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FEASIBILITY OF LARGE SCALE IMPLEMENTATION OF THE COMPONENT APPROACH FOR ASSESSMENT OF FUNDAMENTAL MOTOR SKILLS IN GRADES K-3

The University of North Carolina at Greensboro ED.D. 1986

FEASIBILITY OF LARGE SCALE IMPLEMENTATION OF THE COMPONENT APPROACH FOR ASSESSMENT OF FUNDAMENTAL MOTOR SKILLS IN GRADES K-3

By

Virginia K. Jenkot

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Approved by

Adviser

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at the University of North Carolina at Greensboro.

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JENKOT, VIRGINIA K. Feasibility of Large Scale Implementation of the Component Approach for Assessment of Fundamental Motor Skills in Grades K-3. (1986) Directed by Dr. Kate Barrett. 128 pp.

The purpose of this study was to determine the feasibility of using Roberton and Halverson's component approach to assess the developmental sequences of the hop and skip in an actual K-3 public school situation. More specifically, the study examined the implementation procedures involving objectivity training, videotaping, and coding along with parental reactions to developmental information.

Subjects were 206 male and female students in grades K-3 in one school. The coders were two physical education practitioners from the same school. Subjects were videotaped performing two skills: hop and skip.

Coders were trained to use the Roberton and Halverson component approach to .80 exact agreement prior to coding. A training videotape of both ambiguous and unambiguous examples of hop and skip sequences was coded by Roberton and Halverson and used as the criterion for acceptable level of objectivity for coders. Exact percent agreement and Cohen's Kappa coefficient of objectivity were used to examine percent of coder agreement. Objectivity was assessed prior to, at the midpoint, and one week following coding. Acceptable level of agreement was maintained

except for one component (hop-arms) for Coder #2 on the final assessment.

Parents of each subject received their child's individual developmental profile, a letter of explanation and a brief questionnaire designed to elicit general response and questions regarding the developmental information. Parent comments, at a return rate of 27%, reflected an interest in norm relating this information and also a desire to learn ways in which to use the information to enhance their child's development.

It was concluded that it was feasible to implement this approach in a public school setting. It was recommended that the objectivity training procedures be standardized based on the findings in this study to reduce the amount of time required and to ensure coder consistency.

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CHAPTER I

INTRODUCTION

Motor development has been defined as "...changes over time in motor behavior that reflect the interaction of the human organism with its environment" (Wickstrom, 1983, p. 3). It is a body of knowledge which directly relates to the area of physical education. The rate at which motor development progresses is affected by environmental factors such as maturation, experience, social influences, opportunity, motivation, instruction and physiological limitations (Corbin, 1973; Gallahue, 1982; Rarick, 1976; Rarick, 1980; Wild, 1938). Knowledge of children's readiness and critical learning periods are other factors to understand regarding motor development (Gallahue, 1982; Roberton & Halverson, 1984; Seefeldt, 1978).

Assessment of the development of basic skills has taken several forms over time starting with simple recording of motor achievements for the purpose of establishing norms and percentiles (Bayley, 1936; McCaskill & Wellman, 1938). No standardized criteria were

used in these assessments of skill performance. No methods or systems were established to guarantee objectivity and consistency in assessment. Descriptive checklists regarding maturity levels of skills followed. These skills were described in more detail giving the practitioner more information regarding the skill and often contained reference to instruction (Gallahue, 1982). More recently, and in addition to performance measures and developmental checklists, efforts have been made to identify how specific body components change over time within a skill. The result of this approach is referred to as intra-task sequential stages or steps of development (Roberton & Halverson, 1984; Seefeldt, Reuschlein, & Vogel, 1972). There are two basic approaches appearing in physical education textbooks which use the intra-task concept. These are the total body configuration approach (Seefeldt, Reuschlein, & Vogel, 1972) and the component approach (Roberton & Halverson, 1984).

The total body configuration approach describes stages of development which view several segments of the body simultaneously in each stage. For example, stage one in the hop defines what the leg, body, and arm should look like; likewise in stages two, three, and four (Seefeldt & Haubenstricker, 1979). Although the authors of this approach state that these stages are not indivisible units

(Branta, Haubenstricker, & Seefeldt, 1984), an underlying assumption is accepted that the body segments described in each stage develop proportionately to each other.

The component approach is an orientation to the development of motor skills which acknowledges the development of component parts at different rates within an individual and between individuals (Roberton, 1977a). Roberton (1978a) believes that stage development occurs at the component level only and therefore has broken down each component of a skill into developmental steps. For example, the hop is broken down into two components, leg and arm, and each component is given a separate step of development resulting in a profile of that skill.

Now that information regarding the development of motor skills has reached current textbooks (Gallahue, 1982; Logsdon (Ed.), Ammons, Barrett, McGee, & Roberton, 1984; Morris & Stiehl, 1985; Siedentop, Herkowitz, & Rink, 1984), physical educators can make choices regarding which approach will best meet their needs. Once the choice is made, the next step is implementation of the approach. It is at this point, implementation, where difficulty is encountered. In order for the practitioner to obtain valid information through use of any specific approach to assessment, it is necessary to have a specific strategy or framework to follow which can be applied to an actual

school situation. Roberton and Halverson (1984) have given a few suggestions for application, but none specific enough as to be considered a strategy. This study will focus on the technical or process aspects of how to implement the component approach in a K-3 school situation. This approach was selected for use in this study because of its preciseness and research base.

Purpose of the Study

The purpose of this study was to determine the feasibility of using Roberton and Halverson's (1984) component approach to assess the developmental sequences of the hop and skip in an actual K-3 public school situation. More specifically, this study saught to answer the following questions:

1. What is the length of time needed to train teachers to code hop and skip component levels of development with at least .80 criterion agreement?

2. Can teachers maintain at least .80 agreement during the entire coding procedure?

3. What were the actual time and cost factors for:

    a. Videotaping all subjects.

    b. Coding all data.

4. What were the parent reactions to the motor development profile for their child?

5. What factors influenced the procedures of

videotaping, teacher training, and coding?

Definition of Terms

For the purpose of this study, the following terms are operationally defined.

1. Component Approach to Motor Development - an orientation to the development of motor skills which acknowledges the development of component parts at different rates within an individual and between individuals (Roberton, 1977a).

2. Developmental Step - a way of moving within a motor task that is noticeably different from previous or later ways of moving (Roberton, 1978).

3. Developmental Sequence - the series of developmental steps for each component of a skill.

4. Feasibility - capable of being carried out (videotaping, objectivity training, coding, report to parents.).

Assumptions

This study is conducted with knowledge of the following assumptions:

1. It is accepted that there are fundamental motor skills which are essential to the development of more advanced skills.

2. The Roberton and Halverson (1984) developmental sequence for the skip has been accepted as valid. (The hop

has been validated; Halverson & Williams, 1985). (See Appendix A)

3. The conditions of this study will not adversely affect childrens' performance of the hop and skip.

4. Use of videotape is an appropriate vehicle for recording, observing, and analyzing developmental sequences.

Scope

This study must be interpreted within the following boundaries:

1. Subjects in this study numbered 206 which were comprised of 12 intact classes distributed as follows:

Kindergarten	3 classes	= 39
1st grade	3 classes	= 60
2nd grade	3 classes	= 51
3rd grade	3 classes	= 56

2. The subjects were from School District 96, Willow Grove School, Buffalo Grove, Illinois.

3. Two teachers were involved in the study.

4. Each subject was videotaped performing two skills:

   a. Hop

   b. Skip

5. The camera was placed 30 feet from the subject.

6. The subject traveled along an arc approximately

73 feet in length.

7. Five hops/skips were coded.

Significance

This study implemented the Roberton and Halverson (1984) component approach to determine feasibility for use of such a precise assessment in an actual school environment. Although the total body configuration approach has been intended as a practical tool for the practitioner to use, the data produced by this approach are more general in nature than the data produced by the component approach (Branta, Haubenstricker, & Seefeldt, 1984). This study sought to represent a number of practitioners who were not satisfied with general data but had a need and desire for more precise information on the development of motor skills.

The component approach, in the form cited in this study, (Roberton & Halverson, 1984) has been in the elementary physical education literature since 1977 (Roberton & Halverson, 1977). To the investigator's knowledge there has been no report of any large scale implementation of the component approach for assessment purposes in any public school setting. This is believed to be attributed to the lack of direction or guidelines regarding implementation of this approach for assessment of skills. The results of this study can yield

significant information which will show if indeed it is feasible to use the component approach in an actual K-3 school situation, or if the development of a system or framework for administration would render this approach more usable to the practitioner who desires more technical information regarding the development of selected motor skills.

CHAPTER II

REVIEW OF LITERATURE

Literature related to assessment of the fundamental skills was reviewed to determine both the nature of the types of assessment used and the extent to which they had been implemented in physical education. The focus of assessment in the literature vacilated between measuring the quantitative and qualitative characteristics of skills throughout the years. Investigators have used descriptive, mechanical, kinesiological, and developmental methods to analyze and assess skills. This chapter is divided into three sections: (a) brief historical overview of motor development assessment, (b) two approaches to intra-task skill development, and (c) specific motor skill research: hop and skip.

Brief Historical Overview of Motor Development Assessment

Motor skill development research originally stemmed from the tradition of child psychology. This may account for the generality expressed in the early motor development assessment scales (Connolly, 1979). Pioneers

in the field of motor development such as Bayley (1936), Wellman (1938), and Shirley (1931) attempted to discover the bridge between what children do and what children can do. Through extensive observation and notation of behaviors they brought to light the importance of motor development in the overall realm of child development.

The early investigators developed motor scales of performance indicating normative behavior based on the tendency for certain phases in the developmental sequences to be achieved by children at approximately the same chronological age (Espenschade, 1980). These scales primarily measured skills in quantitative terms with little analysis of the relative proficiency or quality expressed in the performance of the skill (Bayley, 1936; Brace, 1927; Frankenberg & Dodds, 1939; Lincoln & Oseretsky, 1923; McCaskill & Wellman, 1938; Shirley, 1931).

Although this research was inconclusive and inconsistent as far as what was actually being measured and how, in fact, skills develop, it provided the background and a revived interest in the qualitative aspect of movement skill development. Throughout this time several researchers began to identify qualitative aspects of skills and stage-like sequences (Deach, 1951; Gesell & Amatruda, 1965; Roberton, 1977a; Seefeldt,

Reuschlein, & Vogel, 1972). These were in various checklist and stage forms containing descriptions of the skill as categorized from immature to mature performance.

Intra-task Skill Development

A common acceptance was being established for the concept of intra-task skill development. Intra-task sequences are: "...changes that take place in individual body actions that occur during the acquisition of single motor skills." (Williams, 1983, p. 207).

The following literature traces the beginning of the intra-task research and how several authors have built on this research.

Wild's research in 1938 laid the foundation for much of the research on intra-skill development. In this study, children's throwing patterns were observed to determine the various stages which were present at both 6-month and 1-year intervals for ages 2 to 12. Four clearly defined stages of throwing behavior resulted from this study. Each stage contained descriptive characteristics of several body features. Stage 1 in throwing, for example, listed characteristics related to general whole body movement, age range, backswing, elbow flexion, foot placement, trunk rotation, and follow through (see Table 1). Each of the subsequent stages also referred to each of these body features, or components as

Table 1

Wild's 4 Stages of Throwing*

STAGE 1 is characterized by typical anteroposterior movements, of which there is a preliminary incipient stage with no body movement. This stage can be assigned to ages two to three or possibly up to four, and is described as follows: The reverse movement of the arm is either sideways-upward or forward-upward usually to high above shoulder, elbow much flexed. With this reverse arm movement the trunk extends with dorsal flexion of ankles and carries the shoulders back. The trunk straightens, carrying the shoulders forward, and flexes forward with plantar flexion of ankles as the arm swings forward over the shoulder and down in front. Elbow extension starts early. Movements of body and arm are almost entirely in the anteroposterior plane over feet which remain in place; the body remains facing the direction of throw all the time; the arm is the initiating factor. There is trunk left rotation toward the end wth the arm's forward reach.

STAGE II is marked by the introduction of body and arm movements in the horizontal plane, as contrasted to the anteroposterior plane, and is assigned to ages three and one-half to five years. The whole body rotates right, then left above the feet; the feet remain together in place. The arm moves either in a high oblique plane above the shoulder or in a more horizontal plane, but with a forward downward follow-through. The elbow is much flexed; it may extnd at once or later. The body changes its orientation and then reorientates to the throwing direction. The arm is the initiating factor.

STAGE III marks the introduction of stepping; it is the right-foot-step-forward throw, assigned to age five to six. The weight is held back on the left rear foot as the spine rotates right and extends; the arm swings obliquely upward over the soulder to a retracted position with elbow much flexed. The forward movements consist of a stepping forward with right foot, unilateral to the throwing arm, with spine left rotation, early turning of the whole body to a partial left facing and trunk forward flexion, while the arm swings forward either in an oblique-above-the-shoulder plane or in a sideways-around-the-shoulder plane, followed by a forward downward movement of follow-through. Elbow extension does not start at once. This throw has both anteroposterior and horizontal features.

STAGE IV is the left-foot-step-forward throw with trunk rotation and horizontal adduction of the arm in the forward swing. This throw is the mature form and all boys from six and one-half years up have it. The girls have, in most cases, attained the body and foot movements, but incompletely developed forms of the arm movement. Others show decided regressions or retardations.

*Taken from: Wild, M. (1938). The behavior of throwing and some observations concerning its course of development in children. Research Quarterly, 9 (3), 20-24.

the research referred to them later. This study did not give nor intended to give a strategy for use by the practitioner. Based on Wild's (1938) study, two directions were evident for assessing developmental skills: total body configuration and body component sequences.

Most of the research which supports the concept of intra-task sequential stages has been classically described in terms of a total body configuration (Deach, 1951; Gallahue, 1982; Haubenstricker, Branta, & Seefeldt, 1983; Seefeldt, Reuschlein, & Vogel, 1972; Williams, 1983). In this approach the various components of the body involved in performance of the skill were grouped and viewed together in a single stage (Seefeldt & Haubenstricker, 1982). Advocates of the total body configuration approach believed that there was sufficient cohesion between these components to classify them together into one stage of development.

Gallahue (1982) divided fundamental skills into three stages: initial, elementary, and mature. The features or components listed in each stage of throwing also referred to body, elbow, trunk, feet, and follow through. These stages were presented in checklist form for the purpose of aiding the teacher in assessment (see Table 2).

Williams (1983) devised two phases: preparatory phase

Table 2

Throwing

Developmental Sequence Checklist*

INITIAL STAGE

_The action is mainly from the elbow
_Elbow of the throwing arm remains in front of the body; action resembles a push
_Fingers spread at release
_Follow through is forward and downward
_Trunk remains perpendicular to the target
_Little rotary action during throw
_Body weight shifts slightly rearward
_Feet remain stationary
_There is often purposeless shifting of the feet during preparation of throw

ELEMENTARY STAGE

_In preparation, arm is swung upward, sideways, and backward to position of elbow flexion
_Ball is held behind head
_Arm is swung forward, high over the shoulder
_Trunk rotates toward the throwing side during preparatory action
_Shoulders rotate toward throwing side
_Trunk flexes forward with forward motion of arm
_Definite forward shift of body weight
_Steps forward with leg on same side as throwing arm

MATURE STAGE

_Arm is swung backward in preparation
_Opposite elbow is raised to balance preparatory action in the throwing arm
_Throwing elbow moves forward horizontally as it extends
_Forearm rotates and thumb ends up pointing downward
_Trunk markedly rotates to throwing side during preparatory action
_Throwing shoulder drops slightly
_A definite rotation through hips, legs, spine, and shoulders during throw
_Weight during preparatory movement is on the rear foot
_As weight is shifted, there is a step with the opposite foot

*Taken from: Gallahue, D. (1982). Understanding motor development in children. New York: John Wiley & Sons.

and action phase, to classify the three body components of trunk/head, arm, and leg action along with a control component. She used three stages in direct reference to age (see Table 3).

Another view of intra-task sequential skill development classified skills according to individual body components (Roberton, 1978b). For example the trunk component in the overarm throw was classified separately from any arm or leg action which occurred simultaneously. Each component was analyzed into the number of steps which occurred in the process of skill development (see Table 4).

Clark and Phillips (1985) used a component approach to analyze the standing long jump. They utilized kinesiological film analyses to determine the levels of development of both arm and leg components separately (see Table 5).

Wickstrom (1983) explained skill development in terms of developmental trends. Developmental trends defined the skill development process in a broader or more general interpretation as opposed to the more specific or precise methods described previously. The trend was meant to view the change in skill development as more continous than step-like. An example of a list of developmental trends for a specific skill can be seen in Table 6.

Table 3

Process Characteristics of Skipping*

Mature Pattern (mastered reasonably well by age 6-7):
Trunk is erect; focus is forward.
Arms swing freely in opposition to legs.
Knee and ankle extend for take-off.
Knee and ankle flex upon landing.
Nonsupport leg flexes to aid elevation.
Body is suspended in air momentarily.
Continuous alternate step-hop foot pattern.
Movement is smooth, rhythmical, springing, effortless.

