to be facing the direction of the throw.

d) Throw the ball, being sure that the elbow leads the hand until the elbow is approximately even with the shoulder. The wrist should snap forward on the follow through.

e) The left arm should not interfere with the throwing pattern.

f) The angle of the ball on the upward arc should be about 45 degrees.

The author followed the same procedure for the kick, that he did the throw. He provided the physical

52 Ibid., p. 57.
education instructor with the mimeographed guidelines of the points which he desired the instructor to stress.

Data for both the fall and spring training programs were analyzed. Experimental and control groups for both spring and fall were compared in an analysis of covariance. That analysis disclosed: 1) No difference was found between the improvement that the spring training group made in throwing and kicking ability and that improvement which the fall training group made in throwing and kicking, 2) there was no difference between the improvement of boys and that of girls for either skill of throwing or kicking.

The author's generalization about the results was:

The findings of this study would appear to warrant the conclusion that for eight year old boys and girls, throwing and kicking training programs in addition to regular physical education programs do not result in greater improvements in throwing and in kicking ability than do regular physical education programs; and that in throwing and in kicking ability, eight year old boys are superior to eight year old girls.

Dohrmann's findings seem to be in agreement with Miller and Hicks; that instruction in specific skills

53 Ibid., p. 46.
does not accelerate skill development in young children. It would appear that Dohrmann's attention to the details of instruction in throwing and kicking was as carefully planned as Dusenberry's, who found gains in throwing for distance as a result of specific instruction.

One possible explanation for the difference in findings might be that Dusenberry's subjects were age three to seven, and Dohrmann's subjects were eight years old.

A procedural difference also existed. Dusenberry herself, instructed the subjects of her research; while Dohrmann provided only mimeographed materials for the physical education teachers in the schools where his subjects were found.

Glassow, Halverson and Rarick observed children for two years to study the relationship between the development in the skills of throwing, kicking and jumping and the type of physical education program which the children experienced. Using the identical filming and testing procedures as used by Glassow and Kruse, they compared their data to the data collected over an earlier six year period (1953-1957) by Glassow and Kruse relative to the motor performance and

\[54\] Glassow, Halverson and Rarick, loc. cit.
motor development of children from the same elementary school in Wisconsin. The former investigation did not include any planning of the physical education program, but these investigators were convinced that it should have been more vigorous. They referred to the previous program as being game-centered rather than child-centered.

The subjects for the study by Glassow, Halverson and Rarick, were all of the children enrolled in the first, third, and fifth grades at the time the experiment began. At the beginning of the school year 1959-60, performance scores were obtained for all subjects in six motor skills: running, jumping, throwing, pull-up, sit-up and shuttle run. Strength scores were obtained for a random sample of the subjects, ninety children in all, at the end of each of the two years. At the same time, film records of these subjects were recorded for the run, jump and throw.

The measure for throw differed from the ordinary distance throw. The research team felt that velocity is a more valid measure of throwing ability. Their rationale was that the "distance of a throw is a result of the

55 Glassow and Kruse, loc. cit.
56 Glassow, Halverson and Rarick, p. 1.
velocity imparted to the ball and the angle at which the ball is projected." The equipment used was a stop watch which recorded, to the nearest 1/100th second, from the time the ball left the hand until it reached a backdrop 50 feet from the throwing line. The velocity was determined by finding the difference between the height at the time of release and the end of the flight, and eliminating the effect of gravitational force.

A program of "vigorous" activity was provided for grades one, three and five which furnished the experimental subjects. The major difference in content, according to the authors "is the emphasis on basic skills in the first grade." Circle games with limited participation were almost excluded from the program, and activities were not used in preparation for certain games. Games were used, but only after the essential skills had been developed to the degree necessary for a successful, purposeful experience.

Instruction was coordinated by the research team. Classes were organized to make maximum use of available time, space and equipment. Classes met for one-half hour, three times per week.

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57 Ibid., p. 17.

58 Glassow, Halverson and Rarick, p. 19.
By comparing the scores of children who participated in the "vigorous" physical education program with the scores of the children previously measured in the same school, it was found that the children involved in the "vigorous" program excelled only in running. Jumping and throwing scores were not superior.

The explanation offered by the authors was that the classes were asked to run to and from the playground, and that running was easily included in the program. They further concluded, "it suggests that each special skill must be practiced if improvement is to be made." 59

In addition, they examined the relationship of strength to the three basic skills under investigation. The findings regarding gains of strength, are, in the opinion of this writer, inconclusive. Measures of strength were taken for the first time eight months after the experimental program was begun. Early gains would, therefore, not be recorded. However, the findings which were reported; that gains were found in the development of strength in the lower extremities are consistent

59 Glassow, Halverson and Rarick, p. 19.
with the fact that the children improved significantly in running skill.

An interesting aspect of this study was the accompanying film analysis of the skills studied, in particular, the analysis of the throw. The component parts of the throwing pattern which were objectively analyzed for gain by grade and sex were: trunk rotation, stepping with opposite foot, and length of stride.

Trunk rotation, as described by Glassow, Halver­son and Rarick, is a 90 degree turn of the trunk from the back swing to the direction of the throw. Their find­ings show gains for each grade and sex from the first to the second year of the study.

A second analysis showed that a step forward on the foot opposite the throwing hand facilitates rotation of the trunk. These observations are in agreement with Wild who described body rotation, governed by hand and foot opposition, as an essential characteristic of the mature throwing pattern. Gains in this movement cri­terium were not statistically significant because the

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60 Ibid., p. 70

61 Wild, op. cit., p. 20.
starting position of many children before instruction, was one of facing the direction of the throw.

The last gain score derived from film analysis compared the length of stride before and after instruction. A consistently longer stride was taken by all children from the first to the second year of experiment.\textsuperscript{62}

Even though the gain scores derived from film analysis were conclusive evidence that gains were made by the experimental subjects during the two year program, it would have been valuable to have compared film data which had been gathered on the same children prior to their participation in the experimental program. The authors have substantial gain scores for the subjects studied; but there is no evidence that these objective gains, derived from film analysis, are due to the kind of physical education program instituted for the duration of the study. It is possible that as Seils proposed, the increase in skill was, in fact, a natural increment due to maturity.\textsuperscript{63}


\textsuperscript{63}Seils, op. cit., p. 260.
FEEDBACK MECHANISMS INVOLVED IN LEARNING
MOTOR SKILLS

Feedback is a term generally agreed upon by experts in the fields of psychology and physical education to mean knowledge of results. The importance of feedback is that it is fundamental to all learning.

Bilodeau and Bilodeau (1961)\(^4\) stated that "studies on feedback or knowledge of results (KR) show it to be the strongest, most important variable controlling performance and learning. It has been shown repeatedly, as well as recently, that there is no improvement without knowledge of results, progressive improvement with it, and deterioration after its withdrawal."\(^5\)

A popular analogy which has been used to describe the function of feedback learning, compares man to a computer. Robb (1966)\(^6\) described the machine analogy as follows: "The receptors are the input mechanism which convey information to the individual through sensory


\(^5\)Ibid., p. 250.

\(^6\)Margaret Robb, "Feedback", Quest, (May, 1966), 38-43.
organs. The output or effector mechanisms are the muscles or glands.\textsuperscript{67}

Singer (1963)\textsuperscript{68} further elaborates the computer analogy and describes the role of feedback in motor skills:

Feedback occurs when some of the output is isolated and fed back into the machine as input. The principle of feedback is characteristic of all organisms and closed-loop control systems.

Another name for the feedback mechanism is servomechanism. A servomechanism is a closed-loop control system operating on the principle of feedback. Information, in the form of errors, is sent back to the device controlling the output, the input is then modified, and the output is corrected.

Every human organism must know or see his results; otherwise, he will not improve. In a skilled act, responses cause sensations from the proprioceptors, eyes and other sense organs and this feedback or knowledge of results tells the person how he is doing. When errors in movement are made feedback informs us as to the nature and extent of the corrections needed. Motor skills with which the physical educator are concerned may be thought of as continuous closed-loop system interactions between performance and the sensory effects of each performance. Activity is controlled and regulated by means of this sensory input.\textsuperscript{69}

\textsuperscript{67}Ibid, p. 38.


\textsuperscript{69}Ibid., p. 290.
In skilled movement this regulatory activity is a voluntary movement adjustment which brings a response closer to a desired movement pattern. Perceptual abilities, according to Clifton (1967), plays an important role in the regulatory function of feedback. She stated: "The successful use of feedback as a control concept is determined by the extent to which an individual is attuned to feedback information, be it from internal or external modes and conceives of it as new input to be reorganized."71

The implied relationship between feedback and behavior is the intrinsic motivational nature of the feedback itself. Bilodeau and Bilodeau describe the motivational properties of reinforcement as knowledge of results serving to reinforce habits, and providing the motivation for learning or performing.72

Other roles which have been ascribed to feedback


71Ibid., p. 24.

72Bilodeau, op. cit., p. 253.
are that it is regulatory and reinforcing. Adams (1964) distinguished between these two by their temporal relationship to the response pattern of the organism. The regulatory function of feedback is apparently one of continuous change in motor behavior, while the reinforcement function is associated with changes in behavior brought about by learning. Adams described regulatory feedback as coming from multiple feedback loops: visual, auditory, proprioceptive, and tactile. They operated simultaneously to regulate motor behavior. Feedback that influences learning was described as "in the Thorndike tradition of defining and applying a class of reinforcing stimuli that are presumed to strengthen a relatively stable habit state for S."74

Singer distinguishes the reinforcing and regulatory functions of feedback by labeling reinforcing as "extrinsic," and regulatory as "intrinsic."75

Another term, augmented feedback, is a kind of


74 Ibid., p. 186.

75 Singer, op. cit., p. 29.
extrinsic feedback. It is defined by Robb as "information which is given generally by the experimenter or the teacher to supplement the information contained in the task." 76

Types of feedback are further defined by Robb according to the temporal relationship between performance and feedback. Information given after the completion of a task is labeled "terminal feedback." Ongoing, moment to moment feedback is referred to as "concurrent." 77

Lawther (1968) reviewed research on knowledge of results and reported several basic principles as to the effectiveness of knowledge of results on the stimulation of learning:

1. Learning is proportionally greater as the quality, exactness, and precision of this playback of knowledge of results increases.

2. When knowledge of results is not available, the learner can improve to some extent by setting up his own criteria from past experience, to help him subjectively approximate his results.

3. With a delay of knowledge of results, performance declines.

4. Performance deteriorates when knowledge of results is withdrawn.

5. Continuous and complete knowledge of results

76Robb, op. cit., p. 39.

77Ibid., p. 38.
fosters much greater learning than discontinuous and incomplete knowledge of results.

(6) Precise supplemental aids (graphs, films of actions, etc.), which provide more precise knowledge or make apparent the learner's performance and those of better performers, seem to increase learning.

(7) Feedback of incorrect information retards learning in direct proportion to the amount of misinformation.

Singer compiled a similar list of generalizations from research studies on knowledge of results.

(1) The performer usually has hypotheses about what he is to do and how he is to do it, and these interact with knowledge of performance.

(2) For all practical purposes, there is always some knowledge of his performance available to the human performer.

(3) Knowledge of performance affects the rate of learning and level reached by learning.

(4) Knowledge of performance affects motivation.

(5) The more specific the knowledge of performance the more rapid the improvement and the higher the level of performance.

(6) The longer the delay in giving the knowledge of performance, the less effect the given information has.

(7) In the case of discontinuous tasks where knowledge of performance is given, small inter-
vals between trials are generally better for learning than are longer ones.

(8) When knowledge of performance is decreased, performance drops.

(9) When knowledge of performance is decreased, performance drops more rapidly if trials are relatively massed.

(10) When subjects are not being given supplementary knowledge of performance by the experimenter any longer, the ones who maintain their performance level have developed some substitute knowledge of performance.

(11) When direct (supplementary) knowledge of performance is removed, systematic "undershooting" or overshooting may appear in performance.

