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**A MOTOR CREATIVITY TEST
FOR COLLEGE WOMEN**

by

Elizabeth Gay Glover

**A Dissertation Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education**

**Greensboro
1974**

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APPROVAL PAGE

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The purpose of this study was to develop a tool for measuring the motor creativity of college women. The theoretical construct of the Torrance Tests of Creative Thinking, Figural Form, was used as the model to develop twelve movement tasks for exploratory purposes. The tasks consisted of three types of activities: a warm-up activity with one stimulator, an activity with several stimulators, and an activity with one repeated, traditional stimulator. To determine the construct validity of the motor creativity test, the researcher examined the movement performances which subjects performed in the twelve movement tasks of the exploratory and pilot studies and rated each task on a scale of seven criteria. On the basis of these ratings, three tasks were selected as valid for the motor creativity test. A scoring system was devised to enable judges to describe, analyze and evaluate the movement performances of subjects on five variables - fluency, originality, flexibility, elaboration and motor creativity.

The motor creativity test, composed of three tasks (Move to Sounds, See and Move and Hoops and Lines), was administered four times to twenty-five college women who were enrolled in the physical education service course program at the University of Oregon. The first administration was used to acquaint the subjects with the tasks and the equipment involved. The movement performances from the second, third and fourth testing sessions were recorded on videotapes.

Three judges were trained to describe, analyze and evaluate the movement performances of the subjects who performed in

the pilot study. These data were treated statistically to determine the reliability and objectivity of the judges following the training session. The judges twice evaluated the movement performances of the twenty-five subjects in the second testing session of the motor creativity test. These two evaluations provided data for determining the reliability and objectivity of the judges in using the scoring system. The objectivity correlation coefficients for both evaluation sessions provided statistical information relating to the level of improvement of the judges' evaluations. Other statistical information resulting from the treatment of these data included means, standard deviations, intercorrelation coefficients among the variables for each task and intrajudge and interjudge percentage agreements.

One judge, the researcher, also evaluated the movement performances from the third and fourth testing sessions in order to study the effect of increasing the time length for evaluating the movement performances on the tasks. These evaluations were combined with those of the second testing session to provide scores for each subject on each task on one testing session, two testing sessions and all three testing sessions. The data from these evaluation sessions were treated statistically to determine means, standard deviations and intercorrelation coefficients among the task variables and the evaluation sessions.

Within the limitations of this study, the following conclusions can be drawn:

1. Based upon the theoretical construct of the Torrance Tests of Creative Thinking, Figural Form, the motor creativity test, composed of three tasks (Move to Sounds,

See and Move and Hoops and Lines) is a valid tool for measuring the motor creativity of college women.

2. Although the motor creativity test is a valid tool, the scoring system, which enables judges to describe, analyze and evaluate the movement performances of subjects, needs further refinement in order to be an objective and reliable system for evaluating motor creativity.
3. The motor creativity test should be used with caution as a tool for measuring motor creativity until the scoring system is revised and proven to be a reliable and objective system for evaluating motor creativity.

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

The violent disruption of educational institutions in the Sixties shocked American society. It was experiencing a revolution. In a current bestseller, Future Shock, Toffler (1970) describes this social change as a super-industrial revolution, meaning that people must cope with several revolutions simultaneously. In his views key concepts for understanding the super-industrial revolution are transiency, novelty and diversity.

In comparing the institutions of yesterday with those of tomorrow, Toffler (1970) indicates that yesterday's educational institutions reflected the industrial society - square buildings symbolizing the factory; ringing bells signifying changes in time, place and activities; and marching and sitting in straight lines indicating order and precision. Teachers were workers; students, raw materials; and the school system, a bureaucracy. In the educational system of tomorrow, he predicts that machines will perform the routine tasks and men will perform the intellectual and creative tasks. (1970:398-427)

Other influential thinkers, writing within the last ten years, have emphasized the nurturing of creativity within the individual as a significant way of coping with changes in society. At the 1963 Utah Conference on Scientific Creative Talent,

historian, Arnold Toynbee (1964) stated that the prevailing mental attitudes and behavioral habits of a society may "stunt, stultify, and stifle" the potential creative ability of individuals. His elaborations on this theme relate to possible causes of the violent behaviors of students in American colleges in the Sixties:

When creativity is thwarted, it will not be extinguished; it is more likely to be given an anti-social turn. The frustrated able child is likely to grow up with a conscious and unconscious resentment against the society that has done him irreparable injustice, and his repressed ability may be diverted from creation to retaliation. (Toynbee, 1964:6)

In analyzing the conditions of creativity, Bruner (1966), a distinguished educator, implies that man creates because he seeks an answer to the nature of his own acts through these creations. This in itself is man's struggle to achieve dignity. Man made the machine and the machine is useful, but it has not answered the question concerning man's dignity. (1966:16)

For the past fifty years, creativity has been a controversial subject. Many researchers have avoided the study of creativity because the variables controlling the phenomenon are difficult to control and manipulate scientifically. Gutman (1967) elaborates on the difficulties of investigating creative behavior:

Creative behavior, by its very nature is spontaneous, inner-directed, ordinarily not capable of being elicited at will. Therefore, it is unpredictable and escapes manipulation and control. It is generally not amenable to experimentation. (1967:3)

Although creativity is considered to be nebulous, some psychologists have tried to define creativity, the creative

process, the creative person and the creative environment. General conclusions of these explorations indicate that man by his very nature possesses the potential for creative behavior. (Guilford, 1967; Murphy, 1958; Rogers, 1961; C. W. Taylor, 1964a; I. A. Taylor, 1971a; and Torrance, 1969)

In an effort to challenge the unique potential of every individual, educators have studied the college drop-out, particularly the highly creative individual. In a number of cases, students have reported that a college educational experience was confining and lacked "novelty, challenge or esthetic stimulation." (Heist, 1968:53) In the study of uneasy youth, Heist (1968) presented a sketch of Karen, who was bitterly disappointed with her college studies in music, graphic arts and dance. To Karen the dance program was "'ladylike calisthenics'." One highlight of Karen's education was her participation in sports. She reported to Mr. Heist the "'sheer delight' she experienced from the movement of her body, whether playing field hockey, swimming, or dancing." (1968:23)

Recent emphasis on creativity in education has sparked the philosophical examination of creative aspects of the movement experience in physical education. Dorman (1968) studied creativity as a significant concept of sport, dance and physical activity. She reported that creativity was a multidimensional concept which occurs as a result of intellectual, emotional and kinesthetic dissonance within the individual. The creative process occurs in sport, dance and physical activity is an effort to resolve intellectual, emotional and kinesthetic dissonance.

Mesenbrink (1971) also used a philosophical method of inquiry to explore the interrelationships existing in three aspects of creativity - the creative personality, the creative process and the teaching-learning environment - with physical education activities and methodologies. The major premise in her study was that the creative process can be developed and the creative personality enhanced through physical education programs. She concluded that physical education is unique in providing an experience of total involvement of the whole individual "in the media of movement," with the "tactical manipulation of animate and inanimate objects, communication with others, self-appraisal, and the development of self-awareness." (1971:97)

The nurturing of creativity within the individual has been studied in relation to curriculum design. In developing a conceptual curriculum model for physical education, Jewett (1968) identified three categories in a process-oriented classification of movement: developmental movement, co-ordinative movement and inventive movement. The third category, inventive movement, stresses movement unique to the individual. It provides experiences for the individual to use the fundamental movements in formulating new combinations and "creating new forms." (1968:13)

As Torrance (1965) was conducting his research on creativity at the University of Minnesota, he reflected upon a particular experience which made him aware of the potential contribution physical education programs can offer to the development of creative thinking abilities. While observing the creative

movement classes conducted by Gertrude Baker, former head of the Department of Physical Education at the University of Minnesota, he noticed that the first and second grade children were experiencing "very sound creative thinking" in their warm-up activities. He was impressed with "the fluency of ideas expressed in movement, the flexibility and originality of thinking manifested, and the way in which they elaborated their ideas." (1965:26)

As a result of this observation, he administered a battery of the Minnesota Tests of Creative Thinking (Non-Verbal Form B) to the first and second grade children who had completed five weeks of creative movement experiences with Dr. Baker and to the third grade children who were just beginning their experiences. He found that almost one-half of the first and second graders achieved scores which exceeded the mean score for the fifth graders on measures of fluency, flexibility, originality and elaboration. None of the third graders achieved a score that reached the mean score for the fifth grade level. Torrance not only considered these statistics valuable but recognized developmental progress with individual children, for instance:

. . . one third grade boy had created problems in the classroom for some time. His participation in classroom learning activities was minimal and he manifested hostility in many ways. At first he also manifested hostility in the creative movement class. As he found acceptable ways of expressing hostility through movement, his hostility began to diminish and he began to participate in the creative movement class with absorption. Similarly, his general classroom attitude was transformed. His parents also noted a difference. (1965:26)

Several experimental research studies in physical education compare a movement form of creativity, called motor creativity, with figural creativity, verbal creativity, motor performance skills, motor ability, body concepts and intelligence. These studies present two uniquely different tools for measuring motor creativity. (Withers, 1960; Wyrick, 1968) One tool, constructed by Withers (1960), consists of three performance tasks in which individuals develop a short dance composition, a movement phrase of dance technique and a movement improvisation with a visual stimulus from a film. The movement performances are subjectively evaluated on a nine-point scale with seven factors relating to creativity.

The second tool, the Wyrick Motor Creativity Test Battery (1968), is composed of four performance tests in which directions delineate what the individual can do and cannot do. Wyrick's test battery, based upon Guilford's factor-analytic studies (1956), evaluates the movement responses on fluency, originality and motor creativity.

Recent reports identified over one hundred instruments measuring some aspect of creative behavior. (Kaltsaunos, 1971, 1972; Davis, 1971) In analyzing these reports the investigator of this study found that apparently there are numerous tests for measuring verbal creativity and non-verbal creativity, but only two tests for measuring some aspect of creative movement. If more emphasis is to be placed upon the creative movement in physical education programs, then more instruments for conducting research

relating to creative movement must be constructed, tested, modified and retested.

In summary, the current thoughts of influential writers within our society attribute the disorder in educational institutions to the lack of nurturing creativity in individuals. Creativity appears to be an inherent characteristic of every individual. For instance, in infancy the child initially moves to discover. Is it not possible the child also discovers to move? Physical education has been identified as a unique activity for nurturing creativity. Among a possible 107 creativity tests, only two tests purport to measure motor creativity. Some researchers have used these two motor creativity tests to explore the various creativity factors relating to physical activity. Research investigations are needed to construct more tests which will analyze the various kinds of processes and changes in abilities which occur as a person experiences creative movement.

STATEMENT OF THE PROBLEM

The general purpose of this study was to develop a tool for measuring motor creativity of college women.

Subproblems

Problems to be investigated during the study were:

1. An analysis of the theoretical construction of three movement tasks designed to measure motor creativity.
2. The construction of a scoring system for analyzing

the movement responses of, and for evaluating the motor creativity in, college women.

3. The ascertainment of objectivity, reliability and validity in the utilization of the scoring system to analyze such movement responses and to evaluate motor creativity.
4. The examination of interrelationships which exist among the various variables of motor creativity in the three movement tasks.

ASSUMPTIONS

The basic underlying assumptions of this study were:

1. Individuals possess capacities and potentialities for producing a movement form of creative behavior known as motor creativity.
2. Variations in motor creativity range from low levels to high levels.
3. Motor creativity can be identified by means of measuring responses to specific stimuli.

LIMITATIONS OF THE STUDY

The study had the following limitations:

1. Subjects were randomly selected without the consideration of previous creative movement experience or previous creativity training experience.
2. Although subjects were tested four times within a two-week period, the testing period for the total group of

- twenty-five subjects amounted to a four-week period.
3. Subjects were asked to respond to the tasks in a room with video-tape equipment and three people operating the equipment.
 4. Each subject's responses were analyzed and evaluated from a video-tape recording of her movement responses.
 5. The three judges analyzing the movement responses were trained independently on the utilization of the scoring system. Their observations of the video-tapes also occurred independently.

DEFINITIONS OF TERMS

The following definitions were utilized in this study:

Creativity is a complex process whereby a person senses a problem, identifies the difficulty, searches for solution, reinterprets the solution and produces a novel product. Some factors which enable one to evaluate creativity are fluency, originality, flexibility and elaboration (Torrance, 1969)

Fluency is the number of different responses occurring within the activity which relate to the activity. (Torrance, 1966 and 1970)

Originality is the uniqueness and novelty of the responses occurring within the activity. It may be based upon either of two criteria: the responses of the total group or the responses of the individual over a period of time. (Torrance, 1966 and 1970)

Flexibility is the variety of responses, representing different strategies, principles and approaches used to solve the problem in the activity. (Torrance, 1966 and 1970)

Elaboration is the number of details which enhance the responses and increase its character as a unique structure. (Torrance, 1966 and 1970)

Motor Creativity is a person's ability to invent novel ways of moving in relation to his environment by reorganizing old movement patterns which have not been performed. Although motor creativity is considered to be independent of quality and efficiency of movement skill, one's previous movement experience may enhance his motor creativity. (Wyrick, 1966; Torrance, 1969)

Movement Tasks are environmental settings containing stimuli to generate creative movement responses.

Movement Responses are one or more than one movement pattern (e.g., running and jumping while rotating the arms in a small horizontal circle). A response has a beginning and an ending and can be identified in either of two ways:

- a. By the instructions prescribing the movement task.
- b. By the pauses occurring with the person's organization of the movement patterns. (Hutt, 1970)

CHAPTER II

REVIEW OF LITERATURE

The phenomenon of creativity has been a source of concern for people as far back as the age of Plato. Kneller's (1965) review of the various theories defining creativity discloses two ancient philosophical theories, three modern philosophical theories and nine psychological theories. His survey describes the following philosophical theories of creativity:

1. Creativity is divinely inspired.
2. Creativity is a form of madness.
3. Creativity is "a highly developed form of intuition." (1965:21)
4. Creativity is "a life force." ". . . a manifestation of the creative force inherent in life itself." (1965:22)
5. Creativity is "a cosmic force." ". . . rhythmic or cyclical, for the word consists not of a single event, but rather of events that constitute actual entities, which are born, develop, and die." (1965:23)

In a speech presented to the American Psychological Association, Guilford (1950) initiated two decades of extensive research on the measurement of creativity. Various theoretical concepts, various identification approaches and various creativity measurement procedures were developed and tested.

This review of the literature is divided into four parts. The first part reviews the various theoretical rationales which construe the phenomenon of creativity. The second part reports selected research works which have used the various theories to develop assessment procedures. The third part examines the theories,

assessment procedures and selected research utilizing these procedures with respect to motor creativity. The fourth part presents the major issues which influence the assessment of creativity.

PSYCHOLOGICAL THEORIES RELATING TO CREATIVITY

Kneller (1965) and Roweton (1970) have reviewed the various psychological theories relating to creativity. Whereas Kneller merely describes each theory, Roweton classifies the theories into categories: (1) theories emphasizing a cognitive process-orientation to creativity; and (2) theories emphasizing a product-orientation to creativity.

Process-Orientation Theories

In the process-orientation to creativity, Roweton (1970) presents three theoretical approaches to examining creativity: definitional, dispositional and psychoanalytical. The definitional approach consists of opinions and concepts which reflect the author's view of what creativity is. According to Roweton, few of these definitions have been tested. However, he indicates that such definitions may be of heuristic value since they can be a "rich source of testable hypotheses." (1970:3)

Through content analysis, I. A. Taylor (1962) has identified 250 definitions pertaining to creativity. He groups these definitions into five clusters of meaning: expressive creativity, productive creativity, inventive creativity, innovative creativity

and emergentive creativity. These clusters represent a hierarchy of levels at which the creative person is functioning in the environment. Expressive creativity, characterized by spontaneity and freedom, represents the lowest level of creating whereas emergentive creativity, characterized by the development of "ideational original principles," is the highest level of creating. (1971b:1)

Another theoretical approach to creativity, the dispositional approach, examines the basic behavioral structures of creative expression (i. e., personality dimensions, environmental dimensions, cognitive thinking patterns). Methods of investigating the dispositional approach employ adjective check lists, questionnaires, personality inventories, interviews, "living-in" assessments and intelligence and cognitive styles measures. Barron (1963) used this approach to study the underlying disposition towards originality which exists in persons who are considered original. The major premise of his study was that some persons are regularly original whereas other persons are regularly unoriginal. Two criteria defined original response: (1) it must have "a certain stated uncommonness" within the particular group being studied; and (2) it must be "adaptive to reality." (1963:140-141) One hundred United States Air Force Captains were given eight test measures to investigate the following hypotheses:

1. Original persons prefer complexity and some degree of apparent imbalance in phenomena.

2. Original persons are more complex psychodynamically and have greater personal scope.
3. Original persons are more independent in their judgments.
4. Original persons are more self-assertive and dominant.
5. Original persons reject suppression as a mechanism for the control of impulse. (Barron, 1963:147-148)

Barron (1963) concluded that twelve of the fifteen predictors, as measured by the eight tests, prove to confirm the theoretical formulation as stated in the hypotheses.

Roweton (1970) is critical of the studies using the dispositional approach for several reasons. In the first place, the results of studies are based solely on the verbal reports of the subjects. "Data from verbal reporting . . . lacks [sic] empirical validity in the sense of not being publicly observable, repeatable, and falsifiable." (1970:7) Secondly, academic performance findings are often contradictory to the findings in another study. A third criticism is the lack of valid and reliable instruments measuring cognitive thinking patterns. Roweton infers that "the most scientific approach to studying creativity employs testing instruments and experimental procedures . . . yielding objective, reliable, and valid response data." (1970:9)

The third theoretical approach, psychoanalytical, has three major orientations: traditional, neopsychoanalytical and humanistic. The traditional orientation is based upon Freudian psychology. Kneller (1965) indicates that Freud believed that creativity originates in a conflict in the unconscious mind (the id). The unconscious produces a solution to the conflict. If

this solution is ego-satisfying (i. e., fulfills the intended purposes of the ego), then creative behavior occurs. Getzels and Jackson (1962) elaborate on Freud's theory and summarize six major issues that contribute to creative activity:

(1) Creativity has its genesis in conflict, and the unconscious forces motivating the creative 'solution' are parallel to the unconscious forces motivating the neurotic 'solution'; (2) the psychic function and effect of creative behavior is the discharge of pent-up emotion resulting from conflict until a tolerable level is reached; (3) creative thought derives from the elaboration of the 'freely rising' fantasies and ideas related to day-dreaming and childhood play; (4) the creative person accepts these 'freely rising' ideas, the noncreative person suppresses them; (5) it is when the unconscious processes become, so to speak, ego-syntonic that we have the occasion for 'achievements of special perfection'; (6) the role of childhood experience in creative production is emphasized, creative behavior being seen as 'a continuation and substitute for the play of childhood'. (1962:91-92)

Freud's theory has been a basis for the hypothesis that there is a relationship between mental health and creative functioning. Torrance (1967) notes that "the concept of 'regression in the service of the ego' and the conditions which psychoanalysts pose as essential for aggression in the service of the ego sound very much like conditions for productive creativity." (1967:76)

Roweton (1970) reports that neopsychoanalytic theorists find it difficult to follow the traditionalist viewpoint as the psychoanalytic orientation fails to handle certain behaviors adequately. Some neopsychoanalysts tend to shift the source of creativity from the unconscious to the preconscious and to assert that creative behavior is essentially "the product of a repressed . . . aggressive impulse and of regression to infantile

modes of thought or experience" (Schachtel, 1959:243) Schachtel defines creativity as the "art of seeing the familiar fully in its inexhaustible being, without using it auto-centrally for purposes of remaining embedded in it and reassured by it." (1959:184) Schachtel identifies two main modes of perception: autocentric, or subject-centered, and allocentric, or object-centered. As the child grows towards adulthood the auto-centric perception of infancy is replaced by allocentric perception. During this change a secondary autocentric perception develops and is capable of restricting the person's awareness. Secondary autocentricity is a consequence of the socialization process, for it occurs as the maturing person absorbs the conventional responses in society. A person with secondary autocentricity tends to perceive things in relation to himself and "to avoid the new and strange, as a threat to habit and routine." (Kneller, 1960:36) This person is closed to experience and lacks creativity.

According to Roweton (1970), the humanistic orientation considers creativity to be "a product of a 'health' self, a symbol of man's growth-potential." (1970:5) Rogers (1961) attributes the primary motivation for creativity as "man's tendency to actualize himself to become his potentialities." (1961:351) In Rogers' opinion, every individual possesses this tendency for creative activity and needs only the proper conditions in order to release and express it. Inner conditions for expressing creativity are an openness to experience, an internal evaluative

judgment and ability to play spontaneously with elements and concepts. Environmental conditions for fostering creativity are: (1) acceptance of the unconditional worth of the individual; (2) absence of external evaluation; (3) empathetic understanding; and (4) individual freedom for symbolic expression. To Rogers the creative process is "the emergence in action of a novel relational product, growing out of the uniqueness of the individual on one hand, and the materials, events, people or circumstances of his life on the other." (1961:350)

Another humanistic orientation is presented by Maslow. (1968) He identifies two types of creativity: "special talent" creativity and "self-actualizing" creativity, the latter being related to his theory on the needs of a fully-functioning person. In Maslow's opinion, there are three levels of creativity. Primary creativity utilizes the primary thought processes of the person. This kind of creativity is exemplified in the improvisation of artistic works. Secondary creativity includes productive works on bridges, houses, new automobiles and other scientific experiments and literary works. The secondary creativity level occurs as the secondary thought processes take over the primary thought processes. The third level of creativity, called integrated creativity, is a fusion of both types of processes and yields the most productive and great works in science, art, philosophy and literature.

Product-Orientation Theories

Roweton (1970) identifies two approaches in the product-orientation theories: the behavioristic approach and the operational approach. The behavioristic approach functions on the premise that the more creative production of original ideas is practiced and reinforced, the more likely novel ideas are to be increased.

Maltzman (1960a) has used the behavioristic approach to study creativity. First, he differentiates between originality and creativity. Originality occurs relatively infrequently, is uncommon under given conditions and is relevant to those conditions. Creativity refers to the product of original behavior and the reactions to the product by other members of society. An invention which is a consequence of original thinking or behavior may be an important creative product to society. Thus original behavior is related to the individual's past behavior or to the norms of a population to which he is a member. Since many more societal and behavioral variables influence creativity than originality, Maltzman believes that originality, one aspect of creativity, may be studied in the laboratory.

Maltzman and his associates (1960b) reject Guilford's (1950) assertion that the S-R approach cannot deal with creativity when they perform a series of five experiments to investigate the trainability of originality in human subjects. Preliminary to the series of experiments, Maltzman, Bogartz and Breger (1958) used a procedure to repeatedly evoke different associations to the

same stimulus words in a free association situation. This procedure prompted the subject to emit uncommon responses relative to the elicitable hierarchy of each stimulus. They found that such training with intermittent reinforcement of uncommon responses enabled subjects to be significantly more original on a new list of words than subjects without training. Upon the completion of the experiments, Maltzman and his associates (1960b) concluded that the repeated occurrence of common responses to the same stimuli increase the tendency of emitting common responses in other situations. The repeated occurrence of uncommon responses to the same stimuli increases the disposition of original behavior in other situations. Experiments IV and V supported the hypothesis that originality is learned behavior and it "varies as a function of the same antecedent conditions as other forms of operant behavior." (1960b:16)

In Roweton's (1970) view, the second approach to product-orientation theories, the operational approach, consists of programs, courses and techniques which define specific procedures for training creativity. These procedures are systematically developed by altering the creative problem-solver's environment and identifying the effective determinants of creative behavior.

Roweton (1970) also reports that Osborn's (1953) brainstorming techniques have been the most successful of group problem-solving techniques. Osborn's technique has three stages: fact finding, idea finding and solution finding. These stages use any or all of the following seven phases:

1. Orientation: Pointing up the problem.
2. Preparation: Gathering pertinent data.
3. Analysis: Breaking down the relevant material.
4. Hypothesis: Piling up alternatives by way of ideas.
5. Incubation: Letting up to invite illumination.
6. Synthesis: Putting the pieces together.
7. Verification: Judging the resultant ideas. (1953:125)

Osborn's approach augmented Wallas' steps for creative production. Wallas' (1926) design consists of four steps:

(1) preparation, the collecting of needed information; (2) incubation, a temporary pause of relaxation of conscious effort; (3) illumination, a moment of insight; (4) verification, the elaboration of the created product.

In an effort to construct a theory for creative behavior, Guilford (1967) devised an operational model and a morphological model. The operational model for problem-solving emphasizes four major kinds of operations in problem-solving: (1) cognition by sensing and understanding the problem; (2) memory by producing storage for information; (3) production by generating solutions; and (4) evaluation by continually self-checking behavior. The operational model is unique in several aspects. First of all, a repetitive cycle exists between the cognition and production processes. Secondly, the evaluation process is a continually self-checking process recurring after each step. Thirdly, all of the new information absorbed by the individual is stored in the memory storage panel. Guilford (1967) indicates that the memory storage area has four distinct kinds of information centers known as figural forms, symbolic forms, semantic forms and behavioral forms. The four forms are like four different languages

as each form is differently utilized by the person. A painter, a composer or a choreographer may conceive a theme in semantic form and translate it into figural form. Writers who communicate heavily in verbal form utilize the semantic information center; whereas politicians, teachers, social scientists, who deal directly with people, utilize the behavioral information center. It is quite possible that more than one form can be utilized at any one time.

Guilford's (1967) morphological model is a three-dimensional matrix and a cross-classification of intellectual abilities known as the Structure-of-Intellect. Each cell represents a unique ability or intellectual skill. The theory offers 120 hypothetical relationships of which only seventy relationships have been demonstrated.

Guilford (1967) reports that the Structure-of-Intellect model represents four kinds of information, five kinds of operations and six kinds of products. The four kinds of information are figural, symbolic, semantic and behavioral content areas which are described in the problem-solving model.

The five kinds of operations, which Guilford (1967) describes, are similar to those operations in his problem-solving model - cognition, production, memory and evaluation. The significant difference between the two is the division in the production category of convergent operations and divergent operations. Both operations retrieve information from the memory storage center; but convergent-production occurs under severe restriction,

whereas divergent-production encourages diverse solutions and ideas.

According to Guilford (1967), the six kinds of products in which information is processed are units, relations, classes, systems, transformations and implications. Each bit of information in the memory storage panel can be classified as a unit production. Guilford indicates that "a figural unit may be a letter, a geometric form . . ." and "a symbolic unit may be a familiar syllable or word, a bar of music, or a code letter or word." (1967:199) Semantic units are concepts or familiar ideas. Behavioral units are perceptions, feelings and intentions.

In a critical examination of Guilford's Structure-of-Intellect model, Triffinger, Renzulli and Feldhusen (1971) report that the "model does not constitute a theory of creativity, per se, . . .," but actually constitutes "a theory of human intelligence which subsumes some important cognitive aspects of creativity." (1971:105) Triffinger et al. criticize Guilford's work for its sole emphasis on the cognitive aspects of creative behavior. In their opinion, "a comprehensive theory of creativity would necessarily consider in detail the nature and relationship of non-cognitive components of creative behavior, as well as the cognitive aspects." (1971:105)

Other Theories

Although Roweton's (1970) report on the theories of creativity appears to be comprehensive, he fails to show that

there may be some integrated approaches between the process-orientation and product-orientation theories. This possibility is demonstrated in studying Maltzman's work. Roweton classifies Maltzman's work as a product-orientation theory with a behavioristic approach. Maltzman based his beliefs about original behavior on Barron's study, "The Disposition Toward Creativity." (Maltzman, 1960a:230) Barron's work appears to be a process-orientation theory with a dispositional approach.

Another example of an eclectic orientation to creativity theory is Taylor's transactional theory. I. A. Taylor (1971a) presents a heuristic model of creativity which includes the person, his environment, the creative process, the problem on which the person is focusing and the product which results. In this model ". . . creativity involves a transacting personality in a stimulating environment in which key significant problems are converted to creative product closures." (1971a:6) Although character and interfaces of the parts are not fully worked out, I. A. Taylor has constructed some postulates and hypotheses. He proposes that creativity increases with "environment stimulation," "personal transaction," "process openness," "problem incompleteness" and "inherent product closure." (1971a:5) Corresponding to the postulates are the following hypotheses:

1. Stimulation increases transaction.
2. Transaction increases openness.
3. Openness increases sensitivity to key products.
4. Sensitivity to key problems increases product closure. (1971a:5)

The postulates and hypotheses are the foundation for the interrelationships which exist among the various parts of the transactional model: the person, the process, the product, the problem and the environment.

Summary

The phenomenon of creativity has been analyzed through several psychological theories. Process-orientation theories tend to look at the unobservable type behaviors within the person. According to Roweton (1970), the definitional, dispositional and psychoanalytical approaches are unacceptable as theories because the investigated behaviors within the approaches cannot be controlled and manipulated for experimental research methods. Product-orientation theories which include the behavioristic and operational approaches are more amenable to the experimental design as they offer problems and techniques which can be tested and observed.

Utilizing an eclectic approach to investigate creativity appears to be a more extensive procedure. It is multidimensional in that the person, the process, the problem, the environment and the product are examined concurrently. It means testing and analyzing process-orientation approaches by means of observable product-orientation techniques.

SELECTED RESEARCH RELATING TO THE MEASUREMENT OF CREATIVITY

In investigating the methods of assessing creativity, researchers have identified over one hundred instruments for

studying creative behavior. (Kaltsounis, 1971 and 1972; Davis, 1971) These instruments are classified as verbal creativity measures, non-verbal creativity measures, personality measures, biographical inventories and attitudinal inventories.

Guilford (1950) was instrumental in initiating interests in creativity assessment when he constructed, through factor-analytic efforts, a battery of test items that identify cognitive functions specific to creative thinking. These cognitive factors are sensitivity to problems, fluency, flexibility, originality, penetration, analysis, synthesis and redefinition. In a close examination, Guilford (1966a) identifies three kinds of fluency (associational, ideational and expressional); two kinds of flexibility (adaptive and spontaneous); and elaboration as being the specific factors which his test items measure.

In one of the earliest studies, Wilson, Guilford and Christensen (1953) examined various approaches for measuring originality, a factor which they believed to be the most important aspect of creative thinking. In their study, they adopted three definitions of originality and applied corresponding approaches for measuring originality to specifically designed tests. Originality was defined as uncommonness of responses, remoteness of responses and cleverness of responses.

Uncommonness of responses is measured by open-ended tests which require the person to produce responses. An example of this kind of test is the Unusual Uses Test, which consists of two separately timed parts. Each part lists three objects and a

common use for each object. The subject is given five minutes to list six more uses for each object. All responses are tallied to determine their frequency of occurrence within the total test population. Then the responses are weighted according to their frequency of occurrence. Those responses occurring most frequently receive a weight of one whereas those responses occurring most infrequently receive a weight of five. All responses receive some weighting on a continuum ranging from one to five. The subject's responses are scored by assigning the appropriate weighting and summing them. Using the Unusual Uses Test and other similar measures, Wilson and his associates (1953) found that individuals who produce the most "infrequently given ideas" acquire the highest total scores and are "regarded as the most original members of the total group." (1953:364)

Remoteness, a second approach for measuring originality, is defined as "the ability to make remote or indirect associations." (1953:366) Tests measuring remoteness require the subject to make remote associations if he responds at all. One test, Associations I, presents twenty-five pairs of words. The test is designed so that associations between each pair of words are not apparent. The subject's task is to identify a third word which links the two words. The subject's score is the number of responses he gives to the twenty-five items in a four-minute period.

A third approach, which Wilson et al. (1953) used for measuring originality, is cleverness. Cleverness is defined as "the ability to produce responses that are rated as clever by

judges." (1953:367) A test using this approach evokes responses showing variation on a continuum of cleverness. A subject's responses are weighted according to their degree of cleverness. An example of this approach is the Plot Titles Test, which consists of two brief stories. The subject is given three minutes in which to write as many appropriate titles as he can for each story. Judges evaluate the cleverness of each title and assort all titles into six groups on this evaluative basis of cleverness. Weightings from zero to five are assigned each group of titles, with the most clever group receiving a weighting of five. To simplify the scoring technique, Wilson et al. (1953) studied the total scores derived from weightings. Intercorrelations indicated that scores based on zero and one correlated well and scores based on two, three, four and five correlated well. However, a combination of scores based on weights zero and one correlated low with a combination of scores based on weightings two, three, four and five. For this reason, Wilson et al. have reduced the cleverness rating scale to two intervals: zero, for unclever, and one for clever.

By conducting many factor-analytic studies, Guilford has identified a number of factors that contribute to creative thinking as forms of fluency, flexibility and elaboration. He defines fluency as "a matter of facility with which an individual retrieves information from his personal information in storage." (1966a:188) The Associational Fluency Test measures the factor of divergent-production of semantic relations (associational fluency), which is

defined as "the ability to produce a variety of relations or of analogies to given information." (1966b:49) The test instructions direct the subject to list words which mean "about the same as a given word, e.g. Dry." (1966b:49) Most of the tests measuring fluency involve the symbolic or semantic content areas.

According to Guilford flexibility is "a matter of fluidity of information or a lack of fixedness or rigidity." (1966a:188) He indicates that being able to move readily from one class to another and being able to revise strategies or transform given information are important contributions to creative thinking. Transformation enables one "to use information that is retrieved from memory storage in new ways, thus contributing to creative resourcefulness." (1967:200-201) The Match Problems Test measures the factor of divergent production of figural transformation (figural adaptive flexibility), which is defined as "the ability to produce changes in figures that alter the meaning, significance and use of elements." (1966b:46) In this test, the subject is given a layout of adjacent squares or triangles of which each side is a match. He is instructed to remove a specified number of matches, to leave a specified number of triangles and to solve the problem in as many different possible ways as he can.

Guilford describes elaboration as a matter of producing implications. It is placing the final touches on a product. The details given to a scheme are outlined by the scheme itself. When one item of information leads to another item of information, there is implication. The Production of Figural Effects Test

measures the factor of divergent production of implications (figural elaboration), which is defined as "the ability to elaborate upon given figural information." (1966b:47) In this test the subject is given a simple line, such as a V-shaped figure, and then he is instructed to build other lines around it, to add details and to make a more complete figure.

Although these factors, fluency, flexibility, originality and elaboration, appear to be abilities within the divergent-production category of the Structure-of-Intellect model, Guilford (1971) suggests that creative thinking potential can arise outside of the divergent-production category. He indicates that transformation abilities, evaluation abilities and cognition abilities can contribute to creative production. He adds that the ability to see problems or cognize implications, the ability to analyze or cognize systems and the ability to evaluate "functions of many kinds serve to guide and channel creative thinking." (1971:77-78)

Guilford (1971) proposes that there are twenty-four divergent-production abilities and twenty transformation abilities in the Structure-of-Intellect model. He claims that twenty-three of the twenty-four divergent-production abilities and seventeen of the twenty transformation factors have been demonstrated. Since specifically designed tests measure each factor, Guilford has constructed numerous tests for measuring some aspect of creative potential. He indicates that since creative potential is a complexity of many abilities within the

Structure-of-Intellect model, no single divergent-production test can predict creative performance.