DEVELOPMENTAL COMPONENTS	STAGE 1 (4 YRS.)	STAGE 2 (5 YRS.)	STAGE 3 (6 YRS.)
Trunk and Head Position			
trunk is erect	X	X	X
focus is downward	X		
focus is forward		X	X
Arm Action			
move in a jerky fashion or sideways across the body	X		
move freely in opposition to legs		X	X
elbows flex to aid elevation			X
Leg Action			
flat-footed pattern is used	X		
limited flexion and extension on landing and take-off	X		
balls of feet receive weight; ankle and knee flex upon landing			X
knee and ankle extend for take-off			X
nonsupport leg is stiff	X	X	
nonsupport leg flexes to aid elevation			
Control			
skips with one foot while other steps or runs (one-sided skip)	X		
alternate step-hop pattern is used		X	
a shuffle step is executed	X		
movement is jerky and nonrhythmical	X	X	
movement is smooth, rhythmical, and effortless			X
body is suspended in air momentarily		X	X

*Taken from: Williams, H.G. (1983). Perceptual and motor development. New Jersey: Prentice Hall.

Table 4

Developmental Sequences for the Skip*

Leg Action Component
Step 1. One-footed skip . One foot completes a step and hop before the weight is transferred to the other foot. The other foot just steps.
Step 2. Two-footed skip; Flat-footed landing . Each foot completes a step and a hop before the weight is transferred to the other foot. Landing from the hop is on the total foot, or on the ball of the foot, with the heel touching down before the weight is transferred (flat-footed landing).
Step 3. Two-footed skip; Ball of the foot landing . Landing from the hop is on the ball of the foot. The heel does not touch down before the weight is transferred to the other foot. Body lean increases over that found in Step 2.
Arm action component
Step 1. Bilateral assist. The arms pump bilaterally up as the weight is shifted from the hopping to the stepping foot and down during the hop takeoff and flight.
Step 2. Semi-opposition . The arms first swing up bilaterally. During the hop on the right foot, the right arm moves down and back only slightly while the left arm continues to move backward until the step on the left foot. Then, both arms again move forward and upward in a new bilateral pumping action. Now, however, the left arm moves back only slightly while the right arm moves backward until the step on the right foot. Although the arm action has the beginnings of opposition, at some time in the arm cycle both hands are in front of the body.
Step 3. Opposition . The arm opposite the stepping leg swings upward and forward in synchrony with that leg and reverses direction when the stepping leg touches the floor. The arm on the same side as the stepping leg moves backward and down in opposition to the stepping leg. At no time are both hands in front of the body.

*Taken from: Roberton, M.A. & Halverson, L. (1984). The developing child-his changing movement. In B. Logsdon, et. al. (Eds.), Physical Education for Children: A Focus on the Teaching Process . Philadelphia: Lea & Febiger.

Note: These sequences, hypothesized by Halverson, have not been validated.

Table 5

Clark and Phillips Developmental Sequences*

Standing Long Jump

LEVEL I : Arm action: No arm action: arms remain immobile throughout propulsive phase; may exhibit shoulder girdle retraction ("winging") close to take-off. Leg action: Stepping out; a one-footed take-off.

LEVEL II : Arm action: Shoulder flexion only; arms remain immobile during lower extremity flexion. Shoulder flexion occurs with lower extremity extension; some shoulder abduction may be seen. Leg action: Knee extension precedes heels up.

LEVEL III : Arm action: Incomplete biphasic arm action; shoulder hyperextension occurs during lower extremity flexion; shoulder flexion occurs with lower extremity extension; shoulder flexion incomplete (less than 160 degrees) at take-off. Leg action: Knee extension and heels up simultaneously.

LEVEL IV : Arm action: Complete biphasic arm action; same as Level III except that shoulder flexion is complete (greater than 160 degrees) at take-off. Leg action: Knee extension follows heels up.

*Taken from: Clark, J. and Phillips, S. (1985). A developmental sequence of the standing long jump. In J. Clark & J. Humphreys, Motor Development Current Selected Research , Volume 1.

Table 6

Wickstrom's Developmental Trends

Major Trends for Running

1. An increase in the length of the running stride.
2. A decrease in the relative amount of vertical movement in each stride.
3. An increase in hip, knee, and ankle extension at takeoff.
4. An increase in the proportion of time in the nonsupport phase of the stride.
5. An increase in the closeness of the heel to the buttock on the forward swing.
6. An increase in the height of the forward knee at takeoff.
7. A decrease in the relative distance that the support foot is ahead of the center of gravity of the body at contact.

*Taken from: Wickstrom,R.L. (1983). Fundamental motor patterns Philadelphia: Lea & Febiger.

This concept of intra-task stages of development has traditionally meant that everyone exhibited the same predictable sequence of body actions during the acquisition of a skill (Bayley, 1936; Haubenstricker, Branta, & Seefeldt, 1983; Roberton, 1978a; Williams, 1983; Wild, 1938). The authors cited here were not in complete agreement about the rate at which an individual would pass through the sequences. For example: Wild (1938) assigned an age range to each of the four general stages of development in throwing. Gallahue (1982) did not include any reference to age. Williams (1983) included an introductory statement for each skill pertaining to the age at which the skill would be mastered. Haubenstricker, Branta, and Seefeldt (1983) presented tables depicting the sex and age of children performing at various stages of basic skills. Roberton and Halverson's (1984) research referred to developmental sequences as age related but not age determined.

Two Approaches to Intra-task Skill Development

This section of review examines more closely the two approaches to intra-task motor skill development assessment: (a) the total body configuration approach and (b) the component approach. Each is defined, explained by means of related research and analyzed in terms of strengths and weaknesses.

Total Body Configuration Approach

Research on the total body configuration approach (Seefeldt, Reuschlein, & Vogel, 1972) began with the desire to construct a scientifically based curriculum for physical education. This focus was a result of finding no systematic plans of motor performance evaluation. The quantitative measures used during this time resulted in such products as acceptable class standards and scores of performance. Investigation into the use of these measures found that both immature and mechanically unsound skill patterns were being used to achieve these standards and scores.

The total body configuration approach was developed from biomechanical principles based on longitudinal data of children between the ages of 1 and 12. The mature criterion of a skill was defined through performance by highly skilled adult athletes. Abrupt change in a joint position in relation to its previous position indicated a shift from one stage to another. This change in position was indicative of a more mature stage if the result of the joint position change allowed any of the following to occur: increase in the range of movement, addition of rotating joints to the summation of force, improvement in the smoothness of the movement, or improvement in body position (Seefeldt & Haubenstricker, 1982). Although, as

stated previously, sufficient cohesion was found between the components as to classify them into one stage, the advocates of the total body configuration approach did not exclusively believe that all of the components in any one stage are an indivisible unit (Seefeldt, Reuschlein, & Vogel, 1972). It should be noted that these components were orignally based on the research by Wild (1938).

Seefeldt, Reuschlein, and Vogel (1972) first identified developmental stages for four skills: throwing, catching, jumping, and running. These were identified from films of 150 children between the ages of 18 months to 8 years. The stages were meant to be readily discernible through observation by the teacher and therefore were reported in simple descriptive form. By 1976, Seefeldt and Haubenstricker (1982) had identified developmental stages for a total of nine skills.

It is often the case that two similarly skilled children may look quite different while performing the overhand throw and yet, through use of the total body configuration approach, might possibly be classified in the same stage. Because of the generality of the stages and the nature of proven variation in the development of each body component, it would seem that the stage approach proponents must in fact be making some type of undisclosed judgment as to the ranking of component importance in each

stage. For example: If the child displayed the trunk and leg characteristics of one stage and arm characteristics of another stage, where should he be classified? Which component carries more weight? These are the types of questions one must answer when using a more general stage approach. The total body configuration approach was geared toward ease of use and to result in a general feel for the developmental level of a performer.

Component Approach

The Component Approach is an orientation to the development of motor skills which acknowledges the development of component parts at different rates within an individual and between individuals (Roberton, 1977a). The underlying principles for emphasizing the various components separately stated that the total body configuration stages were (a) too general and did not take into consideration the wide variability of individual development and (b) that stages existed only at the component level.

In her early work, Roberton (1977a) broke down each skill into its body components, e.g., arm and trunk action components were identified for throwing. This approach was also based on the research of Wild (1938). Roberton (1977a) originally hypothesized five stages of development within the arm action component and eight stages of

development within the pelvis-spine action component. These stages were then tested across trials lending support to the validation of these stages. All subjects had at least half of their trials in one category and any variations were only to adjacent stages (Roberton, 1977a). Several results of this study lent support for the individual component approach used by Roberton. Some of these were:

1. Of 54 children filmed yearly for three years, only 6% showed change in both their humeral action and their trunk action.

2. Only 7% showed change in both their humeral action and their relative length of stride.

3. Some children showed change in humeral action but not the other components.

4. Some children showed change in other components but not humeral action. (Roberton, 1978a, p. 74)

It is these data which underly Roberton's belief that component assessment of skills is a more correct and precise method of developmental assessment than the total body configuration approach. Other research supports the component level development of skills through cross-sectional and longitudinal validation procedures (Roberton, 1978a; Roberton & Langendorfer, 1980; Halverson & Williams, 1985).

In later work, Roberton and Halverson (1978c) further subdivided the arm action component of the throw into three parts: humeral action, elbow action, and forearm action. Other components of the throw were six categories of trunk action, three categories each for range of pelvic and spinal rotation, and three categories for stepping action. In their most recent work, Roberton and Halverson have identified nine skill sequences using the component approach (Halverson, 1985; Halverson & Williams, 1985; Langendorfer, 1982; Roberton, 1983; Van Sant, 1983; Williams, 1980). Only three of the nine skill sequences, throw, strike, and hop, have been completely validated to date. All of the other sequences have been hypothesized and/or partially validated.

The component approach presents a more flexible model which accounts for the different rates of development within the same individual. It is a more technical and scientific method of assessment.

In summary, the two approaches stem from the same scientific research. The total body configuration approach grouped developmental characteristics to result in general stage sequences for each skill. The component approach separated body components involved in each skill and identified the developmental sequences for each component. It should be kept in mind that the general

purpose and focus of each are, in fact, different and any practitioner trying to choose between them should first identify their own purpose and focus as the basis for choice of one approach over the other.

Specific Motor Skill Research: Hop and Skip

Two fundamental skills were selected for use in this study: hop and skip. These specific skills were selected because they are believed to be basic to other more complex skills and they require skillful organization of the spatial-temporal relationships between body segments or components (Halverson & Williams, 1985).

Hopping has been defined as "...projecting the body into the air by the propulsive force of one foot and the subsequent landing on that same foot" (Broer & Zernicke, 1979). Roberton and Halverson (1984) referred to hopping as a difficult one foot to one foot relationship. Although seemingly simple, the skill of hopping involves dynamic balance, propulsive strength, timing, rhythm, and coordination. Hopping has more commonly been cited for its use in combination with other skills than in isolation. It has been used in such areas as dance, rope jumping, gymnastics and as a type of transitional step in sports when a quick change of direction or pattern is needed (Wickstrom, 1983).

Roberton and Halverson (1984) have described skipping

as a double-task pattern because it combines two basic forms of locomotion, walk and hop in an uneven rhythmical pattern. The step and hop are performed by one foot before the weight is transferred to the other foot. A considerable amount of balance control and timing are required to perform the skip (Williams, 1983).

The appearance of the skills of hop and skip in the literature has primarily taken the form of product measures of (a) the age at which the skills could initially be identified (Bayley, 1967; Frankenberg & Dodds, 1967; and McCaskill & Wellman, 1938) and (b) the number of repeat occurrences performed in a specific distance or length of time (Jenkins, 1930; Williams, 1983).

A search of physical education textbooks related to elementary physical education revealed the inclusion of the skills of hopping and skipping in a variety of forms. Several included reference to hopping and skipping as simply one item on a checklist or skill inventory (Flinchum, 1975; Seagrave, 1981). Others treated the skill with only a brief description (Burton, 1977; Corbin, 1980; Davis & Isaacs, 1983; Espenschade, 1980; Graham, Holt/Hale, McEwen, & Parker, 1980; Siedentop, Herkowitz, & Rink, 1984; Staniford, 1982). Several authors included a description of the skill, mechanical principles involved,

common faults, teaching cues, points to be stressed and activities to enhance development (Dauer, 1979; Kirchner, 1985; Schurr, 1980). Still other texts have presented developmental sequence information in checklist and descriptive forms for the teacher's use (Gallahue, 1982; Morris & Stiehl, 1985; Roberton & Halverson, 1984; Schurr, 1980).

The only substantial data based information on these two skills has come from Haubenstricker, Henn, and Seefeldt (1975), Seefeldt and Haubenstricker (1982), Roberton and Halverson (1984), and Halverson and Williams (1985).

Using the total body configuration approach, Haubenstricker, Henn, and Seefeldt (1975) identified four developmental stages for hopping. High speed film analysis of children performing the skill provided the data base for the stages. Three developmental stages were identified for skipping by Haubenstricker in 1974 (Seefeldt & Haubenstricker, 1978). No further information or validation has been reported for either skill.

As was reported earlier in this review, Roberton and Halverson (1984) hypothesized leg and arm components for both hopping and skipping from filmed data. The hopping sequences originally reported by Roberton and Halverson in 1977 were recently revised and validated by Halverson and

Williams (1985). The sequences included four leg-action steps and five arm-action steps. Skipping sequences were also hypothesized in 1977 by Roberton and Halverson with three steps for arm-action and three steps for leg-action components. No further information of validation for skipping has been reported.

Halverson and Williams (1985) conducted an extensive sequence validation procedure for examining hopping over distance. The three purposes of the study were to (1) verify the comprehensiveness of the sequences, (2) analyze the accuracy of these sequences at early developmental levels, and (3) compare hopping developmental levels between preschool boys and girls. Hopping for distance was filmed using 72 children ages 2 to 6. The sequences were found to be comprehensive after slight modifications. Support was found for the current belief that mature hopping behaviors were not found in most children by age five. It was also found that gender differences were consistent with earlier findings, girls were placed at advanced levels of development more often than boys at age 5. In summary it was found that little research regarding the developmental skills of hop and skip has been conducted. Information on these skills was mainly quantitative in nature.

CHAPTER III

PROCEDURES

Five procedures used to conduct this study will be discussed: subject selection, videotaping procedures, objectivity training, coding, and report to parents. The chapter starts with a brief description of the situation in which the study was conducted.

Situation Background

The study was conducted at Willow Grove School, Buffalo Grove, Illinois, a northwestern suburb of Chicago. The regular teaching situation involved two physical educator practitioners working together in the same gym with two classes of students per 30-minute class period. One teacher was female, one was male.

The first teacher (Coder #1) was the main investigator in this study. Teaching background of the first teacher was 10 years of public school elementary physical education instruction. Academic background included a Bachelor of Education in Physical Education, Master of Education in Curriculum and Supervision, and

this study represented the final requirement for a Doctorate of Education in Physical Education.

The second teacher (Coder #2) had taught elementary physical education for 15 years, 9 of those with the investigator in a team teaching situation. Academic background of the second teacher included a Bachelor of Education in Physical Education, Master of Education in Administration, and continuing coursework in the area of curriculum. This teacher was a highly motivated instructor who was extremely dedicated to maintaining a high quality curriculum. This was demonstrated by extensive work with the first teacher in all areas of the elementary physical education curriculum: planning, instruction, and evaluation. Participation in this study marked the end of his physical education classroom career as he assumed a principalship the following year.

The community in which this study was conducted was of at least middle class socio-economic status. Community surveys indicated that many of the parents held college degrees and many were business owners/managers. High academic expectations permeated this community as reflected by their understanding of statistical interpretations of academic test results, scores, and norms. A highly competitive attitude was not only reflected in academics but also in sports as seen by the

large number of competitive athletic teams in which children from age 5 and up participated.

Individual class size varied from 17 to 25 students. Since two classes were always in the gym together, the class load for both teachers per 30-minute period varied from 34 to 50 students. The classroom teachers were not present during class time. Grade 1, 2, and 3 students had daily physical education while kindergarten met for two 20-minute periods weekly. Two different grade levels were commonly in class together. Both physical education teachers had worked together in this school for 10 years.

The subjects were familiar with videotaping procedures as they had been involved with an assessment project on one previous occasion. The actual setting and schedule of classes were not changed for the purpose of this study in the attempt to maintain the actual school situation.

Selection of Subjects

Subject sample of 206 students, from a total of 248,were included in this study from the entire K-3 population within a K-5 school. The rationale for choosing these grade levels was based on (a) the common practice that physical educators assess the motor development status of the primary grades, and (b) research findings which suggest that mature hop and skip patterns

are reached by approximately age 6 (Williams, 1983).