These generalizations about knowledge of results were derived mostly from research on feedback and learning which was limited to discrete motor responses. It would be unscientific to assume that these same generalizations apply to the learning of gross motor tasks. However, the generalizations about knowledge of results on discrete tasks have provided researchers with a set of basic assumptions under which they might conduct research on gross motor skills which has been almost omitted from studies concerning feedback.

This writer sees little relevance between current research on feedback and the present study. No studies were found which used children as the subjects of inves-

tigation. Since the present study concerns itself with children and the role of augmented feedback (films of one's own movement) in the learning of the gross motor skills of skipping and throwing, the author believes a review of the literature on the role of films in the teaching of physical skills to be more pertinent.

The review of the studies which follow represent a broad spectrum of the variable factors in feedback when motion pictures are used as instructional aids in the teaching of physical skills.

STUDIES ABOUT THE USE OF VISUAL AIDS IN THE LEARNING OF MOTOR SKILLS

A number of authorities in the field of physical education have speculated on predicting the success of various visual aids in the teaching of motor skills. One need only examine the listings of educational films in an early film survey by Hughes and Stimson (1938) to see the apparent worth which physical educators attributed to the moving picture. 80

Hughes and Stimson prepared this comprehensive

list of films in health and physical education, using among their sources: The National Visual Instruction Survey, the Educational Film Catalogue, the Master Catalogue of the American Council on Education and the yearly Directory of the Educational Screen.\(^{81}\)

They classified their listing of physical education films by twenty-nine different topical headings: archery, athletics (general films), baseball, basketball, boating, boxing, camping, dance, equitation, exercise, fencing, fishing, football, golf, gymnastics, hockey, hunting, jujitsu, Lacrosse for women, Olympics, polo, recreation, speedball, soccer, swimming and water sports, tennis, track and field, volleyball, winter sports and wrestling.\(^{82}\) There are more than two hundred fifty film titles listed under the above headings. This seems like an impressive list. But, according to Hughes and Stimson, films were actually used by only ten to fifteen percent of the schools in the United States. The reasons which they gave were: "lack of suitable films; the cost of rent, purchase of production; the notion that motion pictures are entertaining rather than educational, toys rather than tools, substitutions for, rather than supple-

\(^{81}\) Ibid., p. 105.

\(^{82}\) Ibid., p. 153.
mentary to teachers and textbooks." 83

It is interesting to note one description from the list by Hughes and Stimson for a film titled, Children Age 4-6 which reads: "New games, new jolly little five minute variations of hop, skip, and jump are all shown in this film." 84

Friedrich (1952) stated that the most frequently used visual aid in physical education is the motion picture. He cites the following reasons:

(1) Reaches a mass audience
(2) Enlarges the subject matter
(3) Allows for the slowing up of motion
(4) Serves to motivate
(5) Compels attention

85

Friedrich also advocated the use of movies of each individual's performance as a valuable aid in helping the individual overcome various difficulties through seeing his own performance. 86

83 Hughes and Stimson, p. 104.
84 Ibid., p. 132.
85 John Friedrich, "Teaching Games and Skills Through Sight and Sound", Journal of Health, Physical Education and Recreation, XXIII (June, 1952), 44.
86 Friedrich, op. cit., p. 60.
In 1953, Friedrich supported the loop film as being particularly suited to physical education. The cost and function made the film a valuable teaching aid. The loop itself could be of five to twenty feet. The fact that the beginning and end of the loop were connected made continuous showing possible. Friedrich felt that the repetition of the loop film was its most valuable asset for learning physical skills.87

The loop film was also favored by Stevenson (1957) who surveyed research on this visual aid for physical education and found the loop films to be as effective as a highly skilled demonstration. Stevenson believed that, "it may well be that after more research and general use, the loop film will become not only more popular in physical education, but be proven to be more effective in the process of learning motor skills than any other visual aid now used."88


The loop film continued to gain in popularity. The single concept film was introduced, and loop films were made in fifty foot cartridges which could be handled by small children. Mackey (1968) reported on the use of loop cartridges for individual viewing by a student in the classroom. Mackey also suggested that the use of carefully produced single concept films could make a significant contribution to the elementary school. 89

The most recent innovation in the use of visual aids in teaching physical education is the video tape recorder. Coaches have long used this method of providing skill analysis for their players. The video tape recorder has the advantage of instant replay. One major disadvantage of the video tape recorder for instructional purposes is the cost of equipment, particularly the cost of equipment for slow motion playback. Video tape is advocated by Coffey (1968) as being valuable for instruction. The tapes may be replayed several times.

Experimental research to determine the relative value of each type of visual aid has been reviewed by Palmer (1936), Glassow (1942) and Brumbach (1969). No attempt will be made to present the studies as reviewed by these three researchers. Their conclusions and generalization are presented here merely as background material for the more detailed examination of experimental research.

Palmer and Glassow dealt specifically with motion pictures. Their surveys concurred that the majority of the studies in which motion pictures were used showed that movies are a definite aid in learning. Palmer reviewed nine studies on films designed specifically for the classroom and reported the following conclusions:

1. increases initial learning
2. effects an economy of time in learning
3. increases permanence of learning
4. aids in teaching backward children, and
5. motivates learning by increasing interest, attention, self-activity, voluntary reading, and classroom participation.

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Palmer believed that the motion picture's importance in physical education was demonstration and analysis of motion, especially through slow motion analysis. At the time of Palmer's survey, there were very few scientific studies of the use of visual aids in physical education. She suggested that investigation of the use of films in teaching skills is needed.

Bandwagonnitis has always been a disease of the hypochondriac physical educator who often adopts current trends before they are proved patterns.

The power of the media must have been convincing for according to Glassow:

...whether the physical educator was stimulated by his fellow teachers to investigate the possibilities of motion pictures as an instructional device, or whether he deducted the value of such aids from his own experience is of little consequence. The fact remains that the physical educator is in step with the academic profession in the belief that motion pictures are valuable teaching aids. 92

Glassow's conclusion was that there is evidence to support the idea that instructional films in physical education, when combined with the usual instruction, do increase the amount of skill learned.93 Her summary


93 Ibid., p. 501.
includes three topics for future research to determine the value of motion pictures as a teaching device:

(1) Do motion pictures add to teaching efficiency?
(2) What should be included in a film?
(3) Would the picture of individual execution offer greater returns in learning than does the "presentation" film?

Glassow's final question was also asked by Friedrich (1952). The benefits to be gained in viewing oneself in movement is the question which this writer hopes to answer.

Brumbach analyzed thirty-one studies which attempted to evaluate the use of films in teaching physical education activities. His principal finding was that films "as they have been used, are of very little value." However, in presenting a complete analysis of his findings, Brumbach stated a number of conclusions which had positive implications for the use of films, but with certain limitations:

(1). Films seem to be of less value to today's students than they were to students prior to 1950.
(2). Students of college age do not appear to benefit from film-aided instruction, while younger students may find it helpful.
(3). There appears to be little difference

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94 Ibid., p. 502
95 Friedrich, op. cit., p. 60.
between the sexes, in their reaction to films but perhaps men benefit slightly more than women.

(4). Students at the beginning level of instruction seem to find films of little aid in their efforts to learn motor skills, but it may be that films are of more help to those at a more advanced level.

(5). There is no one sport or group of activities that appear to be learned more easily with films than without them.

(6). Apparently there is no more value in showing moving pictures as loop films when in non-loop form; nor is there any special value to various combinations of regular films, loop films, film strips and slide films.

(7). If one wants to use films, it may be that the most beneficial method of using them is a combination of demonstration and diagnostic films.

(8). Again, if films are to be used, students seem to profit from seeing their activities performed in both normal speed and in slower motion rather than seeing them only in one speed.

Ruffa (1937)^97 was cited by Glassow (1942) as being the first to examine the use of motion pictures in coaching.

Ruffa used 110 senior high school boys as subjects in his experiment. He divided the subjects by ability as nearly as possible into three groups. One group received conventional lecture demonstration instruction, the sec-


ond group saw only the films, and the third group acting as an additional control group received no instruction, but were given the same pre and post tests as the other groups.

Ruffa prepared films of the five events chosen for the experiment: football throw, broad jump, shot put, high jump, and 100 yard dash. Each event was filmed at regular and slow speeds.

The instructional plan for the conventional group was to teach each event separately for one week and then to repeat the pattern. The group receiving conventional instruction had time for practice and questions and answers each period.

The experimental group saw the specially prepared film and had a question and answer session during each class period.

At the end of the experiment the three groups were again tested. The results indicated a positive value of using films to teach certain athletic skills.\(^{98}\)

Priebe and Burton\(^{99}\)(1939) examined the effects of

\(^{98}\)Ibid., p. 30.

loop films in teaching tenth grade boys the "western roll". Their subjects were 26 boys, paired on the basis of age, weight, height, physical and mental ability. During the six weeks of the experiment the control group received demonstrations and explanations of the western roll style of high jump. The experimental group, in addition to the conventional demonstrations and explanations, viewed slow motion and normal speed films of three expert high jumpers. At the half way point in the experiment, films were taken of the experimental subjects. They were shown to the subjects during the fifth and sixth week of study.

As a result of this study the investigators found that the group which was taught with the aid of motion pictures was superior to the group which was taught without the use of motion pictures.

The authors concluded that film viewing combined with instruction and practice may be superior to the demonstration practice method.

Priebe and Burton are among the few investigators who included the viewing of self in film instruction. While their conclusions showed the superiority of the use of film in instruction over the conventional method, the factor of viewing self was a particularly unique
experience. It might have been valuable to have had three groups in the experiment control, viewing an expert, and viewing self. It would seem that the topic of viewing one's own performance would be a particularly fruitful topic of investigation and yet it is one which remains relatively untouched at this time.

Lockhart (1944)\textsuperscript{100} followed the early example of Ruffa (1937) in preparing her own films for instructing college freshman women in bowling.

The experimenter used two experimental and two control groups selected at random. Each group received identical instruction, except for the addition of the showing of the bowling film to the experimental groups several times during the fourteen weeks of the study.

The results of the instruction showed that the experimental group, while starting with the same mean scores at the beginning of the study, achieved superior mean scores at the end of the study.

In interpreting the results of her study, Lockhart stated:

In any learning problem it is necessary to obtain an intellectual concept, a clear picture of just what is expected. The film seemed to

\textsuperscript{100}Aileen Lockhart, "The Value of the Motion Picture as an Instructional Device in Learning a Motor Skill," \textit{Research Quarterly}, XV (May, 1944), 181-87.
assist in giving this concept for the movie groups grasped the nature of the desired response more quickly than did the non-movie groups.

Brown and Messersmith (1948)\textsuperscript{102} investigated teaching tumbling to college men with the use of motion pictures.

Forty-three subjects, equated by the Metheny Revision of Johnson's Test of motor ability, were taught by the same instructor three periods a week for seventeen class periods. The classes received identical instruction except for the film treatment of the experimental subjects. The experimental group viewed films of experts, as well as slow motion pictures of their own performance, twice during the experiment. The viewing period for the experimental subjects included the instructor's corrective comments about each subject's performance.

At the end of the experiment, two experienced judges evaluated each student's performance for ten different stunts. The results of the judges' ratings showed that the experimental class made a little more

\begin{quote}
\textsuperscript{101}\textit{Ibid.}, p. 185.
\end{quote}

\begin{quote}
\end{quote}
progress than did the control class, but that the
gains were not statistically significant.

The authors felt that the films offered more
motivation to the experimental subjects, but added that:

...it is doubtful that extensive expenditures
for moving pictures are warranted in the teaching of simple individual activities such as
elementary tumbling unless the class is to
extend through the entire semester. It is
possible that the class time devoted to film­
ing could have been used to greater advantage
in actual practice of the events included in
the lesson.

Brown and Messersmith's findings were positive
in favor of the use of films in instruction. In addi­
tion, the authors admitted to the highly motivational
nature of the experience. And yet, these findings were
countered with a statement that the time could have been
used to better advantage.

Nelson (1958)\textsuperscript{104} studied the effect of slow
motion loop films of the learning of golf. Forty seven
men and women were divided into an experimental and con­
trol group, with an equal number of men and women in
each group. Groups were matched on the basis of a pre­
test of golf skill.