Utilizing an eclectic approach to creativity, Torrance and his associates (1964) initiated a two-way study on the assessment of creativity. In 1958 they surveyed "the development of measures of creative thinking" and at the same time "immersed" themselves in "the lives and experiences of recognized creative persons through their autobiographies, biographies, and writings." (1964:32) The latter approach provided cues for "generating ideas for test tasks," and for selecting test tasks "which would be truest to the process" as comprehended in the experiences of these creative people. (1964:38)

A major requisite in Torrance's work was to construct a set of tasks which assess the creative ability of individuals from kindergarten through graduate school. The tasks were to be challenging enough to require a high level of creative performance for the graduate student and yet, to be easy enough to assess the creative abilities of kindergarten children. In constructing these tasks, Torrance et al. (1964) initially adapted Guilford's tests because they were recognized procedures for assessing creative behavior and were based on a sound theoretical rationale. Considerable exploration of testing procedures and task design preceded the development of the four creative thinking test batteries. Some explored issues relating to the measurement of creative behavior were range and complexity of tasks, task structure and time-limits, task complexity variables, task

appropriateness, the fantasy-reality dimension, individual and oral versus group administration, cues and invitations to regression, test battery length and time-limits, and testing conditions.

On the basis of this extensive investigation of creative behavior, Torrance defines creativity operationally as:

. . . a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies and so; identifying the difficulty, searching for solutions, making guesses or formulating hypotheses about deficiencies; testing and retesting hypotheses and possibly modifying and retesting them; and finally communicating the results. (1966:6)

Utilizing this definition, Torrance has constructed complex tasks, verbal and non-verbal, which make use of the nature of the creative thinking process, the qualities of creative products and creative potentialities. The products of the task are assessed by using Guilford's divergent-production factors: fluency, flexibility, originality and elaboration.

A close examination of the non-verbal or figural tasks reveals pertinent information that can be applied to the development of a tool for assessing motor creativity. Torrance (1966) indicates that the picture construction activity is designed to give the person an opportunity to make purposeful something that has no apparent purpose. The product is evaluated in terms of its originality and elaboration. How unique is the individual in thinking up a response that no one else has thought of? How much detail and elaboration are generated to increase the purposefulness of the idea?

Torrance (1966) reports that the incomplete figures activity arouses in the subject a tendency to structure and integrate premature closure, thus resulting in common responses. In Torrance's opinion, the individual must postpone immediate closure to produce an original response. The activity evokes flexibility in the subject's responses by asking him how many different ideas he can develop. It evokes elaboration in the subject's responses by asking him to build onto his ideas in order to tell a story related to each picture. Since many subjects complete the activity in the ten-minute period, fluency is only moderately involved in the assessment. The products are assessed in terms of their originality, flexibility and elaboration. The flexibility score is acquired by counting the number of different categories the subject is able to use in the total activity. Since there are ten incomplete figures, it is possible for the individual to think of ten different categories of ideas. In this test, flexibility refers to the amount of stereotype behavior the subject's responses reflect.

According to Torrance (1966, 1970), the repeated figures activity stimulates all four divergent-thinking abilities and arouses conflict among the responses tendencies of each type of thinking ability. For example:

Fluency is stimulated by the instructions, 'see how many objects or pictures you can make'; flexibility, by 'make as many different pictures and objects as you can'; originality, by 'try to think of things that no one else will think of'; and elaboration, by 'put as many ideas as you can into each one and make them tell as complete and interesting a story as you can'. (1966:15)

Since time does not permit the individual to perform adequately in all thinking abilities, Torrance (1966) infers that the repeated figures activity calls upon the individual's response tendencies. It arouses the individual either to bring structure and completeness in the incomplete form (as represented by the parallel lines activity in Figural Test, Form A) or to disrupt and destroy the completeness of the structure (as represented in the circles activity in Figural Test, Form B). Usually high elaboration occurs on the repeated circles activity and high originality on the repeated parallel lines activity.

A comparative analysis of the Torrance Test of Creative Thinking with Guilford's factor-type tests reveals several major differences. First of all, Guilford's tests are designed to assess specific creative abilities of adult populations rather than those of children. Secondly, Guilford's tests are designed to identify a single factor. In contrast, Torrance's tests consist of complex tasks, each task being scored on several factors. Thirdly, Torrance has constructed non-verbal test batteries in order to assess the creative abilities of young children. (Goldman, 1964; Wyrick, 1966)

Torrance (1967) recognizes that his tests are "a sharp departure from the factor-type tests" constructed by Guilford and his associates. He reports:

We make deliberate attempts to construct test tasks that would be models of the creative process, each involving different kinds of thinking and each contributing something unique to the batteries under development. Test tasks

are thus fairly complex and have features that make use of what we know about the nature of the creative thinking processes, the qualities of creative products, and creative personalities. (1967:77)

Following Maltzman's theoretical approach to creativity, Mednick (1962) designed a test based on convergent-thinking abilities of the creative process. In the Remote Associates Test the individual responds to thirty items of a convergent variety (e.g., Surprise, birthday, line, _____). The missing word is party.) The individual has to identify a fourth word which relates to the other three words. According to Mednick, the Remote Associates Test discriminates uncreative individuals who have steep hierarchies composed of only a few strong common associations from creative individuals who have broad associative hierarchies composed of a large number of equally available resources.

In a recent review of the Remote Associates Test, Guilford (1971) reports that the test measures convergent-production of semantic relations, a factor within the Structure-of-Intellect model. Guilford infers that convergent-production rarely contributes to creative performance; therefore, this test "should by no means be used as a general-purpose indicator of creative talent." (1971:84)

Pursuing the problem-solving approach, Wallach and Kogan (1965) have devised several tasks in order to identify two variables for indexing individual differences. Their concern about previous assessment techniques of creativity centers on two

generalities. First of all, previous methods of assessing creativity tend to inhibit the individual or raise the anxiety level of the individual by maintaining the test-like structure in their construction and their administration. Secondly, many items place a time limit on the subject as he performs the task. Wallach and Kogan stress two necessities in creativity assessment: game-like tasks and unlimited time allowances. They propose arranging a situation so that individuals can produce appropriate associations; and individuals possessing greater creativity can have the ability to produce more associations and to produce more associations that are unique.

Wallach and Kogan (1965) have devised five types of associates as instruments for exploring creativity. The instruments measure two related variables: number of unique responses produced and total number of responses produced. The items are administered orally to each individual. The situation is game-like and the subject is not pressured by time to complete the item. Two of the five types of associates, pattern meanings and line meanings, elicit visual associations by evoking verbal responses. The other three types, instances, alternate uses and similarities, evoke verbal associations and responses.

In a review of Wallach and Kogan's tests, Guilford (1971) speculates that these tests measure factors such as divergent-production of semantic units, divergent-production of semantic classes, divergent-production of semantic implications,

divergent-production of semantic transformations and possibly cognition of semantic transformations. Guilford is critical of Wallach and Kogan's testing conditions since their tests have no time limits. He reports that when subjects are given liberal time on tests, they will invent strategies to facilitate their performance on the tests. In Guilford's opinion, this advantage may change the character of the test and variables they measure.

Using a conceptual model for investigating creativity, I. A. Taylor (1971a) has formulated a theory that defines creativity as a transactional system rather than a reaction or interaction system. The conceptual model includes the creative personality, the creative environment, the creative process, the creative problem and the creative product. Taylor describes the value of transaction theory in assessing creativity:

The implication of transaction theory to assessment and development is that it is important to first identify the level of action on which the person is operating. It is then suggested here that individuals should be developed or trained to perform transactionally. (1971a:2)

Although Taylor (1971b) is in the process of developing instruments of creative assessment, he has only proposed a conceptual model for assessing the characteristics of the transactional system. He suggests that creative movement can be assessed by evaluating its characteristics and its level of effectiveness as a creative product. This process consists of analyzing the product on the basis of its characteristics (generalization, reformulation, originality, relevancy, hedonics,

complexity and condensation) and its functional effect on the product itself, the problem, the field and society.

Summary

Over one hundred instruments assessing various aspects of creative behavior have been identified. The selected studies in this review represent some of the major attempts in the assessment of verbal and non-verbal creative thinking abilities. Guilford's (1966) factor-analytic studies have emphasized the assessment of individual factors which contribute to creative potential. Each test is specifically designed to evoke responses which assess a particular ability relating to divergent-production, transformation or cognition. Guilford uses quantity and quality of responses as a scoring procedure for each task. Major criticisms of Guilford's assessment procedures are their failure to interrelate cognitive and non-cognitive components of creative behavior and their emphasis on the acquisition of specific responses in a complex phenomenon known as creative thinking.

Torrance's (1966) tests of creative thinking are constructed on a broad, eclectic theory pertaining to creativity and the person, the process and the product. Presently four test batteries, two verbal and two non-verbal, have been constructed and can be administered to individuals of all ages. The verbal test batteries consist of seven parallel tasks, whereas the non-verbal test batteries consist of only three activities. The figural activities are complex tasks specifically constructed to

encourage the subject to make purposeful something that has no apparent purpose; to arouse in him the tendency to prematurely structure and integrate the incomplete design; and to bring about conflict with his response tendencies. Although the task design is a significant departure from Guilford's factor-type tests, Torrance uses Guilford's divergent-production factors (fluency, flexibility, originality and elaboration) to score the responses given in the various activities.

In examining the Torrance Tests of Creative Thinking, Roweton (1970) reports that these test batteries have become the most standard battery in creativity research. Roweton's (1970) chief criticism of the tests pertains to the assessment of fluency and originality. He indicates that the subject's originality score "is obtained by adding the originality scores of the ideas without dividing by the number of ideas produced." (1970:14)

Mednick's Remote Associates Test (1962) measures convergent thinking abilities of the creative person. Although Mednick's test follows the behavioristic approach of Maltzman's work, it has not been widely accepted as an assessment approach. Guilford (1971) reports that convergent-production rarely contributes to creative ability. Other researchers, Jackson and Messick (1967:3), suggest that Mednick's test may be a test of intelligence as it tends to evoke correct responses, rather than "creative" responses which exhibit usefulness as well as unusualness.

The Wallach and Kogan studies (1965) represent problem-solving tasks which differentiate individual differences by assessing two variables: total number of responses and uniqueness of responses. A major criticism of these tests is the lack of controlled testing conditions. Although Guilford (1971) agrees that these tests assess divergent-production factors, he implies that the liberal time limit of the activities change the character of the tests.

Although I. A. Taylor (1971a) has not developed instruments for assessing creative potential, he has devised a conceptual model for examining the creative product, the creative person, the creative environment and the creative process. He suggests assessing the creative product by evaluating its characteristics (generation, reformulation, originality, relevancy, hedonics, complexity and condensation) and its functional effects on the problem, the field and society. Apparently Taylor's work is still in the theoretical stages and does not offer objective quantitative methods of assessing creative abilities.

IDENTIFICATION AND ASSESSMENT OF MOTOR CREATIVITY

Since 1960 several researchers in physical education have analyzed, assessed and compared the relationships of factors relating to creative thinking abilities and movement. A review of this literature reveals three areas of research relating to motor creativity. Philosophical studies have analyzed the creative process in relation to physical activity. Descriptive studies have

presented tools for measuring motor creativity. Experimental studies have utilized the tools for comparing various human performance dimensions.

Philosophical Studies on Creativity and Physical Activity

Two philosophical studies analyzing creativity in relation to physical activity have used different procedures for studying the phenomenon. Both studies produce different theories referring to the creative process as a component of physical activity.

Dorman (1968) has employed a philosophical inquiry method known as conceptual analysis to explore the concept of creativity with respect to dance, sport and physical activity. In her study she defines a concept as "a construct which exists in the mind, and which can manifest itself in concrete particulars." (1968:4) She assumes that creativity is an identifiable concept. In her opinion, its existence in one field may be related to creativity in other fields.

Dorman (1968) gathered much of her data from the library by exploring creativity in art, in literature and in psychology. She discovered eight basic underlying factors in the creative process: Dissonance, movement from known to unknown, insight, influence, influence of past and immediate environment, presence of gestation period, separation from others and individuality.

She selected five activities, dance, golf, field hockey, gymnastics and children's play, in which to observe these basic underlying factors. From her observation, Dorman (1968) concluded

that the concepts of creativity are discernible in sport, dance and physical activity. Differences which exist between activities are relative to the degree of creativity employed by each activity. For instance, team and individual sports are more restrictive in utilizing the creative process than are dance and gymnastics.

Dorman (1968) hypothesizes that the underlying creativity factor which exerts the greatest degree of influence in physical activities is dissonance. Dissonance in physical activity appears in the form of "kinesthetic dissonance--a feeling of physical disturbance." She states that the performer is forced to eliminate this disturbance, thus he creates a new movement pattern. (1968:60)

In another philosophical study, Mesenbrink (1971) has explored the hypothesis that the creative process can be developed and the creative personality enhanced through various physical education programs. Utilizing Gowin's (1969) system of philosophical inquiry, she developed major hypotheses and subhypotheses relating to: creativity; the creative process; the creative personality; the teaching-learning environment contributing to the development of creative potential; activities in the physical education program contributing to the development of creative potential; and a methodological scheme of physical activities for the development of creative potential.

Mesenbrink (1971) has constructed a conceptual model depicting how creativity is related to various theoretical and methodological processes of physical education. She indicates that the most substantial concepts to evolve from the study are "that of sequence." For instance:

The physical and mental developments of the human organism follow specific sequences. The creative process follows a sequence. The learning process follows a sequence; the teaching process follows a sequence corresponding to the learning process. Speculation might be made also concerning a sequence of educative creativity. (1971:92-93)

Mesenbrink (1971) speculates that a person develops his creative potential in three stages. In the first stage, imitative creativity, the person "experiences creative insight." His creative behavior involves imitations of what has been done with some self-discovery. In the second stage, innovative creativity, the person creates combinations of ideas of things which are considered novel in relation to his environment. Mesenbrink calls the third stage, "'socially useful' creativity." In this stage the person produces products that are not only innovative but are also useful in his society. (1971:93)

Major generalizations which emerged from Mesenbrink's study are:

1. The teacher is of prime importance in the environmental structure of the teaching-learning process. (1971:94)
2. The teaching style . . . which a teacher uses is closely aligned with his teaching objectives. (1971:94)
3. Play is an essential part of the creative phenomenon and as such can be assumed to be enhanced through physical education programs. (1971:95-96)

Test Instruments for Measuring Motor Creativity

Some studies have developed movement performance tasks which purport to measure creativity. Withers (1960) has attempted

to determine whether or not the creative thinking ability of dancers can be measured by devices measuring creativity in other arts and sciences. Her study consists of three parts: (1) the construction of performance tasks which require creative behavior in dance; (2) the development of an evaluation sheet for judging the creativity of the dance performance; and (3) the comparison of the task performance ratings with the scores obtained on paper and pencil tests purporting to measure creativity in other arts and sciences.

In the first part of the study, Withers (1960) has constructed three performance tasks. The first task consists of developing a short dance composition to a Haiku poem. Task number two calls for the development of a movement phrase of dance technique which is "more than a mere warm-up activity." (1960:28) Task number three is an improvisation with a visual stimulus from a film strip lasting a minute and twenty seconds.

In the second part of the study, Withers (1960) has developed an evaluation sheet for judging the dance performance. This evaluation form consists of seven factors: overall creativity; sensitivity to the problem; originality; conceptual unity; penetration; appropriateness; and technique. A nine-point rating scale is used for judging each performance on each factor. For example: (1960:55)

Sensitivity to Problem: (Ability to see and understand the problem in terms of dance.)

HIGH	HIGH	HIGH	MIDDLE	MIDDLE	MIDDLE	LOW	LOW	LOW
HIGH	MIDDLE	LOW	HIGH	MIDDLE	LOW	HIGH	MIDDLE	LOW

The judges place an X at the appropriate point.

In the third part, Withers compares the subject's performances on the three tasks with their responses on paper and pencil tests which purport to measure the same factors as those which are measured by the rating scale. Following is a list of the written tests used and the factor which each test measures:

<u>TEST</u>	<u>FACTOR</u>
1. Apparatus	Sensitivity to Problems
2. Hidden Figures Test	Figural Definition
3. Pertinent Questions	Conceptual Foresight
4. Plot Titles Test	Originality
5. Similes I - Test	Associational Fluency
6. Social Institutions	Penetration
7. Topics IF - 1 test	Ideational Fluency

(1960:18)

In discussing the results of the study, Withers (1960) concludes that there is a significant relationship between overall creativity rankings and a significant relationship between the Plot Titles Test and the performance rankings on originality. She reports that the seven factors on the evaluation form are easily recognized in all of the performances. In her opinion, the evaluation form is most usable for task number one and task number three.

A major criticism of Withers' study is its lack of a creative criterion group. On this matter Wyrick (1966) reports the following inconsistencies:

. . . the justification of the subjects as a creative criterion group is unclear. Differences in level of technique and level of creativity among subjects are undiscernable [sic], and both the expertness of the judges and the creative status of the subjects rests [sic] on face validity. In view of the fact that the research was limited to 11 subjects, conclusions drawn referring to the measurement of motor creativity by the use of verbal creativity tests, are, at best, hypotheses. (1966:39-40)

Wyrick's (1966) initial steps to construct a motor creativity test began with defining motor creativity as:

. . . the combination of perceptions, with particular emphasis on the kinesthetic perception, into a new and fresh motor pattern. This motor pattern response may be either a solution to a pre-established question or the expression of an idea or emotion by means of the human body. It is composed of motor fluency, motor originality, and perhaps other yet unknown factors. (1966:79)

Wyrick (1966) defines motor fluency as the ability to produce rapidly a large quantity of motor responses "in a situation requiring little restriction." (1966:79) Motor originality is defined as the ability to produce unique, clever, uncommon or remote responses.

The next step Wyrick (1966) followed in constructing test items was to select movement motivators as stimuli for the tests. These motivators (balls, hoops, parallel lines and a balance beam) were selected on the following criteria:

- a. evoke a sizable range of responses
- b. stimulate different kinds of movement
- c. provide a problem that minimizes the element of fear
- d. stimulate responses that do not require great skill to produce a quantity of movement
- e. require the subject to focus on a different aspect of the movement. (1966:96)

In the third step, Wyrick (1966) constructed sixteen test items, each test item using one of the four motivators as a stimulus. The parallel lines tests consist of two parallel lines on the floor which are six feet apart. Each line is two feet wide and six feet long. The subject's task is to move from one line to another in as many different ways as possible and in compliance with the prescribed directions of each item.

The ball-wall tests use two rubber playground balls eight inches in diameter, one regular volleyball, a two-inch line painted eight feet from the wall and one side of the wall in the testing room. The subject's task is to move the ball from the eight-foot restraining line to the wall in as many ways as possible and in compliance with the prescribed directions of each test item. (Wyrick, 1966)

The beam tests employ a wooden balance beam eight feet long, three inches wide and four inches above the floor. The subject's task is to move from one end of the beam to the other end in as many different ways as possible and in compliance with the prescribed directions of each test item. (Wyrick, 1966)

In the hoop tests, the subject's task is to manipulate the hoop in as many varied ways as possible complying with the prescribed directions of each test item. (Wyrick, 1966)

Wyrick (1966) uses two procedures to time the test items. In the ball-wall tests and hoop tests, the stop watch is started at the beginning of the test and runs continuously for three minutes. In the parallel lines tests and beam tests, the stop watch runs only when the subject is actually performing. The watch stops every time the subject pauses in her performance.

Wyrick (1966) reports that in scoring the test items, the fluency score is the sum of the total responses. All responses are recorded except those that are repeated with many body parts or those responses repeated on a contralateral side. Each movement is descriptively recorded for future analysis. The motor

originality score is determined by noting the frequency with which the response occurs in the sample. Those responses occurring only once are considered unique and given a score of two points. Those responses occurring twice score one point. Responses occurring three or more times receive no points.

Wyrick (1966) administered sixteen test items to twenty-five women who were enrolled in an elementary physical education course. Eight test items were given on Day I and another eight test items were given on Day II. Equivalent-form reliability coefficients of the items, as indicated by the day-to-day correlations, ranged from .59 to .92. Internal reliability coefficients as indicated by the split-half correlational method were .87 for Day I items and .92 for Day II items. Wyrick found that the Day I items yielded higher correlations with the criterion and lower inter-correlations. Because of these data and possible intrasubject variance caused by temporary changes in motivation, health and emotional tensions, Wyrick treated only the Day I data with a multiple regression technique. With this technique, Wyrick selected three batteries of test items for assessing motor originality, motor fluency and motor creativity.

Wyrick (1968) reports that Form O consists of two test items which assess motor originality. The following instructions are presented for these items, Beam I-3 and Beam I-4:

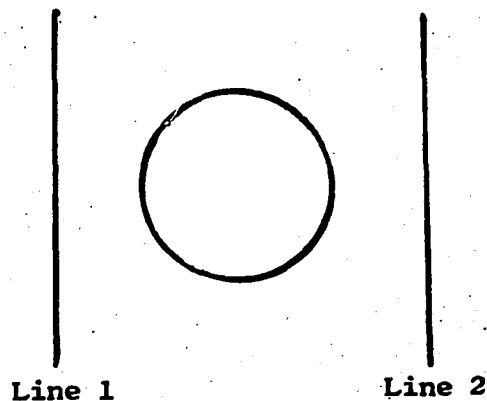
Beam I-3 Move in as many different ways as you can from one end of the beam to the other, so that at some time in your moving your hips are higher than your head. Begin at one end of the beam, and move to the other end. When you reach that end, return to the original end in a

different movement. You may use the beam, or the beam and the floor in combination. The only requirement is that at some point in your travel your hips should be higher than your head. Continue moving from end to end of the beam, each time in a different way, until the time is consumed. Do you have any questions? Ready? Begin. (1966:210)

Beam I-4 Move in as many different ways as you can from one end of the beam to the other, so that some part of your body--excluding your arms, hands, feet, or legs-- touches the beam. Begin at one end of the beam, and move to the other end. When you reach that end, return to the original end with a different movement. Remember, you may not touch the beam with your arms, hands, feet, or legs. You may touch any other part of your body to the beam more than once. Do you have any questions? Ready? Begin. (1966:211)

The second test battery, Form F, consists of four test items which assess motor fluency. These test items are Beam I-3, Hoop I-8, Parallel Lines I-2, and Ball-Wall I-5. The test instructions for Beam I-3 are presented in Form O. The following test instructions are given for the other test items:

Hoop I-8 Move from line one to line two in as many different ways as you can, so that you either go in the hoop or through it. Any way that you can move to get from line one to line two is acceptable, as long as your body, or part of your body, either goes in the hoop or through it. Do not repeat movements. Do you have any questions? Ready? Begin. (1966:212)



Parallel Line I-2 Move in as many different ways as you can from one line to the other, without walking, running, jumping, hopping, skipping, sliding, galloping, or leaping. Begin at line one and move to line two. Upon reaching line two, return to line one in a different way. Continue traveling between the lines, each time with a different movement, until the time is consumed. Remember, you may not walk, run, jump, hop, skip, gallop, slide, or leap. Do you have any questions? Ready? Begin. (1966:210)

Ball-Wall I-5 Move a ball to the wall in as many different ways as you can, either by striking or hitting the ball. It makes no difference where on the wall the ball lands as long as it reaches the wall. Be sure to strike or hit the ball in a different way each time. You may not go over the restraining line. Accuracy is not important. Continue moving the balls to the wall until the time is consumed. Do you have any questions? Ready? Begin. (1966:211)

The third test battery, Form M-C, consists of four test items which assess motor creativity. Three of these items, Ball-Wall I-5, Beam I-3, and Beam I-4, are items described in previous test batteries. The following instructions are for the fourth test item, Parallel Line I-1:

Parallel Line I-1 Move in as many different ways as you can from one line to the other, so that at some point in your movement you include a twisting or turning movement. Begin at line one and perform a movement that incorporates a turn or twist at some point in it until you reach line two. Upon reaching line two, return to line one with a different movement. Continue moving between the lines, each time with a different turning or twisting movement, until the time is consumed. Do not repeat movements. Do you have any questions? Ready? Begin. (1966:210)

In discussing the validity of the Wyrick Motor Creativity Test, Wyrick (1966) reports that "in this study motor creativity is defined operationally as the ability to produce many varied motor responses to a given stimulus in conjunction with the ability to produce original motor responses." (1966:103) Wyrick relies on Ebel to justify the use of face validity for these test items.

Ebel (1961) infers that since operational definitions are basic to the meaning of measurements of length, mass, time and other physical qualities, they may act as valid bases for the construction of behavior tests.

In a third approach to motor creativity assessment, White (1971) developed a motor performance battery. The six test items are adaptations of the Wyrick Motor Creativity Test. The six motor performance problems are: the number of different ways a person can throw a ball against the wall; the number of different ways a person can kick a ball against the wall; the number of different strokes a person can make with a two-handed grip on a bat; the number of different ways a person can cross over a yellow line from one side of the mat to the other; the number of different strokes a person can make with a one-handed grip on a bat; and the number of different ways a person can stroke a ball to the wall using different body parts (no hands or feet).

The test items have very specific instructions. The subject is instructed not only to show different ways of moving but also to "invent some ways." The subject's motor creativity is evaluated by recording his various observable responses with the instrument (ball, bat, or line on the mat). The subject scores one point for each different response.

White designed these motor tests to measure motor creativity of thirteen to fifteen year-old boys within the English school system. These tasks, which he selected and modified, demand that the subject handle equipment in various ways. The emphasis is

placed on how the equipment is used in relation to the person's environment. Since White's study is actually an investigation to determine the relationships among body concept, creativity and sports proficiency, he appropriately constructs motor test items which relate to sport activities.

In a comparative analysis of the three motor creativity tests, it appears that Wyrick's instruments evoke specific responses from the individual whereas Withers' task performances evoke complex responses from the individual. The activities in all task performances and test batteries use stimuli for evoking responses. All activities have time limits for performing the tasks.

White's motor performance battery presents a scoring system which appears to be a cursory technique. For example, the subject merely scores one point for every observable, different response with the instrument. In Wyrick's scoring technique, the subject's originality score is based on the infrequency of occurrence of the various responses in relation to the test population. In a later report, Wyrick (1968) indicates that the scoring technique can be simplified by tallying the responses and eliminating the tedious and time-consuming effort of recording unique responses. Although Withers' evaluation technique is a subjective rating scale, it does analyze more than one or two factors relating to creative behavior.

Research Studies Using Motor Creativity Tests

The motor creativity test batteries are primarily constructed for utilization in studies investigating the relationships between creativity variables and other physical activity variables. In one study, Searle (1966) has investigated the effects of visual, tactile and auditory stimuli on creative efforts of college students in modern dance classes. The instruments for measuring creativity were three test items in the Torrance Tests of Creative Thinking (Figural and Verbal Forms) and Withers' Rating Scale.

First, Searle (1966) established scoring norms for the three creative thinking tests (Unusual Uses, Picture Completion, and Picture Construction) by administering the tests to a control group which consisted of 204 college women students. Then Searle set up and conducted 29 modern dance class sessions for 36 women students. During 24 of the sessions, she presented various auditory, visual, tactile and kinesthetic stimuli to the students as a means for increasing their awareness of the environment with a resultant increase in their efforts in the dance class. Examples of the stimuli included written poems, literary imagery, sound recordings, films, graphic designs, clay modeling and sports imagery. Three of the class sessions were filmed on 8mm film. Three judges used Withers' Rating Scale and rated the student's three performances on the following factors pertaining to creativity:

- a. Over-all Creativity - general creative ability of the performer.
- b. Sensitivity to Problem - ability to see and understand the problem in terms of dance.
- c. Originality - ability to find unique, imaginative, and fresh ideas and movements.

- d. Conceptual Unity - ability to conceive, develop and complete a dance idea--all contributing to the totality of the concept. Ability to communicate intention.
- e. Penetration - ability to give depth of interpretation to the idea and movement--go beyond the obvious:
- f. Appropriateness - ability to choose specific movements that are suitable to the expression of the dance idea.
- g. Technique - ability to use the body in a versatile manner, and avoid movement cliches that are characteristic of the performer. (1966:60-61)

At two different class sessions, the fourth and twenty-sixth, the students in the dance classes responded to three creative thinking tests. Searle (1966) also acquired empirical data in the form of diaries. In these diaries, students expressed their feelings about each class session.

Searle's (1966) statistical findings indicated that twenty-eight out of thirty-six students showed an increase in creative ability. Sixty-seven percent of the students showed an increase in creative ability through the judges' ratings of the films. Fifty-three percent of the student population (N = 36) had an increase in originality scores on both the film ratings and the creativity tests. Thus, Searle (1966) concludes that an increased awareness of the environment through the presentation of auditory, visual, tactile and kinesthetic stimuli results in greater creative effort on the part of the students in modern dance classes.

Wyrick (1966) has explored the relationship of motor creativity with motor ability, intelligence and certain underlying factors of verbal creativity. Subproblems were to

determine: the relationships between motor fluency and motor originality; the relationships between motor creativity responses to motor problems utilizing different equipment; the effects of order presentation on the performances in motor and verbal tests; and the relationship of movement experience and motor creativity scores.

The data-collecting instruments in Wyrick's study were three motor creativity tests, three verbal creativity tests, the Scott Motor Ability test (Scott, 1943), the Scholastic Aptitude Test and a physical education experience questionnaire. Wyrick selected three test items from the Wyrick Motor Creativity Test Battery to measure motor creativity. They were a wall-ball test item, a parallel lines test item and a hoop test item. Either an initial or final presentation of all three motor tests was presented. (For example: Group 1 was presented Verbal Tests 1, 2, 3; Motor Tests 1, 2, 3; and the Experience Questionnaire. The order of presentation for the seventeen subjects in Group 4 was: Motor Test 1, 3, 2; Verbal Tests 1, 3, 2; and the Experience Questionnaire.)

According to Wyrick (1966), statistical treatment of the data indicates a significant relationship between motor fluency and motor originality. Because of this relationship, Wyrick infers that the motor fluency score can be an adequate indicator of motor creativity.

Wyrick (1966) reports no significant relationship between motor creativity scores and motor ability, intelligence and verbal

creativity. Furthermore, movement experience as interpreted by participation in physical education classes and other types of organized activity does not affect motor creativity.

In Wyrick's (1966) opinion, the analysis of variance on presentation order data indicates that there is a slight significant difference among the groups receiving the initial administration of the motor tests. Since no significant differences occurred with the performances on the verbal tests, Wyrick speculates that subjects become tired after twenty-eight minutes of concentration on the verbal test or they develop some type of test reaction which prevents them from responding well on the motor creativity tests.

In the final study, Wyrick (1966) did a correlational matrix of all possible pairings of the fifteen tests. These pairings were motor fluency and motor originality, motor creativity and motor ability, motor creativity and intelligence, and motor creativity and verbal creativity. A significant relationship was noted between motor fluency and motor originality. No significant relationships were found between motor creativity and motor ability, motor creativity and intelligence, and motor creativity and verbal creativity.

Philipp (1967) has investigated the relationships between motor creativity and verbal and figural creativity as well as the relationships between motor creativity and three different factors: motor skills, growth factors and intelligence. The assessment devices used in this study were: the Wyrick Motor Creativity

Battery (fluency scale); Torrance Tests of Creative Thinking, Figural and Verbal Forms; selected motor skills tests measuring static balance, static strength, explosive strength and agility; height and weight measurements; the Lorge-Thorndike Intelligence Test (Thorndike and Lorge, 1944); and age. The subjects were 65 boys and girls in two fourth grade classes. Philipp has found that creativity is not a generalized factor among boys and girls, aged nine and one-half to eleven. No significant relationships were noted between motor creativity and motor skills, intelligence or growth factors or height, weight and age. Philipp (1967) states that a combination of weight, figural fluency and figural originality may predict motor creativity for boys and that a combination of verbal originality, figural fluency and figural flexibility may predict motor creativity for girls.

Nelson (1967) has investigated the relationships between selected aspects of positive mental health, self-cathexis, body cathexis, movement concept and motor creativity. Nelson used the following measuring instruments to acquire her data:

1. Personal Orientation Inventory - measuring the current level of positive mental health. (Shostrom, 1964)
2. Body and Self Catheses Scales. (Jourard and Secord, 1953)
3. Homonym Test - measuring negative influences of bodily concern. (Secord, 1953)
4. Wyrick Motor Creativity Test. (Wyrick, 1966)
5. Movement Concept Scale.

These tests were administered to 78 freshman women in classes of Tennis I, Modern Dance I, Golf I and Golf II. Nelson (1967) has found significant relationships between self-regard, spontaneity and inner-directedness with movement concept, body cathexis and self-cathexis. She reports significant relationships between self-acceptance and both body cathexis and bodily concern as well as a significant relationship between self-concept and both body cathexis and self cathexis. However, her data indicate no significant relationships between motor creativity and the main variables. Consequently, Nelson (1967) concludes that motor creativity as measured by the Wyrick Motor Creativity Test is unrelated to any of the other variables in her study.

White (1971) has investigated the relationships of certain aspects of body concept, creativity and sports proficiency. The measuring instruments were semantic differentials, a version of the human figure drawing test, a version of the alternate uses test, a hierarchial team representation based upon seven-point and ten-point rating scales and a modification of the Wyrick Motor Creativity Test. These tests were administered to thirteen to fifteen year-old English school boys. From the analysis of these data, White (1971) concludes that motor creativity is positively related to body awareness, verbal creativity and sports proficiency. Body concept and verbal creativity are positively related to sports proficiency. Body awareness is unrelated to body esteem, body concept, verbal creativity and sports proficiency. Body esteem is unrelated to motor creativity, verbal creativity and

sports proficiency. Body concept is unrelated to verbal creativity.

Alston (1971) has investigated the relationships among verbal, figural and motor creativity variables of black culturally deprived children. The subjects were 50 boys and girls between the ages of ten and twelve. The assessment devices used in the study were the Torrance Tests of Creative Thinking, Verbal Form A and Figural Form A and the Wyrick Motor Creativity Tests. Alston (1971) reports no significant difference between the means for boys and girls on factors relating to verbal creativity, motor creativity and figural creativity. Test results indicate that there is no relationship between verbal creativity and figural creativity for girls. She infers that the variables measuring verbal creativity and figural creativity may be used to predict motor fluency for the girls and that the variables measuring verbal creativity and figural creativity may be used to predict motor originality for the boys. The variables measuring verbal creativity and figural creativity may be used to predict motor creativity for the total population and for the boys' group.