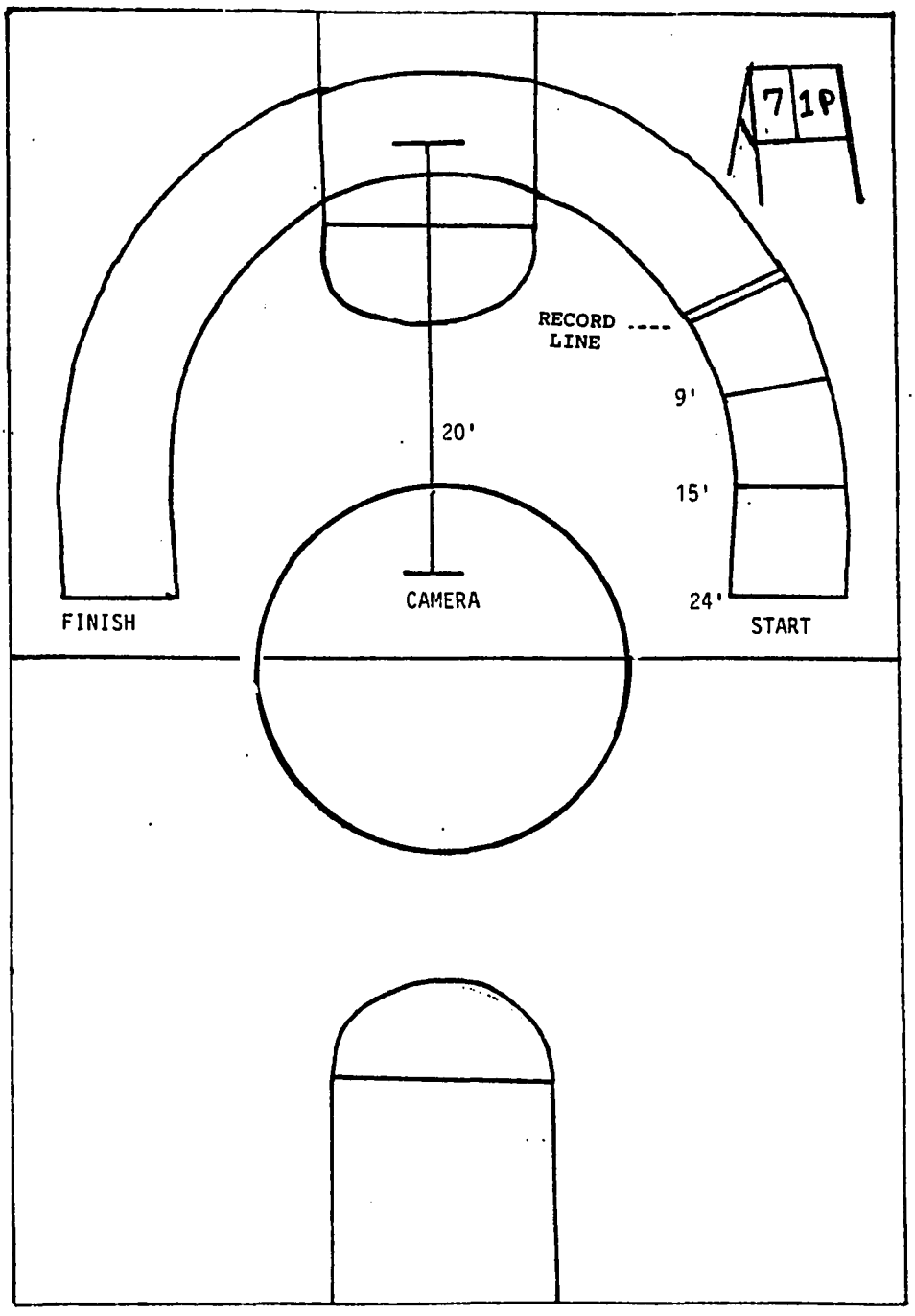
Permission to conduct the study was obtained from the chairman of the School of Health, Physical Education, Recreation and Dance - Human Subjects Review Committee. Permission was also obtained from the principal and the district superintendent to conduct the study during the course of the school day. Next, the informed consent form and an informational letter describing the procedures and purposes of the study and all subject expectations were sent home to the parents of all 248 K-3 students. Actual returns of parent signed consent forms reduced the total sample to 206 subjects. The totals were divided among the four grade levels as follows: kindergarten - 39, first grade - 60, second grade - 51, and third grade - 56. A copy of the letter and consent form can be found in Appendix B.

Videotaping Procedures

Filming Techniques

Videotaping of the subjects was conducted in a gym slightly larger than a regulation size basketball court surrounded by a 6-foot outer border. An arc shaped performance track 73 feet in length and 3 feet in width was marked with colored plastic tape on one half of the gym floor (see Figure 1). To maintain consistency of camera placement, a tape mark was placed on the floor at a

Figure 1. Performance Track



20-foot radius from the center of the performance track. An arc was chosen to allow the camera to be aimed consistently at the midline of the body.

A line was marked 24 feet from the end of the performance track to indicate where the camera would begin to record performance. Next, 3 starting lines were marked in different colors 9, 15, and 24 feet back from the camera recording line. Three different starting lines were used (a) to allow time to increase the potential for eliciting the most mature levels of the skills, (b) to protect against fatigue affecting the children's performance, and (c) to accommodate the differences in skill and developmental levels. Starting lines were assigned as follows: 9-foot: kindergarten hop and skip; 15-foot: first grade hop and skip, and second grade hop; 24-foot: second grade skip, and third grade hop and skip.

At the start of videotaping, the video camera was directed at the camera recording line and identification number stand. The record function was depressed before the subject began performance to allow for camera lag time. When the subject crossed the camera record line the camera was rotated in a scanning motion on the tripod, keeping the subject centered in the view finder, following the subject to the end of the performance track when the record function was stopped.

Video Equipment Description

A General Electric video tape recorder Model #5014X was used to record all of the skill performances. This recorder had the capacity for variable speed slow motion, 1/5 to 1/30 frames per second, frame by frame advance, stop action, and forward/backward high speed visual search. All of these functions were operable through use of a wireless infra-red remote control device. The video camera was a Panasonic ultra light auto-focus color camera, Model #PK 450S. This camera had the capacity for automatic focus, zoom feature, fade in/out feature, and a time/date display. The camera was supported by a standard tripod which allowed the camera to be rotated 360 degrees for scanning purposes. A portable 13-inch black and white RCA television was used as a monitor during actual videotaping. This made it easier and less tedious than trying to view each subject by looking through the small camera viewfinder. Maxell Epitaxial videocassete tapes were used for recording. These videotapes were found to perform much better during slow motion and frame by frame functions for viewing purposes than videotapes of lesser quality.

Subject Identification

Subjects were listed alphabetically in their respective classes, 3 classes for each of the 4 grade

levels for a total of 12 classes. Each class was given a code, e.g.: 2S=second grade-Smith. Next, consecutive numbers were assigned to each subject within their class for identification. A flip card system was designed to identify subjects during videotaping. Two sets of cards were prepared, one with the identification numbers 1 - 25, the other with the class code. These cards were attached to rings on a tubular metal stand 5 feet high by 3 feet wide. The stand was placed behind the camera record line as shown in Figure 1.

During actual videotaping, the subjects were lined up according to their identification number. As each subject waited for the signal to begin their skill performance, the camera operator referred to the subject identification number list and called out the corresponding number for the subject performing the skill. A student assistant flipped the identification number cards according to verbal instruction from the camera operator.

Performance Instructions

Verbal instructions were given to all subjects in the same manner. Two classes entered the gym together at which time the study and procedures were briefly explained to them. Next, it was explained that they were to wait at the appropriate line until the camera operator said "Go". They were instructed to stay in the track while hopping or

skipping until they passed the finish line. The entire class was told which skill to perform and the specific instructions for each were given. Instructions for the skip were to skip as fast as they could. Instructions for the hop were to hop using forceful hops which covered as much distance as possible. This was demonstrated by the investigator.

Following the instructions, one class was lined up in their identification number order at the appropriate starting line while the second class went to the other side of the gym. The camera operator then re-checked the identification number order for errors, absences, and parent consent status. Videotaping was then begun. No instructions were given during the videotaping unless a subject had difficulty or needed them repeated.

When the subjects completed their performance they were instructed to wait for the camera operator to indicate whether it was acceptable. If so, they were to join the other class, if their performance was not acceptable they were asked to repeat their performance immediately. The criterion for acceptable performance was at least five consecutive hops or skips. Approximately 3 subjects per class in kindergarten were asked to repeat their turn and 1 per class for grades 1, 2, and 3. Finally, when the entire class had been videotaped on one

skill, either the groups were rotated, or the camera was rolled to the side and both groups participated in the instructional activity based on the videotaping schedule which can be found in Appendix C.

Instructional Activities

After the videotaping instructions were given, one class went to the videotaping site while the other was involved in instructional activities which met the following criteria:

1. The activitiy was part of the regular curriculum.
2. Maximum participation was maintained.
3. Activities were grade level appropriate.
4. The activity could accommodate increasing numbers of participants as the other class filtered in.
5. It created as little interference as possible with the videotaping.

A brief description of activities used follows. A seven-station fitness circuit with which they were familiar was used for third grade. The circuit was self regulated through use of task cards at each station which stated a description or picture of the activity and the amount to be performed before advancing to the next station. All other grade levels participated in varied tag-type games directed by the second teacher. On a few occasions the second teacher conducted the instructional

activities outdoors to allow a quieter environment for videotaping. This was continued for the first three days of videotaping. The activity was then changed to soccer instruction for all grades. Each student in the class worked on control with their own ball on half of the gym under close supervision. Only 2 out of 20 balls rolled into the videotaping area in a 30-minute period which indicated that it did not matter what activity was used as long as it was presented with confidence and in keeping with regular procedures.

The remaining procedures involved training coders to use the component approach to code the skill performance of all subjects. Methods of determining objectivity were selected. A criterion videotape was developed to be used at the completion of coder training. Decision rules were standardized, and revised level of agreement was established. After objectivity was achieved, data were collected from the videotapes and parents were sent profiles of the developmental levels of their child's hopping and skipping.

Objectivity

For the purpose of this study, exact percentage of agreement and Cohen's Kappa coefficient of objectivity were used to determine coder agreement. Coder agreement was defined by Frick and Semmel (1978) as the consistency

between coders when observing the same subjects or behaviors.

Exact percentage of agreement of .85 was originally established as the level of acceptance needed before data collection began. The method used to calculate this was to divide the number of perfect agreements between two coders by the total number of observations for each individual component.

$$\text{Percent Exact Agreement} = \frac{\text{N (perfect agreement)}}{\text{N (total observations)}}$$

Cohen's Kappa coefficient of objectivity was also used to examine percent of coder agreement. This method utilized contingency tables to take into account the estimated extent to which chance agreement had been exceeded when two observer's scores were compared. Separate contingency tables were used for each of the four components observed; i.e., hop-legs/arms and skip-legs/arms (see Appendix D). The observed marginals of these were used in the formulas as shown below.

Po - Observed % Agreement

$$P_o = \frac{1}{N} \sum_{i=i}^{c} n_{ii}$$

Pe - Estimated % of Chance Agreement

$$P_e = \frac{1}{N^2} \sum_{i=i}^{c} (n_{i+})(n_{+i})$$

k - Cohen's Kappa coefficient of objectivity

$$k = \frac{P_o - P_e}{1 - P_e}$$

Cohen's k was chosen because it most closely fit the data from the component approach observational system. The low cell frequency involved in this study could cause an inflated exact percent of agreement leading to an ambiguous interpretation (Frick & Semmel, 1978). Also the possibility for chance agreement is not considered in exact percent of agreement.

The kappa coefficient shows the agreement between two observers for an individual component ruling out an estimated possibility of chance agreement. Since the category frequency distribution was uneven, correction for chance agreement was important.

Three measures of observer agreement were computed:

1. Criterion Related Agreement-Criterion Videotape (Exact)
   a. Prior to coding the videotapes

2. Inter-coder Agreement (Exact & Cohen's k)
   a. Midpoint of coding
   b. Final - one week after coding

3. Intra-coder Agreement (Exact & Cohen's k)
   a. Midpoint of coding
   b. Final - one week after coding

Criterion Videotape (CVT)

One purpose of this study was to determine the process and amount of time required for objectivity training. The first step was to create a videotape representative of the conditions under which the actual coding would take place. Frick and Semmel (1978) suggest that to train for objectivity, a training videotape should be made containing solely unambiguous examples of each of the component sequence steps. Because it is difficult to obtain completely unambiguous examples of hop and skip sequences and the fact that this would not reflect a naturalistic classroom, a training videotape of both ambiguous and unambiguous subjects was developed. A sample of 42 of the actual subjects were videotaped separately to be used for the criterion videotape. Half of the subjects performed hopping, the other half performed skipping.

It has been noted that a number of observation systems are highly dependent on their original developers

for purposes of training coders. To establish the criterion measure, the originators Dr. Roberton and Dr. Halverson, both researchers in the Motor Development and Child Study Lab at the University of Wisconsin-Madison, were requested to code the videotape. After they accepted, the tape was mailed to them, coded and returned. This coding was used by Coder #1 and #2 as the criterion measure against which an acceptable agreement would be estimated prior to actual coding. After reaching acceptable agreement with the criterion measure videotape, the coders were considered experts.

Coder Training

The two coders began their training at the completion of the videotaping of all subjects. The training process followed the pattern shown below.

1. Study, discussion, and clarification of the developmental sequences.

2. Explanation and discussion of the coding form and procedures for coding (Appendix E).

3. Practice verbal coding together.

4. Code a randomly selected class from the videotapes.

5. Re-code the same class with a 1-day interval.

6. Compute intra and inter-coder exact agreement for each comparison, for each component.

This process was repeated, each time with a different randomly selected class involving 18 separate codings over a 10-day period. Intercoder agreements were computed to acquire a general feel for any great differences in agreement between coders.

Decision Rules

During this process, a decision rule log was used to record elaborations and clarifications of the developmental sequences which were specific to the particular situation. This was vital to the entire training process in order to maintain consistency of coding. A complete list of decision rules can be found in Appendix F.

Level of Agreement

When the coders' level of agreement was close to the accepted level of .85, the criterion tape was coded to determine exact percent of agreement. Acceptable agreement of .85 was not achieved between the coders and the criterion in any component. This was due to the effect that the "transitional" decision rule had on coding. The criterion tape contained several transitional codings which indicated that the subject showed clear evidence of two adjacent steps of development. These codings had been recorded with both steps listed; such as "2/3". Upon discussion with Dr. Roberton and Dr. Halverson, a decision

was made that if a transitional behavior was exhibited by a subject, it was perfectly acceptable to record the higher step when trying to compute exact agreement.

Also as a result of this discussion, the acceptance level of .85 was revised to .80 because of the very nature of the developmental process which can create ambiguous behaviors. Dr. Roberton and Dr. Halverson predicted that coder disagreement on these ambiguities would render a more realistic view of an actual situation. It is highly unlikely that an observational system can be defined with perfectly mutually exclusive categories or that coders can be in perfect agreement over somewhat ambiguous behavior. The percent agreement including transitional codings was computed based on this decision rule.

Acceptable agreement of .80 was achieved as a result of this decision in all but two of the eight components. The coders reviewed the decision rules and retrained on a random sample of subjects from the actual data. A random sample of 10 subjects from the criterion tape was then coded resulting in acceptable levels of agreement. At this point, coding was begun.

Finally, exact percent of agreement was re-assessed both at the mid-point of data collection and one week after completion of data collection. Midpoint coder agreement was computed as a precaution against coder skill

deterioration during data collection. Each coder selected and coded a random sample of 10 subjects hopping and 10 subjects skipping from their respective data . Coder #2's sample was then coded by Coder #1 to compute inter-coder agreement.

Coding

Data were collected from the videotapes by coding the developmental step for each component of each subjects' hopping and skipping performance according to the component approach (Halverson & Williams, 1985; Roberton & Halverson, 1984). A total of 6 classes, 3 hopping and 3 skipping were coded by each coder. Midpoint percent of agreement was calculated and it was found that level of agreement was maintained. The remaining 12 classes were then coded because no retraining was necessary.

Report to Parents

At the completion of the study, parents received a profile of the developmental levels of their child's hopping and skipping along with a letter of explanation and a short questionnaire designed to elicit a very general amount of feedback (see Appendix G). The mean step of development as recorded on the coding form was transferred to an individual profile for each subect. See Appendix A for the complete description of component sequences. These three items were mailed in an 8 x 10

envelope along with a self addressed stamped envelope for return of the questionnaire.

CHAPTER IV

PRESENTATION AND DISCUSSION OF DATA

The purpose of this study was to determine the feasibility of using Roberton and Halverson's (1984) component approach to assess the developmental sequences of the hop and skip in a public school setting. Subjects were 206 K-3 children in a K-5 school. Data are presented and discussed as they relate to the five research questions.

1. What was the length of time needed to train teachers to code hop and skip component levels of development with at least .80 criterion agreement?

2. Can teachers maintain at least .80 agreement during the entire coding procedure?

3. What were the actual time and cost factors for videotaping and coding procedures?

4. What were the parent reactions to the motor development profile for their child?

5. What factors influenced the procedures of videotaping, teacher training, and coding?

Following the presentation and discussion of the data the

question of feasibility will be addressed.

Question #1

What was the length of time needed to train teachers to code hop and skip component levels of development with at least .80 criterion agreement?