\footnotesize{\textsuperscript{103}Ibid., p. 307.}

\footnotesize{\textsuperscript{104}Dale O. Nelson, "The Effects of Slow Motion
Loop Films on Learning of Golf", \textit{Research Quarterly}, XXIX
(March, 1958), 37-45.}
The fifteen instructional periods took five weeks to complete. Each subject was tested at each instructional period. The film group viewed slow motion loop films of the golf swing for five minutes prior to instruction for another five minutes midway in the session, in a tunnel leading to the football field where the experiment was conducted.

The results of the study revealed that both groups made significant gains in skill, with the film group showing superiority on the final day of the study.

An interesting aspect of the study was that the less skilled subjects in the experimental group made their greatest gains during the first part of the instructional viewing. This finding is in agreement with Lockhart (1944) who suggested that motion pictures seem to be at most value during the early stages of learning, decreasing in value as the skill increases. 105

Priebe and Burton (1939) also found that their experimental subjects made the greatest gains early in the experiment. The implication of this evidence is that films possibly eliminate some of the early trial and error learning.

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105 Lockhart, op. cit., p. 185.
Brumbach (1959), on the other hand, found evidence that films were of less value at the beginning of instruction, and more help to those at an advanced level.

Irwin (1958) investigated the effects of selected audio-visual aids on teaching beginning tennis skills and knowledge to college women. Her subjects were eighty-three female college students enrolled in tennis classes. The skills taught were those essential to the game of tennis. Tennis knowledge included history, rules, etiquette, selection and care of equipment and game strategy.

The classes were assigned at random to three techniques for teaching. Two tests were used to determine initial tennis ability. The same two tests were used at the midpoint and end of the study. Classes met three times a week for eighteen weeks.

The audio-visual aids for teaching were sound 16mm films, a set of five filmstrips, and eleven silent loop films. The three teaching groups all received orthodox tennis instruction. In addition the 16mm film

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was used with group one and the two sets of silent films with group two. The third group received only the traditional treatment.

Irwin's introductory remarks, in stating the purpose of her study, included a statement that she had had twelve years of experience in teaching tennis. Perhaps the no significant difference found by the author can be attributed to her own expertise as a tennis instructor. The difference in results obtained by a novice using audio visual aids as compared to an expert using the same materials would be an interesting subject for research.

Drury (1959)\textsuperscript{107} used 8mm slow motion pictures, demonstrations by an average tumbler, and drawings of tumbling skills to study the effectiveness of these visual aids in teaching beginning tumbling. His investigation had four major focuses: to determine which was the most effective method of teaching tumbling; to determine the effectiveness of each visual in light of the degree of difficulty of the skill; third, to determine the effect of the number of times the visual aid is used during each instructional period; and fourth, to deter-

mine the effect of the total number of times the visual is used during the instructional period.\textsuperscript{108}

The subjects of Drury's investigation were one hundred eighty college men. They were divided into nine groups of twenty subjects each. Three classes were assigned to each treatment. In order to assess the effectiveness of the number of times each visual aid was used each group was assigned to a different variation of exposure to the visual.

Each instructional period included a verbal introduction to the stunt to be learned, and an instructional period in which the particular visual for each group was used. Several practice sessions were held during each period in which the subject was rated in his performance by a judge.

The results were that no one of the visual aids studied was more effective than any other. There was no statistically significant relationship between the difficulty and the type of visual aid used. A significant relationship was found in the number of times the visual

\textsuperscript{108}Ibid., p. 2.
aid was used during each instructional period. The variation found to be most effective was the pattern which used the visual aid once during the first class period, twice during the second class period, and three times during the third class period, with any visual.  

Berlin (1959) did extensive research on the effects of varied teaching emphasis during early learning on the acquisition of selected motor skills. An investigation of the visual aids (pictures, slides, film loops, movies) was one of the major problems in her investigation.

Subjects of the experiment were one hundred and eleven sophomore women students enrolled in classes in a required physical education program. Classes met twice weekly for sixteen weeks. Five skills were presented to each class: the golf swing, the soccer punt, the fencing lunge, the tennis serve, and catching a lacrosse ball. The same number of class periods were given to each skill in each of the classes. A rotational system was established for the assignment of the various teaching methods examined. Each skill was presented in

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109Ibid., p. 52.

a different manner to each class. All classes experienced all methods of instruction. The methods were: demonstration, trial and error, verbal detail, and visual aid.\textsuperscript{111} The investigator served as teacher for every group throughout the entire period of the investigation.

The visual aids used in the study were described by the author as those materials available to most physical education instructors. Portions of the selected movies which were not directly concerned with the specific technique being learned were not shown the students.

Loops, slides, and slidefilms were used in the same manner. Verbal instructions were given in conjunction with the visual aid did not analyze the skill. Students were asked to observe the visual closely and to think about their own movements.

Performance tests for each skill were administered three times during the experiment. Data for each skill was reported according to the treatment received. The comparison of visual aids with other methods revealed that visual aids as they were used in this study, were one of the least effective means of improving skills. Only verbal detail ranked lower.

\textsuperscript{111}Ibid., p. 61.
A questionnaire survey was given to determine the student preference for each method used. Least preferred by the subjects was visual aid. Concerning the use of visual aids the author concluded:

Good visual aids may combine with practice to aid in skill development. Caution is advised in the selection of such aids from the standpoint of content as related to the "general idea" that the learner is introduced to in the initial lesson and also from the standpoint of the appeal of the film, slide, or loop. In other words, the visual aid should supplement the general idea and not elaborate or conflict with it. Also, it should be motivating rather than uninteresting.

Among Berlin's suggestions for further study is the recommendation to study varied teaching devices and techniques on skill acquisition by elementary school children at the beginning level of learning.

The apparent ineffectiveness of visual aids in Berlin's study may possibly be attributed to the sterile manner in which they were used. The experimenter made every effort not to describe or explain the visual aid. It was presented visually without interpretation and explanation. According to the author some visuals were those regularly used on rainy days.

This seemingly unimportant fact may be indicative

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112 Ibid., p. 183
113 Ibid., p. 195.
114 Ibid., p. 196.
of either the quality of the visual aids or the attitude of the experimenter and the set of students toward visual aids.

Clifton and Smith (1962)\textsuperscript{115} investigated the effect of viewing one's own performance on expressed concept of self in the performance of selected motor skills.

Their subjects were sixty male and female college students who volunteered for the experiment. Subjects were divided into three treatment groups. At the onset of the experiment, all subjects were asked to perform the skills of walk, run, catch, throw, and jump. All subjects were told that they were being filmed. Immediately after filming, the subjects were given a checklist of words which described his performance as either favorable or unfavorable.

Four weeks later, all subjects were asked to return to the lab. Experimental subjects viewed their own films either alone or in a group. Control subjects performed the same skills they did at the initial experi-

\textsuperscript{115}Marguerite A. Clifton and Hope N. Smith, "Viewing Oneself Performing Selected Motor Skills in Motion Pictures and Its Effect Upon the Expressed Concept of Self in Performance", \textit{Research Quarterly}, XXXIII (October, 1962), 369-75.
imental session. They performed either in a group or alone. Immediately the subjects completed a checklist similar to the first checklist, to determine each subjects feelings about his performance.

These checklists were analyzed to determine the pre and post self rating responses for each group. A general trend which appeared through this analysis was that the responses of the experimental subjects, who privately viewed films of themselves tended to show more positive scores than either the group viewing subjects or the control subjects. The authors felt that the number of negative scores tabulated by the group viewers suggest that private viewing is desirable when subjects view their own performance.\textsuperscript{116}

The conclusions of the study were:

(1) Viewing motion pictures of one's own performance in throwing overhand effects a change in the scores representing the individual's expressed self concept of performance in this skill.
(2) Viewing an individual loop film of one's own performance of the skill of throwing effects a change in scores toward the positive.
(3) Viewing one's own performance on a group film effects a change in response resulting in a significant difference in the scores for catching between loop viewers and group viewers.

\textsuperscript{116}Ibid., p. 374.
whereas initial responses did not reveal this difference between the two groups. 117

Brown (1962) 118 investigated the effectiveness of using polaroid pictures and sound filmstrips to teach archery to beginners.

Her subjects were members of two archery classes in a university required physical education program for women. Classes met two times a week for fifteen weeks. The experimental group was taught to shoot by a method employing the use of sound filmstrips and a series of three polaroid pictures of each subject. The control group received oral instruction and practice.

The results showed that both groups improved significantly when tested at twenty yards. However, difference scores indicated a decrease for the experimental group at thirty yards with no significant improvement for the control group. There was a decrease for both groups at forty yards.

The experimental group showed a definite improvement in form from the first to third and final picture. Pictures were taken at the beginning and at the middle

117 Ibid., p. 375.

of the experiment were projected on an opaque projector in front of the whole class.

Brown's finding that an improvement in archery score did not accompany the improvement in form, as shown by the polaroid pictures, seems inconsistent. The research by Clifton and Smith (1962)\(^{119}\) indicated that group viewing may have some detrimental effects on an individual's concept of his own movement. They recommended private viewing when subjects viewed their own performance.

Brown's finding of a decrease in score for the experimental subjects may possibly be attributed to some negative feelings which her experimental subjects might have had in viewing their pictures in a group.

Wyness (1963)\(^{120}\) studied the use of action pictures to teach college men to put the shot.

Fifty college men, age 17-25, were subjects for the experiment. There were three different treatment groups as well as a control group. The film treatment which the experimental subjects received was: (1) seeing slow motion films of self putting shot, (2) viewing

\(^{119}\)Clifton and Smith, loc. cit.

\(^{120}\)Gerald S. Wyness, "A Study of the Effectiveness of Motion Pictures as an Aid in Teaching a Gross Motor Skill" (unpublished Doctor's dissertation, University of Oregon, 1963).
motion pictures of champion shot putters, and (3) alternately viewing self and champions. A fourth group received standard class instructions in the skill.

Filming and viewing took place weekly during the experiment. Viewing was done in a group with each subject viewing himself and his classmates at each viewing period.

Analysis of the data showed that all groups improved from their initial to their final scores in putting the shot. There was no statistically significant difference in the mean scores which could be attributed to the treatment of any group.

The author, as an experienced track coach, concluded that the exposure to the experimental variables was of no significant advantage over adequate lecture-demonstration teaching. Wyness followed a procedure similar to Berlin by using a questionnaire to determine how the subjects felt about the films. Berlin's questionnaire had students rank the five methods of teaching in order to determine how well they liked each method. Wyness also used a questionnaire and asked the subjects if they felt seeing the films helped them. Although eighty seven percent of the subjects who viewed the films felt

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121 Ibid., p. 40.
that the films had helped them significantly, their scores were not significantly different from the non-viewers.

Several of the studies reviewed infered that there is perhaps a critical period when the viewing of films would be most helpful in the learning of physical skills. Some researchers, such as Lockhart, suggest that films may be most beneficial in the early learning stages. Wyness and Brumbach (1961) suggested that perhaps highly skilled athletes might profit more from viewing films than students of average motor ability.

Haskins (1965)\textsuperscript{122} investigated the use of film as a training device for the development of reaction time of college tennis players.

The experimenter developed a training film with hypothetical situations of returns. Experimental subjects viewed strokes of tennis players on film and responded by indicating the direction, right or left, the ball would come to him. A device was made to record the subjects first movement in the correct direction.

Haskins found that the use of films proved to be of value in training players to cut the response time when reacting to a ball hit by an opponent.

\textsuperscript{122}Mary Jane Haskins, "Development of A Response-Recognition Training Film in Tennis Perceptual and Motor Skills, XXI (August, 1965), 207-11.
Gray (1965) investigated the use of daylight projection of loop films on learning in badminton.

Periodic tests in the skills of badminton using sixty male students enrolled in four college badminton classes provided data on experimental subjects. The experimental subjects viewed loop films periodically during the course. For fifteen periods they viewed loop films of their instructor, a tournament player, for two minutes prior to class time and again for two minutes during class time. From the sixteenth class period, experimental subjects used the visual aids interspersed with student evaluation. Skill tests were given to all subjects periodically: at the fourth, fifth, fifteenth, sixteenth, seventeenth, twenty-seventh, twenty-eighth and twenty-ninth, or final class period.