Summary

During the past decade, philosophical studies have explored concepts of creativity in relation to physical education activities. The results of one study disclose that kinesthetic dissonance is the underlying creativity factor which exerts the greatest influence in physical activities. This philosophical viewpoint is

related to Festinger's (1957) theory of cognitive dissonance which is based upon the Gestalt theoretical rationale for creativity.

Another philosophical study implies that interacting processes exist between creativity and physical education activities. The researcher speculates that there is a sequence of educative creativity consisting of three stages: imitative creativity, innovative creativity and socially useful creativity. This philosophical viewpoint is based upon Maslow's (1968) theoretical rationale for creativity which consists of three sequential stages: primary creativity, secondary creativity and integrated creativity.

Although both studies present theoretical rationales for linking the creative process with physical education activities, neither study presents a system for conducting experimental research based on these rationales.

Several research studies have investigated the procedures for assessing motor creativity. Withers (1960) has constructed three performance tasks, which call for open-ended movement activity. The tasks are scored on a nine-point rating scale which uses seven of Guilford's (1950) factors relating to creativity.

Wyrick (1968) has developed three test batteries which purport to measure either motor fluency, motor originality or motor creativity. The prescriptive instructions of each test item evoke specific responses from the subject. These responses are scored in terms of fluency, a summation of the total responses and

originality, the uniqueness of the responses in relation to the total test population.

White (1971) adapted Wyrick's test items to develop a battery of six motor performance tests. The tests have specific instructions which evoke responses that may be scored for fluency, a summation of the total number of different responses.

All of these motor creativity tests use various stimuli such as poetry, films, bats, balls, hoops, lines and beams to evoke responses. All of the test activities have set time limits in which the tasks are performed. The time limits in Wyrick's tests are three minutes, whereas the time limits in the Withers and White tests are two minutes. Scoring systems for the tests are cursory techniques as they merely record the total number of responses. No attempt is made to record quantitatively the creative aspects of the responses, i.e., details involved in the movement. Withers does present a subjective rating scale by means of which scores can be quantified.

A number of research studies have used these assessment procedures to investigate the relationships between motor creativity and such dimensions as intelligence, verbal and figural creativity, motor ability, growth factors, motor skills, mental health, self cathexis, body cathexis, movement concept, sports proficiency and physical education experience. Several studies report no significant relationships between motor creativity and such dimensions as intelligence, motor ability, verbal creativity, physical education experience, motor skills, growth factors (height,

weight and sex), mental health, body and self catheses, movement concept and body esteem. Other studies disclose significant relationships between motor creativity and dimensions such as figural fluency, figural originality, verbal originality, body awareness, verbal creativity and sports proficiency. These results indicate an inconsistency within investigations. For example, two studies indicate contradictory relationships between motor creativity and verbal creativity. Since these studies employ different assessment procedures, it is difficult to generalize on the results of such studies. None of the constructed assessment tools provides scoring techniques which are objective, quantitative means for evaluating the creativity variables of individuals at all age levels. Consequently, any change in assessment procedure may influence the results of the study.

MAJOR ISSUES ON THE ASSESSMENT OF CREATIVITY

The major issues concerning assessment of creativity fall into three general categories: validity, reliability and usability. Validity refers to the degree to which a test measures what it purports to measure. (Anastasi, 1961) Reliability refers to the degree of consistency and stability within the test scores. (Triffinger and Poggio, 1972) Usability refers to the degree to which a test can be easily administered, scored and utilized through normative procedures. (Triffinger and Poggio, 1972)

Validity

The major problem in developing a creativity test is selecting a criterion for establishing the validity of the tests. Triffinger et al. (1971) report that difficulties in assessing creativity are due to the absence of a widely accepted creativity theory and the absence of an established criterion. In discussing test validation, Ebel (1961) reveals disagreement among authorities on the concept of validity. These three problems complicate the selection of an adequate criterion for establishing the validity of a creativity test.

According to Ebel (1961), mistrust in what a test appears to measure leads the researcher to seek empirical and deductive procedures for test validation. On this subject, he states:

. . . completely empirical validation is seldom possible. Strictly speaking it is impossible in principle. We cannot escape judgment regarding the choice of a criterion, nor can we escape appearances (i.e., observations) in getting criterion data. To avoid an infinite regress of criterion validations one must stop somewhere and accept or proclaim an arbitrary definition of the thing to be measured. What happens more often is that we accept highly questionable criteria, obtain discouragingly low correlations, and finally give the whole thing up as a bad job. (1961:643)

Triffinger and Poggio (1972) describe three general categories in which the validity of a test may be documented. These categories are content validity, construct validity and criterion-related validity.

Content validity. Content validity is the degree to which the test covers a representative sample of the behaviors being measured. Triffinger and Poggio (1972) raise several questions in

examining content validity of creativity tests. For example:

What is an adequate definition of 'creativity'?

Is there one 'creativity' or 'many'?

How can studies which employ different measures be compared?

What constitutes an adequate operational definition of 'creativity'? (1972:260)

Torrance (1966) reports that a person may behave creatively in an infinite number of ways. Any attempt to develop a comprehensive battery of tests of creative thinking is absurd, since no one knows the number or the range of test tasks necessary to acquire "an adequate assessment of a person's potentialities for creative behavior." (1966:23)

Torrance is one of the few researchers who has tried to insure the content validity of his test batteries. He believes that the test tasks in the Figural and Verbal Batteries, Forms A and B, sample a wide range of abilities in the universe of creative behaviors. His work shows that consistent and deliberate efforts were made to base the test stimuli, the test tasks and instruction and scoring procedures on the best theory and research available. (Torrance et al., 1964 and Torrance, 1966) In the early stages of the development of the test batteries, Torrance and his associates (1964) analyzed the lives of eminent creative people, the personality attributes of creative people, the nature of creative performances and the research on the functioning of the human mind. These analyses enabled Torrance and his associates to define creativity operationally and to construct test tasks and scoring procedures which assess figural and verbal creative thinking abilities at various educational levels.

Construct validity. Freeman (1962) defines construct validity as "the extent to which the test items individually and collectively sample the range or class of activities or traits, as defined by the mental process or the personality trait being tested." (1962:94) Construct validity differs from content validity in two ways. In construct validity each process or trait being tested is not only analyzed and made explicit but also characterizes the process or traits being measured.

Triffinger and Poggio (1972) describe three essential steps in construct validation procedures:

First, on the basis of the theory upon which the test has been developed, the researcher develops hypotheses concerning the behavior of high and low scorers. Then, data are gathered to test those hypotheses. Third, the data collected provide evidence for inferring whether the theory is adequate. If the theory fails to account for the actual evidence, there is need for revision of the test, reformulation of the theory, or rejection of the theory. (1972:257)

Two problems relating to acquiring validity are definition and criteria. Different definitions of creativity and criteria for assessing creativity have led to difficulties in the formulation of testable hypotheses. The utilization of widely differing tasks representing the assessment of different psychological processes presents a major problem in developing a consistent theoretical basis for interpretation of results among various research studies. In the area of construct validity, Triffinger and Poggio (1972) stress the need for an extensive theory on which to base prediction and interpretations of creativity research studies. The theory should include the definitions of creativity

as well as appropriate criteria for assessing creativity and for selecting creativity measures.

Both Torrance (1966) and Guilford (1967) have reported construct validity procedures in their research studies. Torrance reports a number of research studies employing a variety of measures comparing personality characteristics of high and low scorers on the Torrance Tests of Creative Thinking. Some of these measures were psychiatric interviews, Rorschach Ink Blots, attitude inventories, life experience inventories, vocational inventories, self-descriptive and adjective checklists. In any of the studies which assess the creative thinking abilities of subjects ranging from kindergarten children to classroom business teachers, the high creative scorer showed personality characteristics and behaviors which were quite different from those of individuals with low creativity scores.

Guilford (1967) employed a factor-analytic approach to document the construct validity of his creativity tests. Using the Structure-of-Intellect model, Guilford identified creative thinking abilities in the categories of divergent-production, transformation, convergent-production and evaluation. Thus he has devised twenty-two tasks, each test assessing one factor (i.e., Plot Titles [clever] assesses originality; Figure Production assesses semantic elaboration; Brick Uses assesses semantic spontaneous flexibility).

Goldman (1964) reports that the major differences between Guilford's and Torrance's work is that "Guilford's tests are

designed to identify or represent a single factor," whereas "Torrance . . . initiated more complex tests each of which could be scored on several factors." (1964:4) Torrance has emphasized the processes of creative thinking rather than the products of creative thinking.

Criterion-related validity. Studies using criterion-related validity procedures may be divided into two kinds: concurrent or short term studies and predictive or long term studies. In both kinds of studies, the researcher finds out the effectiveness of a test in predicting an individual's behavior in specified situations. (Triffinger and Poggio, 1972)

The major issue in criterion-related validity studies is the selection of a criterion. At the 1959 Research Conference on the Identification of Creative Scientific Talent, Stein (1959) presented six categories of criteria which have been used to predict creative ability:

1. Definition Criterion - Investigations of processes or characteristics of individuals in "creative" professions (i.e., art, dance, science).
2. Statistical Criterion - Employment of one or more tests to differentiate groups or individuals by their deviation from a specific score.
3. Judgment Criterion - Utilization of ratings or awards by individuals to evaluate the creativity of individuals.
4. Products Criterion - Determination of creative individuals by the number of products produced.
5. Ultimate Criterion - Critical examination of the products and responses of individuals through objective creativity criteria, (i.e., patents, publications, ideas, new products, etc.). (McPherson, 1956:24-29)

6. Individualized Criterion - The assumption that potentiality for creativity is "a drive within the organism which is manifested in self-actualizing tendencies". (Stein, 1959:179) With this criterion the individual recognizes when he has achieved his goal and ulterior judgments are unnecessary. (Maslow, 1959; Rogers, 1954)

Torrance (1966) uses a number of different criteria to indicate the concurrent validity of the Torrance Tests of Creative Thinking. These criteria are peer nominations, sales productivity and educational achievement. Torrance recognizes that peer nominations and teacher nominations are possibly inappropriate criteria for indicating the concurrent validity of the tests. For the peer nominations criterion, Torrance uses such questions as:

Who in your class talks the most?
 If you cannot do something that you had planned, who in your class is likely to come up with another plan or idea?
 Who thinks of the most, wild, or fantastic ideas? (1966:42-43)

Torrance indicates that these simple questions provide "useful insights concerning the validity of tests of creative thinking." (1966:42-43)

In reference to the criticism that teacher nominations are an inappropriate criterion, Torrance points out that in special programs designed for creatively gifted children, the selection of the participants is mainly made by teacher nominations. Torrance reports that "even such a skeptic as Vernon (1964) thinks that by age '22 or so, good college tutors could give fairly good judgments' of a student's creative potentialities." (1966:44)

Torrance (1972) recently reported several predictive validity studies. In a twelve-year predictive study, several tasks from the Torrance Tests of Creative Thinking were administered to high school students. Follow-up studies (after seven years and twelve years) utilized questionnaires which requested information concerning "the subjects' marital status, number of children, occupation, spouse's occupation, highest level of education achievements, a description of most creative achievement, and a statement of aspirations." (1972:246) In his conclusions, Torrance (1972) makes the following statement:

Although the subjects of this 12-year predictive validity study were fairly advantaged and most of them had ample opportunities and freedom to develop their creative abilities, the results do indicate that creativity tests administered during the high school years can predict real-life adult creative achievements. (1972:250)

Triffinger and Poggio (1971) point out a number of problems concerning criterion-related validity studies. Establishing appropriate criteria has been difficult because of the disagreement on such issues as the meaning of novelty, the evaluation of products, the determination of process criteria and "the persistent criticism that 'creativity' may . . . be used better to describe a rare quality or genius rather than a psychologically distinct set of individual difference variables." (1971:256)

Since creativity is a complex construct, Triffinger and Poggio (1972) doubt that arbitrarily selected tests can predict a complex, multidimensional criterion of creative behavior. They

suggest broadening the selection of test tasks, and utilizing multivariate statistical procedures in analyzing the results.

In summary, the underlying problems in validating the assessment procedures of creative behavior have been concerned with the formulation of a widely-accepted theory of creativity and an appropriate selection of a criterion to establish the validity of the measuring devices. Apparently, many studies have failed to define creativity and they lack a theoretical base for measuring creative behavior. Furthermore, many studies have failed to investigate thoroughly various kinds of validity. One researcher, Torrance, has operationally defined creativity as a complex process. His investigations of creative behavior, which have been undertaken over a fourteen-year period, reflect his attempts to analyze content, construct, concurrent and predictive validities of the Torrance Tests of Creative Thinking.

Although some researchers have criticized Torrance's work (Ausubel, 1963; Thorndike, R. L., 1963; Kreuter and Kreuter, 1964; Mueller, 1964; Vernon, 1964; Wallach and Kogan, 1965; Hoepfner, 1967), his thorough investigations far exceed the research efforts of other researchers who have investigated the assessment of creativity.

Reliability

According to Triffinger and Poggio (1972), reliability may be established by one or all of several approaches: stability, comparability and internal inconsistency. The method for assessing stability is commonly referred to as a test-retest method.

Triffinger and Poggio (1972) question whether the usual methods for determining stability apply to the stability measures of creativity. Is creativity a stable human characteristic? Since creativity may be a multidimensional construct, would it be more appropriate to refer to the stability of each component part of the creativity measure? What is the appropriate interval for acquiring test-retest reliability? How can the motivational levels of subjects be controlled on test-retest reliabilities?

The second approach to reliability, comparability, involves the administration of an alternate form of the test measure. For example, the Torrance Tests of Creative Thinking offer alternate forms (Forms A and B) for both figural and verbal test measures. Triffinger and Poggio (1972) think that the problem with alternate test forms is verifying that both forms measure the same aptitudes.

The third approach to reliability, known as internal consistency, assumes that the subject's performance on one part of the test will not differ greatly from his performance on other parts of the test. Since many creativity measures consist of open-ended items rather than discreet items, such an approach may be inappropriate for determining reliability. (Torrance, 1966)

Torrance (1966) reports a fourth approach to analyzing reliability of tests: inter- and intra-scorer reliability. In Torrance's training procedure a prospective scorer studies the scoring manual and scores a set of four or five tests. He next compares his scores with those of an experienced scorer and discusses the differences with the experienced scorer. Then the

prospective scorer is given a set of twenty-five to forty completed tests to score. Coefficients of correlations are computed between the scores of the experienced scorer and the inexperienced scorer. Torrance (1966) reports that these correlations are generally above .90, and there are almost no differences in the means. If intercorrelations are below .90 and sizable differences in the means do appear, then the inexperienced scorer continues his training.

Usability

Triffinger and Poggio (1972) point out several problems relating to the usability of creativity tests. First, if the conditions for administering the tests are not controlled, how can the test scores be adequately interpreted? Factors such as working time, warm-up activities, test instructions, administration procedures and testing environment need to be controlled, or the variability in scores will be due to these uncontrolled factors rather than to individual differences.

A second problem relating to the usability of a test is the scoring procedure. When a scoring procedure employs subjective processes, evidence of the agreement among the independent scores should be indicated. Also training procedures in using the scoring techniques should be provided, so that the research can be replicated or the research results used effectively.

In reference to open-ended scoring measures, Triffinger and Poggio (1972) recommend developing more accurate assessment procedures for originality and improving the accuracy of scoring

procedures by utilizing the computer. Computer scoring of tests has been employed in several studies. (Paulus and Renzulli, 1968; Archambault, 1969; Greene, 1971)

A third problem concerning usability is establishing appropriate norms. If normative scoring procedures are used for creativity measures, the research should identify the norm groups and the representative test tasks. Such information allows for reliable comparability of test results. Some researchers contend that normative procedures are inappropriate for creative measures. However, Triffinger and Poggio suggest that profiles (such as those which Torrance and Guilford have developed) which indicate inter-individual variations in creative thinking may be more useful than single composite scores. The major criticism that Triffinger and Poggio present is that studies fail to indicate the population group from which the norms were developed.

Summary

Major issues concerning the assessment of creativity relate to the validity, reliability and usability of the assessment tools. Validity is the degree to which the test measures what it purports to measure. Reliability is the degree of consistency and stability within the test scores. Usability refers to the degree to which the test can be administered, scored and utilized through normative procedures.

Three approaches to validating a test are through content, construct and criterion-related studies. The content approach analyzes the degree to which the behaviors being measured are

representative of the sample. The construct approach studies the degree to which explicit processes or traits are measured individually and collectively by the test items to predict an individual's behavior in a specified situation. Usually the last approach is concerned with concurrent (short term) and predictive (long term) studies.

Formulating a definition of creativity and the establishment of adequate external criteria are the chief problems in validating creativity measures. The absence of a widely accepted theory of creativity, the lack of adequate operational definitions of creativity, and the absence of an established creativity criterion are the major issues affecting all studies relating to content validity, construct validity and criterion-related validity.

Three approaches to assessing the reliability of a test measure are stability, comparability and internal consistency. A test-retest reliability method is used to assess stability. Researchers have questioned the application of certain theoretical and methodological postulates involved with determining the stability of most test scores as being applicable to the stability measures of creativity. Since theoretical formulations imply that creativity is not a stable human characteristic, the test-retest method for determining stability of creativity measures may be irrelevant. Identifying an appropriate interval for administering the tests is another crucial issue in estimating the test-retest reliability. Two additional issues are the motivational influences of the subjects between test administrations and the inability of

creativity measures to sample the complete universe of creative behaviors.

Comparability is a second approach to determining the reliability of test measures. Usually this procedure involves administering alternate forms of the test to the subjects. The main issue concerning comparability is how to verify that alternate forms of test items measure the same aptitudes as the measurement tool.

A third approach, assessing internal consistency, involves determining whether or not the subjects' scores on one part of a test are similar to their performances on other parts of the test. Determining the internal consistency of creativity measures through traditional approaches is questionable, as many creativity test items are open-ended items rather than discreet items.

A final issue which needs consideration in creativity assessment is the usability of the tool. Problems relating to usability involve test administration, test scoring and norms. Researchers indicate that controlled conditions in administering the test items need to be assured; the development of new scoring procedures need to be established; and the identification of the population and specific testing conditions need to accompany normative data.

SUMMARY OF THE REVIEW OF LITERATURE

The above review of literature reveals numerous philosophical and psychological theories of creativity none of which has been

widely accepted. The psychological theories can be categorized as process-orientation theories and product-orientation theories. Process-orientation theories define creativity, describe the dispositional traits characterizing the creative person and analyze the internal psychic forces influencing the creative individual.

Product-orientation theories present two approaches: operational procedures for studying the processes of creativity and the identification of behavioral functions which can be manipulated and controlled in studying one aspect of creativity, novelty of the product.

Other theories emphasize an eclectic approach to the examination of creativity. These theories stress the importance of simultaneously analyzing the many influential aspects of creativity: the person, the process, the environment, the problem and the product.

Some of the psychological theories have formulated methodological approaches which include instruments for assessing aspects of creativity. Selected reviews listing the use of these assessment instruments indicate a wide variety of procedures and strong disagreement among researchers using these procedures. Examination of the various techniques verify the contradiction relating to the assessment of creativity. Some tools consist of discrete test items, whereas other tools are complex tasks. Some tools assess factors of divergent-production thinking, whereas other tools assess convergent-production thinking. Some tools are employed in controlled testing situations, whereas other tools

are used in game-like conditions which emphasize unlimited time intervals. Some tools primarily assess the cognitive components of creative thinking, whereas other tools attempt to interrelate both cognitive and non-cognitive components. In spite of contradictory viewpoints, some researchers have, through extensive investigations, developed objective, quantitative procedures for assessing creativity. These tools appear to have sound theoretical rationales. They offer evidence of validity by means of content, construct and criterion-related studies as well as evidence of high reliability coefficients and of usability with normative profile procedures.

The review of the physical education literature reveals a growing concern for the unique individuality of a person's movement in physical activities. This concern has contributed to a number of studies which have analyzed a phenomenon designated as motor creativity. Some studies have philosophically explored the theoretical sources of the creative process in relation to the movement processes in physical activity. Other studies have developed assessment tools based upon specific aspects of previously accepted assessment procedures of creativity. These studies utilize the tools to investigate the relationships of motor creativity to other dimensions such as intelligence, growth factors, motor skills and sports proficiency, other creative thinking abilities, mental health and self-concept attributes and physical education experiences. The conglomeration of assessment procedures used in these investigations does not offer supportive evidence for

comparing the innumerable kinds of variables. The various assessment procedures have different theoretical rationales and different normative procedures. Yet it appears that some researchers have arbitrarily selected tests based on dissimilar theories and using different assessment procedures to investigate various interrelationships of interests. A comparison of the results of these studies is inconsequential, except that it does suggest a need for further research in motor creativity.

The Wyrick Motor Creativity Test has been the major assessment tool in motor creativity studies. This test battery is based upon Guilford's factor-analytic tests of creativity. The Wyrick test items are discrete items which assess two divergent-production factors: originality and fluency. Many of the studies using the battery compare motor creativity with verbal and figural creativity. These studies employ the Torrance Tests of Creative Thinking to assess verbal and figural creativity. Since the Wyrick test items are discrete items and the Torrance test items are complex tasks assessing four divergent-production factors, there is a possibility that the data acquired with these tools are incomparable. Researchers have stressed the importance of selecting assessment techniques which have consistent theoretical designs.

Presently, there are no motor creativity tests based upon the rationale of the Torrance Tests of Creative Thinking. The Figural Forms of the Torrance Tests are suggestive of ways in which to develop motor creativity tasks using divergent-thinking factors as measurable variables. Data acquired with such a motor

creativity test can be compared with other data acquired by tools using similar theoretical rationales.

CHAPTER III

THE MOTOR CREATIVITY TEST

The construction of the motor creativity test presented four problems:

1. The construction of movement tasks based upon the Torrance Tests of Creative Thinking, Figural Form.
2. The presentation of the movement tasks to a small sample of college women for exploratory purposes.
3. The selection of three movement tasks for the motor creativity test.
4. The construction of a scoring system for assessing the subjects' movement performances on these tasks.

For the purpose of solving these problems creativity was defined operationally as a complex process whereby a person senses a problem, identifies the difficulty, searches for a solution, reinterprets the solution and produces a new product. More specifically, motor creativity was defined as a person's ability to invent novel ways of moving in relation to his environment by reorganizing old movement patterns into novel movement patterns. This definition served as a basis for the construct validation of the movement tasks in the motor creativity test.

CONSTRUCTION OF THE MOVEMENT TASKS

Twelve movement tasks were designed for exploring the assessment of motor creativity. The objectives of the tasks were: (1) to encourage the subject to use gross movement patterns; (2) to arouse within the subject the desire to organize new movement patterns in relation to a stimulator; and (3) to stimulate the subject to move in diverse and novel ways.

Three different kinds of activities were embedded in the movement tasks. Group I tasks consist of activities which enable the individual to warm-up moving creatively. These tasks - Move to Sounds, Move with Ball, Move with Hoop and Move with Rope (see Appendix B, page 275)-allow the subject a great amount of openness and freedom to explore new ways of moving the body in space with one stimulator. The subject was encouraged to move using different body parts, to move in ways which no one else will move and to move in as many different ways as possible. These movement tasks appear to be analogous with the picture construction activity in the Torrance Tests of Creative Thinking. (Torrance, 1970)

Group II tasks consist of activities which enable the subject to move freely in relation to several stimulators. These tasks placed a slight limitation on the individual's exploratory movement by demanding some organization in her movement responses with each different stimulator.

Group II tasks were designed to be analogous with the incomplete figures activity of the Torrance Tests of Creative

Thinking, Figural Form. (Torrance, 1970) This activity provides experience whereby the subject controls tension and delays gratification of the impulse for closure. It appears that the Group II tasks accomplish this objective in several ways. Two tasks, Obstacle Course and Boxes (see Appendix B, page 275), use a number of familiar objects as stimulators. The subject is told to select any of the objects with which to move, to move the objects in as many different ways as possible and to move in ways which no one else will move. In these tasks the subject had to overcome the desire to move the object and her body in familiar movement patterns. In the other two tasks, See and Move (Objects) and See and Move (Subjects) (see Appendix B, page 275), the subject views a film which presents various stimuli having incomplete movement patterns. The subject is told to complete the various movement patterns using different body parts, to move in as many different ways as possible and to move in ways in which no one else will move. These kinds of directions encourage the subject to use unfamiliar movement patterns.

Group III tasks consist of activities which limit the subject's freedom to move creatively by exposing her to a repeated traditional stimulator. In these tasks, Hoops and Lines, Ropes, Hoops and Beams (see Appendix B, page 275), the subject is repeatedly exposed to the same stimulator and encouraged to destroy old patterns and to create new ones. These tasks appear to be analogous with the repeated figures activity in the Torrance Tests of Creative

Thinking, Figural Form. (Torrance, 1970) This activity requires the subject to make multiple associations to a single stimulus.

EXPLORATORY STUDIES ON THE MOVEMENT TASKS

During the fall term of 1972, two exploratory studies were conducted with the freshman women students majoring in physical education at the University of Oregon. The purpose of Exploratory Study I was to investigate the time limits of the tasks.

Six tasks of varying time limits were presented to four subjects. Two tasks were randomly selected from each group of four tasks by a task drawing process. These tasks, which are designated by an asterick, were selected from the following task groups:

Group I Tasks

Move to Sounds*
Move with Ball
Move with Hoop
Move with Rope*

Group II Tasks

Obstacle Course*
See and Move
(Objects)
See and Move
(Subjects)
Boxes*

Group III Tasks

Hoops and Lines*
Ropes*
Hoops
Beams

Variations in time limit for each task were one minute, two minutes, three minutes and four minutes. Four subjects were assigned a letter and through random rotation of these letters, which was accomplished by a drawing process, each subject was randomly exposed to the various tasks. For example:

First Task Selection

<u>Move with Rope</u>		<u>Boxes.</u>		<u>Ropes</u>	
<u>Minutes</u>	<u>Subjects</u>	<u>Minutes</u>	<u>Subjects</u>	<u>Minutes</u>	<u>Subjects</u>
One	A	One	B	One	C
Two	B	Two	A	Two	D
Three	C	Three	D	Three	A
Four	D	Four	C	Four	B

Second Task Selection

<u>Move to Sounds</u>		<u>Obstacle Course</u>		<u>Hoops and Lines</u>	
<u>Minutes</u>	<u>Subjects</u>	<u>Minutes</u>	<u>Subjects</u>	<u>Minutes</u>	<u>Subjects</u>
One	D	One	C	One	A
Two	C	Two	D	Two	B
Three	B	Three	A	Three	C
Four	A	Four	B	Four	D

At the completion of each task performance the subject was given an opinionnaire (see Appendix D 293). Each subject was requested to state her preferences on the time limit for each task. An analysis of the subjects' responses, as revealed in Table I, page 84, enabled the investigator to prescribe time limits for the task performances in Exploratory Study II. Three-minute time intervals were assigned Group I and Group II tasks and a one-minute time interval was assigned the Group III tasks.

Several purposes were proposed for Exploratory Study II. The first purpose was to acquire videotape recordings on the movement tasks in order to answer the following questions:

1. Are these tasks feasible items for measuring motor creativity as defined in this study?
2. Do the tasks stimulate the subject to respond?

TABLE 1

SUBJECT PREFERENCES FOR TIME LIMITS ON TASK
PERFORMANCES IN EXPLORATORY STUDY I (N=4)

Tasks	Minutes											
	$\frac{1}{4}$	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	Indefinite
<u>Group I</u>												
Move to Sounds							1		1		1	1
Move with Rope			2	2								
<u>Group II</u>												
Obstacle Course			1		1					1	1	
Boxes			1				1	1	1			
<u>Group III</u>												
Ropes			4									
Hoops and Lines		1	1	1								

3. Do the tasks stimulate a variety of responses from the subjects?
4. Do the tasks allow the subjects to respond freely?
5. Do the tasks enable the subjects to organize new ways of moving?
6. Do the tasks encourage some subjects to delay performing traditional movement patterns and to perform unique and novel movement patterns?

A second purpose of Exploratory Study II was to determine the feasibility of videotaping and evaluating the simultaneous performances of several subjects. A third purpose was to investigate a subject's ability to perform the tasks alone and with other persons.

Twelve subjects were randomly assigned to three groups: A, B, and C. Three subjects in each group were randomly selected to perform one task alone. Then each subject was exposed to three additional tasks. In these situations, the subjects performed the tasks with others in groups varying from one to three persons. For example, Subject One in Group A was presented two Group I tasks, one Group II task and one Group III task. The other members in Group A also performed some of the same tasks with Subject One.

The tasks were presented to the three groups of subjects in the following order:

Group I Tasks

Move with Hoop	Subject One, Group A
Move to Sounds	Subject One and Two, Group B
Move with Ball	Subjects One, Two and Three, Group C
Move with Rope	Subjects One, Two, Three, and Four, Group A

Group II Tasks

See and Move (Objects)	Subject One, Group B
Boxes	Subjects One and Two, Group A
See and Move (Subjects)	Subjects One, Two, and Three, Group B
Obstacle Course	Subject One, Two, Three and Four, Group C

Group III Tasks

Hoops and Lines	Subject One, Group C
Beams	Subjects One and Two, Group C
Ropes	Subjects One, Two and Three, Group A
Hoops	Subjects One, Two, Three and Four, Group B

At the completion of each task the subject responded to an opinionnaire (see Appendix D, page 293) which requested information pertaining to the challenge of the task, the time limit of the task and whether she preferred to perform the task alone or with others. Table 2, page 87, summarizes the subjects' opinions on the time limits for each task.

The results of Exploratory Studies I and II indicated that the assigned time limits of three minutes for the Group I and Group II tasks and one minute for the Group III tasks were appropriate. Apparently the subjects preferred to respond to Group I and Group II tasks for a longer period of time than for Group III

TABLE 2

SUBJECT PREFERENCES FOR TIME LIMITS ON TASK
PERFORMANCES IN EXPLORATORY STUDY II (N=4)

Tasks	(N)	Minutes											Indefinite
		$\frac{1}{4}$	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	
Group I													
Move with Rope	(4)					1	1			1		1	
Move with Hoop	(1)				1								
Move to Sounds	(2)					1	1						
Move with Ball	(3)					1	1			1			
Group II													
Obstacle Course	(4)					1		1					2
See and Move (Objects)	(1) *												
See and Move (Subjects)	(3)	3											
Boxes	(2)					1				1			
Group III													
Hoops and Lines	(1)					1							
Beams	(2)					2							
Ropes	(3)		1	1		1							
Hoops	(4)		4										

*About ten seconds per sequence.

tasks because the Group I tasks placed less limitation upon them and because the change of stimulators in the Group II activities made the tasks more interesting. The stimulators in Group III tasks were repeated stimuli. Each Group III task calls for a type of response in which some subjects can be very creative. Such performers must be able to continually destroy old patterns of moving in order to overcome boredom and dissatisfaction with the problem.

In Exploratory Study II, the subjects were asked about their preferences in performing the task, for example: alone; with one other; with two others; with three others; and with a specified number. Answers ranged from alone to "a whole bunch." Table 3, page 89, summarizes these responses. Although the data relating to preferences in performing the tasks with others suggest that the subjects prefer to perform the task with at least one other person, the television camera was unable to follow more than one subject in the performance. It also appeared that some subjects relied upon the performances of other subjects in creating novel movement patterns. On the basis of this information, the subjects in the final study were tested individually.

Another interesting facet in both exploratory studies is the subject's opinions with respect to their performances of the task. The subjects responded to four questions: Was the task fun to do? Why? Was the task challenging to do? Why? The responses to these questions are summarized in Appendix D, page 293.

TABLE 3
PREFERENCE FOR TASK PERFORMANCE
WITH OTHERS

How would you prefer to perform this task?	Number of Times Preference was Selected
Alone	6
With one other	4
With two others	4
With three others	4
With four or more	7
"Doesn't matter"	2

The Group I and Group II tasks appeared to be more challenging and more fun to do than the Group III tasks. These responses indicate that the Group III tasks are of a different construct and that for some subjects, creating with a repeated stimulus was very difficult. All of the tasks received favorable comments on the challenge of the activity, the fun of the activity and the difficulty of creating new ways of moving with the stimulators.

The videotape performances of the subjects in both studies were analyzed, described and recorded on an audiotape. Only the twelve tasks in Exploratory Study II were transcribed on paper and evaluated in terms of creativity variables: fluency, originality, flexibility and elaboration.

At this early stage of the study, the investigator had not developed an adequate scoring system. The exploratory studies provided information which contributed to the improvement of the scoring system. Through the evaluation of the movement responses of the subjects in Exploratory Study II, the investigator was able to identify the characteristics of a movement response; to classify various kinds of actions for assessing the flexibility variable; and to observe various characteristics which relate to the assessment of elaboration.

SELECTION OF THREE MOVEMENT TASKS

During the winter term of 1972, a pilot study was conducted to acquire movement performance data on five subjects for each of the twelve movement tasks. The purposes for conducting the pilot

study were to select three movement tasks for measuring motor creativity and to obtain a videotape recording to be used in training judges to evaluate movement performances.

Twelve women students in the professional physical education program at the University of Oregon volunteered to be subjects for the pilot study. This group included five freshmen, two sophomores, four juniors and one senior. To obtain these subjects, the investigator visited the professional physical education activity classes and gave the students an information sheet (see Appendix A, page 271) telling them about the purpose of the study, the procedures of the study and the treatment of the data. Volunteers were given consent forms (see Appendix A, page 272) and told to report to the testing area at an assigned time.

During the testing session a subject responded to the movement task alone. A two- to fifteen-minute rest period was given between the performance of each task, at which time the subject waited in the hallway adjacent to the testing area. After completing the testing session, the subject was given the option of viewing her performance on the television monitor. All subjects wore leotards, tights and no shoes.

The movement responses of the five subjects in each movement task were verbally described on an audiotape and transcribed to paper. These written descriptions were analyzed and evaluated in terms of the creativity variables of fluency, originality, flexibility and elaboration.

This evaluation process enabled the researcher to finalize the construction of the scoring system. Sub-categories were devised for the flexibility variable. The scoring procedures for the originality variable were further developed and refined. The procedures for using the scoring system were revised. Rather than view the tape continuously and verbally describe the movements on audiotape, the researcher decided to view the tape in twenty-second intervals and record the written descriptions on the evaluation worksheet (see Appendix C, page 283) after each interval. This new procedure appeared to be more consistent and workable than previous procedures.

In selecting the three movement tasks for the motor creativity test, the researcher subjected the data on the twelve tasks to the following criteria:

1. Does the task evoke different abilities in solving problems, such as the ability to destroy traditional movement responses; the ability to re-combine old movement patterns; and the ability to invent new movement patterns?
2. Does the task time limit enable the subject to become involved with the environmental stimuli?
3. Are the movement responses in the task sufficiently recognizable for evaluation purposes?
4. Does the data for the task indicate that subjects generate innumerable and various responses in the fluency and flexibility categories?