The total length of time needed to train the two teachers in this study to code with at least .80 criterion agreement was 9 hours 40 minutes for Coder #1 and 5 hours 45 minutes for Coder #2 (see Table 7). Coder training time prior to the coding of the criterion videotape (CVT) was spread over a 10-day period. The total time spent in individual preparation, reading, and studying the sequences was 1 hour 10 minutes for Coder #1 and 45 minutes for Coder #2. This time was distributed in 5 and 10-minute blocks immediately before each practice coding session. Coder #1 began training first with the intention of achieving expert coder status in order to train coder #2. Coder #1 spent 8 hours 30 minutes in practice coding time, 3 hours 30 minutes more than Coder #2. The criterion videotape was not returned from Dr. Roberton and Dr. Halverson in time to complete the training procedure in this manner.

When the CVT arrived, both coders coded the tape together to determine if .80 agreement was achieved. The results can be seen in Table 8, column 1 CVT. The

Table 7

Coder Training Time

	Coder #1	Coder #2
Preparation Time (Study of Sequences)	1 hr 10 min	45 min
Practice Coding Time-Total	8 hrs 30 min	5 hrs
TOTAL	9 hrs 40 min	5 hrs 45 min

accepted level of agreement was not achieved initially in any of the four components for Coder #1, and was only achieved in two out of four components for Coder #2: hop-leg (.81) and skip-arm (.80). Intercoder agreements for CVT were acceptable for two of the four components: hop-leg (.86) and skip-leg (.85).

Column 2 depicts CVT with transitional coding consideration. The transitional coding decision rule allowed for a behavior to be coded in the higher of the two adjacent steps when clear evidence of both steps was observed. With the transitional decision rule in mind the agreements in column 1 were re-computed and results then found coder agreement, CVT with transitional, in the acceptable range in three out of four components for both Coder #1 and Coder #2. The hop-arm component for both coders was the only one in which acceptable agreement was not achieved (Coder #1 - .62; Coder #2 - .66). Retraining on the hop-arm component was necessary.

The retraining process involved reading and study of the component sequence and decision rules concerning the hop-arm component. This was followed by re-coding a random sample of the criterion videotape. Only one re-coding was necessary for both coders to achieve acceptable level of agreement as reported in Table 8, column 3. This retraining might not have been necessary

Table 8

Criterion Videotape (CVT) Coding

Exact Percent Agreement Between:
Coder #1, Coder #2 and CVT;
Coder #1 and Coder #2

	Coder #1		
	CVT	CVT w/transit.	After retraining
Hop			
Legs	.76	.86	N/A
Arms	.52	.62	1.00
Skip			
Legs	.55	.85	N/A
Arms	.75	.90	N/A
	Coder #2		
Hop			
Legs	.81	.90	N/A
Arms	.57	.66	.82
Skip			
Legs	.75	.95	N/A
Arms	.80	.90	N/A
	Inter-Coder Agreement		
Hop			
Legs	.86	.91	
Arms	.71	.81	
Skip			
Legs	.85	.90	
Arms	.70	.90	

if the transitional ruling had been defined beforehand.

A possible reason for the difficulty with the hop-arm component may have been the actual component description. Halverson and Williams (1985) in their recent research on hopping have shown that this component is very difficult to observe and code. The difficulty in this study may have been affected by using ambiguous examples of the hop for the training process. If completely unambiguous examples of the five categories for hop-arm action were used, it can be hypothesized that the coders would have achieved acceptable agreement with less difficulty. This increase in time was not considered to be poor training on the part of these coders. The fact that both coders were very close in their level of agreement on the hop-arm component would seem to lend support to the difficulty of observing and coding this component. The rate of achieving acceptable agreement was not appreciably different between the two coders even though the length of training time for Coder #1 was 3 hours 30 minutes more.

The total amount of coder training time could possibly be reduced in these ways:

1. Pre-establishment of decision rules.

2. Availability of training videotape with unambiguous examples of the sequence steps accompanied by written rationale for each example.

If standardized in this way, the training could efficiently be completed in approximately five hours; three for the hop components and two for the skip components. This could be broken down into 10 thirty-minute sessions or 5 one-hour sessions. Each session would include one-third preparation time and two-thirds practice coding time. If these procedures were followed it would seem possible to train a practitioner to achieve an acceptable level of criterion agreement. It is not known whether the typical practitioner would indeed be willing to invest 5 hours to achieve expert status on the Roberton and Halverson component approach to assessing developmental levels of the hop and skip.

Question #2

Can a teacher maintain at least .80 agreement during the entire coding process?

Results showed that both teachers in this study were able to maintain .80 or above exact percent agreement during the entire coding process except for the hop-arm component for Coder #2 at the final check (.60). As a precaution against coder skill deterioration both intra- and inter-coder exact percent agreement were computed at the midpoint of coding and one week after completion of coding (see Table 9). Each coder selected and coded a random sample of 10 subjects hopping and 10 subjects skipping from their respective data.

Table 9

Intra/Inter-Coder Percent Exact Agreement

Midpoint and Final

	Intra-Coder #1		Intra-Coder #2	
	Midpoint	Final	Midpoint	Final
Hop				
Legs	.89	.90	.90	.90
Arms	.89	1.00	.80	.60
Skip				
Legs	1.00	1.00	.90	1.00
Arms	1.00	.90	1.00	.90

	Inter-Coder Agreement	
	Midpoint	Final
Hop		
Legs	1.00	1.00
Arms	.80	1.00
Skip		
Legs	.90	1.00
Arms	.90	.80

The agreements shown in Table 9 were computed using each coder's own completed data, not the criterion videotape. Percent exact agreements at the midpoint were found to be .80 or above on all components of the hop and skip for both intra- and inter-coder computations for both coders. This indicated that retraining was not necessary. Had acceptable agreements not been obtained then it would have been necessary to determine the cause and retrain before completion of coding.

To further examine observer agreement the kappa coefficients for all components of Midpoint and Final check were calculated and are shown in Table 10. These coefficients indicated coder agreement with an estimated amount of chance considered.

Since the criterion videotape used in this study represents actual classroom behavior, Frick and Semmel (1978) have suggested a kappa coefficient of .75 as acceptable. At the midpoint check acceptable intracoder agreement was achieved by Coder #1 on all components, on two of four components for Coder #2 (skip-leg and skip-arm), and on two of four components for intercoder agreement (hop-leg and skip-leg). In total, an acceptable kappa was achieved in 8 out of 12 instances for both the midpoint and final check although not for the same components. In two components, the kappa changed from

Table 10

Kappa Coefficient

Midpoint and Final

	Intra-Coder #1		Intra-Coder #2	
	Midpoint	Final	Midpoint	Final
Hop				
Legs	.81	.79	.74	.80
Arms	.84	1.00	.62	.39
Skip				
Legs	1.00	1.00	.78	1.00
Arms	1.00	0	1.00	.63

	Inter-Coder Agreement	
	Midpoint	Final
Hop		
Legs	1.00	1.00
Arms	.64	1.00
Skip		
Legs	.80	1.00
Arms	.62	.52

below .75 midpoint to above .75 final:

1. Hop-leg Coder #2 .74 - .80
2. Hop-arm Inter-Coder .64 - 1.00

and in one other component the kappa changed from above .75 midpoint to below .75 final:

1. Skip-arm Coder #1 1.00 - 0
2. Skip-arm Coder #2 1.00 - .63.

The intercoder skip-arm component did not reach .75 for either midpoint (.62) or final (.52) check.

Since the kappa coefficient is a typically more conservative measure of agreement, it is logical to assume that these coefficients may be lower than the percent exact agreements. The overall low kappa's may be attributed in this case to sample size and the homogeneous grouping.

The low sample size of 10 which was used to check the midpoint and final agreement seemed to have an effect on the kappas. This was determined from closer examination of the final skip-arm component kappa of zero for Coder #1 (see Appendix D). Nine out of the 10 observations were grouped into one cell. This caused a poor distribution among the marginals and consequently an extreme kappa. If the sample size were larger it is hypothesized that the distribution among cells would have been greater, thus giving a truer picture of coder agreement.

Homogeneity of the entire sample is believed to have had an effect on the distribution among cell frequencies. The subjects were all members of intact classes most of whom had been part of the daily physical educaton program taught by the same two teachers for the duration of their attendance at that school. This could indicate that since they were all exposed to the same type of instruction over an extended period of time that they would exhibit a similar trend in skill level development. This would not necessarily reflect on the adequacy of the coders.

Question #3

What were the actual time and cost factors for videotaping and coding procedures?

The videotaping was conducted over a 6-day period during actual class time with a range of taping sessions from three to nine per day. The amount of time involved in videotaping all 12 classes was 1 hour 14 minutes for the hop and 2 hours 3 minutes for the skip (see Table 11). These times do not include the 5 minutes which was used each session for explanation and organization of the subjects according to identification numbers.

It is shown that 6 minutes were required to videotape 13 kindergarten subjects (K-1) hopping and only 4 minutes to tape 21 first grade subjects (1P). This might be attributed to (a) the higher level of understanding of first grade subjects, (b) more kindergarten subjects were

Table 11

Videotaping and Coding Time (Minutes)

HOP

Class	N	Videotaping Time	Coding Time	Coder
K-1	13	6	42	2
K-2	10	6	22	1
K-3	16	5	37	2
1-H	18	4	32	1
1-P	21	4	30	1
1-M	21	4	34	2
2-B	19	4	36	2
2-Bh	17	4	30	1
2-L	15	5	35	2
3-H	20	5	24	1
3-T	19	6	24	1
3-Th	17	4	16	2
TOTAL-HOP		1 hr 14 min	8 hrs 2 min	

SKIP

K-1	13	7	32	1
K-2	10	7	34	2
K-3	16	10	30	1
1-H	18	6	43	1
1-P	21	10	41	2
1-M	21	10	45	2
2-B	19	8	55	1
2-Bh	17	7	41	1
2-L	15	6	32	2
3-H	20	6	48	2
3-T	19	9	45	2
3-Th	17	7	37	1
TOTAL SKIP		2 hr 3 min	10 hrs 44 min	

asked to repeat their performance than first grade, and (c) the fact that it took longer for kindergarten to actually perform the same skill because it was more difficult for them. More time was required to videotape the skip than the hop. This was attributed to the nature of the skill requiring more time to perform. The coding took place over a 7-day period for Coder #1 and a 5-day period for Coder #2.

Coding time variability was attributed to the degree of ambiguity in the subjects' performance of the skills. Ambiguous performance typically meant that it was necessary to view the performance several times to determine the source of confusion; e.g.; clothing which limited the view, transitional behavior, technical difficulty such as scanning inconsistency.

Actual dollar cost to conduct this study would have been $1,456.00 if the video equipment needed to be purchased. Eight high quality videotapes were purchased for this study to place each grade level of each skill on a separate tape. The video camera used was the property of the school district and not purchased for this study. The video recorder was purchased specifically for the high quality frame advance and slow motion features. The cost of the equipment involved was:

Video camera	$700.00
Video Recorder	700.00
Videotapes	56.00
Total	$1456.00

During this study it was found that a less expensive video recorder performed equitably to the one purchased for the study. This was tested by both coders coding the same videotape on two different machines and comparing the results. The results were exactly the same. Coder #2 then used the less expensive video machine for coding data.

Question #4

What were the reactions of parents to the motor development profile on their child?

At the conclusion of coding, individual profiles of the hop and skip by component were prepared for all subjects and mailed to their parents. Included with this profile were a brief questionnaire and a letter of explanation (see Appendix G). Responses from question number one are presented in table form followed by discussion. Responses from questions two and three are presented in discussion form because the questions were general and required written response. Quotations cited in this section were taken directly from the Parent Comments. A list of all parent comments can be found in Appendix H.

Overall Returns

Of the 206 questionnaires sent out, 56 or 27% were returned. The returns by grade level can be seen in Table 12. The highest percent of return was first grade at 35% followed by second grade with 31%, kindergarten with 23%, and third grade with 18%. This low return rate indicates a need to be cautious in interpretation of the responses. Although insights gained were considered of value, they cannot be generalized across the population in this study.

This overall low number of returns may have been affected by the fact that they were mailed home three days before the last day of the school term. Most of the questionnaires were returned within one week. The remainder of the returns were distributed over three months.

A possible explanation of the third grade response rate of 18% may be that parents tended not to be concerned with this motor development information unless a problem with their child was indicated. As expressed by one parent, they could see no use for this information "...unless there was a medical or coordination problem." Parent Comment Question 2 Grade 3-#3. (PCQ2 3-3)

The low kindergarten return rate of 23% is being attributed to a previous situation which occurred in the district less than four months prior to this study. The

Table 12

Questionnaire Returns

Grade	No. of Returns	Percent
K	9/39	23%
1	21/60	35%
2	16/51	31%
3	10/56	18%
Total	56/206	27%

entire school district used the component approach on a trial basis to assess four skills. This was conducted and reported to parents. Parents may not have seen the necessity to return the questionnaire as they seemed to know the information already as expressed by this comment: "Knew necessary information already." (PCQ2-K5)

First and second grade response rate and reaction seemed to reflect a slightly higher parent level of interest. Their return rates were 31% and 35% respectively. Following are some parent comments from grades one and two which give support to this statement.

> "If I knew the proper steps involved (if the information were more fully explained) in a given skill, I could give help at home in advancing the skill." (PCQ2 1-2)
>
> "Any information about my child's abilities (physical as well as scholastic) is appreciated." (PCQ3 1-4)
>
> "I'm interested in all areas of my child's development-mental, social, spiritual, and physical." (PCQ3 1-7)
>
> "...to see if my child needs any help in those areas." (PCQ2 2-1)
>
> "...becoming aware of my child's progress and helping him to do the things he needs to progress further." (PCQ2 2-3)
>
> "I appreciate the information and would like to be informed on a continual basis of my child's motor skill development." (PCQ3 2-13)

Following are results and discussion of the Parent Comments form.

Parent Comments - Question #1

Now that you have information about your child's hopping and skipping, would you be interested in information on other skills such as rolling, throwing, jumping, and catching? If so, which skills?

The actual number of parents that responded Yes to receiving information on all of the skills mentioned was 16 (see Table 13). Eleven of these 16 were from kindergarten and first grade. Fourteen out of 56 parents responded No to receiving any further motor development information. Two responded that they were indifferent toward the information. These data suggest that parents of the lower grade levels might have been more interested than those in the higher grade levels. Some parents of third grade commented that they already knew their child could perform these skills well. for example:

> "I already knew my child was coordinated so it came as no surprise when the results arrived." (PCQ2 3-4)

> "...it's always nice to have your observations confirmed by someone who is knowledgeable." (PCQ1 3-4)

The other 26 respondents indicated interest in the variety of skills listed in Question #1. The two skills which received the highest number of tallies were throwing with 18 tallies and catching with 18 tallies. These tallies were concentrated in the first grade responses with 12 tallies for throwing and 11 tallies for catching.

These numbers in throwing and catching may be

Table 13

Parent Comments - Question #1

Parent Comment	Grade				
	K	1	2	3	Totals
Yes*	5**	6	4	1	16
No	2	2	5	5	14
Indifferent	-	-	-	2	2
Rolling	-	3	1	-	4
Throwing	2	12	2	2	18
Jumping	-	2	3	1	6
Catching	2	11	3	2	18
Other	-	-	kicking	-	1

*Tallies in this row represent parent response of "Yes" to all skills mentioned.

**These numbers represent tallies of parent responses.

attributed to the fact that many parents in this school begin to involve their children in competitive sport activities in the first grade. This might account for their interest in throwing and catching. Also throwing and catching are very common skills which parents would be more apt to observe or to use in play with their children. The following comments lend support to this interpretation.

> "Would like to see her become more interested in athletics." (PCQ2 1-4)
>
> "I'd like more information on throwing and catching skills. My son is a baseball player." (PCQ1 1-11)
>
> "Perhaps throwing and catching since many children seem to have trouble with these skills." (PCQ1 1-15)
>
> "...explains why my child may or may not be interested in participating in certain physical sports." (PCQ2 1-13)
>
> "I would use it to help me choose some activities to do with my child." (PCQ2 1-14)
>
> "It would be interesting to see the comparison of baseball skills with other children of same age." (PCQ2 1-17)
>
> "Throwing and catching. He seems coordinated until a ball is involved in his skills." (PCQ1 1-19)

Parent Comments - Question #2 and Question #3

Question #2 Do you see any ways that you can use this information? Please explain.

Question #3 What is your overall reaction to this approach for assessing your child's hopping and skipping?

Report of comments and discussion of questions two and three were treated together because the information

seemed to overlap. The categories which emerged from this information were (a) use of skill information, (b) sport related comments, (c) norm related comments, and (d) overall reaction.

Responses showed that 19 of the 56 respondents to question two said "yes" they had an interest in working with their child on the skills of hopping and skipping along with other skills, while 18 said "no" they did not see any use for the information. Following are some comments from those who responded "yes".

> "I plan on working on improving some of these skills this summer. By playing games etc." (PCQ2 K3)
>
> "Yes, to help and encourage these skills at home." (PCQ2 K4)
>
> "Yes. I would use it to help me choose some activities to do with my child. I did think children just progressed at their own rate. I can see, though, that they should be encouraged to practice different skills in an enjoyable way." (PCQ2 1-14)
>
> "Yes. We can encourage our child to increase his arm movement when hopping or skipping." (PCQ2 1-19)
>
> "By becoming aware of child's progress and helping him to do the things he needs to progress further." (PCQ2 2-3)
>
> "Find out what his coordination level is for sports." (PCQ2 2-4)
>
> "Practice skipping perhaps." (PCQ2 2-16)
>
> "For sports such as soccer and softball." (PCQ2 3-10)

Some parents who responded "no" to use of this

information gave the following reasons.