Results of the experiment indicated that midpoint in the course, the experimental group had made significant improvement but the control group had not. Final results indicated that there was no significant difference between badminton playing ability of experimental or control subjects as a result of the kind of instruction each experienced.

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The conclusion by Gray concerning the apparent value of visual aids in early learning is in agreement with Lockhart and Nelson (1958). Both found that films were beneficial for beginners in the first few weeks of instruction.

Burkhard, Patterson and Dapue (1967)\(^\text{124}\) investigated the use of 8mm films on learning skills of karate. The unique aspect of this study is that it is the only study where only films of the subjects own skill were used to study the effect of motion pictures on skill acquisition.

The subjects were thirteen male students enrolled in an evening karate class. Classes met twice a week for a one and a half hour period for nine weeks. The subjects were divided into an experimental and control group. Both groups received identical instruction in the same class by an instructor with fifteen years karate experience. Once a week, all students were filmed. At the next class period, five days after filming, the experimental subjects, as a group, viewed the films of their skills. During viewing, individual errors were pointed out and corrective instruction given to each student.

During this time, the control group practiced as usual. After the viewing session, both groups came together for the remainder of the class period. Corrective instruction was provided for all subjects but without the use of films.

For the purpose of evaluation, two basic skills were selected. A panel of five judges, experts in karate, viewed films and evaluated the performance of all subjects.

Results were that the performance of the experimental group, after five weeks of the study, were significantly better than the control group. Difficulty in filming and overrating by judges caused difficulty in getting consistent data for the last four weeks of the study.

DeBacy's (1970) research questioned the accuracy of a student's perception of his own performance as filmed on videotape.  

Women college students, enrolled in eleven beginning golf classes, served as subjects for the experiment. The experiment was begun after seven weeks of instruction. All subjects were taped indoors, hitting a real golf ball from an artificial turf. Following the taping, each

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subject viewed the performance of four models in the execution of the same skill and arrived at a self assessment. Experimental subjects viewed their own performance, immediately followed by a second viewing of the models and made a second self-assessment. Models were representative of four skill levels on a continuum of approximately equal intervals on a scale from one to twelve. Subjects indicated if they judged themselves to be poorer than, better than, or equal to the model's performance they felt was closest to their own performance.

A panel of judges rated the subjects' video performance and this rating was used as a base performance score. For analysis the judges' ratings were compared with the subjects' self-assessment. The results were:

(1) The difference between the post self-assessment mean and the mean of the judges was significant only in the control group.

(2) The experimental treatment was effective in producing a statistically significant improvement in accuracy of self-assessment.

(3) Viewing oneself performing a skill will reduce any difference between self-assessed skill and actual skill.

SUMMARY OF FILM RESEARCH

Fifteen studies were reviewed which examined the

126 Ibid., p. 31
effectiveness of films in teaching motor skills. Thirteen of these studies sought to answer the question, "Do visual aids help the learner?" The other two studies were involved with viewing one's own performance in relation to one's self-concept and one's ability to accurately assess one's own movement patterns.

The subjects of the studies were mostly college students. Thirteen studies used college students as subjects; one study involved senior high boys and another, junior high boys.

The use of film varied widely. In seven studies only films of experts were used. In six studies subjects viewed the performance of an expert as well as their own performance. Viewing, for the most part, was conducted in a group. One study examined the effect of groups as opposed to individual viewing of one's own performance on the expressed self-concept and found private viewing to be more desirable for a positive self-concept, than group viewing.

The results of the thirteen studies, which examined the effects of viewing motion pictures on the acquisition of skills revealed: eight studies had positive results, one had early positive results and concluding results of no significant difference, and four studies
indicated no significant difference between the use of films and conventional teaching methods.
CHAPTER III

PROCEDURES

The purpose of the present study is to examine the improvement, if any, after instruction in the skills of skipping and throwing.

Children who were assigned to both the control and experimental groups received identical instruction in skipping and throwing during eighteen instructional periods. In addition, each experimental subject experienced seeing films of himself skipping and throwing, and participated in an individual verbal analysis of his films in a room alone with the experimenter.

The skills of skipping and throwing were measured before and after instruction and treated statistically to determine if there were significant gains which might be attributed to the treatment received.

SUBJECTS

Subjects were first and fourth grade children from Walls School, a public school in Kent, Ohio. A class of twenty first graders, and a class of thirty fourth graders were selected by the school principal in
response to the request for subjects of this age. Data were collected for seventeen first grade children, ten boys and seven girls, and for twenty-six fourth graders, twelve boys and fourteen girls.

TESTING

Testing for the maximum distance achieved using the overarm throwing pattern was done at the beginning and at the conclusion of the study. All of the testing was done out-of-doors, on a black top area which had been marked for this purpose.

The testing procedures were the same as for the throwing test described in the *Youth Fitness Test Manual* published by AAHPER in 1958:127

Rules:

1. Only an overhand throw
2. Three throws
3. The distance recorded is the distance from the point of landing to the nearest point on the restraining line.

Scoring:

1. Record the best of three trials to the nearest foot.

A restraining line and a blacktop area marked off in one foot intervals was used for the ball throw test.

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As with filming, the first grade children used a tennis ball and the fourth grade children used a softball. The same order of children was used in the ball throw test as was used in filming. Children in the class assisted in the testing procedures by standing on the spot indicated by the experimenter to mark all throws. After each subject had thrown three balls, his longest throw was measured with a tape from the point where the ball landed to the nearest point on the restraining line. The score was recorded (to the nearest foot) and reported simultaneously to each child.

The testing was conducted with special regard for sex differences which might influence performance. The fourth grade girls and boys were tested separately; but the first grade girls and boys remained together. For testing, the first grade children were accompanied by their classroom teacher; the fourth grade children were not.

The subjects in each grade were paired as experimental and control subjects according to sex, and by rank order placement, from the highest to the lowest in the initial ball throwing test. Every other subject was assigned to the experimental or control group on the basis of their rank order scores for the ball throwing.

*The scores for the ball throw test are reported in Chapter IV, Tables 1 and 2.
test. The statistical treatment of all subjects computed the difference between the gain scores.

EQUIPMENT

A Bell and Howell 8mm cartridge load camera was used for all the filming. The camera was adjustable from a speed of sixteen to forty-eight frames per second. The film used was Kodak Kodachrome II, color film.

A grid screen, placed behind the subject for filming, was made from one half inch plywood, and constructed in three four foot sections. The sections were made to interlock by means of latches, and could be interlocked to form one twelve foot length, or to form a corner with one section four feet long and the other section eight feet long. The grid was painted flat white and marked off in inch squares with black quarter inch tape. The purpose of the grid screen was to provide a scale object within which the photographic field could be used as a point of reference for the analysis of the movements. For diagrams of the filming area, refer to Appendix A, figures 1 and 2.

FILMING PROCEDURES OF THE SKIP

The camera position for filming the skip was directly in front of the center of the twelve-foot
length grid screen, and from twenty to thirty feet from the grid, depending on the direction of the movement. Movement parallel to the grid was filmed at a point twenty feet from the grid; while movement perpendicular to the grid was filmed at a point thirty feet from the grid. During the filming of the skip, it was necessary for the experimenter to move forward and backward between these two points. A line of sight found to be most suitable for filming the children was found to be thirty-six inches from the floor. This line of sight was achieved from a sitting position.

In order to facilitate the forward and backward movement and to maintain a line of sight thirty-six inches from the floor, it was necessary for the experimenter to develop a moving seat. This was accomplished by using a bench which was eighteen inches high to which wheels were attached. The experimenter straddled the bench, and propelled it forward and backward with her feet. The camera, with a pistol grip handle, was hand-held firmly against her face. Both eyes remained open during the filming.

Before beginning this study, the experimenter had perfected this method filming children by shooting one hundred and twenty rolls of fifty foot film. It is
the belief of the experimenter that this amount of practice made it possible to be consistent, and that a hand-held camera in this situation was as reliable as a tripod-held camera would have been.

The filming for the skip consisted of four different sequences. Each sequence had a starting point and a finishing point; and both the subject and the camera stopped at both of these points. These four sequences from the vantage point of the camera were: (1) movement parallel to the grid, and from the left to the right of the grid, (2) movement parallel to the grid and from the right to the left of the grid, (3) movement perpendicular to the center of the grid and toward the camera, (4) movement perpendicular to the grid and away from the camera to the center of the grid. The subject skipped on a line parallel to the grid behind a line two feet from the front of the grid. For the pathway away from the grid and back toward the grid, the subject used the camera and the center of the grid as starting and stopping points.

For the filming of sequences (1) and (2), the subjects began to skip at a point five feet from the near end of the grid and skipped to another point five feet beyond the end of the grid. Actual footage of film of the subject was taken from these starting and stopping
points. For filming sequences (3) and (4) the subject was filmed as long as his full image was in the camera.

Two speeds were used for filming. The regular camera speed of sixteen frames per second was used to film sequences (1), (2), (3) and (4). Sequences (1) and (2) were filmed a second time, at the slow motion speed of forty-eight frames per second. A review of the literature investigating the value of motion pictures as an instructional device revealed that in half of the studies which found positive results, slow motion pictures were used. It was the opinion of the author that children benefit most from viewing both at slow speed and regular speed.

A brief demonstration by the experimenter, as well as an opportunity for practice, preceded the filming of the skip. The purpose of the demonstration was to show the children the skill and sequence of filming. The experimenter demonstrated the skip pattern as a step hop on each foot, in an uneven rhythm, alternating feet, swinging arms in opposition. The children were instructed to skip once around the area with the experimenter. The only correction or comment made by the experimenter was to remind the children to skip as the experimenter had demonstrated. The experimenter then demonstrated
the pathway of each of the four movement sequences in succession while the children watched.

The initial filming of the skip took one class period for each grade. The filming of the skip preceded any further instruction in that skill, other than the brief demonstration by the experimenter to define the skill pattern and movement sequence for filming.

FILMING PROCEDURES OF THE THROW

The camera position for filming of the throw was a point twenty feet directly in front of the center of two of the four foot sections of the grid screen which had been placed in line with the intended flight of the ball. The third section of the grid, placed perpendicular to the other two, formed the back corner of the filming area. For a diagram of the throwing area, refer to Appendix A, figure 1.

The filming sequence for the throw began with the subject standing in the corner with two balls on the ground near the subject's back foot, and ended with his completed follow-through. Each subject was filmed twice using the over-arm pattern at a camera speed of forty-eight frames per second.

As with the skip, the experimenter demonstrated the skill pattern and the filming sequence. The demon-
stration of the throw included those aspects of the skill which would later be taught to the children: opposition of hand and foot; rotation of the trunk; a shortened lever in the backswing, and a long lever at the time of release; correct point of release, and movement of the body in the direction of the target.

The children were given a brief time to practice with a partner before being filmed. The only correction or comment made by experimenter during the practice was to remind the children to use the overarm pattern as had been demonstrated. In addition to demonstrating the overarm pattern, the experimenter's instructions to each child insured that the response elicited in the throw would be the overarm pattern. The instructions for the throw were based on Halverson's (1966) work in which she sought to describe an environment that would best elicit the overarm pattern with opposition of hand and foot.  

128 Each child was instructed to stand in the filming corner, in a stride position, with his throwing arm away from the target. All of the subjects, with the exception of one first grade boy, were right handed. The two balls to be thrown were placed on the ground beside the subject's back foot. The subject was instructed that on the signal,

128 Lolas E. Halverson, "Development of Motor Patterns in Young Children", Quest, Monograph VI (May, 1966), 44-5.
"go", he was to pick up a ball as fast as he could, and to throw it as hard and as far as he could.

First grade children were filmed using a tennis ball while fourth grade children were filmed using a softball. The decision to use a different size ball for first and fourth graders was based on the fact that the size of a first grader's hand is smaller than a fourth grader's hand. Also, it was the theory of the experimenter that fourth grade children might be better motivated to throw a softball. In exploring equipment to be used in testing first, second, and third grade children, Seils (1951) reported a .953 reliability of a ball throw test using a softball and a .980 reliability using a tennis ball.