5. To serve as a basis for construct validity, can the movement performances be evaluated in terms of the four variables of creativity as defined in this study (fluency, originality, flexibility and elaboration)?
6. Does the task endanger the physical health of the subject?
7. Is the administration of the task too time-consuming?

The researcher used a rating scale to evaluate each movement task on its capability to meet each criterion. Each movement task was given three points for a high rating, two points for a medium rating, or one point for a low rating. Table 4, page 94, summarizes these ratings.

Move to Sounds appeared to be the most valid task in Group I. The movement responses in Move with Hoop, Move with Rope and Move with Ball were difficult to identify because the scorer had to observe not only the movement responses of the subject's body but also the movement responses the subject performed with the object. The Move with Ball task rated low on ability to generate performances with high fluency and flexibility characteristics. Apparently many subjects succumbed to the traditional ways of handling the ball. The absence of an external object in the Move to Sounds task enabled this task to acquire a high rating on the fifth criterion: the ability to which the task performances can be evaluated in terms of the four variables of creativity.

TABLE 4

MOVEMENT TASKS RATINGS ON SEVEN CRITERIA

Tasks	Criteria							Criteria Total Points
	1	2	3	4	5	6	7	
<u>Group I</u> Move to Sounds Move with Hoop Move with Rope Move with Ball	3	3	3	2	3	3	3	20
	3	3	2	3	2	3	3	19
	3	3	2	3	2	3	3	19
	3	3	2	1	1	3	3	16
<u>Group II</u> Obstacle Course See and Move (Objects) See and Move (Subjects) Boxes	3	2	2	3	1	1	1	13
	3	3	3	2	2	3	2	18
	3	2	3	3	3	2	2	19
<u>Group III</u> Hoops and Lines Ropes Beams Hoops	3	3	2	3	2	3	3	19
	3	1	1	1	1	2	1	12
	3	3	1	2	1	1	1	12
	3	2	1	1	1	3	3	14

Rating Scale
 High = 3 points
 Medium = 2 points
 Low = 1 point

See and Move (Subjects) appeared to be the most valid task in Group II. For Obstacle Course and Boxes, time limits were too long and the movement responses were difficult to identify. The filmed objects in See and Move (Objects) were so similar that this task failed to generate performances that rated high on fluency and flexibility characteristics. Obstacle Course had a low rating and See and Move (Subjects) had a medium rating on the safety characteristics because the stimulators in these tasks endangered the physical health of unskilled subjects. The time consumed in setting up the Obstacle Course for each subject made this task rate low in administrative ability. See and Move (Subjects) movement performances rated high on the ability to be evaluated on the four variables of creativity. It was difficult to evaluate the movement performances of the other tasks on these variables.

Hoops and Lines was the most valid task in Group III. The time limit for Ropes was too short whereas the time limit for Hoops was too long. The movement responses were difficult to identify in Ropes, Hoops and Beams. Hoops and Lines rated high on ability to generate movement performances with fluency and flexibility characteristics whereas Beams rated medium and Ropes rated low. Beams and Ropes failed to rate high on safety characteristics because the stimulators endangered the physical health of unskilled subjects. Beams rated low and Ropes rated medium on administrative ability because the equipment had to be set up for each subject. Although none of the Group III tasks rated high on the ability to generate movement performances which were easy to evaluate, the

medium rating of Hoops and Lines was higher than the ratings of the other tasks.

The three selected tasks, Move to Sounds, See and Move (Subjects) and Hoops and Lines represent tasks with sixteen high ratings and five medium ratings out of a possible twenty-one ratings on the seven criteria. The construction of these tasks differed so that the motor creativity test consists of three different kinds of activities: a warm-up task, an incomplete movement patterns task and a repeated stimulus task.

CONSTRUCTION OF THE SCORING SYSTEM

The major objective in developing the scoring system was to provide a system in which the movement performances of the subject could be analyzed. The variables of fluency, originality, flexibility and elaboration used in the Torrance Tests of Creative Thinking (Torrance, 1970) were adopted for use in this scoring system.

Fluency

Fluency, as defined in this study, is the number of different responses which occur within the activity and relate to the activity. A response is identified by its beginning and ending in a movement pattern which represents a movement idea. Pauses, changes in direction or a total change in movement pattern indicate a new movement idea or response. For example, in two twenty-second observation periods, one subject performed the following four responses:

1. Lifting and lowering the arms and wiggling the fingers.
2. Alternate lifting of bent arms, walking backwards and circling the arms.
3. Walking forward with bent knees and lowering the arms.
4. Standing in place, circling and twisting the trunk, circling bent arms while bending the knees and hips.

These four responses are identified by changes in direction and changes in movement pattern.

Originality

Originality, as defined in this study, is the uniqueness and novelty of the responses occurring within an activity. A point system is used to evaluate each response for its uniqueness and originality. This system utilizes the percentage value of each action in the response and the various combinations of actions in the response.

The scorer follows several steps to assess originality. First, she tallies all the actions used in all of the responses for the total group of subjects. Secondly, the scorer uses the formula $\frac{X}{Y}$ to find the percentage value of each action in relation to the total number of responses. X is the number of times the action is used in the responses for the total group of subjects, and Y is the total number of responses including the

repetitions. Thirdly, the scorer evaluates each response for its unique actions and its various combinations of actions by assigning the appropriate points to each response: three points for each different action in a response having a percentage value of less than 2 percent; two points for each different action in a response having a percentage value between 2 percent and 4.9 percent; and one point for each different action in a response having a percentage value between 5 percent and 10.9 percent. If an action with a percentage value of one or more points occurs more than once in a response, the response receives the percentage value points of only one of those actions. For example, a subject makes the following response in the Move to Sounds task:

Turn in place, run, lower trunk, roll over sideways, rise,
turn in place, run, lower trunk and roll over sideways.

In the Move to Sounds task rolling is a unique action with a percentage value of two points. However, this response receives two points rather than four points because one roll is a repeated action within the response.

In addition to earning percentage value points, a subject may receive bonus originality points by using five or more different actions in a given response. The subject scores one point for each response using five different actions, two points for each response using six different actions, and three points for each response using seven or more different actions. In the previously given example the subject has performed five different

actions (underlined) with the response; therefore, she earns one bonus originality point for that response.

In summary, the subject receives three originality points for the previously described response in the Move to Sounds task. Two points are awarded for the unique action of rolling and one point is given as a bonus originality point for the five different actions performed in the response.

Flexibility

Flexibility, as defined in this study, is the variety of responses, representing different strategies, principles and approaches used to solve the problem in the activity. In analyzing creative movement, flexibility describes the different kinds of actions which the subject employs in the movement performances with the stimulator. These actions are classified as locomotor movements, non-locomotor movements and manipulative movements. Each category is divided into sub-categories. The locomotor movement category includes twelve action sub-categories. The non-locomotor movement category includes twenty-three action sub-categories and the manipulative movement category includes fifteen action sub-categories.

The scorer assesses flexibility by checking the appropriate sub-category when the subject uses an action in solving the movement task. Almost all actions which the subject uses can be described by the sub-categories. If the scorer observes an action for which there is no classification, then a new

sub-category is created and labelled. Each category and sub-category employed in this study are defined in Appendix C, page 283.

Elaboration

Elaboration, as defined in this study, is the detail of each movement response. These details include the use of body parts, the use of floor space, the changes in level and the changes in tempo. Each time the subject uses a different body part in the movement, the scorer records the body part used. The body part may be used as a supporting base or as a portion of the base; it may be used to initiate the action in the response; and it may be used as a result of the total movement response. For example, lowering the trunk to a tuck position near the floor involves bending the knees and hips and curling the trunk so the scorer checks knees, hips and trunk. Since there are only sixteen body part sub-categories, the subject's maximum score is sixteen points in this category.

In the second elaboration category, use of floor space, the scorer checks on a facsimile of the testing area, the various floor areas in which the subject moves. An area is checked only once, even though the subject moves in and out of the area several times. Since there are only nine floor areas, the subject's maximum score on the use of floor space is nine points.

For the third elaboration category, changes in level, the scorer records one point each time the subject executes a change

in level from high to low, low to medium, medium to high, and so forth. The subject's head is used as a reference point for judging whether she has made a significant change in level. When the head lowers from a medium position (erect standing position) to a low position (tuck position near the floor), the scorer records one point in the level change category. If a response involves lowering and raising the head concurrently, then only one point is recorded. If the head is lowered, followed by one or more responses and then raised to a high position, the subject receives two points in the category. The subject's feet are used as reference points when the subject is jumping or moving from the floor to a high position above the floor. The scorer records one point for each lift from the floor when the feet appear to be twelve inches off the floor.

In the fourth elaboration category, changes in tempo, the scorer records one point each time the subject increases or decreases the rate of the total movement. Changes in tempo may be noted between responses as well as within each response. On each occasion the scorer records one point in this category. Both the tempo change and level change categories are open-ended since there are no maximum limits placed upon the performance.

Scoring Procedures

The procedures for using the scoring system were standardized. The videotape recording of the movement task is played in twenty-second observation intervals. During each observation

period, the scorer observes the gross movement patterns of the subject. The recorder is stopped and the scorer briefly describes the observed responses in the responses column on the Evaluation Worksheet (see Appendix C, page 283). Repeated responses are noted by a tally mark following the brief description of the subject's response. The scorer checks the actions which the subject uses in the flexibility column and checks the body parts which the subject uses in the elaboration column. The actions and body parts are checked only once because repetitions of these sub-categories are of no value in the assessment of flexibility and elaboration. If actions or body parts which the subject uses are not listed on the Worksheet, the scorer writes these new sub-categories in the appropriate areas and records them. At the scorer's request, this twenty-second observation period on the videotape recording may be repeated. After all responses have been described and all of the different actions and body parts checked for this observation interval, the videotape recording is played for another twenty-second observation period.

After observing and recording the movement responses which the subject has performed in the task, the scorer rewinds the videotape recording for a second playing session. In this session the tape runs continuously as the scorer observes and records by tally marks in the following sub-categories of elaboration: changes in level, changes in tempo and use of floor space.

The scorer assesses fluency by evaluating the description of the movement responses. Each response which is different and relevant is noted by a tally mark in the fluency column.

The scorer assesses originality by recording all of the described actions, including repetitions, in the responses on the Originality Worksheet (see Appendix C, page 283). All actions are totalled and the percentage value of each action is determined. The scorer determines the total points for each unique action which the subject performs in the movement task. As the scorer evaluates each response, she circles the unique actions in the response and records the unique action points in the originality column. Then the scorer underlines all actions, except the repeated actions, in each response. The scorer counts the number of different actions in the response, determines the appropriate bonus point value for the response and records and circles this value in the originality column.

All tallies, checks and numbers are summarized and recorded in the score area in the upper right-hand corner of the Worksheet. The Evaluation Worksheet in Appendix C, page 283, is an example of the scoring procedure.

CHAPTER IV

PROCEDURES

In conducting this study a motor creativity test was constructed and administered. Data from the test administration were utilized to evaluate the test as to objectivity and reliability.

CONSTRUCTION OF THE MOTOR CREATIVITY TEST

As indicated in Chapter III, twelve movement tasks were designed for exploratory purposes. Two exploratory studies were conducted in which the investigator studied time limits for the tasks; the feasibility of the tasks as measures of motor creativity; the procedures for acquiring and evaluating the movement performances; and the subjects' task performance preferences. A pilot study was conducted in which movement performance data were obtained on videotape recordings for two purposes: (1) to select three movement tasks for the motor creativity test; and (2) to train the judges in utilizing a scoring system for evaluating the performances of the tasks set by the motor creativity test. The subjects for these studies were students in the professional physical education program at the University of Oregon. The subjects' movement performances in the pilot study were analyzed and the movement tasks were subjected to a rating scale

of seven criteria: construct characteristics; time limit characteristics; movement response characteristics; fluency and flexibility characteristics; evaluation ability; safety characteristics; and administrative ability. The three tasks selected for inclusion in the motor creativity test were Move to Sounds, See and Move (Subjects) and Hoops and Lines. These tasks are described in Appendix B, pages 276-280.

The final problem in constructing the motor creativity test was to develop a scoring system. The purpose of this system was to enable scorers to analyze, describe and evaluate the subjects' movement performances on the motor creativity test. The four variables used in the Torrance Test of Creative Thinking (Torrance, 1970) were adopted as variables for this scoring system. Fluency was measured by the number of different and relevant movement responses. Originality was determined by the uniqueness of actions based upon percentage values which were related to the total number of actions and responses performed. The originality score also reflected the combinations of actions in the response. Flexibility was evaluated by the number of different actions performed. Elaboration described the amount of detail performed in the movement. In order to maintain consistency in scoring the subjects' movement performances, procedures for using the system were developed.

ADMINISTRATION OF THE MOTOR CREATIVITY TEST

Three movement tasks purporting to measure motor creativity were administered to twenty-five college women. Their movement performances were recorded on videotape. Three judges were selected and trained to analyze, describe and evaluate the movement performances on the videotape recordings.

Selection of the Subjects

The subjects were twenty-five women students enrolled in the service course program in the Department of Physical Education for Women at the University of Oregon during the spring term of 1972. Five subjects were randomly selected from each class roster of twenty-five randomly selected courses. These courses involved such activities as swimming, life saving, skin diving, canoeing, bowling, archery, golf, badminton, horseback riding, jogging, conditioning, exercise and posture, karate, ballet, bicycle touring, ski touring, mountain hiking and softball.

After constructing a list of possible candidates for the study, the researcher contacted each person prior to the initial testing session. Each potential subject was given an information sheet (see Appendix A, page 273) which related the nature of the study. If she consented to be a subject for the study, she signed a consent form (see Appendix A, page 274) and her testing hours were arranged. If she refused to be a subject, the researcher contacted the next candidate who had been randomly selected in the same class.

Presentation of the Motor Creativity Test

Three movement tasks - Move to Sounds, See and Move (Subjects) and Hoops and Lines - were presented to each subject four times within a two-week period. The testing sessions were designed so that one-day intervals occurred between the first and second testing sessions and between the third and fourth testing sessions. A four-day interval occurred between the second and third testing sessions. For example, Subject One reported to the testing area on Monday and Wednesday of the first week and on Monday and Wednesday of the second week. Occasionally, a subject was unable to make the testing sessions. Rather than eliminate the subject from the study, the researcher arranged new testing hours for her.

Each subject was assigned a specific time in the evening to report to the testing area. The subject wore a leotard, tights and no shoes. Upon her arrival at the testing area, the subject was given instructions for each movement task. She performed the movement tasks alone. A two-minute rest period was given between each task presentation.

The first testing session was a pre-testing experience to familiarize the subject with the videotape equipment, the movement tasks and the administrative personnel. The purposes of this session were to help dissipate the uncomfortable feelings subjects experience in performing the tasks and to encourage them to explore their creative potential. Only for this session were the movement tasks presented in the following order: Hoops and Lines, See and Move (Subjects) and Move to Sounds. After performing the tasks,

the subject was allowed to view her performance on the television monitor. These movement performance data were not used for assessment purposes. At the second, third and fourth testing sessions the movement tasks were presented in a different order: Move to Sounds, See and Move (Subjects) and Hoops and Lines.

All of the movement performances were recorded on an Ampex one-inch videotape. A Bell and Howell television camera, Model 2962, and an Ampex videotape recorder, Model VR-5100, were operated by two persons who had experience in taping movement performances. The researcher gave the instructions for each task, operated a Wollensack audiotape recorder for the Move to Sounds task and a Kodak Super 8mm movie projector for the See and Move (Subjects) task. The judges observed the movement performances on a Setchell Carlson Monochrome television monitor, Model 6M901.

The equipment was set up in the same area before each testing area. Figure 1, page 109, shows the placement of all equipment in a gymnasium of 50 feet by 80 feet. For the See and Move (Subjects) task the movie screen was placed in an equipment closet and the projector was placed on a table which was five feet from the screen. The doors to the closet helped to darken the area so that the film sequences were easily seen by the subjects.

The researcher used a two-inch gray fabric tape for the two lines in the Hoops and Lines task. Figure 1, page 109, shows the approximate positions of the lines during the four testing sessions. This tape was not removed from the floor during the testing sessions. Before each presentation of the Hoops and Lines

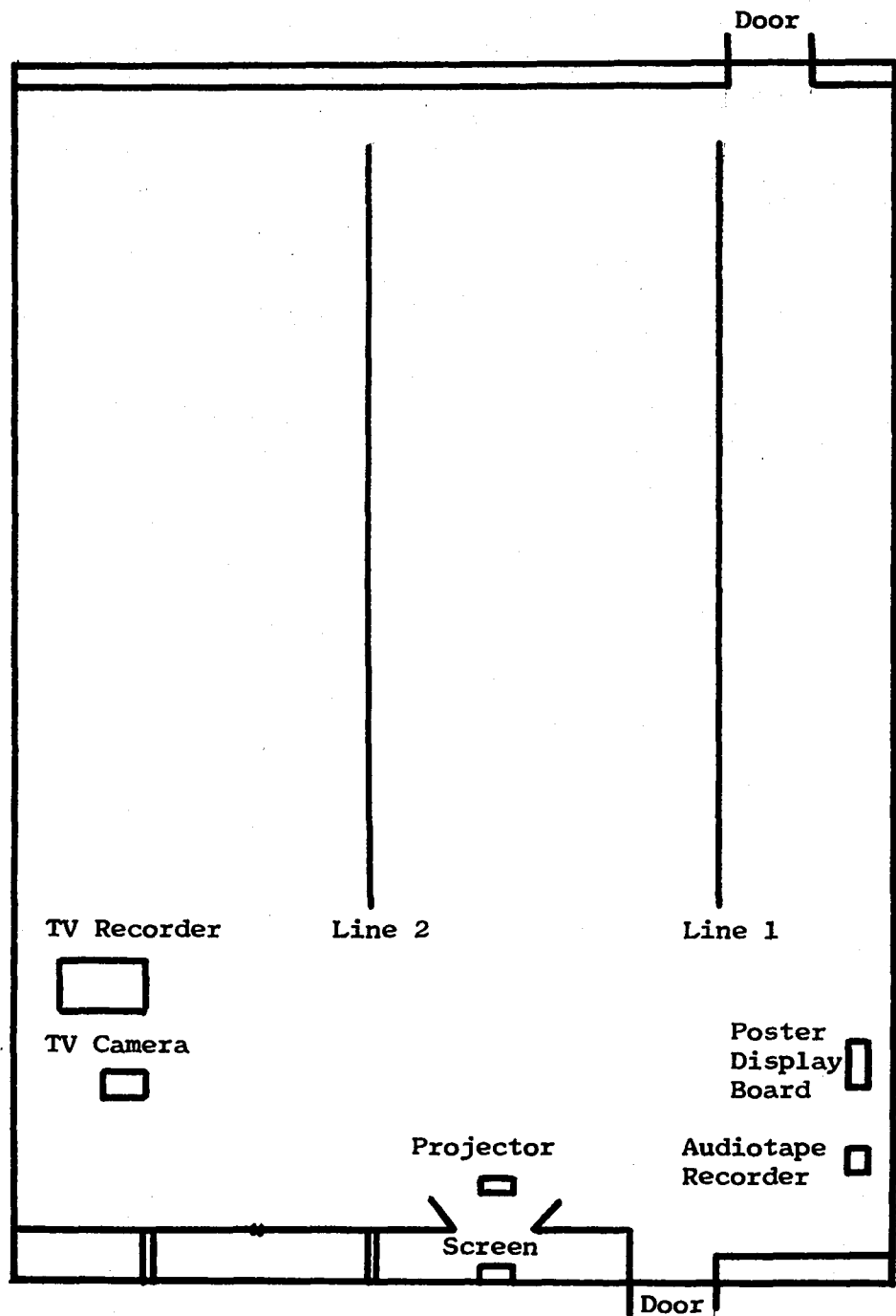


FIGURE 1
DIAGRAM OF TESTING AREA
(50' x 80')

task, three hula hoops were placed between the lines and ten feet apart (see Hoops and Lines illustration in Appendix B, page 280).

Assessment of the Motor Creativity Test

Three judges were selected to assess the movement responses on the motor creativity test. Two of the judges were former physical education instructors who had extensive experience in teaching gymnastics and fundamentals of movement and in judging gymnastics events at the college level. The researcher was the third judge.

Training sessions. The movement performance data obtained during the pilot study were used to train the three judges to use the scoring system for analyzing, describing and evaluating the movement responses. At the first training sessions, the judges were given written material on the assessment of the motor creativity test, definitions of terms relating to motor creativity, descriptions and instructions of the movement tasks, evaluation procedures of the movement responses, definitions of the flexibility categories and sub-categories and the various evaluation worksheets. All of this material was reviewed with the judges and they were instructed to frequently review the definitions of the flexibility categories and sub-categories.

In learning how to use the scoring system, the judges observed and evaluated the movement performances of five subjects on three movement tasks: Move with Hoop, Move with Rope and See and Move (Objects). After evaluating the movement performances of each task, the judges discussed and compared the results of

their evaluations. When the judges appeared to show adeptness in using the scoring system, the pilot study data on the Move to Sounds, See and Move (Subjects) and Hoops and Lines tasks were presented twice to the judges for evaluation.

Two judges had fifteen training sessions and one judge had thirteen training sessions. These sessions, which amounted to a total of one hundred hours, enabled each judge to observe and evaluate forty-five movement performances.

Evaluation of the motor creativity test performance. Three judges twice evaluated the movement performances of the subjects' second testing session on the Move to Sounds, See and Move (Subjects) and Hoops and Lines tasks.

One judge, the researcher, evaluated the movement performances of the third and fourth testing sessions. The results of the observations of the third and fourth testing sessions were combined with the results of the evaluations of the second testing session to give scores for each subject on the following combinations of tasks:

1. Move to Sounds III (six minutes)
2. Move to Sounds IV (nine minutes)
3. See and Move III (four minutes)
4. See and Move IV (six minutes)
5. Hoops and Lines III (two minutes)
6. Hoops and Lines IV (three minutes)

TREATMENT OF DATA

In both the training session evaluations and the motor creativity test evaluations, the judges ascertained quantitative scores for sixty-three variables. The five dimensional variables were fluency, originality, flexibility, elaboration and motor creativity, a summation of all variables. The other fifty-eight variables included three flexibility categories, fifty-one flexibility sub-categories and four elaboration categories.

The first step in the treatment of the data was to determine the judges' ability to use the scoring system in evaluating fifteen movement performances observed in the training sessions. The raw data obtained from the two evaluation sessions for the three judges which were treated included scores on twelve variables: fluency, originality, flexibility, locomotor movements, non-locomotor movements, manipulative movements, elaboration, body parts, floor space, level changes, tempo changes and motor creativity. Objectivity and reliability correlation coefficients were determined for the judges' evaluations of each variable. In addition, interjudge and intrajudge percentage agreements were determined for the judges' evaluation of each variable.

The second step in the treatment of the data was to ascertain the judges' ability to use the scoring system on the movement performances of twenty-five subjects to whom the motor creativity test had been administered. Twice the judges evaluated the movement performances of twenty-five subjects on three

movement tasks. The following statistical information was ascertained from treatment of these data.

1. Objectivity and reliability correlation coefficients of twelve variables on each movement task.
2. Means and standard deviations of twelve variables on the first evaluation session and on the second evaluation session.
3. Correlation coefficients among the twelve variables for each movement task on the first evaluation session and on the second evaluation session.
4. Interjudge and intrajudge percentage agreements for all variables (sixty-three) for each movement task.

The third step in the treatment of the data was to determine the relationships among five variables (fluency, originality, flexibility, elaboration and motor creativity) on the movement performances of twenty-five subjects in the three testing sessions. The researcher analyzed and evaluated movement performances which the twenty-five subjects had performed on the tasks in the second, third and fourth testing sessions. The evaluation of the combined movement performances of the second testing session (second observation) and the third testing session represented the scores for the third evaluation session. The scores for the fourth evaluation session included the evaluation of the combined performances of the second, third and fourth testing sessions. Means and standard deviations were determined for each variable on each

session. Correlational methods provided statistical information on the following relationships.

1. The relationship among the variables of each movement task in the second evaluation session.
2. The relationship among the variables of each movement task of the third evaluation session.
3. The relationship among the variables of each movement task in the fourth evaluation session.
4. The relationship among the variables of each movement task in the second and third evaluation sessions.
5. The relationship among the variables of each movement task in the second and fourth evaluation sessions.
6. The relationship among the variables of each movement task in the third and fourth evaluation sessions.

Statistical Procedures Used on the Training Session Data

Spearman's Rank Difference correlational method (Guilford, 1965) was used to determine the objectivity and reliability correlation coefficients for the training session data. Percentage agreements were determined by a method which had been used to estimate objectivity and reliability of category systems in other studies. (Scott, 1955; Flanders, 1967;

Howey, 1968; Barrett, 1970) In this method, the observation of judges was paired successively. The formula used in estimating the percentage agreement between paired evaluations of judges was $\frac{X}{Y}$, where X = the total number of judge agreements, and Y = the total number of observations made. (Barrett, 1970:149)

Interjudge percentage agreement examined the extent to which a judge agreed with the other judges in observations and evaluations of the movement performances. The scores for fifteen subjects on each variable (twelve) were successively paired between each judge. Then the formula $\frac{X}{Y}$ was used to find the interjudge percentage agreement on each variable for the evaluation of Judges I and II, Judges II and III and Judges I and III.

For example, Judge I's scores for five subjects on fluency are 8, 9, 10, 7, and 6, whereas Judge II's scores for the same five subjects on fluency are 7, 10, 11, 7, and 8, respectively. These scores are paired. In each pairing, the high score is placed in the Y column (total number of observations made) whereas the low score is placed in the X column (total number of observations agreed upon). In this example, the scores in the Y column are 8, 10, 11, 7, and 8 which totals 44. The scores in the X column are 7, 9, 10, 7, and 6 which totals 39. The interjudge percentage agreement $\left[\begin{array}{c} X \\ - \\ Y \end{array} \right]$ on fluency with these five subjects is 89 percent.

The intrajudge percentage agreement examined the extent to which a judge agreed with what she had observed and evaluated at an earlier time. To determine the intrajudge percentage agreement the scores for fifteen subjects on each variable (twelve) were

paired successively between the first evaluation session and the second evaluation session of each judge. Then the formula $\frac{X}{Y}$ was used to find the intrajudge percentage agreement on each variable for the evaluations of Judge I, Judge II and Judge III.

Statistical Procedures for the Motor Creativity Test Data

The statistical analyses of the data on the motor creativity test were performed by the User Services Group, Computer Center, at the University of Oregon. All programs were run on a 360 IBM, Model 50H computer. A SPSS program was used to determine means, standard deviations and zero-order correlation coefficients. A special program was written in order to determine the cumulative interjudge and intrajudge percentage agreements. In this program, the judges' twenty-five evaluations on each variable for each task were paired successively. An interjudge percentage agreement was found for each pairing (for example, Judge I and Judge II, fluency score for Subject One on Move to Sounds). The interjudge percentage agreements for the evaluations of twenty-five subjects on a variable in a task were totalled and divided by the number of subjects to ascertain a cumulative interjudge percentage agreement for that variable.

Cumulative interjudge percentage agreements were found by pairing the data between the evaluation sessions of Judges I and II, Judges II and III and Judges I and III on twelve variables and for three tasks. Cumulative intrajudge percentage agreements were found by pairing the data between the first evaluation session and

the second evaluation session for the evaluations of Judge I, Judge II and Judge III on twelve variables and for three tasks.

A modification of the percentage agreement procedure was used to determine the interjudge and intrajudge percentage agreements on the fifty-one sub-categories of flexibility. To ascertain the interjudge percentage agreement, the judges' evaluations of twenty-five subjects for each sub-category were paired successively. All pairings which indicated an agreement in the selection of the sub-category were totalled and divided by the number of subjects. Interjudge percentage agreements were determined for the evaluations of Judges I and II, Judges II and III and Judges I and III on the selection of the fifty-one flexibility sub-categories with each task.

To ascertain the intrajudge percentage agreement, the data for the judge's first evaluation were paired successively with the data for the judge's second evaluation session. All pairings which indicated an agreement in the selection of the sub-category were totalled and divided by the number of subjects. Intrajudge percentage agreement was determined for the evaluations of each judge on fifty-one flexibility sub-categories with each task.

CHAPTER V

ANALYSIS OF DATA

The purpose of this study was to develop a motor creativity test for college women. Twelve movement tasks were designed for exploratory purposes. Three of these tasks were selected for inclusion in the motor creativity test. A scoring system for describing, analyzing and evaluating the movements which the subjects performed in the tasks was constructed. Three judges were trained to use the scoring system. The data obtained from these training sessions were treated statistically to determine reliability and objectivity correlation coefficients and intrajudge and interjudge percentage agreements.

The motor creativity test was administered four times to twenty-five undergraduate women enrolled in the physical education service course program at the University of Oregon. Their performances during the second, third and fourth testing sessions were videotaped. The judges twice evaluated the subjects' movement performances which were videotaped during the second testing session. These data were treated statistically to determine reliability and objectivity correlation coefficients and intrajudge and interjudge percentage agreements. Other statistical information resulting from the treatment of these data included means, standard deviations and intercorrelation coefficients among the variables evaluated by each judge during the two evaluation sessions.

One judge evaluated the movements which the subjects performed in the second, third and fourth testing sessions. These data were treated statistically to determine the relationships among the variables in each movement task and in the combined testing sessions, for example, the second testing session, the second and third testing sessions, and the second, third and fourth testing sessions. The statistical analyses of the motor creativity test data were performed on an IBM 360 computer at the Computing Center, University of Oregon.

TRAINING SESSION RESULTS

Three judges were trained to use the scoring system for describing, analyzing and evaluating the movement performances of subjects. At the completion of the training session, the judges twice evaluated fifteen movement performances. These evaluations included movement performances of five subjects performing the Move to Sounds task, the See and Move task and the Hoops and Lines task.

Spearman's Rank-Difference correlational method was used to determine the reliability and objectivity correlation coefficients of the five dimensional variables in the motor creativity test. These variables were fluency, originality, flexibility, elaboration and motor creativity. Intrajudge and interjudge percentage agreements were determined for the five dimensional variables, three flexibility categories and four elaboration categories in the scoring system.

Correlation Coefficients

In regard to interpreting correlation coefficients, Guilford (1965) stated that coefficients are relative to the circumstances of the situation in which they are obtained and that they need to be interpreted in reference to these circumstances. Several factors influenced the results of the training session data. First, fifteen movement performances constitute a very small sample. Second, the data include subjective evaluations based upon the judges' descriptions of the movements on videotape recordings. A third circumstantial factor is that motor creativity is a summation of the other variables. Consequently, the range of scores for some of these variables is small. A narrow range of scores tends to reduce the correlation coefficients, "as slight changes anywhere in a distribution result in much greater variations in distribution positions." (Clarke, 1970:236) Guilford (1965) reported that reliability coefficients need to be in the upper bracket of .70 to .98, whereas validity coefficients need to be in the lower bracket of .00 to .80. For the purposes of this study, correlation coefficients from .80 to .98 were considered high; coefficients from .60 to .79, moderate; and coefficients from .00 to .59, low.

Reliability correlation coefficients. To ascertain reliability correlation coefficients of the training session data, the five dimensional variables evaluated by each judge during the first and second evaluation sessions were correlated. Of the fifteen correlation coefficients presented in Table 5, page 121,

TABLE 5
 RELIABILITY CORRELATION COEFFICIENTS:
 JUDGES TRAINING SESSION (N=15)

Variables	Judge I	Judge II	Judge III
Fluency	.93**	.70**	.72**
Originality	.58*	.88**	.70**
Flexibility	.76**	.64**	.80**
Elaboration	.92**	.83**	.78**
Motor creativity	.74**	.94**	.91**

* $r > .45$ $p < .05^a$

** $r > .64$ $p < .01^a$

^aValues from Dixon and Massey's Tables
 (Guilford, 1965, p. 593)

fourteen coefficients are significant at the .01 level and one at the .05 level. For Judge I, reliability correlation coefficients indicate high relationships for fluency ($r = .93$) and elaboration ($r = .92$); moderate relationships for flexibility ($r = .76$) and motor creativity ($r = .74$); and low relationships for originality ($r = .58$). For Judge II, reliability correlation coefficients reveal high relationships for originality ($r = .88$), elaboration ($r = .83$) and motor creativity ($r = .94$); and moderate relationships for fluency ($r = .70$) and flexibility ($r = .64$). For Judge III, reliability correlation coefficients show high relationships for flexibility ($r = .80$) and motor creativity ($r = .91$); and moderate relationships for fluency ($r = .72$), originality ($r = .70$) and elaboration ($r = .78$). Thus with the exception of one judge and one variable, all reliability correlation coefficients are at either high or moderate levels.

Objectivity correlation coefficients. To determine objectivity correlation coefficients of the training session data, the evaluation of the variables by Judges I and II, Judges II and III and Judges I and III were correlated. As is evidenced by data in Table 6, page 123, the results of these correlations range from $r = .23$ to $.94$ during the first evaluation session and from $r = .45$ to $.89$ during the second evaluation session.

In Session I, ten of the fifteen correlation coefficients are significant at the .01 level and three at the .05 level. Among the judges, seven coefficients indicate high relationships

TABLE 6
 OBJECTIVITY CORRELATION COEFFICIENTS:
 JUDGES TRAINING SESSION (N=15)

Variables	Judges I-II	Judges II-III	Judges I-III
<u>Session I</u>			
Fluency	.79**	.81**	.94**
Originality	.63*	.65**	.58*
Flexibility	.23	.70**	.23
Elaboration	.93**	.89**	.89**
Motor creativity	.78**	.90**	.85**
<u>Session II</u>			
Fluency	.89**	.63*	.80**
Originality	.89**	.71**	.55*
Flexibility	.82**	.48*	.45*
Elaboration	.89**	.89**	.86**
Motor creativity	.89**	.89**	.81**

* $r > .45$ $p < .05^a$

** $r > .64$ $p < .01^a$

^aValues from Dixon and Massey's Tables
 (Guilford, 1965, p. 593)

($r = .81$ to $.94$); five coefficients, moderate relationships ($r = .63$ to $.79$); and three coefficients, low relationships ($r = .23$ to $.58$). Elaboration is the only variable with correlation coefficients showing three high relationships among the judges ($r = .89$ to $.93$). Correlation coefficients for fluency indicate high relationships between Judges II and III ($r = .81$) and between Judges I and III ($r = .94$), but a moderate relationship between Judges I and II ($r = .79$). Correlation coefficients for originality reveal a moderate relationship between Judges II and III ($r = .70$) but low relationships among the other judges ($r = .23$). Motor creativity correlation coefficients indicate high relationships between Judges II and III ($r = .90$) and between Judges I and III ($r = .85$) but a moderate relationship between Judges I and II ($r = .78$).