> "No. We should encourage our children to participate in physical activities regardless of their levels of achievement." (PCQ2 K6)
>
> "Not really. Maybe if I was worried she couldn't do something I would be more likely to use this information." (PCQ2 1-10)
>
> "No. This information needs to be accompanied by other information that explains where a child at that age should be. This information all by itself is interesting to note, but is of no real value by itself without anything to compare it to." (PCQ2 1-15)
>
> "No, unless abnormal." (PCQ2 3-1)
>
> "No unless there was a medical or coordination problem." (PCQ2 3-3)
>
> "No. We would need some interpretation. If not sports related, is there a correlation to physical development, social etc, development or anything else?" (PCQ2 3-6)

In addition to the first grade parents who were interested in throwing and catching skills, several other parent comments reflected interest in how these particular skills related to competitive sports.

> "Would like to see her become more interested in athletics." (PCQ2 1-4)
>
> "I think it's interesting to see how the assessment relates to other skills more closely related to sports areas (soccer, baseball, etc.)." (PCQ2 1-16)
>
> "Sports, to see if he's ready for baseball." (PCQ2 1-18)
>
> "Find out what his coordination level is for sports." (PCQ2 2-4)

"A. is interested in basketball..." (PCQ2 3-7)

"For sports such as soccer and softball." (PCQ2 3-10)

"I would be interested in anything involving his feet, i.e. kicking (he plays soccer)." (PCQ1 2-9)

"Perhaps if you could relate then to something i.e. what sports K. might be particularly suited for, what to stay away from, etc." (PCQ1 3-6)

Parents of all grade levels expressed concern about their child's achievement on the skills of hopping and skipping. They did not appear to understand that the profile of their child's skills was developmental information which by nature cannot be transposed into norms (Roberton & Halverson, 1984). It can only be viewed when looking at each individual child's growth and development and not as a method of comparison between individuals. Also, no age or grade levels have been assigned as appropriate for specific steps of development. Some of the parent comments which indicated a need for more information related to comparisons are listed here.

"This information can let me know where my child is developmentally, compared to his peers." (PCQ2 K2)

"I want to be sure that my daughter develops good co-ordination and motor skills at the appropriate rate for a child her age." (PCQ2 K9)

"The information as sent to me was somewhat vague since I could make no comparisons to the 'norm' for the specific age category and/or skill as defined." (PCQ2 1-12)

"I don't know if my child is where he should be for his age." (PCQ1 1-14)

"This information needs to be accompanied by other information that explains where a child at that age should be." (PCQ2 1-15)

"Without relating the data to norms, there is nothing I can constructively do with this information." (PCQ3 2-8)

"Then growth development and normative standards regarding age would also be needed for comparison tools." (PCQ3 2-10)

"What are norms at this age?" (PCQ3 2-16)

"...is there a correlation to physical development, social development or anything else?" (PCQ2 3-6)

"What is the average level for a third grader?" (PCQ3 3-8)

This interest in norms might indicate a need for a more in-depth explanation of the developmental information. This could be approached in many ways, e.g., written materials, video presentation, workshop format, or actual classroom visitation. Some parents also requested clarification of terms used in the profile.

"Even though I didn't understand some of the terminology (semi-opposition) I'm sure your approach is fine." (PCQ3 K2)

"I feel it's very important to make the parents aware of the stages in their child's development. But perhaps there could be more explanation beforehand telling parents about the various steps in each skill. For example, "two arm pump" in skipping needs possibly a visual demonstration to the parents." (PCQ3 K4)

"Need explanation on the precise actions of the skill in order to help at home." (PCQ3 1-2)

"More information is needed as to the parameters of each level. What is the definition of "semi-opposition" and "opposition"?" (PCQ3 2-5)

"I don't understand your approach." (PCQ3 3-2)

"No explanation is given for each developmental step." (PCQ2 3-2)

The third and final question which parents responded to was designed to elicit their general reaction toward the component approach to assessing fundamental skills such as hop and skip. Positive reaction was given by 33 of 56 parents while only 3 out of 56 reacted negatively on question three toward this approach (see Table 14). The highest individual positive response, 15 out of 56, was given by first grade parents followed by 10 for second grade. This tally coincides with the idea that parents at this level are interested in any information on their child which would indicate achievement or readiness. Nineteen parents responded with questions, requests regarding more indepth explanation, desire for norms to use in comparing their child to other children, or simply indifference. The indifferent reaction might be attributed to the fact that the motor development information was not specifically related to anything in particular such as sport or norms as discussed previously. Parents in this school are accustomed to translating scores into achievement indicators.

Table 14

Parent Reaction to the Component Approach

Parent Comments	Grade				(N=56)	
	K	1	2	3	Total	Percent
Positive	5	15	10	3	33	59%
Negative	1	0	2	0	3	5%
Other	3	6	4	7	20	36%

Question #5

What factors influenced the procedures of videotaping, teacher training, and coding?

Videotaping

Videotaping procedures were relatively simple due to the familiarity of both teachers with video equipment use. The only videotaping difficulty encountered was the discovery of the lag between the time the camera was started to the time the recorder began to record. This resulted in a number of classes taped in which some subject identification numbers were not visible.

The process of creating the criterion videotape was difficult. The initial attempt at this involved choosing a random sample from the actual videotape data using two video recorders. This was abandoned for technical reasons and a sample (N=42) of the actual subjects equally distributed across grade levels was used.

The subjects hop and skip performance may have been affected by the curved performance track used. The subjects seemed to have a sidewards lean while hopping and skipping on the track. Dr. Halverson noted in conversation that the subjects taped in this study seemed to have a larger number of transitional codings in skipping where one foot was often in a lower step than the other.

Some subjects changed the intensity of their hop or skip invariantly which could lead to incorrect assessment of their developmental levels. Some seemed to be distracted by the instructional activities in the gym. Occasionally a subject would stop before the end of the track or would not perform at least five consecutive hops or skips. In these cases, the subject was asked to repeat their performance immediately.

Teacher Objectivity Training

Teacher objectivity training was affected by several factors. Established guidelines were not available therefore Coder #1 began training first in the attempt to discover what difficulties would be encountered so that Coder #2's training would be less difficult.

The coded criterion videotape was received 2 weeks later than planned. This slowed down the entire coding process and changed the procedure of Coder #1 achieving objectivity before Coder #2. The coders attempted to establish decision rules while waiting for the return of the criterion tape. These rules were revised after the initial criterion tape was coded and discussed with the experts.

During training the teachers found it difficult at first to code one entire class per session due to fatigue and the beginning level of coding ability which they had.

With practice and clarification of decision rules this ability was increased by the beginning of data coding.

Difficulty was encountered arranging time for both teachers to discuss/practice coding together due to outside commitments of Coder #2. The only time available to both coders was an occasional free period and late afternoon after extracurricular programs were over. Teacher fatigue was a real problem with all of the training procedures. Nearly all coding was done after a complete day of teaching.

Coding

Each coder was assigned six classes of hopping/skipping to code before the midpoint objectivity check. Coder #1 completed the six classes before Coder #2 and had to wait before continuing with the other classes. Coder #2 also was absent for 2 days which also delayed the coding.

Feasibility

The question of feasibility will be addressed in two parts: (a) capable of being carried out and (b) value to students, teachers, and parents. The results discussed in this chapter have led the investigator to the conclusion that the Roberton and Halverson component approach is logistically possible to be used in a public school setting under the conditions specific to this study.

Vital to the success of use of the component approach was the fact that the teachers were able to achieve acceptable reliability. This was done with no guidelines to follow so it is believed that objectivity could be achieved more easily in the future based on the findings of this study. The high motivation and interest which the teachers held for effective instruction in physical education was seen as the second important factor contributing to the feasibility of this study. Most of the actual training and data coding had to be done outside of the regular school hours. The third factor which allowed this study to be conducted was the availability of adequate video equipment. The previous experience which both teachers had with the component approach was indeed an asset although would not be essential to training others in use of the component approach. In order to ensure reliability with use of this approach, it is recommended that a standardized training video tape with training manual be developed. This would reduce some of the inherent variability in the observation skills which teachers have and possibly also reduce the amount of time needed to train. Any difficulties in achieving an acceptable level of agreement could more easily be pinpointed in this way.

Defining the value of large scale implementation of the component approach required the determination of its

value to students, teachers, and parents. The information acquired through use of the component approach seemed to be of more value to the teachers than to parents in the form cited in this study. The teachers reported value in both the individual and class profiles. The individual profiles helped in identification of developmentally immature hop and skip patterns. It should be noted that several of these subjects had not been previously identified as immature possibly due to the common mishap of being "lost in the crowd". There seems little doubt that class profiles were of value to the teachers for both diagnosis and curricular planning.

Parents although interested in the profile information did not appear to find the information of particular value by itself. The responses suggested that parents might be more interested and would possibly become more involved in their child's motor development if this information were related to something like sports. Value to the parents might also be increased with more indepth explanation accompanied by a demonstration of developmental levels of fundamental skills.

Value of the component approach assessment to the students is directly related to how well the teachers and parents understand and apply the information to enhance individual developmental levels. The value of this

developmental information would seem to lie in the effect that intervention would have on the development of fundamental skills. The process of intervention would mean determining the level of development, applying specific activities, and re-evaluating the level of development to check for further development.

CHAPTER V

SUMMARY OF FINDINGS AND RECOMMENDATIONS

The purpose of this study was to determine the feasibility of using Roberton and Halverson's (1984) component approach to assess the developmental sequences of the hop and skip in a public school setting. Subjects were 206 K-3 children in a K-5 school. The following findings were derived from this study.

1. The amount of time used to train teachers to code hop and skip component levels of development with at least .80 criterion agreement was 9 hours 40 minutes for Coder #1 and 5 hours 45 minutes for Coder #2.

2. The coders were able to maintain .80 level of agreement during the entire coding process except for the hop-arm component at the final check for Coder #2.

3. Videotaping 206 subjects for both the hop and skip required a total of 3 hours 17 minutes.

4. Coding of all subjects for both the hop and skip required 18 hours 46 minutes.

5. It was possible to videotape 206 K-3 subjects on

2 skills during regular class time.

6. Valuable insights were gained from parent comments.

Recommendations

Based on the results of this study, several recommendations are made here for further study and improvement in the use of the component approach.

1. Standardized training method should be developed. This would aid in consistency of coding across coders.

2. Comparison of reliability between live and videotaped coding should be determined. If video equipment is not available, is this a viable approach to use?

3. Comparison of skill performance on curved versus straight track should be examined.

4. The effects of intervention on the development of the skills of hop and skip should be studied to determine how frequently assessment of fundamental skills on a large scale should be conducted.

BIBLIOGRAPHY

Arnheim, D.D., & Pestolesi, R.A. (1978). Elementary physical education: A developmental approach. St. Louis: C.V. Mosby Co.

Baltes, P.B., & Goulet, L.R. (Eds.) (1970). Life span development psychology: Research and theory. Philadelphia: Lea & Febiger.

Bayley, N. (1936). The california infant scale of motor development. Berkley: University of California Press.

Branta, C., Haubenstricker, J., & Seefeldt, V. (1984). Age changes in motor skills during childhood and adolescence. In R. Terjung (Ed.), Exercise and Sport Sciences Reviews, 12, 467-520.

Breihan, S. (1982). Consistency of arm-leg opposition in performing three tasks. Perceptual and Motor Skills, 54, 203.

Broer, M.R., & Zernicke, M. (1979). Efficiency of human movement. Philadelphia: W.B. Saunders Co.

Burton, E.C. (1977). The new physical education for elementary school children. Boston: Houghton Mifflin Co.

Connolly, K. (1979). The development of competence in motor skills. In G. Roberts & D. Landers (Eds.), Psychology of Motor Behavior and Sport.

Corbin, C. (1973). A textbook of motor development. Dubuque: Wm. C. Brown.

Dauer, V.P., & Pangrazi, R.P. (1979). Dynamic physical education for elementary school children. Minn: Burgess Pub. Co.

Deach, D.F. (1951). Genetic development of motor skills in children 2 through 6 years of age. Unpublished doctoral dissertation, University of Michigan, Ann Arbor.

Espenschade, A.S., & Eckert, H.M. (1980). Motor development. Columbus: Charles E. Merrill.

Flinchum, B.M. (1975). Motor development in early childhood. St. Louis: C.V. Mosby.

Frankenberg, W., & Dodds, J. (1967). The Denver developmental screening test. Journal of Pediatrics, 71, 181-191.

Frick, T., & Semmel, M. (1978). Observer agreement and reliabilities of classroom observational measures. Review of Educational Research, 48 (1), 157-184.

Gallahue, D. (1982). Understanding motor development in children. New York: John Wiley & Sons.

Glassow, R.B., Halverson, L.E., & Rarick, G.L. (1965). Improvement of motor development and physical fitness in elementary school children. Cooperative Project No. 696. Madison: University of Wisconsin.

Halverson, L.E. (1966). Development of motor patterns in children. Quest, 6, 44-53.

Halverson, L.E., Roberton, M.A., & Harper, C. (1973). Current research in motor development. Journal of Research and Development in Education, 6 (56).

Halverson, L.E., & Williams, K. (1985). Developmental sequences for hopping over distance: A pre-longitudinal screening. Research Quarterly for Exercise and Sport, 56 (1), 37-44.

Hanson, M. (1965). Motor performance testing of elementary school age children. Unpublished doctoral dissertation. Seattle: University of Washington.

Hardin, D., & Garcia, M. (1982). Diagnostic performance tests for elementary children (grades 1-4). Journal of Physical Education Recreation & Dance, 53 (2), 48.

Harper, C.J. (1979). Learning to observe children's motor development. Part III Observing children's motor development in the gymnasium. Paper presented to the American Alliance for Health, Physical Education, Recreation, and Dance National Convention, New Orleans, LA.

Haubenstricker, J.L., Branta, C.F., & Seefeldt, V.D. (1983). Preliminary validation of developmental sequences of throwing and catching. Paper presented at the North American Society for the Psychology of Sport and Physical Activity International Conference. East Lansing, MI.

Haubenstricker, J.L., Seefeldt, V.D., & Branta, C.F. (1983). Preliminary validation of a developmental sequence for the standing long jump. Paper presented at the American Alliance for Health, Physical Education, Recreation, and Dance National Convention, Minneapolis, MN.

Haubenstricker, J.L., Seefeldt, V.D., Fountain, C., & Sapp, M. (1981) A developmental sequence for kicking. Paper presented at the American Alliance for Health, Physical Education, Recreation, and Dance Midwest District convention, Chicago, IL.

Herkowitz, J. (1978). Developmental task analysis: The design of movement experiences and evaluation of motor development status. In M.V. Ridenour (Ed.), Motor Development: Issues and Applications. Princeton: Princeton Book Co.

Keogh, J. (1970). A rhythmical hopping task as an assessment of motor deficiency. In G. Kenyon (Ed.), Contemporary Psychology of Sport. Chicago: Athletic Institute.

Keogh, J. (1977). The study of movement skill development. Quest, 28, 76-88.

Langendorfer, S. (1980). Longitudinal evidence for developmental changes in the preparatory phase of the overarm throw for force. In Research Abstracts, 1980, AAHPERD, Washington, D.C.

Latchaw, M. (1954). Measuring selected motor skills in 4, 5, & 6th grades. Research Quarterly, 25, 439-449.

Leme, S. (1973). Developmental throwing patterns in adult female performers within a selected velocity range. Unpublished master's thesis, University of Wisconsin, Madison.

McCaskill, C.L., & Wellman, B.L. (1938). A study of common motor achievements at the preschool ages. Child Development, 9 (3), 141-150.

McClenaghan, B.A., & Gallahue, D.L. (1978). Fundamental movement: A developmental and remedial approach. Philadelphia: W.B. Saunders.

Mackes, B.E. (1984). Relationship of pattern element emergence between two locomotor patterns in children. Doctoral dissertation, University of Illinois, Champaign.

Milne, C., Seefeldt, V., & Reuschlein, P. (1976). Relationship between grade, sex, race, and motor performance in young children. Research Quarterly, 47 (4), 726.

Morris, A. (Ed.). (1981). Motor development: Theory into practice. Monograph 3: Motor Skills, 49-60.

Morris, G.S., & Stiehl, J. (1985). Physical Education: From intent to action. Columbus: Charles E. Merrill.

Rarick, G.L. (1976). Concepts of motor learning: Implications for skill development in children. In J.G. Albinson & G.M. Andrew (Eds.), Children in Sport and Physical Activity. Baltimore: University Park Press.

Rarick, G.L. (1980). Motor development, its growing knowledge base. Journal of Health Physical Education and Recreation, 51 (7), 26-61.

Ridenour, M. (Ed.) (1978). Motor development: Issues and application. Princeton: Princeton Book.

Riley, M., Barrett, K., Martinek, T., Roberton, M.A. (1980). Children and youth in action: Physical activities and sports. Office of Human Development Services, Washington, D.C.

Roberton, M.A. (1975). Stability of stage categorizations across trials: Implications for the 'stage theory' of overarm throw development. Unpublished doctoral dissertation, University of Wisconsin, Madison.