Arrangements were made to film the fourth grade girls and boys separately. While the films were being taken of the fourth grade girls, the boys played at the other end of the playground. Children of the same sex acted as ball retrievers during the filming of the fourth grade throw. Observation during filming by members of the opposite sex, might have a detrimental effect on the performance of fourth grade children but it was not a cause of concern for the first grade.

The fourth grade children came to the filming sessions unattended by their classroom teacher or by
any other adult. The experimenter was known to most of the fourth grade children from her supervisory work within the school. Since she was not known to the first grade children, who had just started school, the classroom teacher's presence at the filming sessions was reassuring to them. The first grade teacher accompanied her class and assisted the experimenter during the filming by talking quietly to the children and helping them to remain calm. Both groups of children were very attentive and cooperative during the filming. There was very little or no evidence on the film that the children were self-conscious or inhibited in their performance. Exposure to the movie camera on the first day of class, in which the children were filmed playing informally, may have been a contributing factor to the ease with which the children seemed to perform.

THE INSTRUCTION PROGRAM

In addition to the filming and training sessions at the beginning and at the conclusion of the study, the first and fourth grade subjects in both the experimental and the control groups participated in eighteen one-half hour instructional periods over a period of nine weeks.
All of the instruction was done by the experimenter. First and fourth grade subjects received their instruction separately; however, no distinction was made between the instruction given to either the experimental or control subjects within one grade. All of the instructional periods dealt specifically with the skills of skipping and throwing. The one purpose of the instruction was to help each child improve in the skills of skipping and throwing.

During the instructional periods, all subjects had an opportunity to discuss their progress with the researcher. An effort was made to give each child as much individual attention as possible in each skill. Methods of teaching were varied from day to day to include direct, reciprocal and guided discovery. The children were verbally reinforced for correct movement and verbal responses during each class period. The same information was presented to all students in the instructional program which the experimental subjects received in the viewing program.

In addition to using the various methods of teaching, the experimenter varied the learning environment as much as possible from day to day. In developing throwing skills the children worked alone, with partners, in small groups, and as a team. They threw yarn balls,
whiffle balls, tennis balls, soft rubber balls, and softballs. In developing skipping skills the children worked alone, with a partner, and in a group. They skipped to music, and to instrumental accompaniment. They did dances which included skipping, and they made up dances in which they skipped.

Throughout the instructional program, careful attention was given to the vocabulary used to communicate with the children. The meaning of every word was carefully explored. For example, in introducing the overarm throw to children, the experimenter named parts of the body and asked each child to touch the part of his body that had been named. The value of this seemingly simple exercise in communication was immediately apparent when the children were asked to touch their trunks. The first graders responded, in all seriousness, by each pointing to his own nose.

In addition to simple word recognition tasks, the children were encouraged to observe and correct one another verbally. It was felt that some practice in verbalizing about the skills would help the children internalize their own understanding. This notion was based on the results of studies describing the cognitive development of the young child. Several studies have shown that the cogni-
tive development of infants is related to the verbal level of the mother in caring for the child. A high level of verbalization has been reported to result in a high level of cognitive development in the child. 130-2.

Lockhart, in expressing her views, concerning a teacher's communication with students, provided several guidelines for verbalization in the instructional program:

1. The effectiveness of verbalization then depends upon the level of understanding of the learner and the skill of the instructor in selectively analyzing and verbally guiding performance.
2. The value of explanation increases as familiarity with terminology increases.
3. Specificity in instruction is important to the acquisition of motor skill.
4. Explanation does have value in motor learning but verbal instructions should be kept at a minimum during the early stages of learning. Most physical education teachers talk too much! 133

133 Aileen Lockhart, "Communicating with the Learner", Quest, Monograph VI (May, 1966), 57-67.
The experimenter did not attempt to remember the group to which each child had been assigned, nor were the children identified by group at any time during the instructional program. The only time during the study that a child was identified as an experimental subject was during the viewing period. The experimenter at times made an assumption about the group to which one or two of the children belonged, but when the data was tabulated and recorded with the name of each subject, these assumptions were found to be incorrect.

Instructional materials used during the study were developed for a publication for the American Association for Health, Physical Education and Recreation. This material provided the framework within which the instructional periods were planned. Verbal composites were developed by the authors which present a picture of an inefficient child and an efficient child for each of the twelve fundamental skills examined. These verbal composites were studied and used as a guideline during the instructional phase of this study. The composites of an inefficient child skipping and throwing were studied as examples of what a child might do, while the composites

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of an efficient child skipping and throwing, were studied as examples of what a child could learn to do with the help of individualized instruction. These verbal composites, for skipping and throwing may be found in Appendix B.

THE VIEWING PROGRAM

Each child in the experimental group viewed films of his skills and participated in an individualized analysis of his skills alone in a room with the experimenter. The child participated in eighteen instructional periods with the control subjects as well as the individual analysis. The only difference between the treatment of the groups was the experience of the experimental subjects who viewed and analyzed their own films during an individual conference with the experimenter.

The ball throw test and the instruction in throwing and skipping preceded the viewing experience for the experimental subjects. First, the time interval between filming and viewing was shorter for fourth grade subjects. Fourth grade subjects received one period of instruction in each skill prior to viewing their skills, while the first grade subjects received two periods of instruction in each skill. Secondly, the individual viewing conference was held for one single half hour period with each
fourth grade subject, and for two fifteen minute periods with each first grade subject.

There were several reasons for the first of these two differences. The first grade children were not as accustomed to following directions as were the fourth grade children, nor were they as familiar as the fourth graders with some of the standard procedures in the gymnasium. In addition, many of the first grade children could not identify their left body parts from their right body parts. Many did not know the meaning of the term "opposite", or that the "trunk" was a part of the torso, not the nose. The content of the skill instruction prior to viewing, identical for first and fourth grade subjects, took more time for the first grade subjects to understand because of their lack of experience.

The reason for dividing the viewing room experience into two sessions for first grade subjects was that the activities during the viewing experience required the full attention of the viewer, and it was doubtful that the first grade children could be as attentive for that length of time. A complete schedule of filming, testing, instruction and viewing is presented in Appendix C.

The viewing room was a small conference room,
nine by twelve feet, with a hall entrance, one shaded window, chairs, a table, and a movie screen. Additional equipment provided by the experimenter included a projector, and two portions of the light box, used in the experiment.

A Bauer T-4 8mm movie projector was used to project the films. The projector was equipped with a zoom lens and a high intensity bulb. These two factors made it possible to project a large bright picture in a small dimly lit room. The projector was equipped to show film at nine and then at eighteen frames per second. Each subject viewed himself skipping at a regular speed, and approximately one-third and one-sixth as fast as regular speed. The projection speed of eighteen frames per second was used only for viewing the first sequence of each skill. The speed of nine frames per second was used for all other viewing. Slow motion projection was an asset in helping each subject analyze his skill. For example, in the analysis of the overarm throw the subject could trace the flight of the ball on the movie screen with his finger to help him determine the point of release and the flight pattern of the ball.

The procedures followed by the experimenter in the viewing period were written on cards. When specific directions were given to the viewing subjects, the direc-
Directions were read aloud, verbatim, to the subjects. Directions for each portion of the experiment will be found in Appendix D.

The viewing period itself was divided into two distinct parts. In the first part, the subject played a card game with the experimenter and saw films of himself playing in the gymnasium. In the second half of the viewing period, the subject concentrated on an analysis of the film which showed him skipping and throwing a ball.

Part I: Pre-Viewing

It was the belief of the experimenter that, for some children, the novelty of seeing oneself on film for the first time might be distracting. For this reason, a pre-viewing experience was provided. This experience served to acquaint each child with the viewing room, and permitted each child to see a movie of himself playing in the gymnasium with his classmates.

In addition to familiarizing the child with the room and his own image on the screen, the pre-viewing period was used to stress the importance of watching the film closely. Each child saw a film of a free play period conducted by the classroom teacher which was taken during the first class meeting. The film showed each child playing alone, and with other children in groups of two, three
and four.

A device was developed by which the child could press a button and signal the recognition of his own image on the screen. A training session, in which the child learned to use the signaling device was conducted in the viewing room, and was the first thing the child did in the pre-viewing session.

Upon entering the room, the subject was greeted by name, was seated at the table adjacent to the experimenter, and was given a box to hold. The box was the signal portion of an answer box which the subject would use to signal his recognition response while viewing the film. The use of the box was explained, and to make sure that the subject understood the directions, he practiced signaling a response to the color blue when presented on cards by the experimenter to the subject.

Three by five inch cards, upon which were one inch squares of various colors, were presented on the table in front of the subject. The subject was instructed to push the button each time a blue square appeared. A blue square appeared five times out of twenty cards: once alone, once with two, three, and four squares of other colors. These combinations were similar to the groupings of children on
the film which was used in this pre-viewing period. Thus the subject was predisposed by analogy, to the film grouping situation and was prepared to understand the recognition test.

Following the card game for learning the use of the response-recognition device, the pre-viewing film was shown and the subject was asked to signal when he saw his own image projected onto the screen.

The signal portion of the answer box which the subject held, was connected to a light producing mechanism near the front of the room. The light was screened from the subject. A diagram of the viewing room for Part One is presented in Appendix A, figure 3. The experimenter was in a position to view the films and at the same time to observe the recognition response. The experimenter tabulated each correct response, and at the same time said, "good" or "good work." The purpose of the experimenter's verbal response was to encourage the subject to pay close attention to the films.

At the conclusion of the films each child was told that he did an excellent job; for, in fact, he did. Each child was able to recognize himself in all of the scenes in which he was in the foreground, as well as in several
scenes in which he appeared in the background.

At the conclusion of Part One of the experiment the first grade subjects were told that they had done good work, and that they should return the next day. The fourth grade children continued through Part Two without interruption.

**Part II: Viewing**

For Part Two of the viewing session, points of reference were established for the subject which would give him the same orientation to the viewing room as were used in the filming. The movie screen served as the reference for the grid screen. A target on a side wall and the experimenter seated opposite the movie screen served as referents for the direction of the subject's movements. For a diagram of the room, see Appendix A, figure 4. During this portion of the viewing session the subjects were asked to demonstrate as well as view, particular aspects of skipping and throwing. It was hoped that the position of the subject in relation to the viewing screen would make it easier for him to identify with his image on the screen. For this reason the subject was asked to stand in the same relative position to perform each part of the skill pattern as when he was
filmed. The direction of movement in his demonstration would then be identical with the image on the viewing screen. For the purpose of communicating with the subject, this was found to be very helpful.

The procedure for film analysis was identical for each subject. The subject demonstrated one part of the skill then viewed his skill concentrating on the same part of the skill which he demonstrated for the experimenter. Help was given, during the demonstration, to assist each subject in performing each skill as near to the desired form as possible. During viewing, a series of probing questions was used to help each subject penetrate the analysis of his own skill. Viewing continued throughout the analysis. The number of times which each subject saw his own movement sequences depended upon his response to the questions of the experimenter. A sample of the questions used with a subject judged excellent in skipping, and another subject poorly skilled in throwing, is presented in Appendix D.

The criteria used to analyze the skills in the verbal analysis with the subjects were the same criteria used by the panel of judges in the project "K-4". The criteria for skipping and throwing may be found on the judges' rating sheets in the Appendix G.

The skip was viewed and analyzed first. Before
viewing the throw the subject was assisted by the experimenter in summarizing the points which were brought out in the analysis of the skip. The same procedure was followed for viewing the throw. Reinforcing statements were made for each correction which the subject could remember. If the subject omitted a point which he had previously brought out, he was reminded of it. Each subject was thanked and told that he would work in the gymnasium to help improve his skills.

ANALYSIS OF THE FILMS BY THE JUDGES

Films of each child skipping, taken both at the beginning and at the conclusion of the study, were evaluated by a panel of three judges to provide scores by which the experimental and control treatments were examined. Each subject was rated independently according to predetermined criteria.