The objectivity correlation coefficients of the variables which were evaluated during Session II indicate that the judges improved in their abilities to use the scoring system consistently. Eleven of the fifteen correlation coefficients are significant at the $.01$ level and four at the $.05$ level. Among the judges, ten correlation coefficients show high relationships ($r = .80$ to $.89$); two coefficients, moderate relationships ($r = .63$ and $.71$); and three coefficients, low relationships ($r = .54$ to $.55$). Correlation coefficients for motor creativity and elaboration show high relationships among the judges ($r = .81$ to $.89$). Fluency correlation coefficients reveal high relationships between Judges I and II ($r = .89$) and between Judges I and III ($r = .80$), but a moderate relationship between Judges II and III ($r = .63$). Originality

correlation coefficients indicate a high relationship between Judges I and II ($r = .89$), a moderate relationship between Judges II and III ($r = .71$), and a low relationship between Judges I and III ($r = .55$).

Percentage Agreements

Since this study employed an observational system for scoring the motor creativity test, a procedure for determining intrajudge and interjudge percentage agreements was used. This procedure has been used in other studies utilizing observation systems. (Flanders, 1967; Bellack, 1966; Hawthorne, 1968; Howey, 1968; and Barrett, 1970) Acceptable percentage agreements in these studies ranged from 73 to 96 percent. Interjudge percentage agreements of 85 percent and above were acceptable in Flanders' study (1967). The percentage agreements ranged from 84 to 96 percent in Bellack's study (1966), and from 73 to 95 percent in Howey's study (1968). In Barrett's study (1970), a percentage agreement of 80 percent was acceptable, whereas agreements between 60 and 79 percent suggested "a positive direction." (1970:154) Barrett speculated that percentage agreements at this level may improve with further refinement of the tool and training in use of the tool. For the purposes of this study, percentage agreements of 80 percent and above were acceptable.

Intrajudge percentage agreements. To determine intrajudge percentage agreements of the training session, the evaluations of the fifteen movement performances during the first evaluation

session were paired successively with similar data obtained during the second evaluation session. These data included five dimensions (fluency, originality, flexibility, elaboration and motor creativity), three flexibility categories and four elaboration categories. The intrajudge percentage agreements presented in Table 7, page 127, range from 63 to 97 percent. Twenty-nine of the percentage agreements are at or above 80 percent. Seven of the percentage agreements are between 60 and 79 percent. With additional training of the judges and refinement of the scoring system, agreements at this level should improve.

For Judge I, the intrajudge percentage agreements show consistencies in evaluating all variables except originality and tempo changes. For Judge II, percentage agreements indicate consistencies in evaluating all variables except originality, manipulative movements and tempo changes. For Judge III, percentage agreements show consistencies in evaluating all variables except level changes and tempo changes. To obtain higher intrajudge percentage agreements, the judges may need additional training in evaluating originality, manipulative movements, level changes and tempo changes.

Interjudge percentage agreements. To determine interjudge percentage agreements of the training session, the variables evaluated by the three judges during the two evaluation sessions were paired successively. These variables included five dimensions (fluency, originality, flexibility, elaboration and motor creativity), three flexibility categories and four elaboration categories. The

TABLE 7

INTRAJUDGE PERCENTAGE AGREEMENTS:
JUDGES TRAINING SESSION (N=15)

Dimensions and Categories	Judge I (Percent)	Judge II (Percent)	Judge III (Percent)
Fluency	90	82	86
Originality	77	77	84
Flexibility	88	91	97
Locomotor movements	84	86	89
Non-locomotor movements	80	85	90
Manipulative movements	92	66	92
Elaboration	91	89	89
Body parts	88	91	88
Floor spaces	93	88	90
Level changes	81	82	75
Tempo changes	74	63	71
Motor creativity	83	95	92

interjudge percentage agreements presented in Table 8, page 129, range from 64 to 91 percent in Session I and 66 to 96 percent in Session II. In Session I, 64 percent of the percentage agreements are at or above 80 percent. Thirty-six percent of the agreements are within the range of 60 to 79 percent and show possibilities of improvement. Only a slight difference is noted in the percentage agreements between Session I and II. In Session II, 69 percent of the agreements are above the 80 percent level. The remaining 31 percent are within the range of 60 to 79 percent and show possibilities of improvement.

Session I percentage agreements indicate consistencies among the judges in evaluating motor creativity, fluency, locomotor movements, elaboration, body parts, floor spaces and level changes. Low interjudge percentage agreements in both sessions indicate that the judges may need additional training in evaluating originality, flexibility, manipulative movements and tempo changes.

MOTOR CREATIVITY TEST RESULTS

Three judges twice evaluated the movement performances of twenty-five subjects on three movement tasks - Move to Sounds, See and Move and Hoops and Lines. Means, standard deviations and range of scores were determined for each variable. Pearson Product-Moment correlational method was used to determine the

TABLE 8
 INTERJUDGE PERCENTAGE AGREEMENTS:
 JUDGES TRAINING SESSION (N=15)

Dimensions and Categories	Judges I-II (Percent)	Judges II-III (Percent)	Judges I-III (Percent)
<u>Session I</u>			
Fluency	87	90	87
Originality	77	70	75
Flexibility	78	87	84
Locomotor movements	80	80	81
Non-locomotor movements	75	83	79
Manipulative movements	78	75	88
Elaboration	87	90	87
Body parts	82	80	88
Floor spaces	90	87	87
Level changes	91	66	67
Tempo changes	75	64	70
Motor creativity	90	87	85
<u>Session II</u>			
Fluency	86	76	94
Originality	79	75	75
Flexibility	91	85	75
Locomotor movements	83	78	79
Non-locomotor movements	83	82	87
Manipulative movements	83	74	81
Elaboration	92	89	90
Body parts	89	89	91
Floor spaces	93	89	91
Level changes	88	83	83
Tempo changes	72	66	76
Motor creativity	96	90	90

reliability and objectivity correlation coefficients of the five dimensional variables, three flexibility categories and four elaboration categories for each movement task, each judge and each evaluation session. Correlation coefficients among the variables indicated the interrelationships of the variables in each movement task. Cumulative intrajudge and interjudge percentage agreements were used to examine the extent to which the judges agreed in their evaluations of the five dimensional variables, three flexibility categories, fifty-one flexibility sub-categories and four elaboration categories.

In examining the data the researcher accepted $r = .80$ to $.98$ as indicating high relationships, $r = .60$ to $.79$ as moderate relationships and $r = .00$ to $.59$ as indicative of low relationships. The researcher also examined further the dimensions and categories with acceptable percentage agreements of 80 percent and above. Dimensions and categories with percentage agreements between 60 and 79 percent are also noted because with refinement of the tool the percentage agreements of these evaluated variables may improve.

Move to Sounds

The Move to Sounds data consist of the evaluations of eleven variables - fluency, originality, flexibility, locomotor movements, non-locomotor movements, elaboration, body parts, floor spaces, level changes, tempo changes and motor creativity -

which were obtained from three judges during two evaluation sessions.

Reliability correlation coefficients. Table 9, page 132, presents the reliability correlation coefficients for the variables evaluated by each judge in the Move to Sounds task. These coefficients range from $r = .25$ to $.98$. For Judge I, nine correlation coefficients are significant at the $.01$ level and one at the $.05$ level. For Judge II, all correlation coefficients are significant at the $.01$ level. For Judge III, eight correlation coefficients are significant at the $.01$ level and one at the $.05$ level.

For Judge I, reliability correlation coefficients indicate high relationships for elaboration ($r = .83$), floor spaces ($r = .92$) and level changes ($r = .96$); moderate relationships for fluency ($r = .73$), originality ($r = .67$), locomotor movements ($r = .75$) and motor creativity ($r = .77$); and low relationships for flexibility ($r = .50$), non-locomotor movements ($r = .54$), body parts ($r = .36$) and tempo changes ($r = .53$). The low correlation coefficient for flexibility is significant at the $.05$ level, whereas the low coefficient for body parts is not significant at the $.05$ level.

TABLE 9

RELIABILITY CORRELATION COEFFICIENTS:
MOVE TO SOUNDS (N=25)

Variables	Judge I	Judge II	Judge III
Fluency	.73**	.92**	.63**
Originality	.67**	.84**	.82**
Flexibility	.50*	.84**	.49*
Locomotor movements	.75**	.80**	.27
Non-locomotor movements	.54**	.79**	.25
Elaboration	.83**	.91**	.94**
Body parts	.36	.71**	.56**
Floor spaces	.92**	.87**	.91**
Level changes	.96**	.94**	.98**
Tempo changes	.53**	.80**	.82**
Motor creativity	.77**	.94**	.90**

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's Tables
(Guilford, 1965, pp. 580-581)

For Judge II, reliability correlation coefficients indicate high relationships for all variables ($r = .80$ to $.94$) except for non-locomotor movements ($r = .79$) and body parts ($r = .71$). The coefficients for these variables indicate moderate relationships.

For Judge III, reliability correlation coefficients indicate high relationships for originality ($r = .82$), elaboration ($r = .94$), floor spaces ($r = .91$), level changes ($r = .98$), tempo changes ($r = .82$) and motor creativity ($r = .90$); a moderate relationship for fluency ($r = .63$); and low relationships for flexibility ($r = .49$), locomotor movements ($r = .27$), non-locomotor movements ($r = .25$) and body parts ($r = .56$). The low coefficient for flexibility is significant at the .05 level, whereas the low coefficients for locomotor movements and non-locomotor movements are not significant at the .05 level.

Objectivity correlation coefficients. The objectivity correlation coefficients presented in Table 10, page 134, range from $r = .10$ to $.97$ in Session I and from $r = .06$ to $.99$ in Session II. In Session I, twenty-two of the thirty-three correlation coefficients are significant at the .01 level and four coefficients at the .05 level. Among the judges, twelve correlation coefficients indicate high relationships ($r = .80$ to $.97$); seven coefficients, moderate relationships ($r = .62$ to $.76$); and fourteen coefficients, low relationships ($r = .10$ to $.58$). Correlation coefficients for elaboration, floor spaces and level changes indicate high relationships among the judges ($r = .83$ to $.97$). Correlation coefficients for tempo changes indicate a

TABLE 10
OBJECTIVITY CORRELATION COEFFICIENTS:
MOVE TO SOUNDS (N=25)

Variables	Judges I-II	Judges II-III	Judges I-III
<u>Session I</u>			
Fluency	.76**	.14	.20
Originality	.67**	.50*	.69**
Flexibility	.74**	.50*	.58**
Locomotor movements	.36	.10	.30
Non-locomotor movements	.54**	.62**	.54**
Elaboration	.94**	.86**	.87**
Body parts	.68**	.49*	.42*
Floor spaces	.84**	.83**	.83**
Level changes	.97**	.94**	.93**
Tempo changes	.80**	.37	.37
Motor creativity	.83**	.71**	.81**
<u>Session II</u>			
Fluency	.63**	.51**	.44*
Originality	.62**	.53**	.45*
Flexibility	.75**	.23	.44*
Locomotor movements	.29	.06	.18
Non-locomotor movements	.74**	.11	.30
Elaboration	.93**	.87**	.83**
Body parts	.26	.31	.08
Floor spaces	.93**	.83**	.83**
Level changes	.99**	.96**	.97**
Tempo changes	.90**	.68**	.60**
Motor creativity	.81**	.78**	.70**

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's Tables
(Guilford, 1965, pp. 580-581)

high relationship between Judges I and II ($r = .80$) but non-significant relationships among the other judges ($r = .37$). Correlation coefficients for motor creativity indicate high relationships between Judges I and II ($r = .83$) and between Judges I and III ($r = .81$), but a moderate relationship between Judges II and III ($r = .71$). Correlation coefficients for fluency show a moderate relationship between Judges I and II ($r = .76$) but low and non-significant relationships among the other judges ($r = .14$ and $.20$). Originality correlation coefficients show moderate relationships between Judges I and II ($r = .67$) and between Judges I and III ($r = .69$) and a low relationship between Judges II and III ($r = .50$). Flexibility correlation coefficients show a moderate relationship between Judges I and II ($r = .74$) and low relationships between Judges I and III ($r = .58$) and between Judges II and III ($r = .50$). Correlation coefficients for locomotor movements indicate non-significant relationships ($r = .10$ to $.36$), whereas the coefficients for non-locomotor movements show a moderate relationship between Judges II and III ($r = .62$) and low relationships among the other judges ($r = .54$).

Only slight changes are evident in the correlation coefficients of the variables evaluated during Session II. Twenty-one of the thirty-three coefficients are significant at the .01 level. Among the judges, eleven correlation coefficients indicate high relationships ($r = .81$ to $.99$); eight correlation coefficients, moderate relationships ($r = .60$ to $.78$); and fourteen coefficients, low relationships ($r = .06$ to $.53$). Major changes in Session II

evaluations occur with respect to body parts, tempo changes and motor creativity correlation coefficients. Correlation coefficients for body parts show non-significant relationships among the judges ($r = .08$ to $.31$). Motor creativity correlation coefficients show a moderate relationship between Judges I and III ($r = .70$). Both of these changes are decrements below the coefficients of the variables evaluated during Session I. Correlation coefficients for tempo changes show moderate relationships between Judges II and III ($r = .68$) and between Judges I and III ($r = .60$). These changes are increments above the coefficients of the variables evaluated during Session I.

Relationships among the variables. The acceptable variables in the Move to Sounds task can be identified by examining the relationships among the variables evaluated by each judge in each session. Tables 11 through 16, pages 137 through 142, respectively, present the means, standard deviations and inter-correlation coefficients for the variables in Move to Sounds.

All correlation coefficients between fluency and motor creativity are significant at the .01 level and show high to low relationships between the variables ($r = .80$ to $.53$). Two correlation coefficients between fluency and originality show a moderate relationship ($r = .61$ and $.74$). Three correlation coefficients between fluency and flexibility show moderate to low relationships ($r = .64$ to $.52$). Three correlation coefficients between fluency and elaboration show low relationships ($r = .50$ to $.54$).

TABLE 11

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION I
 VARIABLES: JUDGE I EVALUATIONS ON MOVE TO SOUNDS (N=25)

Move to Sounds Session I Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.42*	.52**	.28	.43*	.16	.01	-.13	.20	.02	.53**
2. Originality			.62**	.43*	.44*	.36	.66**	-.09	.32	-.08	.90**
3. Flexibility				.57**	.80**	.40*	.19	-.31	.46*	.05	.75**
4. Locomotor movements					-.03	.48*	.25	-.01	.39	.26	.57**
5. Non-locomotor movements						.14	.05	-.37	.28	-.13	.49*
6. Elaboration							.29	.22	.88**	.38	.69**
7. Body parts								-.17	.10	.12	.54**
8. Floor spaces									.04	.10	-.03
9. Level changes										-.02	.64**
10. Tempo changes											.12
11. Motor creativity											
MEANS	14.28	25.24	18.04	4.56	13.48	28.60	11.64	2.96	6.48	7.52	86.16
STANDARD DEVIATIONS	2.23	10.72	2.61	1.56	2.14	6.93	1.29	1.24	6.01	2.52	17.56

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 12

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION II
 VARIABLES: JUDGE I EVALUATIONS ON MOVE TO SOUNDS (N=25)

Move to Sounds Session II Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.25	.43*	.29	.34	.54**	.27	.02	.39	.23	.61**
2. Originality			.44*	.42*	.27	.17	.27	.11	-.07	.26	.82**
3. Flexibility				.57**	.86**	.28	.05	-.15	.21	.22	.64**
4. Locomotor movements					.07	.31	-.04	.07	.20	.25	.54**
5. Non-locomotor movements						.14	.09	-.22	.13	.10	.44*
6. Elaboration							.39	.29	.75**	.31	.66**
7. Body parts								.42*	-.12	.23	.38
8. Floor spaces									.04	-.22	.16
9. Level changes										-.23	.37
10. Tempo changes											.33
11. Motor creativity											
MEANS	15.48	25.80	18.08	4.56	13.52	29.80	12.80	3.44	6.24	7.32	89.16
STANDARD DEVIATIONS	2.26	9.43	2.87	1.47	2.37	6.27	1.73	1.56	5.58	3.18	15.07

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^a Values from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 13

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION I
 VARIABLES: JUDGE II EVALUATIONS ON MOVE TO SOUNDS (N=25)

Move to Sounds Session I Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.61**	.58**	.50*	.39	.52**	.37	.32	.42*	.17	.75**
2. Originality			.72**	.17	.72**	.46*	.60**	.27	.35	.03	.91**
3. Flexibility				.46*	.89**	.30	.49*	-.12	.33	-.07	.72**
4. Locomotor movements					.00	.22	.07	.07	.30	-.05	.31
5. Non-locomotor movements						.23	.52**	-.17	.22	-.05	.66**
6. Elaboration							.57**	.22	.81**	.53**	.76**
7. Body parts								-.04	.35	.19	.68**
8. Floor spaces									.08	.03	.27
9. Level changes										.00	.62**
10. Tempo changes											.25
11. Motor creativity											
MEANS	14.72	29.52	19.00	5.36	13.64	29.20	11.68	3.48	6.08	7.96	92.44
STANDARD DEVIATIONS	2.48	10.90	2.58	1.19	2.29	7.88	1.90	1.26	5.57	3.78	19.65

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 14

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION II
 VARIABLES: JUDGE II EVALUATIONS ON MOVE TO SOUNDS (N=25)

Move to Sounds Session II Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.74**	.64**	.69**	.39	.50*	.36	.31	.46*	.02	.80**
2. Originality			.78**	.58**	.62**	.48*	.48*	.34	.44*	-.04	.92**
3. Flexibility				.54**	.90**	.41*	.45*	-.06	.37	.08	.81**
4. Locomotor movements					.12	.19	.15	.25	.28	-.18	.55**
5. Non-locomotor movements						.39	.46*	-.20	.29	.19	.66**
6. Elaboration							.68**	.24	.70**	.46*	.76**
7. Body parts								-.07	.47*	.20	.63**
8. Floor spaces									.06	-.01	.29
9. Level changes										-.25	.64**
10. Tempo changes											.14
11. Motor creativity											
MEANS	14.80	27.60	18.80	5.16	13.72	29.20	11.96	3.48	6.12	7.64	90.24
STANDARD DEVIATIONS	2.31	8.79	2.78	1.25	2.35	7.24	1.62	1.64	5.33	4.36	17.69

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 15

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION I
 VARIABLES: JUDGE III EVALUATIONS ON MOVE TO SOUNDS (N=25)

Move to Sounds Session I Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.35	.36	.25	.34	.41*	-.03	.07	.48*	.01	.55**
2. Originality			.66**	.55**	.56**	.48*	.33	.12	.33	.30	.90**
3. Flexibility				.72**	.92**	.47*	.14	-.04	.39	.33	.76**
4. Locomotor movements					.37	.39	.27	-.17	.18	.57**	.61**
5. Non-locomotor movements						.40*	.04	.04	.41*	.11	.65**
6. Elaboration							.35	.58**	.86**	.25	.78**
7. Body parts								.05	.15	.04	.35
8. Floor spaces									.44*	.02	.28
9. Level changes										-.20	.64**
10. Tempo changes											.33
11. Motor creativity											
MEANS	14.56	25.48	16.40	4.52	11.88	30.28	13.48	3.60	6.16	7.04	86.56
STANDARD DEVIATIONS	2.97	10.66	2.58	1.12	1.94	7.30	1.48	1.47	6.00	2.92	18.91

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 16

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION II
 VARIABLES: JUDGE III EVALUATIONS ON MOVE TO SOUNDS (N=25)

Move to Sounds, Session II Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.20	.23	.19	.15	.42*	.38	.07	.37	.13	.53**
2. Originality			.39	.34	.24	.46*	.31	.29	.29	.25	.86**
3. Flexibility				.68**	.77**	.39	.47*	-.15	.18	.23	.51**
4. Locomotor movements					.05	.33	.21	-.10	.30	.18	.45*
5. Non-locomotor movements						.11	.46*	.12	-.02	.15	.30
6. Elaboration							.32	.44*	.82**	.49*	.81**
7. Body parts								-.11	.16	.10	.45*
8. Floor spaces									.30	.04	.35
9. Level changes										-.03	.61**
10. Tempo changes											.40*
11. Motor creativity											
MEANS	14.88	28.04	16.20	4.76	11.44	30.32	14.00	3.68	5.72	6.92	89.44
STANDARD DEVIATIONS	3.31	9.41	1.76	1.13	1.29	6.89	1.26	1.49	5.13	3.30	16.26

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

Coefficients correlating fluency with non-locomotor movements, body parts, floor spaces, level changes and tempo changes are either significant at the .05 level or non-significant. In the session in which fluency correlates the highest with motor creativity ($r = .80$), fluency also correlates moderately with flexibility ($r = .64$), originality ($r = .74$) and locomotor movements ($r = .69$).

All correlation coefficients between originality and motor creativity are significant at the .01 level and show high relationships ($r = .82$ to $.92$). Four coefficients correlating originality and flexibility indicate moderate relationships ($r = .62$ to $.78$). Two correlation coefficients between originality and locomotor movements show low relationships ($r = .55$ to $.58$), whereas three coefficients between originality and non-locomotor movements indicate moderate to low relationships ($r = .72$ to $.56$). Two coefficients between originality and body parts indicate moderate relationships ($r = .60$ to $.66$). Coefficients correlating originality with elaboration, floor spaces, level changes and tempo changes are either significant at the .05 level or non-significant. In the session in which originality correlates the highest with motor creativity ($r = .92$), originality also correlates moderately with fluency ($r = .74$), flexibility ($r = .78$), and non-locomotor movements ($r = .62$) and at a low level with locomotor movements ($r = .58$).

All correlation coefficients between flexibility and motor creativity are significant at the .01 level and range from high to low ($r = .81$ to $.51$). Five coefficients between flexibility and

locomotor movements indicate moderate to low relationships ($r = .72$ to $.54$), whereas six coefficients between flexibility and non-locomotor movements indicate a high to moderate relationship ($r = .92$ to $.77$). Coefficients correlating flexibility with elaboration, body parts, floor spaces, level changes and tempo changes are either significant at the .05 level or non-significant. In the session in which flexibility correlates the highest with motor creativity ($r = .81$), flexibility also correlates highly with non-locomotor movements ($r = .90$), moderately with originality ($r = .78$) and fluency ($r = .64$) and at a low level with locomotor movements ($r = .54$).

Only four correlation coefficients between locomotor movements and motor creativity are significant at the .01 level and range from moderate to low ($r = .61$ to $.54$). One coefficient correlating locomotor movements with tempo changes shows a low relationship ($r = .57$). Coefficients correlating locomotor movements with non-locomotor movements, elaboration, body parts, floor spaces and level changes are either significant at the .05 level or non-significant. In the session in which locomotor movements correlate the highest with motor creativity ($r = .61$), locomotor movements also correlate moderately with flexibility ($r = .72$) and at low levels with originality ($r = .55$) and tempo changes ($r = .57$).

Three correlation coefficients between non-locomotor movements and motor creativity are significant at the .01 level and indicate moderate relationships ($r = .65$ to $.66$). Only one coefficient correlating non-locomotor movements with body parts

shows a low relationship ($r = .52$). Coefficients correlating non-locomotor movements with elaboration, floor spaces, level changes and tempo changes are either significant at the .05 level or non-significant. The highest correlation coefficients between non-locomotor movements and motor creativity are observable in two sessions ($r = .66$). In one session (Table 13, page 139), non-locomotor movements correlate highly with flexibility ($r = .89$), moderately with originality ($r = .72$) and at a low level with body parts ($r = .52$). In the other session (Table 14, page 140), non-locomotor movements correlate highly with flexibility ($r = .90$) and moderately with originality ($r = .62$).

All correlation coefficients between elaboration and motor creativity are significant at the .01 level and range from high to moderate ($r = .81$ to $.66$). Two coefficients correlating elaboration with body parts indicate moderate and low relationships ($r = .68$ and $.57$). Only one coefficient between elaboration and floor spaces shows a low relationship ($r = .58$). All correlation coefficients between elaboration and level changes are significant at the .01 level and indicate high to moderate relationships ($r = .88$ to $.70$). Only one coefficient correlating elaboration with tempo changes shows a low relationship ($r = .53$). In the session in which elaboration correlates the highest with motor creativity ($r = .81$), elaboration also correlates highly with one other variable, level changes ($r = .81$). In this particular session (Table 16, page 142), originality is the only other variable which correlates highly with motor creativity ($r = .86$).

Only three correlation coefficients between body parts and motor creativity are significant at the .01 level and range from moderate to low ($r = .68$ to $.54$). Coefficients correlating body parts with floor spaces, level changes and tempo changes are either significant at the .05 level or non-significant. In the session in which body parts correlate the highest with motor creativity ($r = .68$), body parts also correlate moderately with originality ($r = .60$) and at low levels with elaboration ($r = .57$) and non-locomotor movements ($r = .52$).

The coefficients correlating floor spaces with motor creativity, level changes and tempo changes are either significant at the .05 level or non-significant.

Five correlation coefficients between level changes and motor creativity are significant at the .01 level and show moderate relationships ($r = .61$ to $.64$). Coefficients correlating level changes with tempo changes are not significant at even the .05 level. The highest correlation coefficients between level changes and motor creativity are observable in three sessions. In one session (Table 11, page 137), level changes correlate highly with elaboration ($r = .88$). In the other two sessions (Table 14, page 140 and Table 15, page 141), level changes correlate either moderately ($r = .70$) or at a low level ($r = .58$) with elaboration.

Correlation coefficients between tempo changes and motor creativity are either significant at the .05 level or non-significant.

In summary, the originality, elaboration and flexibility variables in Move to Sounds have the highest relationships with motor creativity variable. Although flexibility relates moderately to originality, elaboration has a low relationship with originality. Fluency correlation coefficients show high to low relationships with motor creativity, moderate to low relationships with originality and flexibility and low relationships with elaboration. Although locomotor and non-locomotor movements relate to motor creativity at moderate and low levels, coefficients for non-locomotor movements indicate high relationships with flexibility, whereas coefficients for locomotor movements show moderate to low relationships with flexibility. Of the four elaboration categories, level changes has the highest relationships with elaboration and motor creativity. Correlation coefficients for level changes show high to moderate relationships with elaboration and moderate relationships with motor creativity. Body parts, floor spaces and tempo changes have low relationships with elaboration. Coefficients for body parts show moderate to low relationships with motor creativity. Coefficients for tempo changes (with one exception) and for floor spaces are not statistically significant.

Intrajudge percentage agreements. To determine the intrajudge percentage agreements of the Move to Sounds task, the variables evaluated by the three judges during Session I were paired successively with the variables evaluated during Session II. The

intrajudge percentage agreements presented in Table 17, page 149, range from 72 to 95 percent. Nine percent of these agreements range from 72 to 79 percent, thus with refinement of the scoring system, these percentage agreements show possibilities of improvement. For Judge I, 82 percent of the percentage agreements; for Judge II, 91 percent; and for Judge III, 100 percent are acceptable. Intrajudge percentage agreements indicate that Judge I was consistent in evaluating all categories except originality and tempo changes, whereas Judge II was consistent in evaluating all categories except tempo changes.

Intrajudge percentage agreements were also determined for the locomotor movement and non-locomotor movement sub-categories. The percentage agreements for the locomotor movement sub-categories presented in Table 18, page 150, indicate that 81 percent of the agreements are acceptable and 19 percent show possibilities of improvement. Intrajudge percentage agreements for locomotor movements show that Judge I was inconsistent in evaluating jumping and skip/gallop/slide; Judge II, inconsistent in evaluating jumping; and Judge III, inconsistent in evaluating hopping, skip/gallop/slide, bouncing and pushing/pulling.

Table 19, page 151, presents the intrajudge percentage agreements for the non-locomotor movement sub-categories. These agreements range from 44 to 100 percent. Seventy-seven percent of the agreements are acceptable. Nineteen percent of the agreements show possibilities of improvement. The intrajudge percentage agreements for non-locomotor movements indicate that

TABLE 17
 INTRAJUDGE PERCENTAGE AGREEMENTS:
 MOVE TO SOUNDS (N=25)

Dimensions and Categories	Judge I (Percent)	Judge II (Percent)	Judge III (Percent)
Fluency	89	95	87
Originality	76	84	82
Flexibility	89	93	90
Locomotor movements	84	94	83
Non-locomotor movements	89	91	89
Elaboration	90	92	94
Body parts	88	91	94
Floor spaces	88	91	90
Level changes	85	83	86
Tempo changes	75	72	80
Motor creativity	90	93	92

TABLE-18

INTRAJUDGE PERCENTAGE AGREEMENTS FOR LOCOMOTOR
MOVEMENT SUB-CATEGORIES: MOVE TO SOUNDS
(N=25)

Locomotor Movement Sub-Categories	Judge I (Percent)	Judge II (Percent)	Judge III (Percent)
1. Walking	100	100	96
2. Running	96	84	96
3. Jumping	72	76	88
4. Hopping	84	80	68
5. Leaping	96	92	84
6. Skipping/galloping/ sliding	68	80	72
7. Turning	92	100	96
8. Rolling	88	100	96
9. Rotating in/into inverted position	100	100	100
10. Bouncing	88	92	64
11. Pushing/pulling	88	96	72
12. Falling	96	96	84

TABLE 19

INTRAJUDGE PERCENTAGE AGREEMENTS FOR NON-LOCOMOTOR
MOVEMENT SUB-CATEGORIES: MOVE TO SOUNDS
(N=25)

Non-Locomotor Movement. Sub-Categories	Judge I (Percent)	Judge II (Percent)	Judge III (Percent)
1. Balancing	88	88	96
2. Curling/bending	96	100	100
3. Stretching	92	96	92
4. Arching	92	76	96
5. Twisting	88	84	84
6. Turning	84	96	76
7. Pivoting	92	92	100
8. Swinging	88	88	60
9. Swaying	80	72	72
10. Circling	88	68	60
11. Opening/closing	72	84	44
12. Lifting	100	92	100
13. Lowering	100	92	92
14. Kicking	88	100	92
15. Flinging	88	80	100
16. Shaking/vibrating	72	92	72
17. Bouncing	72	80	76
18. Pushing/pulling	60	88	80
19. Falling	88	96	96
20. Rising	88	92	88
21. Lunging	88	100	96
22. Shifting	48	88	56
23. Grasping	84	88	92

Judge I was inconsistent in evaluating opening/closing, shaking/vibrating, bouncing, pushing/pulling and shifting; Judge II, inconsistent in evaluating arching, swaying and circling; and Judge III, inconsistent in evaluating turning, swinging, swaying, circling, opening/closing, shaking/vibrating, bouncing and shifting.

Interjudge percentage agreements. To determine interjudge percentage agreements of the Move to Sounds task, the variables evaluated by the three judges were paired successively for both evaluation sessions. The percentage agreements presented in Table 20, page 153, range from 72 to 93 percent in Session I and from 74 to 94 percent in Session II.

Seventy percent of the agreements in Session I are acceptable and 30 percent show possibilities of improvement. Sixty-four percent of the agreements between Judges II and III are acceptable; whereas between Judges I and III and between Judges I and II, 73 percent of the agreements are acceptable. Low interjudge percentage agreements indicate that the judges were inconsistent in evaluating originality, locomotor movements, level changes and tempo changes.

In Session II, 82 percent of the percentage agreements are acceptable and 18 percent of the agreements show possibilities of improvement. Ninety-two percent of the agreements between Judges I and II; 82 percent, between Judges II and III; and 73 percent, between Judges I and III are acceptable. Low interjudge percentage agreements indicate that the judges were inconsistent in evaluating locomotor movements and tempo changes. The fact that

TABLE 20
 INTERJUDGE PERCENTAGE AGREEMENTS:
 MOVE TO SOUNDS (N=25)

Dimensions and Categories	Judges I-II (Percent)	Judges II-III (Percent)	Judges I-III (Percent)
<u>Session I</u>			
Fluency	92	82	85
Originality	75	73	79
Flexibility	92	86	89
Locomotor movements	77	78	79
Non-locomotor movements	89	86	86
Elaboration	93	89	89
Body parts	90	87	85
Floor spaces	86	88	81
Level changes	91	78	80
Tempo changes	78	67	72
Motor creativity	90	88	90
<u>Session II</u>			
Fluency	91	88	87
Originality	80	80	78
Flexibility	91	83	88
Locomotor movements	77	76	74
Non-locomotor movements	91	82	81
Elaboration	92	90	91
Body parts	87	85	86
Floor spaces	91	84	87
Level changes	94	87	84
Tempo changes	91	78	74
Motor creativity	93	92	91

only one low agreement is found for the evaluation of originality during Session II indicates that the judges improved in evaluating originality.

Interjudge percentage agreements were determined for the locomotor movement and non-locomotor movement sub-categories. Interjudge percentage agreements for locomotor movement sub-categories presented in Table 21, page 155, range from 60 to 100 percent in Session I, and 48 to 100 percent in Session II. Sixty-four percent of the agreements in Session I are acceptable and 36 percent of the agreements show possibilities of improvement. In Session II, only 61 percent of the agreements are acceptable and 27 percent show possibilities of improvement. In both evaluation sessions, 67 percent of the agreements between Judges I and II and between Judges I and III are acceptable. Although 58 percent of the agreements between Judges II and III in Session I are acceptable, only 50 percent in Session II are acceptable. Low interjudge percentage agreements indicate that the judges are inconsistent in evaluating the locomotor movement sub-categories of jumping, hopping, skip/gallop/slide, bouncing and pushing/pulling.

Interjudge percentage agreements for the non-locomotor movement sub-categories presented in Table 22, page 156, range from 48 to 100 percent in Session I and 36 to 100 percent in Session II. Fifty-five percent of the agreements in both sessions are acceptable. Twenty-three percent of the agreements in Session I and 32 percent in Session II indicate possibilities of improvement.