Roberton, M.A. (1977a). Stability of stage categorizations across trials: Implications for the 'stage theory' of overarm throw development. Journal of Human Movement Studies, 3, 49-59.

Roberton, M.A. (1977b). Developmental implications for games teaching. Journal of Physical Education and Recreation, 48 (7), 25.

Roberton, M.A. (1978a). Stages in motor development. In M.V. Ridenour (Ed.), Motor Development: Issues and Applications. Princeton: Princeton Book Co.

Roberton, M.A. (1978b). Longitudinal evidence for developmental stages in the forceful overarm throw. Journal of Human Movement Studies, 4, 167-175.

Roberton, M.A., & Halverson, L. (1977). The developing child-his changing movement. In B. Logsdon (Ed.), Physical Education for Children: A Focus on the Teaching Process. (p. 24-67). Philadelphia: Lea & Febiger.

Roberton, M.A., & Langendorfer, S. (1980). Testing motor development sequences across 9-14 years. In C. Nadeau (Ed.), Psychology of Motor Behavior and Sport. Champaign: Human Kinetics.

Roberton, M.A., & Halverson, L. (1984). The developing child-his changing movement. In B. Logsdon (Ed.), Physical Education for Children: A Focus on the Teaching Process. (p. 24-86). Philadelphia: Lea & Febiger.

Roberton, M.A., Williams, K., & Langendorfer, S. (1980). Prelongitudinal screening of motor development sequences. Research Quarterly, 51 (4), 724-731.

Sanders, J. (1977). A practical application of the segmental method of analysis to determine throwing ability. Unpublished doctoral dissertation. Indiana University, Bloomington.

Schurr, E.L. (1980). Movement experiences for children. A humanistic approach to elementary school physical education. Englewood Cliffs: Prentice-Hall, Inc.

Seefeldt, V. (1978). The concept of readiness applied to motor skill acquisition. In R. Magill (Ed.), Children in Sport: A Contemporary Anthology. Champaign: Human Kinetics.

Seefeldt, V., & Haubenstricker, J. (1974). Developmental sequences in hopping, skipping, striking. Motor Development Workshop. Michigan State University, Ann Arbor.

Seefeldt, V., & Haubenstricker, J. (1979). Patterns, phases or stages: An analytical model for the study of developmental movement. Paper presented at the Symposium on Motor Skill Development. Iowa City, IA.

Seefeldt. V. Reuschlein, S., & Vogel, P. (1972). Sequencing motor skills within the physical education curriculum. Paper presented at the American Association for Health, Physical Education, and Recreation National Convention, Houston, TX.

Shirley, M.M. (1931). The first two years: A study of 25 babies. Vol. 1. Minneapolis: University of Minnesota Press.

Siedentop, D., Herkowitz, J., & Rink, J. (1984). Elementary physical education methods. Englewood Cliffs: Prentice Hall.

Warner, A. (1952). The motor ability of third, fourth, and fifth grade boys in the elementary school. Unpublished doctoral dissertation. University of Michigan, Ann Arbor.

Wickstrom, R.L. (1983). Fundamental motor patterns. Philadelphia: Lea & Febiger.

Wild, M. (1938). The behavior pattern of throwing and some observations concerning its course of development in children. Research Quarterly. 9 (3), 20-24.

Williams, H.G. (1983). Perceptual and motor development. New Jersey: Prentice Hall.

Williams, K. (1980). Developmental characteristics of a forward roll. Research Quarterly for Exercise and Sport, 51 (4), 703.

APPENDIX A

DEVELOPMENTAL SEQUENCES FOR THE HOP

LEG ACTION

Step 1. Momentary flight. The support knee and hip quickly flex, pulling (instead of projecting) the foot from the floor. The flight is momentary. Only one or two hops can be achieved. The swing leg is lifted high and held in an inactive position to the side or in front of the body.

Step 2. Fall and catch; Swing leg inactive. Body lean forward allows the minimal knee and ankle extension to help the body "fall" forward of the support foot and, then, quickly catch itself again. The swing leg is inactive. Repeat hops are now possible.

Step 3. Projected takeoff; Swing leg assists. Perceptible pretakeoff extension occurs in the hip, knee, and ankle in the support leg. There is little or no delay in changing from knee and ankle flexion on landing to extension prior to takeoff. The swing leg now pumps up and down to assist in projection. The range of the swing is insufficient to carry it behind the support leg when viewed from the side.

Step 4. Projection delay; Swing leg leads. The weight of the child on landing is now smoothly transferred along the foot to the ball before the knee and ankle extend to takeoff. The support leg nearly reaches full extension on the takeoff. The swing leg now leads the upward-forward movement of the takeoff phase, while the support leg is still rotating over the ball of the foot. The range of the pumping action in the swing leg increases so that it passes behind the support leg when viewed from the side.

ARM ACTION

Step 1. Bilateral inactive. The arms are held bilaterally, usually high and out to the side, although other positions behind or in front of the body may occur. Any arm action is usually slight and not consistent.

Step 2. Bilateral reactive. Arms swing upward briefly, then are medially rotated at the shoulder in a winging movement prior to takeoff. It appears that this movement is in reaction to loss of balance.

Step 3. Bilateral assist. The arms pump up and down together, usually in front of the line of the trunk. Any downward and backward motion of the arms occurs *after* takeoff. The arms may move parallel to each other or be held at different levels as they move up and down.

Step 4. Semi-opposition. The arm on the side opposite the swing leg swings forward with that leg and back as the leg moves down. The position of the other arm is variable, often staying in front of the body or to the side.

Step 5. Opposing-assist. The arm opposite the swing leg moves forward and upward in synchrony with the forward and upward movement of that leg. The other arm moves in the direction opposite to the action of the swing leg. The range of movement in the arm action may be minimal unless the task requires speed or distance.

Note. This sequence has been partially validated by Halverson and Williams.[70]

Taken from: Roberton, M.A. & Halverson, L. (1984). The developing child-his changing movement. In B. Logsdon, et. al. (ed.), Physical Education for Children: A Focus on the Teaching Process. Philadelphia: Lea & Febiger.

DEVELOPMENTAL SEQUENCES FOR THE SKIP

LEG ACTION

Step 1. One-footed skip. One foot completes a step and hop before the weight is transferred to the other foot. The other foot just steps.

Step 2. Two-footed skip; Flat-footed landing. Each foot completes a step and a hop before the weight is transferred to the other foot. Landing from the hop is on the total foot, or on the ball of the foot, with the heel touching down before the weight is transferred (flat-footed landing).

Step 3. Two-footed skip; Ball of the foot landing. Landing from the hop is on the ball of the foot. The heel does not touch down before the weight is transferred to the other foot. Body lean increases over that found in Step 2.

ARM ACTION

Step 1. Bilateral assist. The arms pump bilaterally up as the weight is shifted from the hopping to the stepping foot and down during the hop takeoff and flight.

Step 2. Semi-opposition. The arms first swing up bilaterally. During the hop on the right foot, the right arm moves down and back only slightly while the left arm continues to move backward until the step on the left foot. Then, both arms again move forward and upward in a new bilateral pumping action. Now, however, the left arm moves back only slightly while the right arm moves backward until the step on the right foot. Although the arm action has the beginnings of opposition, at some time in the arm cycle both hands are in front of the body.

Step 3. Opposition. The arm opposite the stepping leg swings upward and forward in synchrony with that leg and reverses direction when the stepping leg touches the floor. The arm on the same side as the stepping leg moves backward and down in opposition to the stepping leg. At no time are both hands in front of the body.

Note. These sequences, hypothesized by Halverson, have not been validated.

Taken from: Roberton, M.A. & Halverson, L. (1984). The developing child-his changing movement. In B. Logsdon, et. al. (ed.), Physical Education for Children: A Focus on the Teaching Process. Philadelphia: Lea & Febiger.

APPENDIX B

THE UNIVERSITY OF NORTH CAROLINA AT GREENSBORO
SCHOOL OF HEALTH, PHYSICAL EDUCATION & RECREATION

April 29, 1985

Dear Parents:

This is a request for permission to include your child for participation in a research study. For the final stage of my doctorate degree in physical education, I have designed a study around Willow Grove School's specific situation.

The purpose of the study is to determine if it is feasible to use the Roberton and Halverson (1984) component approach for assessing hopping and skipping in an actual school situation. This is the first time a study of this type will be done.

All children in grades kindergarten, first, second and third at Willow Grove School are being asked to participate. Each child will be videotaped:
1. Hopping a distance of approximately 70 feet two times.
2. Skipping a distance of approximately 70 feet two times.

This will be videotaped during your child's regular gym class by Ms. Jenkot and Mr. Uhl. The videotapes will be analyzed to determine the level of development of each skill.

At the completion of the study, the videotapes may be used in the following ways:
1. To train other teachers on how to assess the developmental levels of hopping and skipping. This may occur at meetings, workshops or conventions.
2. To develop longitudinal profiles for a child's hop and skip over time.
3. To examine further comparisons.

At no time will your child's identity be revealed. You will receive a copy of your child's developmental profile for hopping and skipping and will be asked to return it with comments. Your comments will be reviewed to help in determining the value of this assessment approach to hopping and skipping. Please read the attached consent form and return to me tomorrow. Thank you in advance for your assistance in this study. If you have any questions, please feel free to call me.

Ginger Jenkot

Ms. Ginger Jenkot
Physical Education Instructor
Willow Grove School
541-3660

THE UNIVERSITY OF NORTH CAROLINA AT GREENSBORO
SCHOOL OF HEALTH, PHYSICAL EDUCATION & RECREATION

SCHOOL REVIEW COMMITTEE

INFORMED CONSENT FORM*

I understand that the purpose of this study is to determine if it is feasible to use the Roberton/Halverson (1984) component approach for assessing hopping and skipping in an actual school situation.

I confirm that my participation is entirely voluntary. No coercion of any kind has been used to obtain my cooperation.

I understand that I may withdraw my consent and terminate my child's participation at any time during the project.

I have been informed of the procedures that will be used in the study and understand what will be required of my child.

I understand that all of my child's hopping and skipping performance and my comments on the profile form will remain completely anonymous at all times.

I understand that I will receive a summary of the results of the study at the completion of the study.

I understand that at the completion of the study the videotapes may be used to develop profiles, train other teachers, and that this may occur at meetings, workshops or conventions.

I wish to give my voluntary permission for my child's participation in this study.

_____
Parent or Guardian Signature

_____
Child's Name Grade (circle) K 1 2 3

_____
Address

_____
Date

*Adopted from L.F. Locke and W.W. Spirduso. Proposals that work. New York: Teachers College, Columbia University, 1976, p. 237.

THE UNIVERSITY OF NORTH CAROLINA AT GREENSBORO
SCHOOL OF HEALTH, PHYSICAL EDUCATION & RECREATION

SCHOOL REVIEW COMMITTEE

INFORMED CONSENT FORM*

I understand that the purpose of this study is to determine if it is feasible to use the Roberton/Halverson (1984) component approach for assessing hopping and skipping in an actual school situation.

I confirm that my participation is entirely voluntary. No coercion of any kind has been used to obtain my cooperation.

I understand that I may withdraw and terminate my participation at any time during the project.

I have been informed of the procedures that will be used in the study and understand that the following responsibilities will be required of me:

1. Share equal responsibility in the videotaping procedures involved in this study during class time.
2. Participate in coder reliability training to achieve the accepted level of .85.
3. Code 12 classes of hopping and 12 classes of skipping.
4. Retest intra and inter-coder agreement after coding 6 hopping and 6 skipping classes; retrain if necessary to re-establish the acceptance level.
5. Retest intra and inter-coder agreement one week after completion of all coding.
6. Contribute comments and suggestions during the entire process.

I understand that at the completion of the study, all of the above information may be used to develop profiles, train other teachers, and that this may occur at meetings, workshops or conventions; and that a brief description of my background will also be included.

I wish to give my voluntary permission for my participation in this study.

_____
Signature

_____
Address

_____
Date

APPENDIX C

VIDEOTAPING SCHEDULE

Monday	Tuesday	Day 1 Wednesday	Day 2 Thursday	Day 3 Friday	Day 4 Monday	Day 5 Tuesday	Day 6 Wednesday	Thursday	Friday
8:40-9:10 5S	8:40-9:10 5C	8:40-9:10 5C	8:40-9:10 5C	8:40-9:10 5C	8:40-9:10 5S	8:40-9:10 5C	8:40-9:10 5C	8:40-9:10 5C	8:40-9:10 5C
9:10-9:40 3H	9:25-9:55 3T	9:10-9:40 3T	9:10-9:40 3T	9:10-9:40 5S	9:10-9:40 3H	9:25-9:55 3T	9:10-9:40 3T	9:10-9:40 3T	9:10-9:40 5S
9:55-10:25 3T/3Th	9:55-10:25 3Th/3H	9:50-10:10 KA/KW	9:50-10:10 KA/KW <KA-Hop KW-Skip	9:55-10:05 3T/3H <3T-SKIP 3H-SKIP	9:55-10:25 3T/3Th <3T-Hop	9:55-10:25 3Th/3H	9:50-10:10 KA/KW <KA-SKIP KW-Hop	9:50-10:10 KA/KW	9:55-10:05 3T/3H
10:25-10:55 4P/4D	10:25-10:55 4P/4K	10:10-10:40 3Th/4D <3Th-Hop	10:10-10:40 3Th/3H	10:25-10:55 4K/3Th <3th-SKIP	10:25-10:55 4P/4D	10:25-10:55 4P/4K	10:10-10:40 3Th/4D	10:10-10:40 3Th/3H	10:25-10:55 4K/3Th
10:55-11:25 4K/5C	11:10-11:40 4D/5S	10:40-11:10 4P/3H <3H-Hop	10:40-11:10 4P/4K	10:55-11:25 4P/4D	10:55-11:25 4K/5C	11:10-11:40 4D/5S	10:40-11:10 4P/3H	10:40-11:10 4P/4K	10:55-11:25 4P/4D
12:50-1:10 KA	12:55-1:25 1P/2L	11:10-11:40 4K/5S	11:10-11:40 4D/5S	12:50-1:10 KA <K3-HOP +SKIP	12:50-1:10 KA	12:55-1:25 1P/2L	11:10-11:40 4K/5S	11:10-11:40 4D/5S	12:50-1:10 KA
1:10-1:40 2B/2Bh	1:25-1:55 1H/2B	12:55-1:25 1P/1M	1:10-1:40 1P/1H <1P-Hop 1H-Hop	1:10-1:40 1H/2L	1:10-1:40 2B/2Bh <2Bh-Hop	1:25-1:55 1M/2B	12:55-1:25 1P/1M	1:10-1:40 1P/1H	1:10-1:40 1H/2L
1:40-2:10 1P/1M	1:55-2:25 2Bh/1H	1:25-1:55 2B/1H	1:40-2:10 1M/2L <1M-Hop 2L-SKIP	1:40-2:10 2B/1M 2B-SKIP 1M-SKIP	1:40-2:10 1P/1M	1:55-2:25 2Bh/1H	1:25-1:55 2B/1H	1:40-2:10 1M/2L	1:40-2:10 2B/1M
2:10-2:40 2L/1H		1:55-2:25 2Bh/2L	2:10-2:40 2B/2Bh <2B-Hop	2:10-2:40 2Bh/1P <2Bh-SKIP 1P-SKIP	2:10-2:40 2L/1H <2L-SKIP 1H-SKIP		1:55-2:25 2Bh/2L	2:10-2:40 2B/2Bh	2:10-2:40 2Bh/1P

APPENDIX D

MIDPOINT — INTRA-CODER #1

KAPPA COEFFICIENT
CONTINGENCY TABLES

HOP

Coder # 2 / Leg

Criterion or Coder #1: Leg	S_1	S_2	S_3	S_4	
S_1	0				0
S_2		1			1
S_3			3		3
S_4			1	4	5
	0	1	4	4	9

$Po = .89$

$Pe = \frac{1}{92}(1+12+20)$

$= \frac{33}{81} = .41$

$K = \frac{.89 - .41}{1 - .41} = \frac{.48}{.49}$

$= .81$

Coder # 2 / Arm

Criterion or Coder #1: Arm	S_1	S_2	S_3	S_4	S_5	
S_1	0					0
S_2		1				1
S_3			3	1		4
S_4				3		3
S_5					1	1
	0	1	3	4	1	9