A training session, three hours in length, was held for all three judges. Criteria used to rate each child’s skip was thoroughly discussed and several films of children skipping were viewed and rated for practice. In order to eliminate bias, the experimenter did not participate in the rating, but acted as projectionist at each session. Exclusive of the training session, the three rating sessions were one week apart, and lasted for two
and one half hours each. The judges did not communicate with one another or with the experimenter concerning the study during that time. In addition, the judges were asked to refrain from making any comments about the children during viewing.

The films were projected under approximately the same conditions for the judges, as they were for the experimental subjects. The room was dimly lit to enable the judges to see their rating sheets. The projector, a Bauer T-4, was the same one used for projection for the subjects. The speeds used for projection for the judges were eighteen and nine frames per second. The slower speed of nine frames per second greatly facilitated the film analysis.

Rating sheets were provided for each judge. A sample of the rating sheet, with the criteria used to evaluate the skip, is shown in Appendix G.

For each film the projectionist identified the group by grade and sex. The judges recorded the identification number and letter, for example, 1-B for first grade boys, at the top of their rating sheets. Each movie reel contained the film for one group of subjects, either before or after treatment. There were four reels for fourth grade subjects and four for first grade subjects: a reel for boys and a reel for girls, one from before treatment and one from after treatment. The projectionist identified
each child by a number as he appeared upon the viewing screen. The numbers of the subjects were consecutive on each reel starting with number one. There was no way for the judges to identify which subjects were experimental or control. Filming had taken place prior to the assignment of subjects to groups, therefore their order of appearance on the film was random.

The judges rated one criteria at a time for all of the subjects on one film. Each film was shown five times consecutively, one time for each of the five criteria being rated. The judges were instructed to request a rerun immediately for any child whom they had difficulty rating. The rerun was done before viewing the next subject.

The rating by the judge consisted of evaluating each subject according to the criteria agreed upon, and placing that subject's number in one of the three places on the rating scale, on his own rating sheet. This process was repeated for each of the criteria evaluated.

SUMMARY

First and fourth grade children participated in a program of instruction which focused specifically on the skills of throwing and skipping. At the onset of the study, the children were given the AHPER ball throw test to determine the maximum distance each child could throw a ball. On the basis of sex, grade, and rank order
placement in the ball throw test, the subjects were assigned
to either the experimental or the control group. Films of
each individual throwing and skipping, taken prior to any
instruction, were viewed by the experimental subjects in a
period of individual analysis guided by the experimenter.
Both experimental and control subjects received eighteen
one-half hour periods of identical instruction in the two
skills. Test retest scores were collected for all subjects
in the ball throw. Judges viewed and independently rated
each child in skipping according to specific performance
criteria. Gain scores were computed for analysis of the
treatment which each group received.
CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

INTRODUCTION

The material in this chapter includes a presentation of the data collected at the two test periods for throwing and from the subjective rating, before and after treatment, of three judges for skipping. The material is presented separately.

SUBJECTS

Data for seventeen of the original first grade children, and for twenty-six of the original fourth grade children were complete at the end of the study. The absence of two first grade children, within the first three weeks in the study, made it impossible to include them in the study. Another first grade subject moved from the state prior to the final filming date. Data for this subject is complete for throwing only. Two fourth grade children experienced long term illnesses early in the school year and were absent from school during the initial phase of the study. Another fourth grade subject fractured her
arm shortly after the initial filming and testing periods. She was eliminated from the study due to the nature of the physical restriction placed upon her. A fourth grade boy, a transfer student from a special school, was not included in the study due to a disability.

THROWING

Raw data for the ball throw test will be found in Tables 1 and 2. The "t-test" for examining the significance of difference between means of correlated groups was used.

Table 1
Rank Order Softball Throw: First Grade

<table>
<thead>
<tr>
<th>Boys</th>
<th>Before</th>
<th>After</th>
<th>Girls</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject</td>
<td></td>
<td></td>
<td>Subject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>80</td>
<td>105</td>
<td>1</td>
<td>34</td>
<td>26</td>
</tr>
<tr>
<td>2*</td>
<td>72</td>
<td>90</td>
<td>2*</td>
<td>29</td>
<td>46</td>
</tr>
<tr>
<td>3</td>
<td>63</td>
<td>85</td>
<td>3</td>
<td>26</td>
<td>47</td>
</tr>
<tr>
<td>4*</td>
<td>63</td>
<td>73</td>
<td>4*</td>
<td>25</td>
<td>23</td>
</tr>
<tr>
<td>5</td>
<td>46</td>
<td>24</td>
<td>5</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>6*</td>
<td>44</td>
<td>63</td>
<td>6*</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>7</td>
<td>44</td>
<td>49</td>
<td>7</td>
<td>20</td>
<td>17</td>
</tr>
<tr>
<td>8*</td>
<td>40</td>
<td>47</td>
<td>8*</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>9</td>
<td>27</td>
<td>36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10*</td>
<td>27</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*experimental subjects
to test the first hypothesis: No difference will exist between the throwing scores of children who participated in a period of individualized skill analysis and children who did not. In order to accept the hypothesis that a difference existed in the ball throwing scores of the experimental subjects as a result of individualized instruction, the "t" had to be significant at the .05 level. Table 3
shows the mean gain scores of the experimental and control groups and resultant "t" ratio.

Table 3
Mean Gain Scores and Test of Significance in Throwing for Experimental and Control Groups

<table>
<thead>
<tr>
<th></th>
<th>Mean Difference</th>
<th>Df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>7.049</td>
<td>21</td>
<td>5.346**</td>
</tr>
<tr>
<td>Control</td>
<td>3.810</td>
<td>20</td>
<td>1.471</td>
</tr>
</tbody>
</table>

** P < .01

It can be seen that the gain scores of the experimental group after treatment were statistically significant at the .01 level, and that the scores of the control group were not significant.

Further statistical analysis compared the gain scores of subjects to determine if there was a significant difference in throwing among either experimental or control subjects which could be related to the treatment of the subjects. In addition, an analysis of experimental and control subjects by grade and sex using the "t-test" of correlated groups, revealed that there was no statistically significant differences, other than the difference between the experimental and control groups as a whole. Results of these comparisons are shown in Table 4.
Table 4
"t-test" Results of Gain Score Comparisons Between Experimental and Controlled Subjects, Girls and Boys, First and Fourth Grade, Throwing

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Dr</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>7.409</td>
<td>6.500</td>
<td>41</td>
<td>1.226</td>
</tr>
<tr>
<td>Control</td>
<td>3.810</td>
<td>11.864</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>6.455</td>
<td>11.057</td>
<td>41</td>
<td>0.564</td>
</tr>
<tr>
<td>Girls</td>
<td>4.810</td>
<td>7.891</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Grade</td>
<td>7.529</td>
<td>12.560</td>
<td>41</td>
<td>0.930</td>
</tr>
<tr>
<td>Fourth Grade</td>
<td>4.423</td>
<td>6.981</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results show that the treatment received by the experimental subjects, individualized skill analysis from 8mm films, was apparently not instrumental in the statistically significant gains made by that group. Instruction alone was sufficient to cause the statistically significant difference in gain scores for the experimental subjects in throwing.

SKIPPING

A test of internal reliability checking each judge's agreement with herself on each of the five criteria for skipping was accomplished by having the judges re-evaluate the same film after a six week interval. The correlation of each judge with herself may be seen in Table 5. A description of the criteria for judging the skip is presented in Appendix E.
In examining the items of disagreement of each judge with herself, as shown in Table 5, and the items of disagreement among the judges as shown in Table 6, it was observed that the least agreement occurred in the same three items, numbers 2, 3, and 4; and that the least disagreement was found for items 1 and 5. The average correlation of the three judges on each of the items was: item 1, .814; item 2, .616; item 3, .410; item 4, .658; and item 5, .835.

One possible explanation for lack of agreement among the judges, as well as the lack of agreement of each judge with herself might have been the difficulty in discriminating between some criterion measures. For example, on item 2, "push with the foot," it was necessary for the judge to determine the amount of force exerted by the foot in a range from strong to weak. For item 3, "lift with arms," the judges were instructed to determine whether or not a child bent his arms more or less than 45°. Item number 4, "opposition," was judged as to the consistency of the child's use of his arms in opposition to his feet. In addition to these measures, the raters were instructed to observe the consistency of the performance within each item as a final determining factor in their assessment. These critical judgements depended upon the perception of each rater.
Table 5
Correlation of Each Judge's Agreement With Self For All Criteria in the Skill of Skipping

<table>
<thead>
<tr>
<th>Item</th>
<th>Judge 1</th>
<th>Judge 2</th>
<th>Judge 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.924</td>
<td>.756</td>
<td>.932</td>
</tr>
<tr>
<td>2</td>
<td>.516</td>
<td>.172</td>
<td>.818</td>
</tr>
<tr>
<td>3</td>
<td>1.000</td>
<td>.418</td>
<td>.449</td>
</tr>
<tr>
<td>4</td>
<td>.534</td>
<td>.700</td>
<td>.524</td>
</tr>
<tr>
<td>5</td>
<td>.810</td>
<td>1.000</td>
<td>.694</td>
</tr>
</tbody>
</table>

The inter-rating reliability of the three judges was examined by comparing the ratings of the three judges for agreement of each judge with the other two. Table 6 shows the correlation of all three judges for each of the five criteria for eleven cases.

Table 6
Correlation of Three Judges on Five Criteria For Scoring the Skip

<table>
<thead>
<tr>
<th>Items</th>
<th>Judge 1 &amp; 2</th>
<th>Judge 2 &amp; 3</th>
<th>Judge 1 &amp; 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.831</td>
<td>.805</td>
<td>.805</td>
</tr>
<tr>
<td>2</td>
<td>.547</td>
<td>.715</td>
<td>.576</td>
</tr>
<tr>
<td>3</td>
<td>.434</td>
<td>.408</td>
<td>.387</td>
</tr>
<tr>
<td>4</td>
<td>.623</td>
<td>.637</td>
<td>.715</td>
</tr>
<tr>
<td>5</td>
<td>.905</td>
<td>.847</td>
<td>.752</td>
</tr>
</tbody>
</table>
Criteria found to have the highest correlation were broader, more overall descriptions of the skill. Item 1, "the skip pattern," was an evaluation based on the consistency of a step-hop pattern in an uneven rhythm. Item 5, "total assembly," was a single performance score which encompassed the four criteria. Because of the correlation of agreement among the judges was highest for item 5, it was decided to accept that item as the best reliable measure for the statistical analysis of the treatment used in the study.

The "t-test" for examining the significance of the difference between the means of correlated groups was used to test the second hypothesis: No difference will exist between the skipping scores of children who participated in a period of individualized skill analysis and children who did not. In order to accept the hypothesis that a difference existed in the skipping scores of the experimental subjects as a result of individualized instruction, the "t" ratio had to be significant at the .05 level. Table 7 shows the mean experimental and control subjects and the resultant "t" ratio, based on the fifth criterion rating of the three judges. It can be seen that both groups made statistically significant gains in the skill of skipping according to the judges ratings.
Table 7

Mean Gain Scores and Test of Significance in Skipping For the Experimental and Control Groups Based on the Fifth Criterion of the Three Judges' Ratings

<table>
<thead>
<tr>
<th></th>
<th>Mean difference</th>
<th>Df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>1.136</td>
<td>21</td>
<td>3.9318**</td>
</tr>
<tr>
<td>Control</td>
<td>.810</td>
<td>20</td>
<td>3.1788**</td>
</tr>
</tbody>
</table>

** P < .01

Further statistical treatment was done, using gain scores to determine if there was a significant difference in skipping either among experimental or control subjects. In addition, an analysis of experimental and control subjects by grade and sex, using the "t-test" of correlated groups, revealed that there were no statistically significant differences, other than the difference between the experimental and control groups as a whole. Results of these three comparisons may be seen in Table 8.