TABLE 21

INTERJUDGE PERCENTAGE AGREEMENTS FOR LOCOMOTOR
 MOVEMENT SUB-CATEGORIES: MOVE TO SOUNDS
 (N=25)

Locomotor Movement Sub-Categories	Judges I-II		Judges II-III		Judges I-III	
	Sessions		Sessions		Sessions	
	I	II	I	II	I	II
	(Percent)		(Percent)		(Percent)	
1. Walking	96	96	96	100	100	96
2. Running	84	88	88	76	80	72
3. Jumping	72	60	68	56	72	80
4. Hopping	60	72	68	72	68	84
5. Leaping	96	92	84	84	88	92
6. Skipping/ galloping/ sliding	72	52	64	56	68	48
7. Turning	92	100	96	100	88	100
8. Rolling	80	84	100	96	80	88
9. Rotating in/ into inverted position	100	100	100	100	100	100
10. Bouncing	68	72	64	68	80	72
11. Pushing/ pulling	80	80	68	68	72	72
12. Falling	80	80	96	84	84	96

TABLE 22

INTERJUDGE PERCENTAGE AGREEMENTS FOR NON-LOCOMOTOR
MOVEMENT SUB-CATEGORIES: MOVE TO SOUNDS
(N=25)

Non-Locomotor Movement Sub-Categories	Judges I-II		Judges II-III		Judges I-III	
	Sessions		Sessions		Sessions	
	I	II	I	II	I	II
	(Percent)		(Percent)		(Percent)	
1. Balancing	80	80	84	84	88	88
2. Curling/bending	100	96	100	100	100	96
3. Stretching	96	100	100	96	96	96
4. Arching	64	80	72	76	92	88
5. Twisting	88	92	72	88	76	88
6. Turning	96	84	96	76	92	68
7. Pivoting	76	84	76	84	100	92
8. Swinging	60	68	80	60	72	68
9. Swaying	68	68	52	52	76	76
10. Circling	68	56	52	76	68	64
11. Opening/closing	72	76	68	68	56	60
12. Lifting	92	100	92	100	100	100
13. Lowering	84	84	88	80	96	96
14. Kicking	84	80	80	80	96	84
15. Flinging	80	88	80	76	76	80
16. Shaking/vibrating	80	68	64	76	52	68
17. Bouncing	56	72	52	48	56	36
18. Pushing/pulling	52	72	48	56	48	60
19. Falling	88	88	100	100	88	88
20. Rising	88	84	88	84	84	84
21. Lunging	88	92	88	84	92	84
22. Shifting	48	48	56	48	52	52
23. Grasping	56	76	48	52	84	76

In Session I, 57 percent of the percentage agreements between Judges I and II and between Judges I and III are acceptable. Fifty-two percent of the agreements between Judges II and III are acceptable. In Session II, 61 percent of the agreements between Judges I and II; 57 percent, between Judges I and III; and 48 percent, between Judges II and III are acceptable. Low interjudge percentage agreements indicate that the judges were inconsistent in evaluating the non-locomotor movement sub-categories of swinging, swaying, circling, opening/closing, shaking/vibrating, bouncing, pushing/pulling, shifting and grasping.

See and Move

The data of the See and Move task consist of the evaluation of eleven variables - fluency, originality, flexibility, locomotor movements, non-locomotor movements, elaboration, body parts, floor spaces, level changes, tempo changes and motor creativity - which were obtained from three judges during two evaluation sessions.

Reliability correlation coefficients. Table 23, page 158, presents the reliability correlation coefficients for the variables evaluated by each judge on the See and Move task. These coefficients range from $r = .19$ to $.97$. For Judge I, nine correlation coefficients are significant at the $.01$ level. For both Judge II and Judge III, ten correlation coefficients are significant at the $.01$ level and one at the $.05$ level.

For Judge I, reliability correlation coefficients indicate high relationships for flexibility ($r = .82$), elaboration ($r = .86$)

TABLE 23
 RELIABILITY CORRELATION COEFFICIENTS:
 SEE AND MOVE (N=25)

Variables	Judge I	Judge II	Judge III
Fluency	.73**	.88**	.86**
Originality	.19	.90**	.57**
Flexibility	.82**	.89**	.82**
Locomotor movements	.78**	.97**	.81**
Non-locomotor movements	.72**	.69**	.83**
Elaboration	.86**	.87**	.90**
Body Parts	.56**	.70**	.64**
Floor spaces	.69**	.94**	.84**
Level changes	.86**	.85**	.82**
Tempo changes	.30	.45*	.46*
Motor creativity	.73**	.94**	.83**

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^a Values from Wallace and Snedecor's Tables
 (Guilford, 1965, pp. 580-581)

and level changes ($r = .86$); moderate relationships for fluency ($r = .73$), locomotor movements ($r = .78$), non-locomotor movements ($r = .72$), floor spaces ($r = .69$) and motor creativity ($r = .73$); and low relationships for originality ($r = .19$), body parts ($r = .56$) and tempo changes ($r = .30$). The low correlation coefficient for body parts is significant at the .01 level, whereas the low coefficients for originality and tempo changes are not significant at the .05 level.

For Judge II, reliability correlation coefficients indicate high relationships for fluency ($r = .88$), originality ($r = .90$), flexibility ($r = .89$), locomotor movements ($r = .97$), elaboration ($r = .87$), floor spaces ($r = .94$), level changes ($r = .85$) and motor creativity ($r = .94$); moderate relationships for non-locomotor movements ($r = .69$) and body parts ($r = .70$); and low relationships for tempo changes ($r = .45$). The low coefficient for tempo changes is significant at the .05 level.

For Judge III, reliability correlation coefficients indicate high relationships for fluency ($r = .86$), flexibility ($r = .82$), locomotor movements ($r = .81$), non-locomotor movements ($r = .83$), elaboration ($r = .90$), floor spaces ($r = .84$), level changes ($r = .82$) and motor creativity ($r = .83$); moderate relationships for body parts ($r = .64$); and low relationships for tempo changes ($r = .46$) and originality ($r = .57$). The low coefficient for originality is significant at the .01 level, whereas the coefficient for tempo changes is significant at the .05 level.

Objectivity correlation coefficients. The objectivity correlation coefficients in Table 24, page 161, range from $r = -.05$ to $.92$ in Session I and $.19$ to $.92$ in Session II. In Session I, twenty-three of the thirty-three coefficients are significant at the $.01$ level and two coefficients at the $.05$ level. Among the judges, nine correlation coefficients indicate high relationships ($r = .82$ to $.92$); eleven coefficients, moderate relationships ($r = .61$ to $.79$); and thirteen coefficients, low relationships ($r = -.05$ to $.58$). Correlation coefficients for elaboration and level changes indicate high relationships among the judges ($r = .86$ to $.92$). Fluency correlation coefficients show a high relationship between Judges I and II ($r = .84$); but among the other judges, moderate relationships ($r = .69$). Motor creativity correlation coefficients show high relationships between Judges I and II ($r = .81$) and between Judges I and III ($r = .83$); but between Judges II and III, a moderate relationship ($r = .68$). Originality correlation coefficients indicate a moderate relationship between Judges I and III ($r = .61$); but among the other judges, low and non-significant relationships ($r = .13$ to $.38$). Flexibility correlation coefficients show moderate relationships between Judges I and II ($r = .75$) and between Judges I and III ($r = .77$); but between Judges II and III, a low relationship ($r = .58$). Correlation coefficients for locomotor movements show moderate relationships among the judges ($r = .75$ to $.79$). Correlation coefficients for non-locomotor movements and body parts show low relationships among the judges ($r = -.05$ to $.55$). Correlation coefficients for floor

TABLE 24
OBJECTIVITY CORRELATION COEFFICIENTS
SEE AND MOVE (N=25)

Variables	Judges I-II	Judges II-III	Judges I-III
<u>Session I</u>			
Fluency	.84**	.69**	.69**
Originality	.38	.13	.61**
Flexibility	.75**	.58**	.77**
Locomotor movements	.75**	.70**	.79**
Non-locomotor movements	.50*	.33	.55**
Elaboration	.84**	.87**	.80**
Body parts	.13	-.05	.33
Floor spaces	.77**	.70**	.57**
Level changes	.92**	.88**	.86**
Tempo changes	.45*	.12	.15
Motor creativity	.81**	.68**	.83**
<u>Session II</u>			
Fluency	.71**	.62**	.66**
Originality	.69**	.54**	.55**
Flexibility	.75**	.87**	.76**
Locomotor movements	.75**	.70**	.76**
Non-locomotor movements	.46*	.54**	.59**
Elaboration	.92**	.87**	.85**
Body parts	.47*	.19	.41*
Floor spaces	.89**	.69**	.74**
Level changes	.92**	.80**	.83**
Tempo changes	.83**	.37	.32
Motor Creativity	.86**	.86**	.86**

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's Tables
(Guilford, 1965, pp. 580-581)

spaces indicate moderate relationships between Judges I and II ($r = .77$) and between Judges II and III ($r = .70$); but between Judges I and III, a low relationship ($r = .57$).

The correlation coefficients of Session II suggest that the judges showed a reasonable range of improvement in their evaluations of the variables. Twenty-seven of the thirty-three coefficients are significant at the .01 level and three at the .05 level. Among the judges, twelve correlation coefficients reveal high relationships ($r = .80$ to $.92$); eleven coefficients, moderate relationships ($r = .62$ to $.76$); and ten coefficients, low relationships ($r = .19$ to $.59$). Major changes in the correlation coefficients of Session II occur with respect to fluency, originality, flexibility, floor spaces, tempo changes and motor creativity. Fluency correlation coefficients show moderate relationships among the judges ($r = .62$ to $.71$). Originality correlation coefficients reveal a moderate relationship between Judges I and II ($r = .69$) and low relationships, significant at the .01 level, between Judges II and III ($r = .54$) and between Judges I and III ($r = .55$). Flexibility correlation coefficients indicate a high relationship between Judges II and III ($r = .87$) and moderate relationships between Judges I and II ($r = .75$) and between Judges I and III ($r = .76$). Correlation coefficients for floor spaces reveal a high relationship between Judges I and II ($r = .89$) and moderate relationships between Judges II and III ($r = .69$) and between Judges I and III ($r = .74$). Correlation coefficients for tempo changes reveal a high relationship between Judges I and II ($r = .83$) and low and non-significant

relationships among the other judges ($r = .32$ to $.37$). Motor creativity correlation coefficients show high relationships among the judges ($r = .86$). All of these changes are increments above the coefficients of the variables evaluated during the first evaluation session.

Relationships among the variables. The acceptable variables in See and Move can be identified by examining the relationships among the variables evaluated by each judge in each session. Tables 25 through 30, pages 164 through 169, respectively, present the means, standard deviations and intercorrelation coefficients for the See and Move task.

All correlation coefficients between fluency and motor creativity are significant at the .01 level and indicate moderate to low relationships ($r = .77$ to $.51$). Only one coefficient between fluency and originality is significant at the .01 level and indicates a moderate relationship ($r = .67$). Five correlation coefficients between fluency and flexibility reveal moderate to low relationships ($r = .69$ to $.58$). Five coefficients correlating fluency with locomotor movements reveal moderate to low relationships ($r = .76$ to $.54$). Four correlation coefficients between elaboration and fluency show moderate to low relationships ($r = .67$ to $.53$). Two coefficients correlating fluency with floor spaces indicate moderate to low relationships ($r = .63$ to $.51$) and five correlation coefficients between fluency and level changes reveal moderate to low relationships ($r = .63$ to $.51$). Coefficients correlating fluency with non-locomotor movements, floor spaces and tempo

TABLE 25

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION I
VARIABLES: JUDGE I EVALUATIONS ON SEE AND MOVE (N=25)

See and Move Session I Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.41*	.60**	.54**	.44*	.37	-.02	-.07	.51**	-.17	.66**
2. Originality			.64**	.62**	.40*	.41*	.29	.09	.40*	.00	.83**
3. Flexibility				.82**	.79**	.34	.22	.30	.28	.09	.74**
4. Locomotor movements					.30	.38	.26	.16	.34	.13	.71**
5. Non-locomotor movements						.15	.09	.33	.10	.01	.48*
6. Elaboration							.61**	.35	.92**	.28	.79**
7. Body parts								.35	.32	.21	.45*
8. Floor spaces									.12	.20	.25
9. Level changes										.02	.76**
10. Tempo changes											.12
11. Motor creativity											
MEANS	12.16	23.60	18.76	6.08	12.64	26.64	11.64	2.80	10.00	2.20	81.16
STANDARD DEVIATIONS	2.88	6.41	2.85	1.82	1.70	7.18	1.85	.91	5.85	1.38	14.99

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 26

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION II
VARIABLES: JUDGE I EVALUATIONS ON SEE AND MOVE (N=25)

See and Move Session II Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.18	.68**	.76**	.24	.67**	.24	.14	.63**	-.01	.70**
2. Originality			.44*	.10	.54**	.08	.21	-.07	.07	-.13	.74**
3. Flexibility				.75**	.72**	.39	.38	.00	.28	.12	.72**
4. Locomotor movements					.08	.43*	.19	-.20	.42*	.16	.52**
5. Non-locomotor movements						.13	.37	.21	-.02	.02	.55**
6. Elaboration							.48*	.22	.88**	.09	.69**
7. Body parts								.41*	.10	.13	.45*
8. Floor spaces									-.10	-.03	.08
9. Level changes										-.17	.60**
10. Tempo changes											-.02
11. Motor creativity											
MEANS	13.20	20.48	19.20	6.48	12.72	27.76	11.80	3.20	10.36	2.40	80.64
STANDARD DEVIATIONS	2.60	8.35	2.27	1.58	1.51	6.27	1.76	1.26	5.71	1.32	13.95

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 27

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION I
VARIABLES: JUDGE II EVALUATIONS ON SEE AND MOVE (N=25)

See and Move Session I Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.46*	.69**	.62**	.34	.61**	.63**	-.05	.47*	.14	.75**
2. Originality			.70**	.65**	.32	.37	.61**	.07	.20	-.05	.83**
3. Flexibility				.76**	.66**	.52**	.57**	-.01	.44*	-.15	.84**
4. Locomotor movements					.01	.58**	.57**	-.16	.50*	.00	.79**
5. Non-locomotor movements						.12	.21	.16	.09	-.23	.37
6. Elaboration							.54**	.27	.90**	.27	.80**
7. Body parts								.13	.21	.08	.72**
8. Floor spaces									.12	-.04	.14
9. Level changes										.07	.64**
10. Tempo changes											.09
11. Motor creativity											
MEANS	11.96	22.64	19.28	6.88	12.40	27.68	11.96	2.96	10.08	2.68	81.56
STANDARD DEVIATIONS	1.99	7.30	2.72	2.05	1.76	6.90	2.37	.93	5.54	1.31	15.29

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 28

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION II
VARIABLES: JUDGE II EVALUATIONS ON SEE AND MOVE (N=25)

See and Move Session II Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.41*	.63**	.67**	.28	.66**	.51**	.18	.54**	.20	.77**
2. Originality			.73**	.62**	.49**	.16	.30	.07	.05	.08	.81**
3. Flexibility				.81**	.73**	.32	.46*	-.00	.18	.21	.82**
4. Locomotor movements					.18	.50*	.46*	-.07	.43*	.16	.80**
5. Non-locomotor movements						-.04	.23	.07	-.20	.17	.43*
6. Elaboration							.50*	.43*	.90**	.25	.68**
7. Body parts								.29	.19	.01	.55**
8. Floor spaces									.18	.05	.25
9. Level changes										.06	.53**
10. Tempo changes											.22
11. Motor creativity											
MEANS	11.92	22.96	19.08	7.08	12.00	27.56	12.16	3.08	9.72	2.60	81.52
STANDARD DEVIATIONS	2.04	8.14	2.96	2.06	1.78	6.66	1.99	1.29	5.32	1.26	15.10

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 29

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION I
 VARIABLES: JUDGE III EVALUATIONS ON SEE AND MOVE (N=25)

See and Move Session I Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.11	.29	.36	.13	.53**	-.14	.05	.60**	.21	.51**
2. Originality			.79**	.47*	.72**	.30	.65**	.06	.17	.02	.85**
3. Flexibility				.67**	.85**	.38	.50*	-.05	.24	.33	.84**
4. Locomotor movements					.19	.60**	.34	.24	.35	.57**	.68**
5. Non-locomotor movements						.09	.41*	-.24	.07	.04	.63**
6. Elaboration							.19	.47*	.89**	.39	.70**
7. Body parts								-.06	.03	-.11	.50*
8. Floor spaces									.19	.15	.20
9. Level changes										.08	.57**
10. Tempo changes											.26
11. Motor creativity											
MEANS	12.48	18.20	17.40	6.28	11.12	29.08	13.88	3.56	9.08	2.56	77.16
STANDARD DEVIATIONS	3.12	8.94	2.90	1.54	2.19	5.39	1.17	1.50	4.32	1.66	15.43

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^a Values from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 30

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION II
 VARIABLES: JUDGE III EVALUATIONS ON SEE AND MOVE (N=25)

See and Move Session II Variables	1	2	3	4	5	6	7	8	9	10	11
1. Fluency		.67**	.58**	.61**	.30	.44*	-.10	-.24	.51**	.34	.77**
2. Originality			.68**	.51**	.53**	.58**	.20	-.09	.60**	.26	.93**
3. Flexibility				.73**	.80**	.35	.11	-.28	.37	.32	.73**
4. Locomotor movements					.18	.46*	.03	.02	.42*	.37	.65**
5. Non-locomotor movements						.10	.13	-.41*	.16	.14	.49*
6. Elaboration							.32	.35	.92**	.39	.78**
7. Body parts								.28	.03	.21	.21
8. Floor spaces									.13	-.11	-.01
9. Level changes										.15	.77**
10. Tempo changes											.39
11. Motor creativity											
MEANS	12.48	20.52	17.80	6.44	11.36	30.84	14.16	3.56	10.72	2.40	81.64
STANDARD DEVIATIONS	3.14	7.80	2.89	1.76	2.00	5.82	1.03	1.26	4.90	1.44	16.35

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

changes are either significant at the .05 level or non-significant. The highest correlation coefficients between fluency and motor creativity ($r = .77$) are observable in two sessions. In one session (Table 28, page 167), fluency correlates moderately with flexibility ($r = .63$), locomotor movements ($r = .67$), elaboration ($r = .66$) and at low levels with body parts ($r = .51$) and level changes ($r = .54$). In the other session (Table 30, page 169), fluency correlates moderately with originality ($r = .67$), locomotor movements ($r = .61$) and at low levels with flexibility ($r = .58$) and level changes ($r = .51$).

All correlation coefficients between originality and motor creativity are significant at the .01 level and show high to moderate relationships ($r = .93$ to $.74$). Five correlation coefficients between originality and flexibility reveal moderate relationships ($r = .64$ to $.79$). Four coefficients correlating originality with locomotor movements show moderate to low relationships ($r = .65$ to $.51$), whereas three coefficients correlating originality with non-locomotor movements show moderate to low relationships ($r = .72$ to $.53$). Only one correlation coefficient between originality and elaboration is significant at the .01 level and indicates a low relationship ($r = .58$). Two coefficients between originality and body parts ($r = .61$ and $.65$) and one coefficient between originality and level changes ($r = .60$) indicate moderate relationships. Coefficients correlating originality with floor spaces and tempo changes are not significant at the .05 level. In the session in which originality correlates the

highest with motor creativity ($r = .93$), originality also correlates moderately with fluency ($r = .67$), flexibility ($r = .68$) and level changes ($r = .60$); and at low levels with locomotor movements ($r = .51$), non-locomotor movements ($r = .53$) and elaboration ($r = .58$).

All correlation coefficients between flexibility and motor creativity are significant at the .01 level and show high to moderate relationships ($r = .84$ to $.72$). Six correlation coefficients between flexibility and locomotor movements ($r = .82$ to $.67$) and between flexibility and non-locomotor movements ($r = .85$ to $.66$) show high to moderate relationships. One coefficient correlating flexibility and elaboration ($r = .52$) and one coefficient correlating flexibility and body parts ($r = .57$) indicate low relationships. Other coefficients correlating flexibility with floor spaces, level changes and tempo changes are not statistically significant. The highest correlation coefficients between flexibility and motor creativity ($r = .84$) are observable in two sessions. In one session (Table 27, page 166), flexibility correlates moderately with fluency ($r = .69$), originality ($r = .70$), locomotor movements ($r = .76$), and non-locomotor movements ($r = .66$); and at a low level with elaboration ($r = .52$) and body parts ($r = .57$). In the other session (Table 29, page 168), flexibility correlates highly with non-locomotor movements ($r = .85$); and moderately with originality ($r = .79$) and flexibility ($r = .67$).

All correlation coefficients between locomotor movements and motor creativity are significant at the .01 level and indicate

high to low relationships ($r = .80$ to $.52$). Two correlation coefficients between locomotor movements and elaboration are significant at the .01 level and show moderate to low relationships ($r = .60$ to $.58$). One coefficient correlating locomotor movements and tempo changes ($r = .57$) indicates a low relationship. Coefficients correlating locomotor movements with non-locomotor movements, floor spaces, level changes and tempo changes are either significant at the .05 level or non-significant. In the session in which locomotor movements correlate the highest with motor creativity ($r = .80$), locomotor movements also correlate highly with flexibility ($r = .81$) and moderately with originality ($r = .62$) and fluency ($r = .67$).

Two correlation coefficients between non-locomotor movements and motor creativity are significant at the .01 level and show moderate to low relationships ($r = .63$ and $.55$). Other coefficients correlating non-locomotor movements with elaboration, body parts, floor spaces, level changes and tempo changes are either significant at the .05 level or non-significant. One correlation coefficient, which is significant at the .05 level, indicates a negative relationship between floor spaces and non-locomotor movements ($r = -.41$). In the session in which non-locomotor movements correlate the highest with motor creativity ($r = .63$), non-locomotor movements also correlate moderately with locomotor movements ($r = .60$) and at a low level with fluency ($r = .53$). In this session (Table 29, page 168), the coefficient

between non-locomotor movements and flexibility is not significant at the .05 level.

All correlation coefficients between elaboration and motor creativity are significant at the .01 level and show high to moderate relationships ($r = .80$ to $.68$). Two correlation coefficients between elaboration and body parts show moderate to low relationships ($r = .61$ and $.54$), whereas six coefficients between elaboration and level changes show high relationships ($r = .92$ to $.88$). Other coefficients correlating elaboration with floor spaces and tempo changes are either significant at the .05 level or non-significant. In the session in which elaboration correlates the highest with motor creativity ($r = .80$), elaboration also correlates highly with level changes ($r = .90$), moderately with fluency ($r = .61$) and at low levels with flexibility ($r = .52$), locomotor movements ($r = .58$) and body parts ($r = .54$).

Two correlation coefficients between body parts and motor creativity are significant at the .01 level and show moderate to low relationships ($r = .72$ and $.55$). Other coefficients correlating body parts with floor spaces, level changes and tempo changes are either significant at the .05 level or non-significant. In the session in which body parts correlate the highest with motor creativity ($r = .72$), body parts also correlate moderately with fluency ($r = .63$) and originality ($r = .61$) and at low levels with flexibility ($r = .57$), locomotor movements ($r = .57$) and elaboration ($r = .54$).

Correlation coefficients between tempo changes and motor creativity are not significant at the .05 level.

In summary, the originality, flexibility and elaboration variables in See and Move have the highest relationships with the motor creativity variable. Fluency relates moderately to motor creativity, flexibility and elaboration. Locomotor and non-locomotor movements show high and moderate relationships with flexibility. All correlation coefficients for locomotor movements show high to low relationships with motor creativity, whereas two coefficients for non-locomotor movements show moderate to low relationships with motor creativity. Of the four elaboration categories, level changes has the highest relationship with motor creativity and elaboration. Correlation coefficients for level changes indicate high relationships with elaboration and moderate to low relationships with motor creativity. Although two correlation coefficients for body parts show moderate to low relationships with motor creativity and elaboration, coefficients for tempo changes and floor spaces indicate low and non-significant relationships with motor creativity and elaboration.

Intrajudge percentage agreements. To determine the intrajudge percentage agreements of the See and Move task, the variables evaluated by the three judges during the first evaluation session were paired successively with similar data evaluated during the second evaluation session. The intrajudge percentage agreements

presented in Table 31, page 176, range from 51 to 96 percent. Eighty-two percent of the agreements are above 80 percent and thus acceptable. Twelve percent of the agreements are between 68 and 79 percent and show possibilities of improvement with refinement of the scoring system. For each judge, 82 percent of the percentage agreements are acceptable. For Judge I and Judge III, intrajudge percentage agreements indicate consistencies in evaluating all variables except originality and tempo changes. For Judge II, intrajudge percentage agreements indicate consistencies in evaluating all variables except level changes and tempo changes.

Intrajudge percentage agreements were also determined for locomotor movement and non-locomotor movement sub-categories. The percentage agreements for the locomotor movement sub-categories presented in Table 32, page 177, range from 56 to 100 percent. Eighty-six percent of the agreements are acceptable and 11 percent show possibilities of improvement. For Judge I, percentage agreements indicate inconsistencies in evaluating the locomotor movement sub-categories of hopping, turning and pushing/pulling. All of the percentage agreements for the evaluations of Judge II are acceptable and show no inconsistencies. For Judge III, percentage agreements show inconsistencies in evaluating the locomotor movement sub-categories of hopping and turning.

Intrajudge percentage agreements for non-locomotor movement sub-categories presented in Table 33, page 178, range from 48 to 100 percent. Eighty-eight percent of the agreements are acceptable and 10 percent show possibilities of improvement. For

TABLE 31

INTRAJUDGE PERCENTAGE AGREEMENTS:
SEE AND MOVE (N=25)

Dimensions and Categories	Judge I (Percent)	Judge II (Percent)	Judge III (Percent)
Fluency	87	94	90
Originality	73	88	73
Flexibility	93	94	92
Locomotor movements	85	96	90
Non-locomotor movements	93	91	93
Elaboration	91	90	93
Body parts	90	90	96
Floor spaces	85	96	92
Level changes	80	79	82
Tempo changes	59	68	51
Motor creativity	91	95	91

TABLE 32

INTRAJUDGE PERCENTAGE AGREEMENTS FOR LOCOMOTOR
MOVEMENT SUB-CATEGORIES: SEE AND MOVE
(N=25)

Locomotor Movement Sub-Categories	Judge I (Percent)	Judge II (Percent)	Judge III (Percent)
1. Walking	84	100	96
2. Running	92	92	84
3. Jumping	84	96	88
4. Hopping	72	88	56
5. Leaping	92	96	92
6. Skipping/galloping/ sliding	80	88	84
7. Turning	76	92	76
8. Rolling	96	100	92
9. Rotating in/into inverted position	100	100	96
10. Bouncing	100	100	92
11. Pushing/pulling	72	100	92
12. Falling	84	96	100

TABLE 33

INTRAJUDGE PERCENTAGE AGREEMENTS FOR NON-LOCOMOTOR
 MOVEMENT SUB-CATEGORIES: SEE AND MOVE
 (N=25)

Non-Locomotor Movement Sub-Categories	Judge I (Percent)	Judge II (Percent)	Judge III (Percent)
1. Balancing	80	96	88
2. Curling/bending	100	100	100
3. Stretching	100	100	100
4. Arching	84	100	88
5. Twisting	92	92	92
6. Turning	80	72	84
7. Pivoting	96	88	100
8. Swinging	84	92	76
9. Swaying	92	84	80
10. Circling	84	76	48
11. Opening/closing	80	84	96
12. Lifting	100	100	100
13. Lowering	100	88	100
14. Kicking	92	84	100
15. Flinging	92	96	100
16. Shaking/vibrating	100	92	92
17. Bouncing	88	92	80
18. Pushing/pulling	72	92	72
19. Falling	84	100	100
20. Rising	88	88	76
21. Lunging	84	100	80
22. Shifting	84	92	60
23. Grasping	84	92	92

Judge I, percentage agreements indicate inconsistencies in evaluating one non-locomotor movement sub-category, pushing/pulling. For Judge II, percentage agreements show inconsistencies in evaluating two non-locomotor movement sub-categories, turning and circling. For Judge III, percentage agreements indicate inconsistencies in evaluating the non-locomotor movement sub-categories of swinging, circling, pushing/pulling, rising and shifting.

Interjudge percentage agreements. To determine interjudge percentage agreements of the See and Move task, the variables evaluated by the three judges were paired successively for both evaluation sessions. The percentage agreements presented in Table 34, page 180, range from 57 to 96 percent in Session I and from 54 to 93 percent in Session II. Seventy-nine percent of the interjudge percentage agreements in Session I are acceptable and 15 percent show possibilities of improvements. Eighty-two percent of the agreements between Judges I and II and between Judges I and III and 73 percent of the agreements between Judges II and III are acceptable. In Session II, 82 percent of the interjudge percentage agreements are acceptable and 15 percent show possibilities of improvement. Among the judges, 82 percent of the agreements are acceptable. In both evaluation sessions low interjudge percentage agreements indicate that the judges were inconsistent in evaluating originality and tempo changes.

Interjudge percentage agreements were also determined for the locomotor movement and non-locomotor movement sub-categories. Percentage agreements for the locomotor movement sub-categories

TABLE 34
 INTERJUDGE PERCENTAGE AGREEMENTS
 SEE AND MOVE (N=25)

Dimensions and Categories	Judges I-II (Percent)	Judges II-III (Percent)	Judges I-III (Percent)
<u>Session I</u>			
Fluency	91	88	86
Originality	78	66	69
Flexibility	92	88	90
Locomotor movements	84	83	87
Non-locomotor movements	90	84	85
Elaboration	88	89	86
Body parts	84	82	83
Floor spaces	96	87	85
Level changes	84	79	81
Tempo changes	64	57	58
Motor creativity	91	88	91
<u>Session II</u>			
Fluency	86	85	86
Originality	77	72	76
Flexibility	93	92	91
Locomotor movements	84	85	88
Non-locomotor movements	90	89	87
Elaboration	93	89	88
Body parts	89	84	83
Floor spaces	92	86	83
Level changes	86	84	81
Tempo changes	77	63	54
Motor creativity	92	92	92

presented in Table 35, page 182, range from 56 to 100 percent in Session I and from 52 to 100 percent in Session II. Seventy-five percent of the agreements in Session I are acceptable and 19 percent show possibilities of improvement. In Session II, 72 percent of the agreements are acceptable and 22 percent show possibilities of improvement. Between Judges I and II, 67 percent of the agreements in both sessions are acceptable. Between Judges II and III, 83 percent of the agreements in Session I and 67 percent in Session II are acceptable. Between Judges I and III, 75 percent of the agreements in Session I and 83 percent in Session II are acceptable. Low interjudge percentage agreements indicate that the judges were inconsistent in evaluating three locomotor movement sub-categories - hopping, skip/gallop/slide and turning.

Interjudge percentage agreements on the non-locomotor movement sub-categories presented in Table 36, page 183, range from 28 to 100 percent in Session I, and from 20 to 100 percent in Session II. Forty-eight percent of the agreements in Session I are acceptable, and 39 percent show possibilities of improvement; whereas in Session II, 61 percent of the agreements are acceptable and 32 percent show possibilities of improvement. Between Judges I and II, 48 percent of the agreements in Session I and 57 percent in Session II are acceptable. Between Judges II and III, 43 percent of the agreements in Session I and 65 percent in Session II are acceptable. Between Judges I and III, 52 percent of the agreements in Session I and 61 percent in Session II are acceptable. Low interjudge percentage agreements indicate that the judges were

TABLE 35

INTERJUDGE PERCENTAGE AGREEMENTS FOR LOCOMOTOR
MOVEMENT SUB-CATEGORIES: SEE AND MOVE
(N=25)

Locomotor Movement Sub-Categories.	Judges I-II		Judges II-III		Judges I-III	
	Sessions		Sessions		Sessions	
	I	II	I	II	I	II
	(Percent)		(Percent)		(Percent)	
1. Walking	92	92	96	100	88	92
2. Running	92	92	80	88	88	88
3. Jumping	84	88	88	88	88	92
4. Hopping	56	56	68	52	72	72
5. Leaping	92	88	84	88	84	100
6. Skipping/ galloping/ sliding	76	60	56	60	72	76
7. Turning	68	76	88	72	64	80
8. Rolling	100	96	100	92	100	88
9. Rotating in/ into inverted position	100	100	96	100	96	100
10. Bouncing	84	84	84	76	100	92
11. Pushing/ pulling	68	72	88	80	80	84
12. Falling	80	92	84	88	88	88

TABLE 36

INTERJUDGE PERCENTAGE AGREEMENTS FOR NON-LOCOMOTOR
 MOVEMENT SUB-CATEGORIES: SEE AND MOVE
 (N=25)

Non-Locomotor Movement Sub-Categories	Judges I-II		Judges II-III		Judges I-III	
	Sessions		Sessions		Sessions	
	I	II	I	II	I	II
	(Percent)		(Percent)		(Percent)	
1. Balancing	56	56	56	64	60	76
2. Curling/ bending	100	100	100	100	100	100
3. Stretching	100	100	100	100	100	100
4. Arching	76	76	76	80	76	80
5. Twisting	76	84	80	88	72	80
6. Turning	56	72	68	72	80	76
7. Pivoting	68	84	72	84	96	100
8. Swinging	80	88	80	80	68	84
9. Swaying	76	68	72	76	80	84
10. Circling	80	72	56	60	52	72
11. Opening/ closing	72	68	64	84	76	68
12. Lifting	100	100	100	100	100	100
13. Lowering	88	100	88	100	100	100
14. Kicking	64	80	68	84	88	80
15. Flinging	84	88	84	88	84	92
16. Shaking/ vibrating	80	80	76	76	88	96
17. Bouncing	76	72	84	80	68	68
18. Pushing/ pulling	64	60	68	56	56	64
19. Falling	96	80	100	100	96	80
20. Rising	92	84	80	84	72	76
21. Lunging	88	80	76	88	72	84
22. Shifting	28	20	40	64	48	48
23. Grasping	60	68	60	52	100	76

inconsistent in evaluating the non-locomotor movement sub-categories of balancing, arching, turning, swaying, circling, opening/closing, bouncing, pushing/pulling, shifting and grasping.

Hoops and Lines

The data of the Hoops and Lines task consist of the evaluations of twelve variables - fluency, originality, flexibility, locomotor movements, non-locomotor movements, manipulative movements, elaboration, body parts, floor spaces, level changes, tempo changes and motor creativity - which were obtained from three judges during two evaluation sessions.

Reliability correlation coefficients. Table 37, page 185, presents the reliability correlation coefficients for the variables evaluated by each judge in the Hoops and Lines task. These coefficients range from $r = .34$ to $.95$. For Judge I, eleven coefficients are significant at the $.01$ level. For Judge II and Judge III, eleven reliability correlation coefficients are significant at the $.01$ level and one at the $.05$ level.

For Judge I, reliability correlation coefficients show ten moderate relationships for fluency ($r = .62$), flexibility ($r = .71$), locomotor movements ($r = .72$), non-locomotor movements ($r = .61$), manipulative movements ($r = .77$), elaboration ($r = .70$), body parts ($r = .62$), floor spaces ($r = .79$), level changes ($r = .77$) and motor creativity ($r = .62$); and two low relationships for originality ($r = .34$) and tempo changes ($r = .52$). The low coefficient for tempo changes is significant at the $.01$ level, whereas

TABLE 37
 RELIABILITY CORRELATION COEFFICIENTS:
 HOOPS AND LINES (N=25)

Variables	Judge I	Judge II	Judge III
Fluency	.62**	.86**	.47*
Originality	.34	.73**	.82**
Flexibility	.71**	.90**	.81**
Locomotor movements	.72**	.88**	.77**
Non-locomotor movements	.61**	.81**	.84**
Manipulative movements	.77**	.95**	.90**
Elaboration	.70**	.78**	.87**
Body part	.62**	.70**	.61**
Floor spaces	.79**	.59**	.67**
Level changes	.77**	.80**	.80**
Tempo changes	.52**	.47*	.80**
Motor creativity	.62**	.94**	.88**

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's Tables
 (Guilford, 1965, pp. 580-581)

the coefficient for originality is not even significant at the .05 level.