$Po = .89$

$Pe = \frac{1}{9}2(1+12+12+1)$

$= \frac{26}{81} = .32$

$K = \frac{.89 - .32}{1 - .32} = \frac{.57}{.68}$

$= .84$

SKIP

Coder # 2 / Leg

Criterion or Coder #1: Leg	S_1	S_2	S_3	
S_1	0			0
S_2		9		9
S_3			0	0
	0	9	0	9

$Po = 1.0$

$Pe = 1.0$

Coder # 2 / Arm

Criterion or Coder #1: Arm	S_1	S_2	S_3	
S_1	2			2
S_2		3		3
S_3			4	4
	2	3	4	9

$Po = 1.0$

$Pe = \frac{1}{81}(4+9+16)$

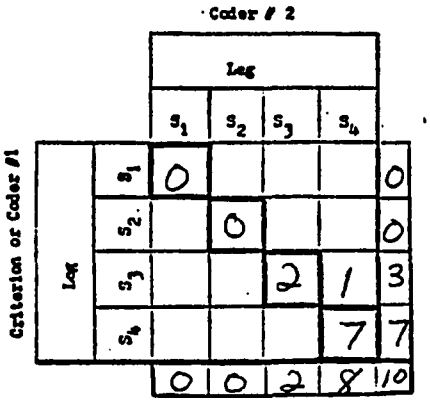
$= \frac{29}{81} = .36$

$K = \frac{1.0 - .36}{1.0 - .36} = 1.0$

MIDPOINT - INTRA-CODER #2

KAPPA COEFFICIENT
CONTINGENCY TABLES

HOP



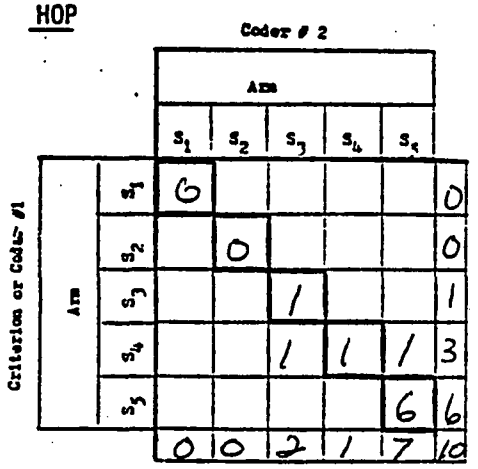
$P_o = .90$

$P_e = \frac{1}{10}2(6+56)$

$= \frac{62}{100} = .62$

$k = \frac{.90-.62}{1-.62} = \frac{.28}{.38}$

$= .74$



$P_o = .80$

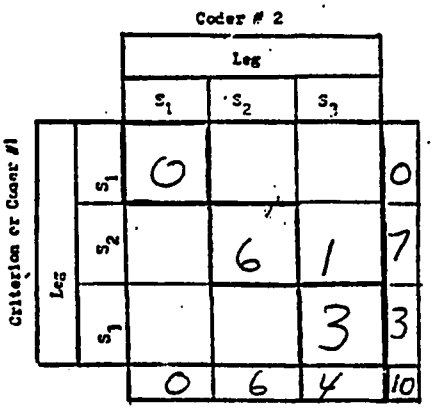
$P_e = \frac{1}{10}2(42+3+2)$

$= \frac{47}{100} = .47$

$k = \frac{.80-.47}{1-.47} = \frac{.33}{.53}$

$= .62$

SKIP

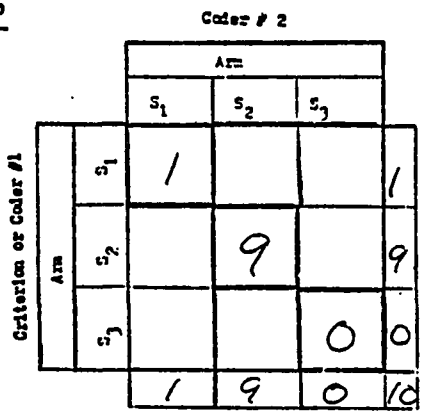


$P_o = .90$

$P_e = \frac{1}{10}2(12+42)$

$= \frac{54}{100} = .54$

$k = \frac{.90-.54}{1-.54} = \frac{.36}{.46} = .78$



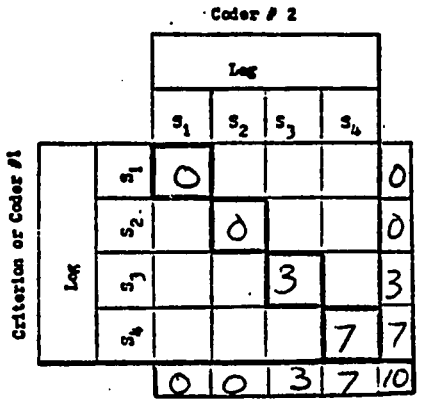
$P_o = 1.0$

$k = 1.0$

MIDPOINT.- INTERCODER: Coder #1 & Coder #2

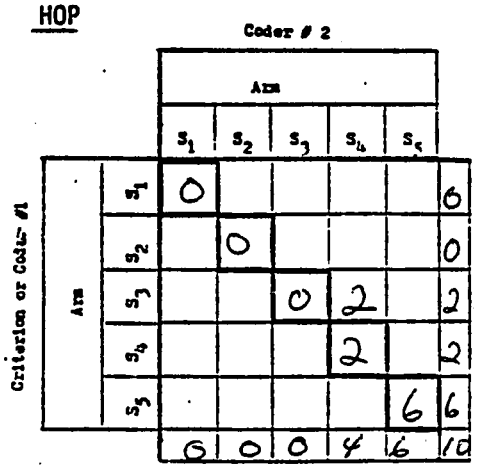
KAPPA COEFFICIENT
CONTINGENCY TABLES

HOP



$P_o = 1.0$

$k = 1.0$



$P_o = .80$

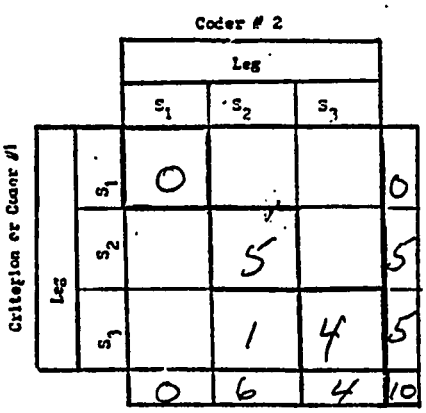
$P_e = \frac{1}{10}2(36+8)$

$= \frac{44}{100} = .44$

$k = \frac{.80-.44}{1-.44} = \frac{.36}{.56}$

$= .64$

SKIP

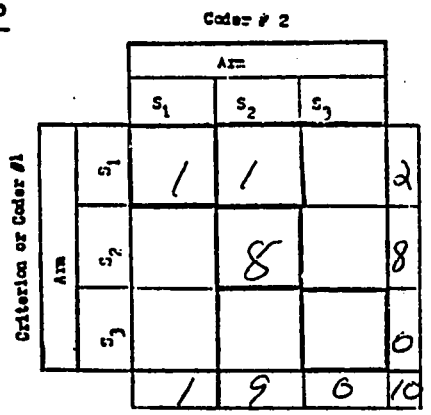


$P_o = .90$

$P_e = \frac{1}{10}2(20+30)$

$= \frac{50}{100} = .50$

$k = \frac{.90-.50}{1-.50} = \frac{.40}{.50} = .80$



$P_o = .90$

$P_e = \frac{1}{10}2(2+72)$

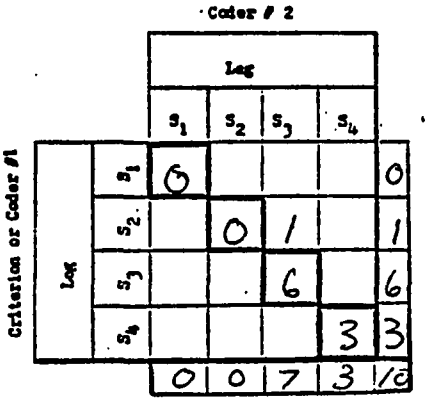
$= \frac{74}{100} = .74$

$k = \frac{.90-.74}{1-.74} = \frac{.66}{.26} = .62$

FINAL - INTRA-CODER #1

KAPPA COEFFICIENT
CONTINGENCY TABLES

HOP



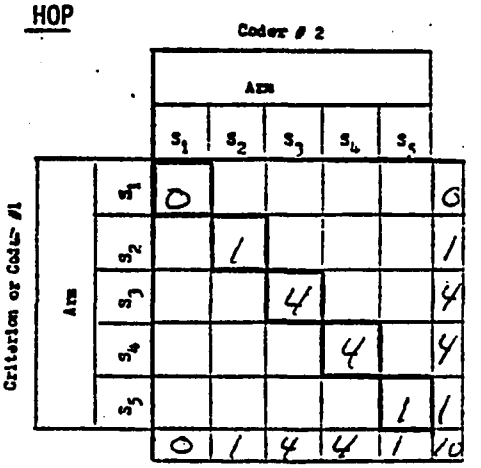
$P_o = .90$

$P_e = \frac{1}{10}2(9+42)$

$= \frac{51}{100} = .51$

$k = \frac{.90 - .51}{1 - .51} = \frac{.39}{.49}$

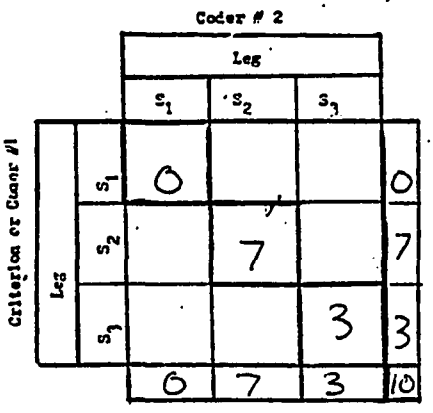
$= .79$



$P_o = 1.0$

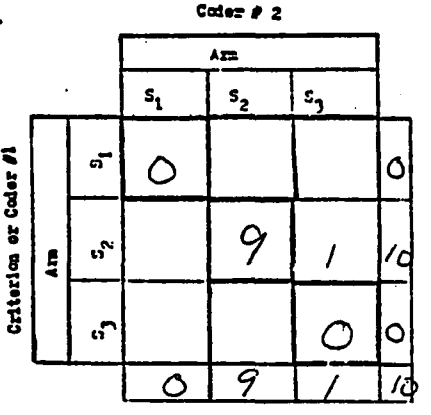
$k = 1.0$

SKIP



$P_o = 1.0$

$k = 1.0$



$P_o = .90$

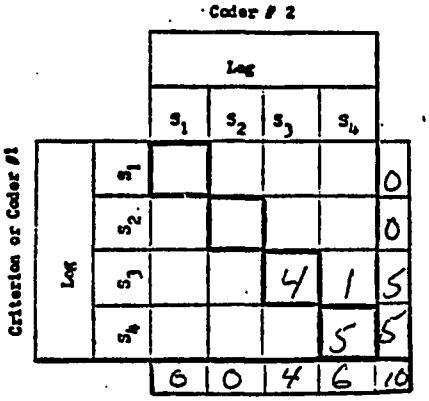
$P_e = \frac{1}{10}2(90) = .90$

$k = \frac{.90 - .90}{1 - .90} = 0$

FINAL - INTRACODER #2

KAPPA COEFFICIENT
CONTINGENCY TABLES

HOP

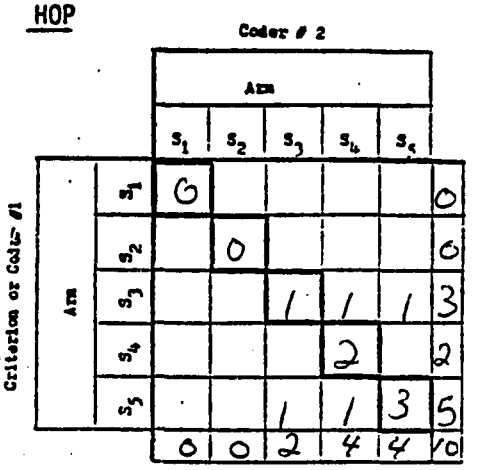


$P_o = .90$

$P_e = \frac{1}{10}2(30+20)$

$= \frac{50}{100} = .50$

$k = \frac{.90-.50}{1-.50} = .80$



$P_o = .60$

$P_e = \frac{1}{10}2(20+8+6)$

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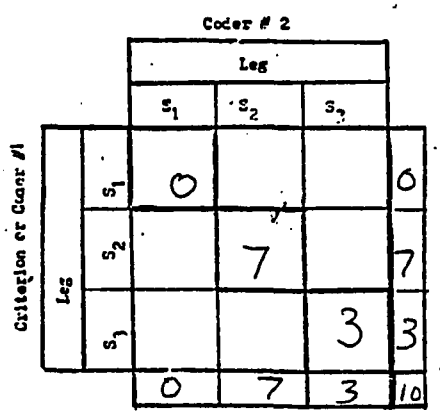
$k = \frac{.60-.34}{1-.34} = \frac{.26}{.66} = .39$

SKIP



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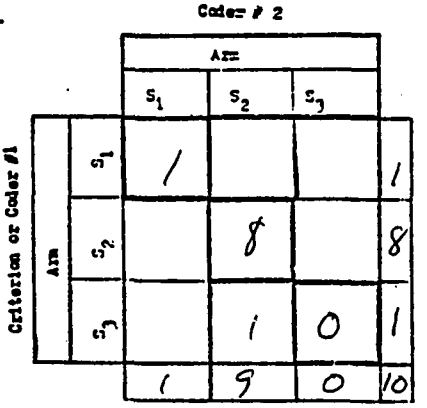
$k = 1.0$



$P_o = .90$

$P_e = \frac{1}{10}2(72+1)$

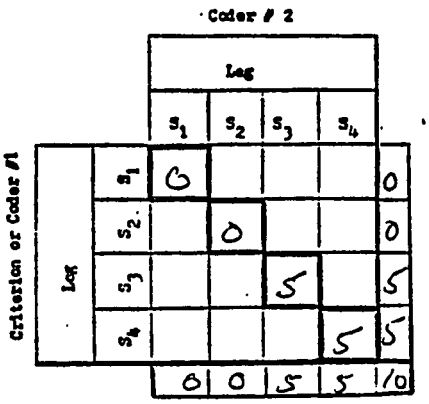
$= \frac{73}{100} = .73$

$k = \frac{.90-.73}{1-.72} = \frac{.17}{.27} = .63$

FINAL - INTERCODER: Coder #1 & Coder #2

KAPPA COEFFICIENT
CONTINGENCY TABLES

HOP



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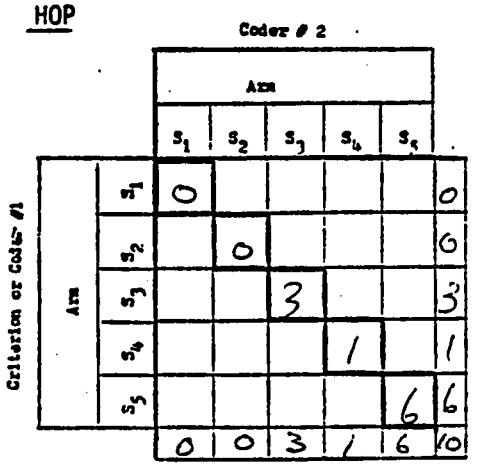
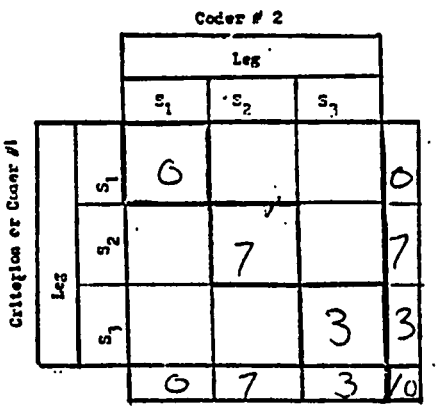
$k = 1.0$



$P_o = 1.0$

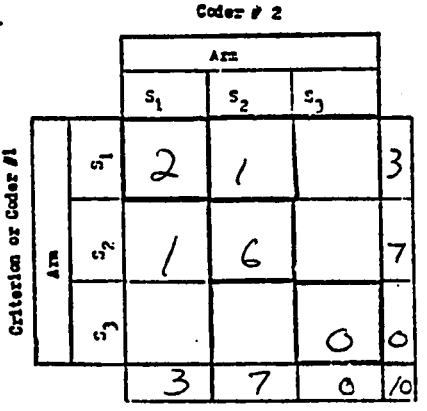
$k = 1.0$

SKIP



$P_o = 1.0$

$k = 1.0$



$P_o = .80$

$P_e = \frac{1}{10}2(49+9)$

$= \frac{58}{100} = .58$

$k = \frac{.80-.58}{1-.58} = \frac{.22}{.42} = .52$

APPENDIX E

Sample Coding Form

CODER: #1 #2	SKIPPING							HOPPING							
	LEG			ARM				LEG				ARM			
SUBJECT CODE #	S_1	S_2	S_3	S_1	S_2	S_3		S_1	S_2	S_3	S_4	S_1	S_2	S_3	S_4	S_5
1																
2																
3																
4																
5																
6																
7																
8																
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25																

APPENDIX F

DECISION RULES

General Rules

1. Do not code more than two classes consecutively.

2. Code all legs first, then arms.

3. Do not code a hop or skip which touches the camera view/record line on the floor; start with the next one.

4. If subject's number is not visible, start with the first full hop or skip.

HOPPING A complete hop includes entire backswing to knee lift of the swing leg.

Arm Action

1. Step 3 - Both arms are pumping. Arms move up and down together not really in synch with swing leg, but either independent of legs or somewhat in synch with swing leg - range being such that the arm opposite the swing leg doesn't really come down enough to match the swing leg.

2. Step 4 - One arm is pumping, other is usually inactive or moving slightly. Arm opposite the swing leg starts to break downward (out of bilateral) matching the swing leg. Swing side arm may match swing leg although some backward movement of the elbow and should occur - it essentially lifts with the swing leg.