SUMMARY

Data on first and fourth grade boys and girls collected from a test of ball throwing and judges' ratings of skipping were analyzed using a "t-test" of correlated groups.
Table 8
"t-test" Results of Gain Score Comparisons Between Experimental and Control Subjects
Girls and Boys, First and Fourth Grades, in Skipping

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>1.136</td>
<td>1.136</td>
<td>41</td>
<td>.848</td>
</tr>
<tr>
<td>Control</td>
<td>.810</td>
<td>1.167</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>.818</td>
<td>1.139</td>
<td>41</td>
<td>.593</td>
</tr>
<tr>
<td>Girls</td>
<td>1.091</td>
<td>1.411</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Grade</td>
<td>.722</td>
<td>1.487</td>
<td>41</td>
<td>.819</td>
</tr>
<tr>
<td>Fourth Grade</td>
<td>1.115</td>
<td>1.107</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In skipping, both the experimental and the control group gained significantly from the pre- to post- tests. The mean differences between the pre- and post- test scores for the experimental group in skipping was larger than that of the control group, but the difference in gain was not statistically significant.

In throwing, only the experimental group gained significantly from the pre- to post- tests.

There was no statistically significant difference in throwing or skipping which could be attributed to either the age or the sex of the subjects.
The results indicated that the treatment of the experimental group, individually guided film analysis of the subject's own skills, was not instrumental in causing a statistically significant difference between the gain scores of the experimental and control subjects in either skill, beyond the gain scores achieved by instruction alone.
CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY AND CONCLUSIONS

The general design of the experiment was to measure the proficiency of throwing and skipping for a group of first and fourth grade children; to administer a program of instruction and to evaluate the proficiency of each child's skill to determine the effects of augmented feedback, in the form of a period of guided analysis of films of each subject's skills, on the skill development of the children.

Subjects were all the children from one first and one fourth grade class in a public school in Kent, Ohio.

The American Association for Health, Physical Education, and Recreation ball throw test was administered both before and after the nine week instructional program to measure throwing ability. Films of the children skipping were taken at the onset and at the conclusion of the experiment. They were evaluated by a panel of judges to measure skipping ability.
The initial films of the subjects skipping and throwing were used in the instructional program for the experimental subjects. Each experimental subject experienced seeing his own films privately with individually guided analysis of his skills by the experimenter. Other than the viewing period for the experimental subjects both groups received identical instruction.

The instructional program was handled by the experimenter. The first and fourth grade children participated in the study as part of their regularly scheduled program of physical education. Each grade met with the experimenter for two, one half hour periods per week for a total of twelve weeks. Testing and filming took place during the regular class time. The individual viewing periods for experimental subjects were scheduled in addition to their regular classes. Every effort was made to vary the instructional program; yet at the same time, focus specifically on the skills of throwing and skipping.

Following the instructional program the subjects were retested with the ball throw test and refilmed in the skill of skipping.

Pre to post scores derived from ball throw for distance and from the judges rating of the overall per-
formance for skipping were compared by means of a "t-test" of correlated samples.

The "t-test" was also applied using gain scores in skipping and throwing to measure the difference if any, between the experimental and control groups due to the type of instruction each received.

The following are the results of all statistical analysis:

(1) Pre to post scores for experimental subjects showed:
   (a) statistically significant gain for throwing
   (b) statistically significant gain for skipping.

(2) Pre to post scores for control subjects showed
   (a) no statistically significant gain for throwing.
   (b) a statistically significant gain in skipping.

(3) Between group comparison showed no significant difference between experimental and control group throwing.

(4) Between group comparison showed no significant difference between experimental and control group for skipping.

In conclusion, the results indicate that the treatment received by the experimental subjects' individually guided film analysis, was apparently not instrumental in the statistically significant gains made by that group in either the skill of skipping or throwing.
Instruction alone, the treatment of all of the subjects, was sufficient to cause the statistically significant gain scores of all subjects in both skipping and throwing.

RECOMMENDATIONS

The results of the study, which indicate no significant difference between experimental and control subjects may stem from the many variables of the experiment. Suggested variables to be investigated with reference to the individualization of instruction using films of a child's own movement are:

(1) Repeated filming and viewing for experimental subjects.
(2) Periodic evaluation of all subjects by filming and testing.
(3) Viewing periods and instructional program conducted by different physical education teachers.
(4) Using children from a different school environment.

The school in which the experiment was conducted is at this time six years old. While it has all of the appearance of being a modern school; it is in essence, a traditional school. Each classroom is a self-contained unit suitable for approximately thirty children. The practices of this educational institution includes the tradition of bells, quiet in the lunchroom, mass instruction and absolute respect for order. To illustrate the
last comment, it was the practice of the author to arrive early at the school and to sit quietly in the back of the fourth grade room prior to the physical education period. It was the practice of the teacher to have the children go to the restroom before going to the gymnasium. The children lined up first in the classroom, walked in line to the restroom, reformed their line and walked back in line to the classroom where they lined up to go to the gymnasium.

In contrast to this environment, the author observed another type of school environment in which there were no bells, conversation was encouraged, instruction was individualized and "apparent" confusion seemed the order of the day. The later description refers, of course, to an open school. Children in an open school are encouraged to do independent study. Children as young as seven years of age may be observed running a movie projector completely unsupervised. Because of the observable difference between the work habits of the children in the two different types of schools, it is the author's recommendation that the school environment be considered as a factor in future studies dealing with

135 Heidie Mitchell, Film, "Bryant Woods School, A New Concept in Education", Kent State University, (December, 1970).
individualization of instruction.

Additional data were gathered during the twelve weeks of the experiment. The procedures for gathering the data were exactly the procedures presented in this study. The subjects were all of the children in another first and fourth grade class in the same school in which the experiment was conducted. The data includes:

1. Ball throw scores taken the first and last week of the experiment.
2. Films of the children skipping and throwing, taken the first and last week of the experiment.

It was the initial intention of this writer to include data on these children in the present study. However, this decision was altered due to the difference in the physical education program as taught by the classroom teacher, the physical education teacher or the experimenter.

However, at the conclusion of the study, films of the children taught by the different teachers were analyzed. This analysis revealed some major differences in the skill of throwing, between those children instructed by the experimenter and those children instructed by the other teachers.

The children taught by the experimenter:

1. Stood consistently with their side to the target in the preparation phase of the throw.
2. Displayed more use of hand and foot opposition and trunk rotation.
(3) Used a wider range of motion more frequently.
(4) Consistently took a step in the direction of the throw prior to releasing the ball.
(5) Used a follow through more frequently.

Though the results of the present study show that there were no statistically significant differences between experimental and control subjects which could be attributed to the treatment, it is the opinion of this writer that the observed differences between the movement of the children taught by the experimenter and those children taught by either the classroom teacher or the specialist, are significant in terms of skill development, and that the differences may be attributed to instruction in the specific skill examined. It is the author's conclusion that in studying children, the maximum distance for throwing may not be the best measure by which to evaluate gains in that skill. Therefore, it is the recommendation of the author that when studying children, analysis of motion pictures be considered in assessing gains in the skill of throwing.

At the writing of this manuscript thirteen of the original first grade group were currently enrolled in the same school. They will be fourth graders when they return to school the fall of 1972. It is the intention of the author to administer the ball throw test and to film both these children and the children remaining of the other
first grade class. It will be impossible to study the fourth grade group, since they will be entering junior high school in the fall.

For purposes of comparison let control group two stand for the group for whom data has not been analyzed.

The comparisons which can be made relate to:

(1) The instruction of a specialist as opposed to the instruction of a classroom teacher, using experimental and control subjects vs. control group two.
(2) Long term retention using experimental and control subjects vs. control group two.
(3) Long term retention using experimental vs. control subjects.
(4) Attitudes towards physical education as a result of first year experiences. (The author continued to teach both classes through the entire year.) First grade experimental and control subjects vs. control two.

All of the above recommendations are related to current issues in the area of elementary school physical education. It is the author's opinion that there is a dire need for research with children, and that the consolidation of pertinent topics of research through team efforts would be a logical approach.
APPENDIX A

DIAGRAMS OF FILMING AND VIEWING AREAS
FIGURE 1

GRID ARRANGEMENT FOR FILMING THROW
FIGURE 2
GRID ARRANGEMENT FOR FILMING SKIP
FIGURE 3

VIEWING ROOM: PART I TESTING AND TRAINING
FIGURE 4

VIEWING ROOM: PART II SKILL ANALYSIS
APPENDIX B

SKILL COMPOSITES FOR SKIPPING
AND THROWING
Inefficient Picture

1. A child might begin the skip pattern from full foot contact with the floor,
2. A child might mix his step-hops with walking,
3. A child might toe out or cross his feet,
4. A child might swing his arms in any random pattern,
5. A child might have body movements from side to side,
6. A child might return to floor with foot from very little suspension.

Efficient Picture

1. instead of pushing from the ball of the foot.
2. instead of doing a step-hop on one foot and then on the other.
3. instead of reaching straight forward with foot.
4. instead of moving them in opposition with forward and upward lift.
5. instead of movement in a forward and upward direction.
6. instead of transferring weight to ball of foot.
THROWING

Inefficient Picture

1. A child might hold the ball in the palm of the throwing hand,

2. Use his non-throwing arm in any random manner,

3. A child might face the target throughout all phases of the throw,

4. A child might push or lift the ball with a short arm movement,

5. A child might keep his feet parallel and stationary or swing his right foot and step with his right foot,

6. A child might release the ball too soon or too late,

7. A child might use a short arm movement and lean away from the target after release,

8. A child might have jerky movements,

Efficient Picture

1. instead of holding the ball with his fingers.

2. instead of stretching it toward the target prior to his backswing with the throwing arm.

3. instead of twisting the trunk to follow throwing arm as it swings backward and forward.

4. instead of swinging the throwing arm backward and forward and taking a big step in the direction of the throw.

5. instead of swinging the throwing arm and simultaneously stepping forward on the opposite foot.

6. instead of releasing as the throwing hand comes in line with the target.

7. instead of reaching fingers toward the target and leaning toward the target.

8. instead of smooth continuous movement from start to finish.
APPENDIX C

SCHEDULE OF FILMING, TESTING, INSTRUCTION, AND VIEWING
<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Grade 1</th>
<th>Grade 4</th>
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<td>Introduction</td>
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<td></td>
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<td>Filmed Skip</td>
</tr>
<tr>
<td>2</td>
<td>Mon.</td>
<td>Instruction Skip</td>
<td>Instruction Skip</td>
</tr>
<tr>
<td></td>
<td>Wed.</td>
<td>Filmed Throw</td>
<td>Filmed Throw</td>
</tr>
<tr>
<td></td>
<td>*Fri.</td>
<td>Tested Throw</td>
<td>Tested Throw</td>
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<tr>
<td>3</td>
<td>Mon.</td>
<td>Tested Throw</td>
<td>Instruction Throw</td>
</tr>
<tr>
<td></td>
<td>Wed.</td>
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<tr>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Part II</td>
</tr>
<tr>
<td>4</td>
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<td>Instruction Skip and Throw</td>
</tr>
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<td></td>
<td>Wed.</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Throw</td>
</tr>
<tr>
<td></td>
<td>*Thurs.</td>
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<td>Part I</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Part II</td>
</tr>
<tr>
<td></td>
<td>*Fri.</td>
<td>Viewing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Mon.</td>
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<td>Instruction Skip and Throw</td>
</tr>
<tr>
<td></td>
<td>Wed.</td>
<td>through</td>
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<td>11</td>
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<tr>
<td></td>
<td>Wed.</td>
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<td>Refilm Throw</td>
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</tr>
<tr>
<td></td>
<td>Wed.</td>
<td>Retest Throw</td>
<td>Retest Throw</td>
</tr>
</tbody>
</table>

* Experimental subjects only
APPENDIX D

VIEWING DIRECTIONS AND SAMPLE RESPONSES
VIEWING ROOM PROCEDURE: PART I TESTING AND TRAINING

Directions which were read to subjects

We are going to play a game. Here is an answer box. By pushing this button you can signal me that you know the correct answer. I am going to show you some cards. Each card has colored squares on it. Whenever you see a blue square, push the button on the answer box to tell me that you see the blue square. Hold the button down as long as you see the blue square. If you do not see a blue square do not push the button. You will get one point for each correct answer.