For Judge II, reliability correlation coefficients indicate high relationships for fluency ($r = .86$), flexibility ($r = .90$), locomotor movements ($r = .88$), non-locomotor movements ($r = .81$), manipulative movements ($r = .95$), level changes ($r = .80$) and motor creativity ($r = .94$); moderate relationships for originality ($r = .73$), elaboration ($r = .78$) and body parts ($r = .70$); and low relationships for floor spaces ($r = .59$) and tempo changes ($r = .47$). The low coefficient for floor spaces is significant at the .01 level and for tempo changes at the .05 level.

For Judge III, reliability correlation coefficients indicate high relationships for originality ($r = .82$), flexibility ($r = .81$), non-locomotor movements ($r = .84$), manipulative movements ($r = .90$), elaboration ($r = .87$), level changes ($r = .80$), tempo changes ($r = .80$) and motor creativity ($r = .88$); moderate relationships for locomotor movements ($r = .77$), body parts ($r = .61$), floor spaces ($r = .67$); and a low relationship for fluency ($r = .47$), which is significant at the .05 level.

Objectivity correlation coefficients. The objectivity correlation coefficients presented in Table 38, page 187, range from $r = -.11$ to $.88$ in Session I and from $r = .05$ to $.92$ in Session II. In Session I, twenty-three of the thirty-six correlation coefficients are significant at the .01 level and five at the .05 level. Among the judges, six correlation coefficients

TABLE 38
OBJECTIVITY CORRELATION COEFFICIENTS:
HOOPS AND LINES (N=25)

Variables	Judges I-II	Judges II-III	Judges I-III
<u>Session I</u>			
Fluency	.72**	.44*	.49*
Originality	.26	.22	.28
Flexibility	.72**	.50*	.63**
Locomotor movements	.81**	.75**	.80**
Non-locomotor movements	.52**	.41*	.58**
Manipulative movements	.78**	.80**	.81**
Elaboration	.78**	.63**	.50*
Body parts	.25	.29	.33
Floor spaces	.83**	.51**	.66**
Level changes	.76**	.66**	.78**
Tempo changes	.88**	-.11	.05
Motor Creativity	.72**	.67**	.63**
<u>Session II</u>			
Fluency	.61**	.27	.19
Originality	.21	.30	.36
Flexibility	.68**	.54**	.69**
Locomotor movements	.77**	.64**	.77**
Non-locomotor movements	.55**	.44*	.61**
Manipulative movements	.70**	.78**	.81**
Elaboration	.72**	.75**	.64**
Body parts	.05	.55**	.26
Floor spaces	.77**	.68**	.74**
Level changes	.92**	.80**	.83**
Tempo changes	.91**	.48*	.40*
Motor creativity	.62**	.60**	.61**

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's Tables
(Guilford, 1965, pp. 580-581)

indicate high relationships ($r = .80$ to $.95$); fourteen coefficients, moderate relationships ($r = .63$ to $.78$); and sixteen coefficients, low relationships ($r = -.11$ to $.58$).

Correlation coefficients for locomotor movements indicate high relationships between Judges I and II ($r = .81$) and between Judges I and III ($r = .80$); but between Judges II and III ($r = .75$), a moderate relationship. Correlation coefficients for manipulative movements show high relationships between Judges II and III ($r = .80$) and between Judges I and III ($r = .81$); but between Judges I and III ($r = .78$), a moderate relationship. Correlation coefficients for floor spaces indicate a high relationship between Judges I and II ($r = .83$), a moderate relationship between Judges I and III ($r = .66$) and a low relationship between Judges II and III ($r = .51$). Correlation coefficients for tempo changes reveal a high relationship between Judges I and II ($r = .88$), but low and non-significant relationships among the other judges. Fluency correlation coefficients indicate a moderate relationship between Judges I and III ($r = .72$); and among the other judges, low relationships significant at the .05 level. Flexibility correlation coefficients show moderate relationships between Judges I and II ($r = .72$) and between Judges I and III ($r = .63$); but between Judges II and III ($r = .50$), a low relationship significant at the .05 level. Elaboration correlation coefficients show moderate relationships between Judges I and II ($r = .78$) and between Judges II and III ($r = .63$);

but between Judges I and III ($r = .50$), a low relationship significant at the .05 level. Objectivity correlation coefficients for level changes ($r = .66$ to $.78$) reveal moderate relationships among the judges. Correlation coefficients for non-locomotor movements ($r = .41$ to $.58$), body parts ($r = .25$ to $.33$) and originality ($r = .22$ to $.28$) indicate low relationships among the judges. Coefficients for body parts and originality are not significant at the .05 level.

Only slight changes are observable in the correlation coefficients of the evaluated variables in Session II. Twenty-six of the thirty-six correlation coefficients are significant at the .01 level and three at the .05 level. Among the judges, five correlation coefficients indicate high relationships ($r = .80$ to $.92$); eighteen coefficients, moderate relationships ($r = .60$ to $.78$); and thirteen coefficients, low relationships ($r = .05$ to $.55$). Major changes in the objectivity correlation coefficients in Session II occur with respect to locomotor movements, non-locomotor movements, manipulative movements, elaboration, floor spaces and level changes. All Session II correlation coefficients for locomotor movements ($r = .64$ to $.77$), elaboration ($r = .64$ to $.75$) and floor spaces ($r = .68$ to $.77$) show moderate relationships among the judges. Correlation coefficients for non-locomotor movements reveal a moderate relationship between Judges I and III ($r = .61$); but among the other judges ($r = .44$ to $.55$), low relationships. Correlation coefficients for manipulative movements reveal a high relationship between Judges I and III ($r = .81$)

and moderate relationships among the other judges ($r = .70$ to $.78$). All correlation coefficients for level changes indicate high relationships among the judges ($r = .80$ to $.92$). These changes in the objectivity correlation coefficients of Session II represent coefficient decrements for locomotor movements and manipulative movements but coefficient increments for non-locomotor movements, elaboration and level changes.

Relationships among the variables. The acceptable variables in the Hoops and Lines task can be identified by examining the relationships among the variables evaluated by each judge in each session. Tables 39 through 44, pages 191 through 196, respectively, present the means, standard deviations and inter-correlation coefficients for the evaluated variables in Hoops and Lines.

All correlation coefficients between fluency and motor creativity are significant at the $.01$ level and show moderate to low relationships ($r = .79$ to $.54$). Five correlation coefficients between fluency and flexibility indicate moderate to low relationships ($r = .72$ to $.58$). Six coefficients correlating fluency with originality ($r = .51$ and $.55$), non-locomotor movements ($r = .57$ and $.51$) and body parts ($r = .58$ and $.53$) indicate low relationships significant at the $.01$ level. Two coefficients correlating fluency with level changes ($r = .52$) and tempo changes ($r = .51$) show low relationships significant at the $.01$ level. A correlation coefficient between fluency and elaboration reveals a moderate relationship ($r = .69$). Other coefficients correlating fluency

TABLE 39

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION I
 VARIABLES: JUDGE I EVALUATIONS ON HOOPS AND LINES (N=25)

Hoops and Lines Session I Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Fluency		.36	.63**	.50*	.57**	.02	.38	.22	.10	.48*	-.03	.64**
2. Originality			.62**	.41*	.56**	.10	.41*	.41*	.13	.29	.07	.84**
3. Flexibility				.73**	.64**	.34	.56**	.29	.17	.62**	.13	.87**
4. Locomotor movements					.48*	-.18	.56**	.08	.43*	.50*	.40*	.67**
5. Non-locomotor movements						-.35	.34	-.10	.44*	.42*	.18	.65**
6. Manipulative movements							.08	.48*	-.51**	.15	-.30	.17
7. Elaboration								.48*	.30	.83**	.67**	.75**
8. Body parts									-.22	.15	-.06	.47*
9. Floor spaces										.14	.28	.23
10. Level changes											.47*	.67**
11. Tempo changes												.29
12. Motor creativity												
MEANS	7.12	17.76	16.08	4.56	6.56	4.96	23.72	9.80	5.48	5.44	3.00	64.68
STANDARD DEVIATIONS	1.88	5.33	3.20	1.78	1.89	2.05	3.82	1.78	.82	2.10	1.47	11.33

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's Tables (Guilford, 1965, pp. 580-581)

TABLE 40

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION II
 VARIABLES: JUDGE I EVALUATIONS ON HOOPS AND LINES (N=25)

Hoops and Lines Session II Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Fluency		.38	.49*	.46*	.45*	-.05	.42*	.09	.19	.28	.41*	.54**
2. Originality			.84**	.22	.55**	.46*	.68**	.56**	.00	.51**	.22	.95**
3. Flexibility				.46*	.65**	.43*	.77**	.40*	.22	.59**	.41*	.93**
4. Locomotor movements					.36	-.32	.26	-.10	.42*	.20	.25	.35
5. Non-locomotor movements						-.28	.50*	-.09	.36	.42*	.55**	.62**
6. Manipulative movements							.39	.65**	-.28	.26	-.11	.44*
7. Elaboration								.46*	.37	.87**	.41*	.85**
8. Body parts									-.38	.27	-.38	.52**
9. Floor spaces										.30	.39	.17
10. Level changes											.21	.67**
11. Tempo changes												.37
12. Motor creativity												
MEANS	7.72	20.40	16.16	4.80	6.52	4.84	24.76	10.88	5.56	5.56	2.76	69.04
STANDARD DEVIATIONS	1.67	7.38	3.04	1.38	2.12	2.36	3.78	2.09	.92	2.12	1.54	13.92

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 41-

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION I
VARIABLES: JUDGE II EVALUATIONS ON HOOPS AND LINES (N=25)

Hoops and Lines Session I Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Fluency		.51**	.65**	.43*	.48*	.27	.44*	.58**	-.06	.38	-.06	.76**
2. Originality			.47*	.29	.29	.25	.21	.18	-.00	.28	-.10	.78**
3. Flexibility				.56**	.51**	.63**	.39	.36	-.05	.40*	.05	.79**
4. Locomotor movements					.31	-.11	.74**	.42*	.50*	.42*	.41*	.67**
5. Non-locomotor movements						-.17	.18	.06	.14	.15	.09	.44*
6. Manipulative movements							-.08	.15	-.48*	.16	-.26	.32
7. Elaboration								.57**	.46*	.77**	.45*	.68**
8. Body parts									-.02	.32	-.16	.50*
9. Floor spaces										.13	.26	.16
10. Level changes											.12	.62**
11. Tempo changes												.15
12. Motor creativity												
MEANS	7.00	17.56	16.80	5.04	5.68	6.08	25.12	11.68	5.24	5.24	2.92	66.44
STANDARD DEVIATIONS	1.29	4.77	3.19	1.57	1.55	2.43	3.97	1.84	1.16	2.15	1.55	9.90

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's Tables (Guilford, 1965, pp. 580-581)

TABLE 42

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION II
 VARIABLES: JUDGE II EVALUATIONS ON HOOPS AND LINES (N=25)

Hoops and Lines Session II Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Fluency		.41*	.72**	.35	.51**	.14	.69**	.53**	.32	.52**	.32	.79**
2. Originality			.34	.30	.03	.13	.31	.19	.23	.10	.34	.74**
3. Flexibility				.44*	.41*	.45*	.78**	.55**	.21	.60**	.54**	.82**
4. Locomotor movements					.20	-.33	.53**	.24	.63**	.19	.49*	.51**
5. Non-locomotor movements						-.44*	.41*	.08	.41*	.25	.42*	.35
6. Manipulative movements							.17	.35	-.49*	.32	-.06	.26
7. Elaboration								.57**	.57**	.75**	.66**	.84**
8. Body parts									.00	.18	.11	.53**
9. Floor spaces										.28	.50*	.43*
10. Level changes											.29	.57**
11. Tempo changes												.60**
12. Motor creativity												
MEANS	7.12	16.92	16.96	4.84	5.80	6.32	24.36	11.00	5.32	5.44	2.60	65.36
STANDARD DEVIATIONS	1.39	4.61	2.42	1.49	1.73	2.34	3.95	1.76	1.03	1.98	1.32	9.80

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 43

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION I
VARIABLES: JUDGE III EVALUATIONS ON HOOPS AND LINES (N=25)

Hoops and Lines Session I Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Fluency		.35	.62**	.42	.19	.37	.46*	.05	.11	.32	.51**	.64**
2. Originality			.74**	.31	.47*	.31	.31	-.07	.21	.32	.23	.83**
3. Flexibility				.58**	.57**	.39	.61**	.05	.39	.55**	.42*	.93**
4. Locomotor movements					.21	-.06	.52**	-.02	.36	.53**	.33	.55**
5. Non-locomotor movements						-.42*	.45*	-.01	.48*	.35	.32	.57**
6. Manipulative movements							.01	.09	-.20	.04	.02	-.31
7. Elaboration								.26	.44*	.78**	.80**	.73**
8. Body parts									.08	-.21	-.06	.08
9. Floor spaces										.20	.13	.38
10. Level changes											.60**	.63**
11. Tempo changes												.58**
12. Motor creativity												
MEANS	7.52	19.00	16.72	4.60	6.64	5.48	26.60	12.72	5.04	5.76	3.08	69.84
STANDARD DEVIATIONS	1.48	4.86	2.94	1.35	2.29	2.18	3.66	1.40	.89	1.94	1.73	10.40

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

TABLE 44

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS OF SESSION II
 VARIABLES: JUDGE III EVALUATIONS ON HOOPS AND LINES (N=25)

Hoops and Lines Session II Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Fluency		.55**	.58**	.22	.20	.38	.29	.16	-.03	.36	.19	.64**
2. Originality			.77**	.19	.27	.56**	.32	.33	-.14	.30	.23	.89**
3. Flexibility				.47*	.53**	.47*	.59**	.39	.13	.48	.53**	.92**
4. Locomotor movements					.39	-.34	.32	.14	.49*	.09	.32	.34
5. Non-locomotor movements						-.38	.45*	.24	.20	.20	.61**	.44*
6. Manipulative movements							.15	.18	-.27	.34	-.05	.51**
7. Elaboration								.62**	.45*	.79**	.81**	.68**
8. Body parts									.22	.22	.25	.50*
9. Floor spaces										.07	.29	.10
10. Level changes											.61**	.58**
11. Tempo changes												.54**
12. Motor creativity												
MEANS	8.12	23.44	17.92	4.36	7.72	5.84	27.88	13.44	5.56	6.16	2.72	77.36
STANDARD DEVIATIONS	1.17	6.51	2.90	1.47	1.93	2.58	3.94	1.47	.87	1.84	1.46	11.91

* $r > .40$ $p < .05^a$

** $r > .51$ $p < .01^a$

^aValues from Wallace and Snedecor's tables (Guilford, 1965, pp. 580-581)

with locomotor movements, manipulative movements and floor spaces are either significant at the .05 level or non-significant. In the session in which fluency correlates the highest with motor creativity ($r = .79$), fluency also correlates moderately with flexibility ($r = .72$) and elaboration ($r = .69$) and at low levels with non-locomotor movements ($r = .51$), body parts ($r = .53$) and level changes ($r = .52$).

All correlation coefficients between originality and motor creativity are significant at the .01 level and show high to moderate relationships ($r = .95$ to $.74$). Four coefficients correlating originality with flexibility reveal high to moderate relationships ($r = .84$ to $.62$). Two coefficients correlating originality with non-locomotor movements ($r = .56$ and $.55$) and one coefficient correlating originality and manipulative movements ($r = .56$) show low relationships significant at the .01 level. A correlation coefficient between originality and elaboration indicates a moderate relationship ($r = .68$). Two coefficients correlating originality with body parts ($r = .56$) and level changes ($r = .51$) suggest low relationships significant at the .01 level. Other coefficients correlating originality with locomotor movements, floor spaces and tempo changes are either significant at the .05 level or non-significant. In the session in which originality correlates the highest with motor creativity ($r = .95$), originality also correlates highly with flexibility ($r = .84$), moderately with elaboration ($r = .68$) and at low levels with non-locomotor movements ($r = .55$), body parts ($r = .56$) and level changes ($r = .51$).

All correlation coefficients between flexibility and motor creativity are significant at the .01 level and show high to moderate relationships ($r = .93$ to $.79$). Three coefficients correlating flexibility and locomotor movements show moderate to low relationships ($r = .73$ to $.56$). Five correlation coefficients between flexibility and non-locomotor movements indicate moderate to low relationships ($r = .65$ to $.51$) and one coefficient correlating flexibility with manipulative movements shows a moderate relationship ($r = .63$). Two correlation coefficients between flexibility and elaboration show moderate relationships ($r = .77$ and $.63$). Four coefficients correlating flexibility with body parts ($r = .55$ and $.56$) and tempo changes ($r = .53$ and $.54$) reveal low relationships significant at the .01 level. Four correlation coefficients between flexibility and level changes indicate moderate to low relationships ($r = .62$ to $.55$). The highest correlation coefficients between flexibility and motor creativity ($r = .93$) are observable in two sessions. In one session (Table 40, page 192), flexibility correlates highly with originality ($r = .84$), moderately with non-locomotor movements ($r = .65$) and elaboration ($r = .77$) and at a low level with level changes ($r = .59$). In the other session (Table 43, page 195), flexibility correlates moderately with fluency ($r = .62$), originality ($r = .74$) and elaboration ($r = .61$) and at low levels with locomotor movements ($r = .58$), non-locomotor movements ($r = .57$) and level changes ($r = .55$).

Four correlation coefficients between locomotor movements and motor creativity are significant at the .01 level and indicate moderate to low relationships ($r = .67$ to $.51$). Four coefficients correlating locomotor movements with elaboration show moderate to low relationships ($r = .74$ to $.52$). A correlation coefficient between locomotor movements and floor spaces shows a moderate relationship ($r = .63$) and one between locomotor movements and level changes shows a low relationship ($r = .53$). Other coefficients correlating locomotor movements with non-locomotor movements, manipulative movements, body parts and tempo changes are significant at the .05 level or non-significant. The highest correlation coefficients between locomotor movements and motor creativity ($r = .67$) are observable in two sessions. In one session (Table 39, page 191), locomotor movements correlate moderately with flexibility ($r = .73$) and at a low level with elaboration ($r = .56$). In the other session (Table 41, page 193), locomotor movements correlate moderately with elaboration ($r = .74$) and at a low level with flexibility ($r = .56$).

Two correlation coefficients between non-locomotor movements and motor creativity are significant at the .01 level and indicate moderate to low relationships ($r = .65$ to $.57$). Two correlation coefficients between non-locomotor movements and tempo changes show moderate and low relationships ($r = .61$ and $.55$). Other coefficients correlating non-locomotor movements with manipulative movements, elaboration, body parts, floor spaces and level changes are either significant at the .05 level or

non-significant. In the session in which non-locomotor movements correlate the highest with motor creativity ($r = .65$), non-locomotor movements also correlate moderately with flexibility ($r = .64$) and at low levels with originality ($r = .56$) and fluency ($r = .57$).

One correlation coefficient between manipulative movements and motor creativity indicates a low relationship significant at the .01 level ($r = .51$). One coefficient correlating manipulative movements and body parts indicates a moderate relationship ($r = .65$). Another coefficient correlating manipulative movements with floor spaces shows a low negative relationship ($r = -.51$). Other coefficients correlating manipulative movements with elaboration, level changes and tempo changes are either significant at the .05 level or non-significant. In the session in which manipulative movements correlate the highest with motor creativity ($r = .51$), manipulative movements also correlate low with originality ($r = .56$).

All correlation coefficients between elaboration and motor creativity are significant at the .01 level and show high to moderate relationships ($r = .85$ to $.68$). All correlation coefficients between elaboration and level changes show high to moderate relationships ($r = .87$ to $.75$). Three coefficients correlating elaboration with body parts indicate moderate to low relationships ($r = .62$ to $.57$). Only one coefficient correlating elaboration and floor spaces is significant at the .01 level and indicates a low relationship ($r = .57$). Four correlation coefficients between elaboration and tempo changes indicate high to moderate relationships

($r = .81$ to $.66$). In the session in which elaboration correlates the highest with motor creativity ($r = .85$), elaboration also correlates highly with level changes ($r = .87$) and moderately with flexibility ($r = .77$) and originality ($r = .68$). In this particular session (Table 40, page 192), originality correlates the highest with motor creativity ($r = .95$).

Two correlation coefficients between body parts and motor creativity show low relationships significant at the .01 level ($r = .52$ and $.53$). Other coefficients correlating body parts with floor spaces, level changes and tempo changes are not significant at the .05 level. In the session in which body parts correlate the highest with motor creativity ($r = .53$), body parts also correlate at low levels with elaboration ($r = .57$), flexibility ($r = .55$) and fluency ($r = .53$).

All coefficients correlating floor spaces with motor creativity, level changes and tempo changes are either significant at the .05 level or non-significant.

All correlation coefficients between level changes and motor creativity are significant at the .01 level and show moderate to low relationships ($r = .67$ to $.57$). Two correlation coefficients between level changes and tempo changes show moderate relationships ($r = .61$ and $.60$). The highest correlation coefficients between level changes and motor creativity ($r = .67$) are observable in two sessions. In one session (Table 39, page 191), level changes correlate highly with elaboration ($r = .83$) and moderately with flexibility ($r = .62$). In the other session

(Table 40, page 192), level changes correlate highly with elaboration and at low levels with originality ($r = .51$) and flexibility ($r = .59$).

Three correlation coefficients between tempo changes and motor creativity are significant at the .01 level and show moderate to low relationships ($r = .60$ to $.54$). In the session in which tempo changes correlate the highest with motor creativity ($r = .60$), tempo changes also correlate moderately with elaboration ($r = .66$) and at a low level with flexibility ($r = .54$). In this particular session (Table 42, page 194), motor creativity correlates highly with both elaboration ($r = .84$) and flexibility ($r = .82$). An examination of the intercorrelation coefficients for all sessions of the three movement tasks shows that this session is the only one in which all correlation coefficients between elaboration and the four elaboration categories are significant at the .01 level ($r = .75$ to $.57$).

In summary, the originality, flexibility and elaboration variables in Hoops and Lines have the highest relationships with the motor creativity variable. Fluency relates moderately with motor creativity and flexibility. Of the three flexibility categories, locomotor movements and non-locomotor movements have the highest relationships with motor creativity and flexibility. Apparently, how a subject moves in relation to an object is more revealing than what she does with the object. Of the elaboration categories, level changes has the highest relationships with motor creativity and elaboration. Body parts and tempo changes have moderate and low relationships with elaboration and other motor

creativity variables (fluency, originality and flexibility). Floor spaces has a low and non-significant relationship with elaboration and motor creativity. With the exception of a moderate relationship with locomotor movements, floor spaces does not relate significantly with the other motor creativity variables.

Intrajudge percentage agreements. To determine the intrajudge percentage agreements of the variables in the Hoops and Lines task, the variables evaluated by the judges during the first evaluation session were paired successively with the variables evaluated during the second evaluation session. The intrajudge percentage agreements percented in Table 45, page 204, range from 67 to 96 percent. Eighty-nine percent of the agreements are above 80 percent and thus acceptable. Eleven percent of the agreements are between 60 and 79 percent and show possibilities of improvement with refinement of the scoring system. For Judge I, 83 percent of the percentage agreements are acceptable, whereas for Judge II and Judge III, 92 percent of the agreements are acceptable. For Judge I, percentage agreements indicate consistencies in evaluating all categories except originality and tempo changes. For Judge II and Judge III, percentage agreements show consistencies in evaluating all categories except tempo changes.

Intrajudge percentage agreements were also determined for the locomotor movement, non-locomotor movement and manipulative movement sub-categories. Percentage agreements for the locomotor movement sub-categories presented in Table 46, page 205, range from 64 to 100 percent. Ninety-two percent of the agreements are

TABLE 45

INTRAJUDGE PERCENTAGE AGREEMENTS:
HOOPS AND LINES (N=25)

Dimensions and Categories	Judge I (Percent)	Judge II (Percent)	Judge III (Percent)
Fluency	85	93	87
Originality	76	86	81
Flexibility	89	93	91
Locomotor movements	82	91	86
Non-locomotor movements	81	88	83
Manipulative movements	82	92	86
Elaboration	90	91	94
Body parts	86	91	94
Floor spaces	94	91	91
Level changes	81	84	86
Tempo changes	74	67	71
Motor creativity	89	96	90

TABLE 46

INTRAJUDGE PERCENTAGE AGREEMENTS FOR LOCOMOTOR
MOVEMENT SUB-CATEGORIES: HOOPS AND LINES
(N=25)

Locomotor Movement Sub-Categories	Judge I (Percent)	Judge II (Percent)	Judge III (Percent)
1. Walking	88	96	92
2. Running	84	92	88
3. Jumping	92	80	88
4. Hopping	88	68	80
5. Leaping	84	100	80
6. Skipping/galloping/ sliding	92	80	92
7. Turning	75	88	64
8. Rolling	100	100	96
9. Rotating in/into inverted position	100	100	92
10. Bouncing	100	100	96
11. Pushing/pulling	80	88	96
12. Falling	96	100	92

acceptable and 8 percent show possibilities of improvement. Intra-judge percentage agreements show that Judge I and Judge III were inconsistent in evaluating the locomotor movement sub-category of turning and Judge II was inconsistent in evaluating hopping.

Intrajudge percentage agreements for the non-locomotor movement sub-categories presented in Table 47, page 207, range from 60 to 100 percent. Eighty-three percent of the agreements are acceptable and 17 percent show possibilities of improvement. For Judge I, intrajudge percentage agreements indicate inconsistencies in evaluating the non-locomotor movement sub-categories of twisting, swinging, lifting and pushing/pulling. For Judge II, percentage agreements show inconsistencies in evaluating the non-locomotor movement sub-categories of twisting and lifting. For Judge III, agreements reveal inconsistencies in evaluating twisting, turning, swinging, circling, lifting and shifting.

Intrajudge percentage agreements for the manipulative movement sub-categories presented in Table 48, page 208, range from 64 to 100 percent. Eighty-five percent of the agreements are acceptable and 15 percent show possibilities of improvement. For Judge I, intrajudge percentage agreements show inconsistencies in evaluating the manipulative movement sub-categories of grasping/holding, lowering, turning and sliding. For Judge II, percentage agreements show inconsistency in evaluating sliding. For Judge III, percentage agreements show inconsistencies in evaluating the manipulative movement sub-categories of turning and twisting.

TABLE 47

INTRAJUDGE PERCENTAGE AGREEMENTS FOR NON-LOCOMOTOR
MOVEMENT SUB-CATEGORIES: HOOPS AND LINES
(N=25)

Non-Locomotor Movement Sub-Categories	Judge I (Percent)	Judge II (Percent)	Judge III (Percent)
1. Bouncing	100	100	100
2. Curling/bending	100	100	92
3. Stretching	84	80	80
4. Arching	96	100	100
5. Twisting	60	76	76
6. Turning	80	80	72
7. Pivoting	100	100	100
8. Swinging	72	84	68
9. Swaying	80	100	92
10. Circling	96	96	76
11. Opening/closing	96	96	96
12. Lifting	64	76	64
13. Lowering	88	100	100
14. Kicking	96	92	100
15. Flinging	92	100	100
16. Shaking/vibrating	100	100	100
17. Bouncing	100	100	100
18. Pushing/pulling	72	100	92
19. Falling	96	100	100
20. Rising	88	96	88
21. Lunging	100	100	100
22. Shifting	96	100	68
23. Grasping	84	100	84

TABLE 48

INTRAJUDGE PERCENTAGE AGREEMENTS FOR MANIPULATIVE
MOVEMENT SUB-CATEGORIES: HOOPS AND LINES
(N=25)

Manipulative Movement Sub-Categories	Judge I (Percent)	Judge II (Percent)	Judge III (Percent)
1. Grasping/holding	68	100	100
2. Throwing	84	100	88
3. Catching	96	100	96
4. Bouncing	88	100	100
5. Striking	100	100	100
6. Kicking	100	100	100
7. Lifting	100	96	100
8. Lowering	64	92	96
9. Pushing	96	100	96
10. Pulling	96	92	92
11. Swinging	92	84	84
12. Rotating	92	96	88
13. Rolling	100	100	96
14. Turning	64	84	72
15. Twisting	88	96	72
16. Sliding	76	76	88

Interjudge percentage agreements. To determine the interjudge percentage agreements of the variables in the Hoops and Lines task, the variables evaluated by the three judges were paired successively for both evaluation sessions. Interjudge percentage agreements presented in Table 49, page 210, range from 60 to 95 percent in Session I and from 60 to 94 percent in Session II. Sixty-nine percent of the agreements in Session I are acceptable and 25 percent show possibilities of improvement. Seventy-five percent of the agreements between Judges I and II and between Judges I and III and 58 percent of the agreements between Judges II and III are acceptable. Low interjudge percentage agreements suggest that the judges were inconsistent in evaluating originality, non-locomotor movements, manipulative movements and tempo changes. In Session II, 67 percent of the agreements are acceptable and 33 percent show possibilities of improvement. Seventy-five percent of the agreements between Judges I and II, 67 percent of the agreements between Judges II and III, and 58 percent of the agreements between Judges I and III are acceptable. Low interjudge percentage agreements show that the judges were inconsistent in evaluating originality, non-locomotor movements, manipulative movements and tempo changes.

Interjudge percentage agreements were determined for the locomotor movement, non-locomotor movement and manipulative movement sub-categories. Percentage agreements for the locomotor movement sub-categories presented in Table 50, page 211, range from 60 to 100 percent in Session I and from 48 to 100 percent

TABLE 49
 INTERJUDGE PERCENTAGE AGREEMENTS:
 HOOPS AND LINES (N=25)

Dimensions and Categories	Judges I-II (Percent)	Judges II-III (Percent)	Judges I-III (Percent)
<u>Session I</u>			
Fluency	87	85	81
Originality	76	77	75
Flexibility	90	87	89
Locomotor movements	86	85	84
Non-locomotor movements	78	73	80
Manipulative movements	74	79	84
Elaboration	90	89	86
Body parts	82	86	76
Floor spaces	95	87	91
Level changes	86	77	83
Tempo changes	83	52	56
Motor creativity	91	90	88
<u>Session II</u>			
Fluency	87	83	84
Originality	71	68	74
Flexibility	90	89	85
Locomotor movements	91	85	85
Non-locomotor movements	77	74	77
Manipulative movements	74	77	78
Elaboration	90	87	88
Body parts	84	82	79
Floor spaces	93	90	94
Level changes	92	80	82
Tempo changes	87	68	60
Motor creativity	87	84	85

TABLE 50

INTERJUDGE PERCENTAGE AGREEMENTS FOR LOCOMOTOR
MOVEMENT SUB-CATEGORIES: HOOPS AND LINES
(N=25)

Locomotor Movement Sub-Categories	Judges I-II		Judges II-III		Judges I-III	
	Sessions		Sessions		Sessions	
	I	II	I	II	I	II
	(Percent)		(Percent)		(Percent)	
1. Walking	88	80	92	88	88	84
2. Running	92	84	92	88	92	80
3. Jumping	92	72	84	76	92	88
4. Hopping	64	60	64	68	100	84
5. Leaping	92	84	88	92	88	84
6. Skipping/ galloping/ sliding	68	80	68	72	68	76
7. Turning	60	64	72	48	72	68
8. Rolling	92	92	92	86	84	88
9. Rotating in/ into inverted position	96	96	96	88	100	92
10. Bouncing	96	96	100	96	96	92
11. Pushing/ pulling	72	72	72	88	92	84
12. Falling	96	100	92	100	96	100

in Session II. In Session I, 72 percent of the agreements are acceptable and 28 percent show possibilities of improvement. Although 72 percent of the agreements in Session II are acceptable, only 25 percent show possibilities of improvement. In both evaluation sessions, 67 percent of the interjudge percentage agreements between Judges I and II and between Judges II and III and 83 percent of the agreements between Judges I and III are acceptable. Low interjudge percentage agreements show that the judges were inconsistent in evaluating four locomotor movement sub-categories - hopping, skip/gallop/slide, turning and pushing/pulling.

Interjudge percentage agreements with respect to non-locomotor movement sub-categories presented in Table 51, page 213, range from 28 to 100 percent in both evaluation sessions. Sixty-two percent of the agreements in Session I are acceptable and 27 percent show possibilities of improvement. In Session II, 65 percent of the agreements are acceptable and 25 percent show possibilities of improvement. Between Judges I and II, 70 percent of the interjudge percentage agreements are acceptable in Session I, whereas 74 percent are acceptable in Session II. Between Judges II and III, 57 percent of the agreements are acceptable in both evaluation sessions. Between Judges I and III, 61 percent of the agreements in Session I and 65 percent in Session II are acceptable. Low interjudge percentage agreements indicate that the judges were inconsistent in evaluating nine non-locomotor movement sub-categories - stretching, twisting, turning, swinging, swaying, lifting, pushing/pulling, shifting and grasping.

TABLE 51
 INTERJUDGE PERCENTAGE AGREEMENTS FOR NON-LOCOMOTOR
 MOVEMENT SUB-CATEGORIES: HOOPS AND LINES
 (N=25)

Non-Locomotor Movement Sub-Categories.	Judges I-II		Judges II-III		Judges I-III	
	Sessions		Sessions		Sessions	
	I	II	I	II	I	II
	(Percent)		(Percent)		(Percent)	
1. Balancing	92	92	96	96	96	96
2. Curling/ bending	100	100	84	84	84	84
3. Stretching	76	72	60	60	60	64
4. Arching	100	96	100	100	100	100
5. Twisting	56	48	68	60	64	80
6. Turning	44	36	28	28	68	84
7. Pivoting	100	100	96	96	96	96
8. Swinging	60	64	68	60	76	72
9. Swaying	68	72	52	44	76	64
10. Circling	92	92	96	76	96	68
11. Opening/ closing	92	92	88	88	96	88
12. Lifting	56	68	60	72	72	64
13. Lowering	96	84	100	100	96	84
14. Kicking	92	96	92	92	100	96
15. Flinging	100	92	100	100	100	92
16. Shaking/ vibrating	100	100	100	100	100	100
17. Bouncing	100	100	100	100	100	100
18. Pushing/ pulling	76	96	76	76	60	72
19. Falling	96	100	100	100	96	100
20. Rising	88	88	68	84	80	88
21. Lunging	100	100	100	100	100	100
22. Shifting	80	84	72	72	68	56
23. Grasping	84	92	40	32	48	40

In Table 52, page 215, the interjudge percentage agreements in respect to the manipulative moment sub-categories range from 56 to 100 percent in Session I and 32 to 100 percent in Session II. Sixty-five percent of the agreements in Session I are acceptable and 23 percent show possibilities of improvement. In Session II, 63 percent of the agreements are acceptable and 25 percent show possibilities of improvement. In Session I, 56 percent of the agreements between Judges I and II, 75 percent of the agreements between Judges II and III and 63 percent of the agreements between Judges I and III are acceptable. In Session II, 63 percent of the agreements among the judges are acceptable. Low interjudge percentage agreements indicate that the judges were inconsistent in evaluating seven manipulative movement sub-categories - grasping/holding, lowering, swinging, rotating, turning, twisting and sliding.