3. Step 5 - Both arms are actively moving - equally in opposite directions.

Leg Action

1. Difference between step 2 & 3: Sometimes a leg held in step 2 may bounce and give the impression of step 3. In these cases view the subject at regular speed to get a feel for the movement - whether the swing leg is actually projecting. In frame advance look for degree of angle change in swing leg hip.

2. Difference between step 3 & 4: Swing leg not only pumps up/forward noticeably, but swings back sufficiently enough to allow the viewer to see a space between the legs when the swing leg is back.

SKIPPING

1. The first skip to be coded starts with the first

stepping action after the camera view/record line on floor (not the hopping portion).

2. Arms must be viewed all the way from step to hop before coding. This takes in upswing and downswing.

3. If not sure of heel strike due to unclear pucture, look at (a) amount of body lean and (b) whether foot is parallel to floor or extended before contact.

4. Look at all skips before coding the mode.

TRANSITIONAL RULE : If there is clear evidence of two adjacent steps, note this and code the higher step.

APPENDIX G

June 1985

Dear Parents:

This is the report of your child's motor skill development in hopping and skipping. Motor skills are the skills children develop when they use their bodies to accomplish goals or perform tasks. Some examples of motor skills besides hopping and skipping are climbing, jumping, throwing a ball, riding a bicycle or just running for the joy of it. Because physical activities - especially games and sports - are a natural part of a child's play, many parents believe that motor skill development will take care of itself. Actually, without help and encouragement, many children fall behind and never catch up in some skills. Some children begin to "drop out" of certain kinds of physical activity and games as early as age 6.*

Because children begin to develop their motor skills long before age 6 and continue to develop them through the elementary grades, they need lots of practice. They should be encouraged to do things like throw, catch, run, skip, hop, leap, climb, jump and roll. They also need to learn how to stop without falling to the floor or the ground!

Children progress through motor development sequences at their own rate. Children of the same age may be at different developmental levels because of differences in motor ability and in the amount of time they have practiced the skill. You need not worry about your child's rate of motor development unless it seems unusually slow. The important thing is that each child shows continued progress.

Enclosed is a summary of your child's hopping and skipping profile. It was determined by looking at the videotapes in slow motion. Since parents and teachers are the most important influence in children's development, your response and reaction to this information is a critical part of this study. Please respond on the Parent Comment page and return this to me today.

I would like to thank you and your child for participating in this study. If you have any questions or would like to discuss your child's profile please call me at school, I will be glad to talk with you. Have a safe and healthy summer.

Sincerely,

Ginger Jenkot

Ginger Jenkot
Physical Education Instructor
Willow Grove School

Taken from: Riley, M. et. al.(1980). Children and Youth in Action: Physical Activities and Sports. U.S. Department of Health and Human Services, Washington, D.C.

INDIVIDUAL PROFILE

for

HOPPING and SKIPPING

Name _____ Class _____

June 1985

[Explanation: Step 1 for each of the sections is the beginning level, the highest numbered step is the most advanced level.]

HOPPING

Leg Action

Step 1	Only 1 or 2 hops in a row	____
Step 2	Repeat hops possible	____
Step 3	Swing leg pumps up and down	____
Step 4	Swing leg leads	____

Arm Action

Step 1	No arm action	____
Step 2	Arms react slightly	____
Step 3	Arms pump in front	____
Step 4	Semi-opposition	____
Step 5	Opposition	____

SKIPPING

Leg Action

Step 1	One foot skip	____
Step 2	Two-footed skip, Flat footed landing	____
Step 3	Two footed skip, Ball of foot landing	____

Arm Action

Step 1	Two arm pump	____
Step 2	Semi-opposition	____
Step 3	Opposition	____

Adapted from: Roberton, M.A. & Halverson, L. (1984). The developing child-his changing movement. In B.Logsdon, et al (Eds), Physical Education for Children: A Focus on the Teaching Process. Philadelphia: Lea & Febiger.

PARENT COMMENTS

PLEASE RESPOND AND RETURN YOUR COMMENTS IN THE ENCLOSED ENVELOPE TODAY. THANK YOU AGAIN FOR YOUR TIME AND COOPERATION.

Your Child's Grade: (circle one) K 1 2 3

1. Now that you have information about your child's hopping and skipping, would you be interested in information on other skills such as rolling, throwing, jumping and catching? If so, which skills?

2. Do you see any ways that you can use this information? Please explain.

3. What is your overall reaction to this approach for assessing your child's hopping and skipping?

APPENDIX H

PARENT COMMENTS

QUESTION #1 Now that you have information about your child's hopping and skipping, would you be interested in information on other skills such as rolling, throwing, jumping and catching? If so, which skills:

KINDERGARTEN

K1 No, not interested because my child shows an average interest and rate of skills which are progressing nicely.

K2 Yes, throwing and catching.

K3 All the skills.

K4 Yes, if a more detailed explanation or profile were provided on other skills (all of above).

K5 No - parents should easily be able to evaluate.

K6 All skills, but just for curiosity.

K7 Yes, catching & throwing - he seems to have interest in baseball.

K8 Yes, if it has anything to do with his academic ability.

K9 All of the above.

GRADE 1

1-1 No.

1-2 Yes - especially throwing and catching, also rolling.

1-3 Yes, all of the above mentioned skills.

1-4 Throwing and catching.

1-5 All the skills.

1-6 All above.

1-7 Yes; all of the above mentioned.

1-8 Definately - the last 3. They seem like they would have many stages of development.

1-9 Not really.

1-10 Throwing, catching and maybe jumping.

1-11 I'd like more information on throwing and catching skills. My son is a baseball player.

1-12 I would be interested in all the above mentioned skills as well as those skills pertaining to balance and general muscular development.

1-13 Yes - rolling, throwing & catching.

1-14 I don't know if my child is where he should be for his age. Is Step 2 and/or 3 good for his age or should he be more skilled? I think that more information about the other skills you have listed would be interesting to us. It would certainly make us more aware of how our child is progressing.

1-15 Perhaps throwing & catching, since many children seem to have trouble with these skills.

1-16 Yes, throwing and catching.

1-17 I would be interested in throwing and catching.

1-18 Yes - throwing and catching.

1-19 Yes. Throwing & catching. He seems coordinated until a ball is involved in his skills.

1-20 Yes. Rolling & throwing.

1-21 All of the above skills will just help to know my child's growth rate that much better. If she didn't score well I would want to know about it. However if one knows and watches their child do these things, as you say, they progress at their own rate. I truly don't understand completely the reason that I would be interested in this. I would think that this would be, however, very useful to the study that you're conducting.

GRADE 2

2-1 All of those mentioned.

2-2 I would only be interested if my child was lacking or behind in these skills.

2-3 Yes, all skills.

2-4 Yes. Rolling, throwing, jumping, catching.

2-5 - -

2-6 No.

2-7 No.

2-8 No.

2-9 I would be interested in anything involving his feet, i.e. kicking (he plays soccer). S's feet turned in severely as a baby and he has worn orthopedic shoes for last 7 years. They still turn in a little.

2-10 I would be interested in knowing about L's throwing, jumping and catching skills, but compared to others his age, etc.

2-11 I would be interested in the reasons for all 3 of our boys batting as left-handers and throwing and catching right handed.

2-12 None.

2-13 Yes, I would. I'm interested in the skills of rolling and jumping.

2-14 All above.

2-15 Yes, jumping and catching.

2-16 Yes - all of the skills listed above. But particularly more information about a connection between these gross motor skills and other areas in his academic life.

GRADE 3

3-1 No, unless she shows some sign of abnormality.

3-2 Your information is totally devoid of substance and interpretation. What are you attempting to analyze?

3-3 We always welcome any information about our child, so any of the above would be interesting.

3-4 I suppose, it's always nice to have your observations confirmed by someone who is knowledgeable.

3-5 No.

3-6 Perhaps, if you could relate them to something i.e. what sports K might be particularly suited for, what to stay away from, etc.

3-7 I would enjoy having information on throwing and catching.

3-8 No.

3-9 Not right now.

3-10 Yes - jumping, throwing and catching.

PARENT COMMENTS

QUESTION #2 Do you see any ways that you can use this information: Please explain.

KINDERGARTEN

K1 The information is generalized even per child - how about using birth order to learned ability in testing. I'm sure you'd find an interesting ratio there.

K2 This information can let me know where my child is, developmentally, compared to his peers. It may indicate that he has a problem that may need looking into.

K3 I plan on working on improving some of these skills this summer. By playing games etc.

K4 Yes, to help and encourage these skills at home.

K5 Knew necessary information already.

K6 No. We should encourage our children to participate in physical activities irregardless of their levels of achievement.

K7 Maybe - if understood it better.

K8 I understand that a child's ability in this area has something to do with his reading. If so this information could be useful.

K9 Yes. I want to be sure that my daughter develops good coordination and motor skills at the appropriate rate for a child her age.

GRADE 1

1-1 No.

1-2 If I knew the proper steps involved (if the information were more fully explained) in a given skill, I could give help at home in advancing with the skill.

1-3 Reinforces my belief that help should be given my child by school district.

1-4 Curious, mostly. Would like to see her become more interested in athletics.

1-5 I plan on working on improving some of these skills this summer. By playing games etc.

1-6 It's just for my own personal interest. Also if either had scored exceptionally low I would be concerned with a possible physical problem.

1-7 Areas where my daughter's skills could be improved can be focused on.

1-8 Absolutely - I will now be able to possibly help my child because I know the chronological order of what they should do.

1-9 No.

1-10 Not really. Maybe if I was worried she couldn't do something I would be more likely to use this information.

1-11 J is very active and plays baseball and soccer all the time. His motor skills are very important to him and to me.

1-12 The information as sent to me was somewhat vague since I could make no comparisons to the 'norm' ,for the specific age category and/or skill as defined.

1-13 Yes, it is helpful to know if there are any delayed motor skills that could or should be reinforced. It also explains why my child may or may not be interested in participating in certain physical sports. Knowing this information may help us in choosing activities that are best suited to my child's abilities.

1-14 Yes. I would use it to help me choose some activities to do with my child. I did think children just progressed at their own rate. I can see, though, that they should be encouraged to practice different skills - in an enjoyable way.

1-15 No. This information needs to be accompanied by other information that explains where a child at that age should be. This information all by itself is interesting to note, but is of no real value by itself without anything to compare it to.

1-16 I think it's interesting to see how the assessment relates to other skills more closely related to sports areas (soccer, baseball, etc.).

1017 It would be interesting to see the comparison of baseball skills with other children of the same age.

1-18 Sports - to see if he's ready for baseball.

1-19 Yes. We can encourage our child to increase his arm movement when hopping or skipping.

1-20 Yes it helps me to know at what level of hopping and skipping my child is at.

1-21 - -

GRADE 2

2-1 To see if my child needs any help in those areas.

2-2 Not really.

2-3 By becoming aware of child's progress and helping him to do the things he needs to progress further.

2-4 Find out what his coordination level is for sports.

2-5 No.

2-6 - -

2-7 No.

2-8 No.

2-9 It was interesting to note that in his skipping he has a flat-footed landing as he is flat-footed.

2-10 I enjoyed learning the information about L's skills and accompanying letter explaining how to apply this information. Since we have seen a steady improvement in his motor skills, and since he participates in soccer, camp, and street dancing where he gets lots of encouragement, I'm not really sure how we can use this information further, but I do appreciate your having made it available to me.

2-11 I suppose siblings in the same family could be compared but we try not to.

2-12 No.

2-13 My husband and I have noticed that our son runs flat footed. Both of us will work with him to try to correct this. Any suggestions? Are steps taken at school in the p.e. classes to teach children the correct way to run?

2-14 It is for my own personal interest. Also if either had scored exceptionally low I would be concerned with a possible physical problem.

2-15 Yes but not at this time.

2-16 Practice skipping perhaps.

GRADE 3

3-1 No, unless abnormal.

3-2 Totally useless - no explanation is given for each developmental step.

3-3 No unless there was a medical or coordination problem.

3-4 I already knew my child was coordinated so it came as no surprise to me when the results arrived.

3-5 No.

3-6 No. We would need some interpretation. If not sports related, is there a correlation to physical development, social etc. development, or anything else?

3-7 A is interested in basketball. We have a basketball net in front of our house. Because of this exposure to the sport, she has progressed at making baskets, but has trouble catching balls. I know this will come in time for her. She is still very young.

3-8 No, I don't see ways to use this information.

3-9 No.

3-10 For sports such as soccer and softball.

PARENT COMMENTS

QUESTION #3 What is your overall reaction to this approach for assessing your child's hopping and skipping?

KINDERGARTEN

K1 It's OK, but not particularly useful for a parent unless there is concern over a physical problem.

K2 Even though I didn't understand some of the terminology (semi-opposition) I'm sure your approach is fine.

K3 If the district was paying for it, it would be too much. There are other places I can see the money going. If A T & T is paying for it and it would help your program it's OK.

K4 I feel that it's very important to make the parents aware of the stages in their child's development. But perhaps there could be more explanation beforehand telling parents about the various steps in each skill. For example, "two arm pump" in skipping needs possibly a visual demonstration to the parents.

K5 How relevant is it to assessing child's large motor skills?

K6 Costs too much money.

K7 Another means for putting child in a box. By comparing to a perfect way of doing things. Sometimes children compensate movements to adjust for their body makeup.

K8 Just another way of assessing his ability.

K9 I think it's great. It's hard to skip and hop with coordination unless the child practices. One of the first skills she learned in ballet at age 3 was hopping and then skipping. Each year, her development improves greatly.

GRADE 1

1-1 Favorable. Could be helpful to family of child with suspected motor skills problem.

1-2 Need explanation on the precise actions of the skill in order to help at home.

1-3 Excellent approach to identifying problems although if help is not offered to solve problems, I don't see benefit.

1-4 Any information about my child's abilities (physical as well as scholastic) is appreciated.

1-5 If the district was paying for it, it would be too much. There are other places I can see the money going. If A T & T is paying for it and it would help your program, it's OK.

1-6 I feel it will develop in time.

1-7 Positive. I'm interested in all areas of my child's development - mental, social, spiritual and physical.

1-8 Fine.

1-9 Not sure why you are doing this.

1-10 No reaction one way or another.

1-11 He thought it was fun!

1-12 The approach seems to be adequate particularly considering the use of videotape.

1-13 It is very interesting, but it would be helpful for parents to know how to help their child progress from one step to the next, or guidelines expressing when to be concerned that a child is not progressing at an acceptable rate.

1-14 Positive.

1-15 I have no strong positive or negative reactions.

1-16 The approach seems fine.

1-17 This is interesting although I don't feel it is of any benefit except in extreme cases.

1-18 It seems complicated.

1-19 We think it is very specific and covers hopping and skipping assessment quite thoroughly.

1-20 To know if my child is on the right track.

1-21 I thought it was neat to find out what I felt I

already knew. It was done in a most responsible way.

GRADE 2

2-1 I think it is very interesting.

2-2 I don't feel it is very meaningful to me.

2-3 To help him in all phases of development so that he can go on to other better learning skills throughout life.

2-4 As long as it helps the kids, it's OK.

2-5 More information is needed as to the parameters of each level. What is the definition of "semi-opposition" and "opposition"?

2-6 It is interesting, but I have no further questions. I'm sure I would have if my child scored at lower levels.

2-7 If I had a child with a problem I might be interested. But I find this of little value.

2-8 Without relating the data to norms, there is nothing I can constructively do with this information.

2-9 Interesting.

2-10 This more "scientific" analysis of motor skills is certainly more extensive than the "Play ball" approach to phys. ed. I appreciate your scholarly efforts. If you could provide this information periodically it would certainly be appreciated. If my child had a motor development problem, I would find this helpful to know. Then growth development and normative standards regarding age would also be needed for comparison tools.

2-11 Seems OK.

2-12 Ridiculous. Waste of time.

2-13 I think it is an excellent approach for assessing these skills. I appreciate the informatiojn and would like to be informed on a continual basis of my child's motor skills development. By continual, I mean perhaps on a yearly basis parents could be advised of their children's motor skills development, or lack of development.

2-14 I feel it will develop in time.

2-15 It helps me to know my child is average in this skill.

2-16 I did like it but felt it wasn't information enough. What are "norms" at this age? What can we do to encourage these skills? What is done in P.E. to encourage these skills? What does "arm action" mean? "Semi-opposition"?

GRADE 3

3-1 Not knowledgeable enough to understand how the approach differs from others.

3-2 I don't understand your approach.

3-3 Nice to have the information, but I don't see any use for it personally.

3-4 My child already knew that hopping and skipping was fun and easy; no surprise or true information that was new.

3-5 - -

3-6 Don't know enough about why it is being done, and again what it correlates to.

3-7 I feel this program was worthwhile and informative and was delighted to receive this information about A's motor skills. It shows you care.

3-8 In regards to the grading, an important fact is missing. Is my child evaluated against children in her grade or all children K-3? Should a 3rd grader be expected to be at the final level and a 1st grader at level 1 or 2? What is the average level for a 3rd grader?

3-9 Beneficial to teaching staff, but unless teaching individually, question how teacher can help each individual child correct movements.

3-10 It was not shown whether these skills were age appropriate. I would like to know if she should be working on certain skills.