We are going to play another game. I am going to show you some pictures of children playing in the gym. Whenever you see yourself, push the button on the answer box to tell me that you see yourself. The movie shows you in the foreground in some scenes, and in the background in other scenes. Hold the button down as long as you see yourself. If you do not see yourself, do not push the button. Watch carefully. You will get one point for each correct answer.
VIEWING ROOM PROCEDURE: PART II SKILL ANALYSIS

Sample interview with subject rated inefficient in throwing

Criteria: Pattern, the overarm throwing movement.
Rating: Inefficient
Description: The subject used the overarm pattern, but with a narrow range of arm movement.
Experimenter: Here is a paper ball, show me how you would throw it to hit the target on the wall very hard.
Subject's Response: The subject stood facing the target and moved his bent arm through a very short range of motion and without any movement of the rest of his body, extended his lower arm in the direction of the target, releasing the ball as he did so.
Experimenter: You hit the target, fine. Now can you hit the target so hard that the ball will bounce right back at you?
Subject's Response: Same body position, more effort in the movement of the arm.
Experimenter: Do you remember how we learned to stand in order to make the ball go faster and harder?
Subject's Response: The subject turned to face the experimenter, with his throwing arm away from the target.
Experimenter: Good, you stand with your side to the
target, your trunk turned to face me. Now, see if this helps you throw the ball harder.

Subject's Response: Moved the arm through a wider range of motion and hit the target a little harder.

Experimenter: Fine, that was harder. (start film) Now, let's look at the film and see if you moved your arm in a wide range. Your arm should move from behind you, towards the target. Did you move in a wide range?

Subject's Response: No.

Experimenter: Good, you caught yourself. That tells me that you are paying attention to your films. Look again, see how your arm stays bent when you throw. That can't help you move the ball very much if you need a wide range to throw hard. (stop film) Let's do some of the other things that we learned help the ball go fast and far.

Criteria: Opposition, the use of the opposite hand and foot.

Rating: Inefficient.

Description: The subject stood facing the target throughout the throw. His body position did not allow him to step forward with his opposite foot since it was already in a forward position.

Experimenter: Can you show me where your base of support is?
Subject's Response: Points to his feet.
Experimenter: Right, your base of support is what supports you. Now, if I asked you to stand sideways to the target, and to widen your base in the direction of the target, show me what you would do.
Subject's Response: Subject stood in a stride position, then moved his forward foot in the direction of the target. Experimenter: Good. You moved the forward foot, the one closest to the target, closer to the target. (start film) Let's look at you film now and see how you stood. Did you stand with one side towards the target? Subject's Response: No.
Experimenter: Did you widen your base in the direction of the target?
Subject's Response: No.
It should be noted here that some subjects who stood facing the target did take a step forward, some with the same foot, and some with the opposite foot. Rotation of the trunk can only be achieved from the starting position of: side to the target. While a subject may take a step towards the target, it is important that this step leads the subject to rotate the trunk.
Experimenter: We learned what that step towards the target does, do you remember what that is? Show me.
Subject's Response: Subject, standing in a stride position, steps towards the target and rotates or twists his trunk in the direction of the target.

Experimenter: Good, your trunk rotates or twists. You start out facing me and end facing the target. (start film) Let's look at your film now and see what your trunk does.

Does your trunk rotate?

Subject's Response: No.

Experimenter: Where does your trunk face the whole time you throw the ball?

Subject's Response: It faces the target. (stop film)

Experimenter: What should it do?

Subject's Response: Turn.

Experimenter: Do you know what helps you rotate your trunk?

Subject's Response: Standing sideways then stepping with the forward foot, rotating the trunk.

Experimenter: Fine. Now let's concentrate on when you let go of the ball to make it go as far as possible.

Criteria: Point of Release.

Rating: Inefficient.

Description: The subject used a pushing motion through his forearm, and released the ball in a upward direction before his arm was extended.

Experimenter: We talked about where your hand should be
when you release the ball. Can you show me where your arm should be when you let go of the ball?

Subject's Response: Subject extended his arm above and in front of his head.

Experimenter: Fine. Extending your arm to a point half way between straight up and straight out will make the ball go farthest. (start film) Let's look at the film and see where you released the ball. Put your finger right on the screen where you see the ball, and follow the ball with your finger. Look at your arm. Did you extend the arm all the way before you let go of the ball?

Subject's Response: No.

Experimenter: Where did your arm point when you released the ball?

Subject's Response: Up.

Experimenter: Where did the ball go? Did it go towards the target, or did it go up?

Subject's Response: It went up too.

Experimenter: Yes it did. Your arm makes the ball go in the same direction the arm goes when you release the ball. We have one more thing to look at. Do you remember what makes the ball go fast and far, something besides the arm?

Criteria: Movement of the body in the direction of the throw.

Rating: Inefficient.
Description: The subject faced the target throughout the preparation, release and follow through stages of his movement. His feet were planted firmly in one place and did not move to impart momentum to the ball. His movement had a clearly backward movement as he fell away from the ball.

Experimenter: What parts of the body should you move after you release the ball?

Subject's Response: All of you.

Experimenter: Yes, any movement you do in the direction you want the ball to go, will make the ball go faster and it will go farther too. Can you show me how you would use your whole body, moving in the direction of the target?

Subject's Response: Subject started to move with a slide in the direction of the target, and continued to move after he released the ball.

Experimenter: That's fine, the faster you move, the faster you will move the ball. (start film) Let's look at the film and see how much your whole body moves towards the target when you throw. One good way to see that is to watch your chest and see if it passes any of the grid lines going up and down. Does your chest pass any lines?

Subject's Response: No.

Experimenter: That's right, you looked like you thought
you should stand still and throw, didn't you? You have worked very hard to analyze your throw. Looking is only one part of this work. In order to be able to improve your throw, you have to be able to remember all of the points you have told me about when you saw your film. I'll say a body part and you tell me all of the things that part should do to help you throw the ball as far as you possibly can. First, the feet? What do you need to remember about your feet?

Subject's Response: Stand sideways to the target, have a wide base of support, and step with the opposite foot.

Experimenter: Good. What do you need to remember about your trunk?

Subject's Response: I need to move my trunk from away from the target to face the target. When I let go of the ball I should be facing the target.

Experimenter: Good. And what about your throwing arm?

Subject's Response: It should move with my trunk and reach out towards the target. When I let go of the ball my arm should be stretched out.

Experimenter: There is one more thing that we talked about. Your whole body does something, what is it?

Subject's Response: I should move before I throw the ball and keep moving my arm after I throw.

Experimenter: Good. Do you think you can remember those
things? You try hard. We will practice throwing every day and I'm sure you will improve.
VIEWING ROOM PROCEDURES: PART II SKILL ANALYSIS

Sample interview with subject rated efficient in skipping

Introduction

We are going to look at the movies of you alone now. First we will look at skipping and then at throwing. I want to know if you understand how to do these skills well enough to look at yourself in the movie and point out your own mistakes so I will ask you to do something for me correctly, then to look at the movie and tell me if you did it correctly then.

Criteria: Pattern.

Excellent Rating: Step hop on alternating feet, moving in an uneven rhythmic pattern. The pattern must be consistent throughout the film.

Description of Subject's skill: Subject moved in a continuous step hop pattern. He maintained the pattern through the six movement sequences.

Experimenter: Stand up near the movie screen and show me how you can skip across the room.

Subject's Response: The subject skipped across the room smoothly.

Experimenter: That's fine. A skip is a step hop on each foot, in an uneven rhythm. (start film) Let's look at
the film of you skipping and see if you did the step hop pattern. Look at your feet. Are they moving the same way you showed me they should move?

Subject's Response: Yes.

Experimenter: Good. You did a very smooth skip. (stop film) Let's look at how well you use your feet when you skip.

Criteria: Push with the foot, movement from heel to toe, full foot extension.

Excellent Rating: The foot should extend, pushing the body off the floor. A good upwards push will life the body two to three lines on the grid screen. When the force is applied to move the body in a forward direction, rather than upward, the body should move across the whole length of the grid in three or four skips.

Description: The subject used his foot effectively to push up. His foot could be seen to be fully extended at the peak of his push. He cleared three grid lines in his upward flight. His movement was from heel to toe. He was consistent in his performance. All six movement sequences showed the same good quality of movement.

Experimenter: Can you show me how your feet move to make you go long or high when you skip?

Subject's Response: Skipping going either very far or very high with each push of the foot.
Experimenter: Fine. You push down very hard with your foot and your body goes either high up in the air or a long distance on each hop. Let's look at the film now and see if you push hard with your feet. (start film)

Do you push hard with your feet?

Subject's response: Yes.

Experimenter: Yes, that is a fine push. Look how high (or far) you went, your pushing foot goes three squares above the floor each time. (stop film and rewind)

Criteria: Lifting with the arms.

Excellent Rating: Arms should swing from the shoulders and assist the forward and upward movement of the body. The movement would be from front to back. For greatest efficiency the arms should move more than 45° away from the body.

Experimenter: Show me what besides your legs help you go high or far when you skip.

Subject's Response: Standing, swinging arms, front to back, in a wide range.

Experimenter: Fine. Your arms are swinging to help lift your body. Let's look at the film and see if you swing your arms to help you move. Are your arms swinging way up, going from front to back, using lots of space to help you go up (in the air) or far?

Subject's Response: Yes.

Experimenter: Good. Your arms are moving front to back
and reaching way out in front each time they swing.
Criteria: Opposition.
Excellent Rating: The right arm should swing simultaneously with the left leg push, and the left arm should swing with the right leg push. The pattern should be clear and consistent in all of his movement sequences.
Experimenter: Can you show me the relationship of the arms and legs in skipping?
Subject's Response: Extending one arm and standing or hopping on the opposite leg.
Experimenter: Fine. You are using your opposite arm and leg. Let's look at the movie now and see if you were using opposition. (start film) Are you using one leg and the opposite arm with each skip that you take?
Subject's Response: Yes.
Experimenter: Right. When you step on your right foot, see how your left arm reaches forward. You are using opposition. (stop film)
Criteria: Total assembly.
Excellent Rating: All of the parts of the skip should be smooth. The pattern, the use of the arms in lifting, arm and foot opposition should appear consistently.
Experimenter: Now when we put all of these parts together the skip should be smooth. Show me what you think a smooth skip looks like.
Subject's Response: Skipping smoothly, using all body parts efficiently.

Experimenter: Fine. That's a good skip, so smooth. Everything fits together. Let's look at the film and see if your skip was smooth? (start film) Is your skip smooth? Are you using your legs, arms? Does your skip seem effortless or easy?

Subject's Response: Yes.

Experimenter: Yes, you have a very good skip. Your pattern is consistent. You push very hard with your feet, see how far you go? Your arms are swinging nice and easy, front to back, and they reach way out on each swing. Your arms and feet move in opposition. And, it all looks good together. That's just wonderful. There are many activities we will do in the gym where you can skip. I'm sure you will like them. Now let's review, were there any things in particular that you need to improve your skip?

Subject's Response: No.
### Judges Rating Sheet

**Skip Grade 1 Group Boys**

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<th>Inefficient</th>
<th>Excellent</th>
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#### Pattern: Step-hop, uneven rhythm

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<th>one pass across the grid</th>
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<td>Consistent pattern</td>
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#### Push with Foot

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<th>Rarely flat-footed</th>
<th>Sometimes; not full extension, Little force</th>
<th>Roll, heel to toe Consistently, Extension of foot, Distance and height</th>
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</table>

#### Lift with arms

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<th>Bending less than 45° angle. Some lateral movement</th>
<th>Consistency; Bending more than 45° Forward and Backward</th>
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#### Opposition

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<th>One pass across grid</th>
<th>Consistent Right Foot and left Hand</th>
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#### Total Assembly

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<th>Wrong pattern Inefficient in two or more criteria</th>
<th>Lack of quality Having lateral Motion; One pass across</th>
<th>All above consistent</th>
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APPENDIX F

JUDGES' RATINGS FOR SKIP
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Judges Ratings: First Grade Skip—Before and After Treatment

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subject was not available for filming

* Experimental subjects
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**Judges Ratings: Fourth Grade Skip—Before and After Treatment**

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BIBLIOGRAPHY


_____. "The Value of the Motion Picture as an Instructional Device in Learning a Motor Skill," Research Quarterly, XV (May, 1944), 81-87.