Summary and Discussion

In this analysis, the percentage of high and moderate reliability correlation coefficients for the motor creativity task variables evaluated by the judges indicate that Move to Sounds is a difficult task to score consistently, whereas See and Move and Hoops and Lines are relatively easy tasks to score consistently. In Move to Sounds, all of the coefficients for variables evaluated by Judge II show high and moderate relationships and are acceptable ($r = .94$ to $.71$). However, only 64 percent of the coefficients for variables evaluated by the other two judges are acceptable ($r = .98$ to $.63$). In See and Move, 91 percent

TABLE 52

INTERJUDGE PERCENTAGE AGREEMENTS FOR MANIPULATIVE
MOVEMENT SUB-CATEGORIES: HOOPS AND LINES
(N=25)

Manipulative Movement Sub-Categories	Judges I-II		Judges II-III		Judges I-III	
	Sessions		Sessions		Sessions	
	I	II	I	II	I	II
	(Percent)		(Percent)		(Percent)	
1. Grasping/ holding	56	32	100	100	56	32
2. Throwing	76	84	80	84	80	92
3. Catching	100	96	100	96	100	92
4. Bouncing	96	84	96	96	100	88
5. Striking	100	100	100	100	100	100
6. Kicking	96	96	96	96	100	100
7. Lifting	88	92	88	92	100	100
8. Lowering	60	80	88	92	56	72
9. Pushing	88	84	88	84	92	84
10. Pulling	80	76	84	76	96	92
11. Swinging	72	64	56	48	60	69
12. Rotating	72	76	68	76	96	92
13. Rolling	84	84	84	80	100	96
14. Turning	60	56	60	56	76	76
15. Twisting	80	80	80	72	76	76
16. Sliding	56	48	56	68	76	64

of the reliability correlation coefficients for variables evaluated by Judge II; 82 percent, by Judge III; and 73 percent, by Judge I are acceptable ($r = .97$ to $.69$). In Hoops and Lines, 92 percent of the reliability correlation coefficients for variables evaluated by Judge III and 83 percent by the other two judges are acceptable ($r = .90$ to $.61$). Apparently, the time span of the task may affect the consistency of the judges' evaluation of the subjects' movement performances in the task. Hoops and Lines is a one-minute task; See and Move, a two-minute task; and Move to Sounds, a three-minute task. In this study, reliability correlation coefficients indicate that the judges were more reliable in evaluating the movement performances in Hoops and Lines, a one-minute task, than in evaluating the movement performances in Move to Sounds, a three-minute task.

Low reliability correlation coefficients ($r = .59$ to $.00$) for variables evaluated by the judges reveal inconsistencies for three Move to Sounds variables (flexibility, non-locomotor movements and body parts); three See and Move variables (originality, body parts and tempo changes); and one Hoops and Lines variable (tempo changes). Means and standard deviations for Move to Sounds (Tables 11 through 16, pages 137 through 142, respectively), See and Move (Tables 25 through 30, pages 164 through 169, respectively) and Hoops and Lines (Tables 39 through 44, pages 191 through 196, respectively) show that with the exception of originality each of these variables has narrow score ranges. Thus, the narrow score ranges in conjunction with the high degree of subjective judgment which the judges used in their

evaluations may have resulted in the low reliability correlation coefficients. Although originality does not have a narrow score range, this variable is very open-ended and the procedure for determining the originality score may have influenced the low reliability correlation coefficients. The subjects' originality scores are strongly based upon the judges' descriptions of their observations of movement performances. Any variance between the judges' descriptions of the movements they observed in the two evaluation sessions may account for the variance in the originality score.

The range of objectivity correlation coefficients shows very little differences in the judges' abilities to evaluate the three motor creativity tasks. Objectivity correlation coefficients for Move to Sounds range from $r = .06$ to $.99$; for See and Move, $r = -.05$ to $.92$; and for Hoops and Lines, $r = -.11$ to $.92$. Sixty-five percent of the objectivity correlation coefficients for variables evaluated by the judges in See and Move; 60 percent, in Hoops and Lines; and 58 percent, in Move to Sounds show high to moderate relationships. Apparently, the judges were slightly more consistent in evaluating the movement performances of See and Move than they were in evaluating the other two tasks. Low objectivity correlation coefficients for the variables in the three movement tasks reveal that the judges were inconsistent in evaluating originality, non-locomotor movements, body parts and tempo changes. In addition, low objectivity correlation coefficient for the variables show that the judges were inconsistent in evaluating fluency, flexibility and locomotor movements in Move to Sounds and fluency in

Hoops and Lines. With the exception of originality, the means and standard deviations for these variables indicate narrow score ranges. As previously stated, the procedures for scoring originality may have affected the correlation coefficients. Therefore, the narrow range of scores as well as the high degree of subjective judgment used in evaluating these variables may account for the low objectivity correlation coefficients.

Correlation coefficients among the variables for the two evaluation sessions of each judge reveal that originality, flexibility and elaboration have the highest relationships ($r = .95$ to $.66$) with motor creativity in the three movement tasks. In all three tasks, originality has the highest relationships ($r = .95$ to $.74$) with motor creativity. Correlation coefficients between flexibility and motor creativity are higher in See and Move ($r = .84$ to $.72$) and Hoops and Lines ($r = .93$ to $.79$) than in Move to Sounds ($r = .81$ to $.51$). Perhaps the stimulators in See and Move and Hoops and Lines encourage more flexibility (different kinds of actions) in the movement performances than does the stimulator in Move to Sounds. Although elaboration has many high and moderate relationships ($r = .85$ to $.66$) with motor creativity in all three tasks, it has only a few moderate and low relationships ($r = .77$ to $.50$) with originality, flexibility and fluency. Apparently, the movement details which some subjects perform in their movement performances may have more effect upon the motor creativity score than the number of responses, the number of different kinds of actions and the number of unique actions they perform in the movement performance. Fluency has high to low relationships ($r = .80$ to $.51$) with motor creativity and moderate to low relationships ($r = .74$ to $.51$) with flexibility and originality.

Correlation coefficients among locomotor movements, non-locomotor movements and manipulative movements show little interrelationship in the motor creativity tasks. Of the three flexibility categories, non-locomotor movements have the highest relationship with motor creativity in Move to Sounds and locomotor movements have the highest relationships with flexibility in See and Move. In Hoops and Lines, both locomotor movements and non-locomotor movements have moderate and low relationships with motor creativity and flexibility, whereas manipulative movements have low and insignificant relationships with motor creativity and flexibility. It appears that how a subject moves in relation to an object is more revealing in this task than what she does with the object.

Correlation coefficients among body parts, floor spaces, level changes and tempo changes show little interrelationship in the motor creativity tasks. Of the four elaboration categories, level changes has the highest relationships with motor creativity and elaboration in the three motor creativity tasks. Body parts, tempo changes and floor spaces have higher relationships with motor creativity and the other variables in Hoops and Lines than in See and Move and Move to Sounds. Perhaps the stimulators encourage the subjects to use these categories more in Hoops and Lines than in the other two tasks.

Intrajudge percentage agreements indicate that 91 percent of the agreements for Move to Sounds; 89 percent, for Hoops and Lines; and 82 percent, for See and Move are acceptable. Low intrajudge percentage agreements reveal that the judges were inconsistent in evaluating originality and tempo changes.

Intrajudge percentage agreements in the locomotor movement sub-categories indicate that 97 percent of the agreements for Hoops and Lines; 86 percent, for See and Move; and 81 percent, for Move to Sounds are acceptable. Low intrajudge percentage agreements show that the judges were inconsistent in evaluating six of the twelve locomotor movement sub-categories - jumping, hopping, skip/gallop/slide, turning, bouncing and pushing/pulling.

Intrajudge percentage agreements with respect to non-locomotor movements reveal that 88 percent of the agreements for See and Move; 83 percent, for Hoops and Lines; and 77 percent, for Move to Sounds are acceptable. Low intrajudge percentage agreements show that the judges were inconsistent in evaluating thirteen of the twenty-three non-locomotor movement sub-categories - arching, twisting, turning, swinging, swaying, circling, opening/closing, lifting, shaking/vibrating, bouncing, pushing/pulling, rising and shifting.

In Hoops and Lines, 85 percent of the percentage agreements with respect to manipulative movements are acceptable. Low intrajudge percentage agreements show that the judges were inconsistent in evaluating five of the seventeen manipulative movement sub-categories - grasping/holding, lowering, turning, twisting and sliding.

Interjudge percentage agreements in Session I indicate that 79 percent of the agreements for See and Move; 70 percent, for Move to Sound; and 69 percent for Hoops and Lines are acceptable.

Percentage agreements in Session II indicate that 82 percent of the agreements for See and Move and Move to Sounds, and 76 percent for Hoops and Lines are acceptable. Low interjudge percentage agreements indicate that the judges are inconsistent in evaluating originality and tempo changes. In addition, low interjudge percentage agreements indicate that the judges were inconsistent in evaluating locomotor movements and level changes in Move to Sounds and non-locomotor movements and manipulative movements in Hoops and Lines.

Interjudge percentage agreements on locomotor movements indicate that in Session I 75 percent of the agreements for See and Move; 72 percent for Hoops and Lines; and 64 percent for Move to Sounds are acceptable. In Session II, 72 percent of the agreements for See and Move and Hoops and Lines; and 61 percent for Move to Sounds are acceptable. Low interjudge percentage agreements indicate that the judges were inconsistent in evaluating five of the twelve locomotor movement sub-categories - jumping, hopping, skip/gallop/slide, turning, bouncing and pushing/pulling.

Interjudge percentage agreements for non-locomotor movements indicate that in Session I 62 percent of the agreements for Hoops and Lines; 55 percent, for Move to Sounds; and 48 percent, for See and Move are acceptable. In Session II, 65 percent of the agreements for Hoops and Lines; 61 percent, for See and Move; and 55 percent, for Move to Sounds are acceptable. Low interjudge percentage agreements show that the judges were inconsistent in evaluating fifteen of the twenty-three non-locomotor movement

sub-categories - balancing, stretching, arching, twisting, turning, swinging, swaying, circling, opening/closing, lifting, shaking/vibrating, bouncing, pushing/pulling, shifting and grasping.

Interjudge percentage agreements with respect to manipulative movements indicate that 65 percent of the agreements in Session I and 63 percent in Session II are acceptable. Low interjudge percentage agreements show that the judges were inconsistent in evaluating seven of the seventeen manipulative movement sub-categories - grasping/holding, lowering, swinging, rotating, turning, twisting and sliding.

Originality appears to be the only dimension with low interjudge percentage agreements. These low agreements range from 66 to 79 percent. With refinement of the scoring system, particularly the originality dimension, these agreements may improve. The low agreements for level changes show a positive direction and with the refinement of the scoring system, these agreements may also improve. Apparently, tempo changes is a very difficult category to observe and evaluate. The judges evaluate both tempo changes and level changes at the same time. If the tempo changes category is eliminated from the scoring system, the judges may be more consistent in evaluating level changes. Percentage agreements indicate inconsistencies in evaluating all three flexibility categories. Perhaps the sub-categories of locomotor movements, non-locomotor movements and manipulative movements are too narrow. In addition, the duplication of actions in all three categories may be confusing. For

example, falling is both a locomotor movement and a non-locomotor movement; and swinging, both a non-locomotor movement and a manipulative movement (see Definitions of Sub-categories in Appendix C). If similar sub-categories are combined into larger units of actions, the evaluations of the judges may improve. The percentage agreements for the evaluations of the locomotor movement, non-locomotor movement and manipulative movement sub-categories reveal many inconsistencies. Furthermore, many of the inconsistent sub-categories describe actions which were selected as unique actions for the originality score (see Unique Actions for the Motor Creativity Tasks in Appendix E). Perhaps the use of inconsistent sub-categories accounts for the inconsistencies in the originality dimension. If the locomotor movement, non-locomotor movement and manipulative movement sub-categories are reorganized and redefined, the percentage agreements for the evaluations of these sub-categories, the flexibility categories and the originality dimension may improve.

RELATIONSHIPS AMONG THE MOTOR CREATIVITY TASKS IN THE THREE TESTING-EVALUATION SESSIONS

The researcher evaluated the movement performances which the twenty-five subjects performed in the second, third and fourth testing sessions in order to study the effect of increasing the time length of evaluating the movement performances on the tasks. The evaluations of the movement performances in the second testing session represent the data of Evaluation Session II. The evaluations of the combined movement performances in the second

and third testing sessions represent the data of Evaluation Session III. The data in Evaluation Session IV include the evaluations of the combined movement performances of the second, third and fourth testing sessions. Means, standard deviations and correlation coefficients for each of the variables were determined for each task in each evaluation session. Pearson Product-Moment correlational method was used to determine the relationships among the variables used in the three evaluation sessions.

Evaluation Session II

Table 53, page 225, presents the correlation coefficients for the motor creativity task variables in Evaluation Session II, which includes the movement performances of the second testing session. Correlation coefficients between motor creativity and the other variables reveal high to moderate relationships in Move to Sounds ($r = .82$ to $.61$); moderate relationships in See and Move ($r = .69$ to $.74$); and high to low relationships in Hoops and Lines ($r = .95$ to $.55$). In all three tasks, the highest coefficients in this session are between motor creativity and originality ($r = .74$ to $.95$).

Correlation coefficients between Move to Sounds and Hoops and Lines indicate little relationship among the variables. None of the coefficients are significant at the .01 level.

Correlation coefficients between Move to Sounds and See and Move show five moderate relationships and four low relationships significant at the .01 level. The moderate relationships

TABLE 93

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS
FOR SESSION II MOTOR CREATIVITY TASKS VARIABLES (N=25)

SESSION II VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
MOVE TO SOUNDS															
1. Fluency		.25	.43*	.54**	.61**	.76**	.10	.56**	.61**	.56**	.31	.47*	.46*	.33	.47*
2. Originality			.44*	.17	.82**	.31	.42*	.22	.34	.50*	.43*	.39	.18	.20	.35
3. Flexibility				.28	.64**	.19	-.08	.23	.20	.12	.31	.22	.08	.14	.21
4. Elaboration					.66**	.60**	-.21	.45*	.61**	.33	.17	.35	.39	.38	.39
5. Motor Creativity						.59**	.17	.46*	.60**	.56**	.45*	.50*	.36	.36	.49*
SEE AND MOVE															
6. Fluency							.18	.68**	.67**	.70**	.31	.45*	.52**	.33	.48*
7. Originality								.44*	.08	.74**	.19	.37	.24	.27	.34
8. Flexibility									.39	.72**	.39	.53**	.56**	.64**	.62**
9. Elaboration										.69**	.28	.39	.36	.19	.37
10. Motor Creativity											.36	.57**	.49*	.41*	.56**
HOOPS AND LINES															
11. Fluency												.40*	.49*	.42*	.55*
12. Originality													.85**	.69**	.95**
13. Flexibility														.77**	.93**
14. Elaboration															.85**
15. Motor Creativity															
MEANS	15.48	25.80	18.03	29.80	89.16	13.20	20.48	19.20	27.76	80.64	7.72	20.24	16.16	24.76	68.88
STANDARD DEVIATIONS	2.26	9.43	2.87	6.27	15.07	2.60	8.35	2.27	6.27	13.95	1.67	7.65	3.04	3.87	14.22

* $r > .40$ $p < .05^a$ ** $r > .51$ $p < .01^a$ ^aValues From Wallace and Snedecor's Tables (Gullford, 1965, pp. 580-581)

are between fluency and elaboration ($r = .60$ and $.76$) and low relationships are between motor creativity and fluency ($r = .56$ to $.59$). A moderate relationship is shown between Move to Sounds motor creativity and See and Move elaboration ($r = .60$); and a low relationship between Move to Sounds fluency and See and Move flexibility ($r = .56$).

Evaluation Session III

Table 54, page 227, presents the correlation coefficients for the motor creativity task variables in Evaluation Session III, which includes the combined movement performances of the second and third testing sessions. Correlation coefficients between motor creativity and the other variables reveal high to moderate relationships in Move to Sounds ($r = .86$ to $.61$); high to moderate relationships in See and Move ($r = .94$ to $.58$); and high to low relationships in Hoops and Lines ($r = .88$ to $.39$). In Hoops and Lines, the coefficient between motor creativity and fluency is not significant at the $.01$ or even $.05$ level. The highest coefficients in this session are between motor creativity and originality in each movement task ($r = .94$ to $.86$).

Correlation coefficients between Move to Sounds and Hoops and Lines indicate very little relationship among the variables. One coefficient between Move to Sounds fluency and Hoops and Lines elaboration indicates a low relationship ($r = .52$). No other coefficients are significant at the $.01$ level.

TABLE 54

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS
FOR SESSION III MOTOR CREATIVITY TASKS VARIABLES (N=25)

SESSION III VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<u>MOVE TO SOUNDS</u>															
1. Fluency		.61**	.34	.46*	.78**	.64**	.59**	.48*	.61**	.70**	.47*	.27	.16	.52**	.47*
2. Originality			.59**	.14	.86**	.38	.57**	.46*	.36	.57**	.29	.13	-.02	.45*	.29
3. Flexibility				.18	.61**	.22	.16	.46*	.15	.21	.34	.15	.11	.44*	.33
4. Elaboration					.61**	.37	.04	.15	.59**	.27	.31	.19	-.14	.12	.21
5. Motor Creativity						.53**	.50*	.48*	.60**	.61**	.43*	.22	-.04	.47*	.38
<u>SEE AND MOVE</u>															
6. Fluency							.69**	.44*	.75**	.85**	.29	.34	.36	.54**	.53**
7. Originality								.55**	.48*	.94**	.24	.41*	.39	.47*	.55**
8. Flexibility									.28	.58**	.35	.39	.47*	.67**	.63**
9. Elaboration										.74**	.24	.27	.00	.37	.36
10. Motor Creativity											.30	.42*	.34	.55**	.59**
<u>HOOPS AND LINES</u>															
11. Fluency												.11	.23	.28	.39
12. Originality													.36	.25	.88**
13. Flexibility														.43*	.58**
14. Elaboration															.62**
15. Motor Creativity															
MEANS	30.24	68.44	22.52	47.52	168.72	27.24	60.84	24.24	46.00	158.32	15.48	48.80	23.64	38.08	126.08
STANDARD DEVIATIONS	4.41	18.72	2.74	12.54	28.87	5.69	23.24	2.62	10.52	35.96	3.07	12.06	2.27	5.28	16.28

* $r > .40$ $p < .05^a$ ** $r > .51$ $p < .01^a$ ^aValues from Wallace and Snedecor's Tables (Guilford, 1965, pp. 580-581)

Correlation coefficients between Move to Sounds and See and Move reveal five moderate relationships and five low relationships. Move to Sounds fluency correlates moderately with See and Move fluency ($r = .64$), See and Move elaboration ($r = .61$) and See and Move motor creativity ($r = .70$); and at a low level with See and Move originality ($r = .59$). Move to Sounds originality correlates at low levels with See and Move originality ($r = .57$) and See and Move motor creativity ($r = .57$). Move to Sounds elaboration has a low correlation with See and Move elaboration ($r = .59$). Move to Sounds motor creativity correlates moderately with See and Move elaboration ($r = .60$) and See and Move motor creativity ($r = .61$) and at a low level with See and Move fluency ($r = .53$).

Correlation coefficients between See and Move and Hoops and Lines reveal two moderate relationships and five low relationships among the variables. See and Move flexibility correlates moderately with Hoops and Lines elaboration ($r = .67$) and Hoops and Lines motor creativity ($r = .63$). See and Move fluency and See and Move motor creativity have low correlations with Hoops and Lines elaboration ($r = .54$ and $.55$) and Hoops and Lines motor creativity ($r = .53$ and $.59$). A coefficient between See and Move originality and Hoops and Lines motor creativity indicates a low relationship ($r = .55$).

Evaluation Session IV

Table 55, page 229, presents the correlation coefficients for the motor creativity task variables in Evaluation Session IV,

TABLE 55

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATION COEFFICIENTS
FOR SESSION IV MOTOR CREATIVITY TASKS VARIABLES (N=25)

SESSION IV VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<u>MOVE TO SOLNES</u>															
1. Fluency		.58**	-.03	.47*	.78**	.43*	.47*	.17	.45*	.50*	.50*	.26	.05	.47*	.42*
2. Originality			.51**	.10	.84**	.33	.37	.35	.27	.37	.25	.24	-.01	.51**	.37
3. Flexibility				-.09	.35	-.06	-.18	.36	-.14	-.14	.20	.13	.02	.25	.20
4. Elaboration					.61**	.36	.13	-.12	.58**	.32	.49*	.30	-.15	.10	.31
5. Motor Creativity						.46*	.38	.23	.52**	.48*	.50*	.35	-.07	.48*	.47*
<u>SEE AND MOVE</u>															
6. Fluency							.79**	.32	.76**	.89**	.25	.40*	.22	.42*	.48*
7. Originality								.48*	.66**	.95**	.18	.39	.24	.40*	.45*
8. Flexibility									.30	.49*	.28	.29	.53**	.53**	.48*
9. Elaboration										.85**	.28	.41*	.12	.52**	.51**
10. Motor Creativity											.25	.44*	.24	.50*	.53**
<u>HOOPS AND LINES</u>															
11. Fluency												.30	.18	.30	.50*
12. Originality													.49*	.35	.91**
13. Flexibility														.46*	.63**
14. Elaboration															.66**
15. Motor Creativity															
MEANS	46.08	111.92	27.72	63.28	246.00	41.00	100.48	26.44	62.68	230.60	22.92	75.32	27.92	47.60	173.76
STANDARD DEVIATIONS	6.61	26.33	2.09	18.51	39.30	9.26	28.12	2.53	15.91	49.70	4.33	16.70	2.93	7.40	24.13

* $r > .40$ $p < .05^a$ ** $r > .51$ $p < .01^a$ ^aValues From Wallace and Snedecor's Tables (Guilford, 1965, pp. 580-581)

which includes the combined movement performances of the second, third and fourth testing sessions. Correlation coefficients between motor creativity and fluency, originality, and elaboration show high to moderate relationships in Move to Sounds ($r = .84$ to $.61$) and high relationships in See and Move ($r = .85$ to $.95$). ~~In both tasks flexibility correlation coefficients are either~~ significant at the .05 level or non-significant. In Hoops and Lines motor creativity correlates highly with originality ($r = .91$) and moderately with flexibility ($r = .63$) and elaboration ($r = .66$). The coefficient between motor creativity and fluency in Hoops and Lines indicates a low relationship significant at the .05 level. The highest correlation coefficients in the three movement tasks are between motor creativity and originality ($r = .84$ to $.95$).

Correlation coefficients between Move to Sounds and Hoops and Lines indicate little relationship among the variables. One correlation coefficient between Move to Sounds originality and Hoops and Lines elaboration shows a low relationship ($r = .51$). No other coefficients are significant at the .01 level.

Correlation coefficients between Move to Sounds and See and Move reveal little relationship among the variables. Two coefficients, Move to Sounds elaboration and Move to Sounds motor creativity, indicate low relationships with See and Move elaboration ($r = .52$ to $.58$). No other correlation coefficients between Move to Sounds and See and Move are significant at the .01 level.

Correlation coefficients between See and Move and Hoops and Lines reveal five low relationships among the variables. See and Move flexibility correlates at low levels with Hoops and Lines flexibility ($r = .53$) and Hoops and Lines elaboration ($r = .53$). See and Move elaboration correlates at low levels with Hoops and Lines elaboration ($r = .52$) and Hoops and Lines motor creativity ($r = .51$). See and Move motor creativity has a low correlation with Hoops and Lines motor creativity ($r = .53$).

Relationship Between Sessions II and III Variables

Table 56, page 232, presents the correlation coefficients for all of the motor creativity task variables in Evaluation Sessions II and III. Although correlation coefficients reveal a number of significant relationships between Session II and Session III tasks, high relationships appear in the Move to Sounds and See and Move tasks. Move to Sounds II motor creativity has a high correlation with Move to Sounds III motor creativity ($r = .83$) as does Move to Sounds II originality with Move to Sounds III originality ($r = .87$). See and Move II fluency has a high correlation with See and Move III fluency ($r = .86$) as does See and Move II motor creativity with See and Move III motor creativity ($r = .82$). The correlation coefficient for Hoops and Lines II and III flexibility shows a low relationship ($r = .52$). Other coefficients for the dimensional variables for each task reveal moderate relationships between the two evaluation sessions ($r = .62$ to $.79$).

TABLE 56

INTERCORRELATION COEFFICIENTS FOR SESSIONS II AND III
MOTOR CREATIVITY TASKS VARIABLES (N=25)

SESSION II VARIABLES	SESSION III														
	MOVE TO SOUNDS					SEE AND MOVE					HOOPS AND LINES				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<u>MOVE TO SOUNDS</u>															
1. Fluency	.73**	.23	.11	.39	.45*	.70**	.42*	.39	.72**	.62**	.42*	.34	.29	.35	.49*
2. Originality	.47*	.87**	.47*	.17	.76**	.35	.41*	.26	.36	.45*	.19	.09	-.24	.28	.16
3. Flexibility	.42*	.40*	.67**	.18	.47*	.20	.08	.36	.26	.18	.23	.19	.11	.28	.29
4. Elaboration	.49*	.10	.03	.78**	.48*	.43*	.15	.39	.59**	.36	.13	.18	-.08	.29	.24
5. Motor Creativity	.69**	.70**	.45*	.53**	.83**	.54**	.39	.45*	.63**	.56**	.28	.22	-.12	.40	.33
<u>SEE AND MOVE</u>															
6. Fluency	.67**	.27	.03	.48*	.49*	.86**	.49*	.35	.70**	.68**	.30	.24	.28	.47*	.43*
7. Originality	.24	.50*	.19	-.06	.35	.33	.71**	.31	.20	.59**	.26	.31	.29	.22	.38
8. Flexibility	.50*	.26	.10	.26	.37	.58**	.57**	.62**	.41*	.62**	.37	.40*	.55**	.65**	.65**
9. Elaboration	.46*	.18	.04	.63**	.46*	.61**	.30	.12	.79**	.53**	.30	.09	-.15	.12	.15
10. Motor Creativity	.55**	.47*	.15	.38	.57**	.73**	.74**	.41*	.67**	.82**	.40*	.34	.25	.38	.48*
<u>HOOPS AND LINES</u>															
11. Fluency	.46*	.52**	.40*	.32	.58**	.37	.27	.27	.26	.33	.77**	.04	.25	.44*	.35
12. Originality	.39	.34	.16	.37	.46*	.58**	.49*	.39	.52**	.59**	.23	.72**	.35	.42*	.76**
13. Flexibility	.48*	.25	.16	.44*	.45*	.63**	.47*	.42*	.46*	.57**	.30	.54**	.52**	.52**	.69**
14. Elaboration	.41*	.32	.24	.30	.43*	.48*	.52*	.56**	.39	.56**	.21	.52**	.45*	.78**	.72**
15. Motor Creativity	.48*	.39	.23	.41*	.53**	.62**	.53**	.48*	.51**	.63**	.33	.65**	.45*	.59**	.79**

* $r > .40$ $p < .05^a$ ** $r > .51$ $p < .01^a$ ^aValues From Wallace and Snedecor's Tables (Guilford, 1965, pp. 580-581)

Correlation coefficients among the variables for Move to Sounds II and Hoops and Lines III reveal no relationships significant at the .01 level. Coefficients for Hoops and Lines II fluency and Hoops and Lines II motor creativity show low relationships with Move to Sounds III originality and Move to Sounds III motor creativity ($r = .52$ to $.58$).

Correlation coefficients for fluency, motor creativity and elaboration show moderate to low relationships between the evaluations of See and Move and Move to Sounds during Sessions II and III ($r = .54$ to $.72$).

Correlation coefficients for See and Move II flexibility show moderate relationships with Hoops and Lines III elaboration ($r = .65$) and Hoops and Lines III motor creativity ($r = .65$) and a low relationship with Hoops and Lines III flexibility ($r = .55$). Correlation coefficients for Hoops and Lines II originality, Hoops and Lines II flexibility, Hoops and Lines II elaboration and Hoops and Lines II motor creativity show moderate to low relationships with all five variables in See and Move III ($r = .51$ to $.63$).

Relationships Between Sessions II and IV Variables

Table 57, page 234, presents the correlation coefficients for the motor creativity task variables in Evaluation Sessions II and IV. Two correlation coefficients reveal high relationships in Move to Sounds and See and Move tasks. Move to Sounds II motor creativity has a high correlation with Move to Sounds IV motor creativity ($r = .80$) as does See and Move II fluency with See and

TABLE 57

INTERCORRELATION COEFFICIENTS FOR SESSIONS II AND IV
MOTOR CREATIVITY TASKS VARIABLES (N=25)

SESSION II VARIABLES	SESSION IV VARIABLES														
	MOVE TO SOUNDS					SEE AND MOVE					HOOPS AND LINES				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<u>MOVE TO SOUNDS</u>															
1. Fluency	.60**	.41*	-.01	.42*	.58**	.64**	.55**	.34	.68**	.67**	.44*	.48*	.28	.39	.56**
2. Originality	.39	.69**	.42*	.20	.65**	.30	.22	-.01	.25	.26	.17	.06	-.26	.20	.10
3. Flexibility	.25	.44*	.50*	.15	.44*	.13	.13	.25	.21	.18	.21	.38	.24	.27	.42*
4. Elaboration	.39	.18	-.07	.75**	.54**	.42*	.22	.16	.61**	.41*	.19	.26	.02	.26	.30
5. Motor Creativity	.54**	.65**	.32	.53**	.80**	.48*	.34	.16	.56**	.47*	.29	.29	-.07	.34	.35
<u>SEE AND MOVE</u>															
6. Fluency	.57**	.27	-.17	.49*	.50*	.84**	.63**	.22	.79**	.78**	.33	.38	.28	.47*	.50*
7. Originality	.19	.32	.01	.00	.25	.35	.53**	.24	.22	.45*	.27	.20	.06	.22	.26
8. Flexibility	.46*	.31	-.16	.28	.41*	.60**	.65**	.51**	.57**	.69**	.34	.47*	.49*	.63**	.64**
9. Elaboration	.43*	.20	-.22	.66**	.50*	.58**	.33	-.06	.69**	.51**	.39	.26	-.04	.18	.30
10. Motor Creativity	.49*	.38	-.15	.43*	.54**	.73**	.69**	.24	.68**	.76**	.45*	.39	.15	.40*	.49*
<u>HOOPS AND LINES</u>															
11. Fluency	.49*	.55**	.35	.35	.63**	.37	.22	.24	.18	.26	.72**	.12	.07	.39	.34
12. Originality	.39	.49*	.06	.39	.58**	.58**	.54**	.18	.52**	.59**	.26	.64**	.12	.34	.61**
13. Flexibility	.41*	.34	-.01	.44*	.51**	.65**	.55**	.21	.52**	.61**	.30	.49*	.25	.41*	.55**
14. Elaboration	.39	.43*	.01	.29	.49*	.50*	.56**	.40*	.52**	.60**	.18	.40*	.27	.66**	.56**
15. Motor Creativity	.46*	.51**	.07	.42*	.62**	.63**	.58**	.28	.55**	.64**	.34	.57**	.20	.49*	.63**

* $r > .40$ $p < .05^a$ ** $r > .51$ $p < .01^a$ ^aValues From Wallace and Snedecor's Tables (Guilford, 1965, pp. 580-581)

Move IV fluency ($r = .84$). Correlation coefficients for Move to Sounds II and IV flexibility ($r = .50$) and Hoops and Lines II and IV flexibility ($r = .25$) reveal low and non-significant relationships between the two evaluation sessions. Correlation coefficients for See and Move II and IV originality ($r = .51$) and See and Move II and IV flexibility ($r = .53$) show low relationships between the two evaluation sessions. Other coefficients for the variables in each task indicate moderate relationships between the two evaluation sessions ($r = .60$ to $.76$).

A correlation coefficient for Move to Sounds II fluency indicates a low relationship with Hoops and Lines IV motor creativity ($r = .56$). No other coefficients for Move to Sounds II and Hoops and Lines IV are significant at the .01 level. Coefficients correlating fluency, originality, flexibility and motor creativity in Hoops and Lines II with Move to Sounds IV originality and Move to Sounds IV motor creativity show moderate to low relationships, significant at the .01 level ($r = .62$ to $.51$).

Correlation coefficients for Move to Sounds II fluency, Move to Sounds II elaboration and Move to Sounds II motor creativity show moderate to low relationships with See and Move IV fluency, See and Move IV originality, See and Move IV elaboration and See and Move IV motor creativity ($r = .68$ to $.55$). Correlation coefficients for fluency ($r = .57$), elaboration ($r = .66$) and motor creativity ($r = .54$) reveal moderate to low relationships between See and Move II and Move to Sounds IV.

Correlation coefficients for See and Move II flexibility show moderate relationships with Hoops and Lines IV elaboration ($r = .63$) and Hoops and Lines IV motor creativity ($r = .64$). However, coefficients for originality, flexibility, elaboration and motor creativity in Hoops and Lines II indicate moderate to low relationships with fluency, originality, elaboration and motor creativity in See and Move IV ($r = .65$ to $.51$).

Relationships Between Sessions III
and IV Variables

Table 58, page 237, presents the correlation coefficients for the motor creativity task variables in Evaluation Sessions III and IV. All but one of the correlation coefficients for the variables in the motor creativity tasks indicate high relationships between the two evaluation sessions ($r = .80$ to $.98$). Hoops and Lines III flexibility correlates moderately with Hoops and Lines IV flexibility ($r = .68$). Of the three motor creativity tasks, See and Move has the most coefficients above $r = .90$ and the most coefficients (nine) indicating high relationships between the two evaluation sessions.

Correlation coefficients for Move to Sounds III fluency show low relationships with Hoops and Lines IV fluency ($r = .52$), Hoops and Lines IV elaboration ($r = .51$) and Hoops and Lines IV motor creativity ($r = .54$). Hoops and Lines III elaboration has a low correlation with Move to Sounds IV originality ($r = .54$). No other correlation coefficients between the two evaluation sessions of Hoops and Lines and Move to Sounds are significant at the .01 level.

TABLE 58

INTERCORRELATION COEFFICIENTS FOR SESSIONS III AND IV
MOTOR CREATIVITY TASKS VARIABLES (N=25)

SESSION III VARIABLES	SESSION IV VARIABLES														
	MOVE TO SOUNDS					SEE AND MOVE					HOOPS AND LINES				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<u>MOVE TO SOUNDS</u>															
1. Fluency	.84**	.55**	.16	.50*	.75**	.58**	.52**	.29	.60**	.61**	.52**	.38	.17	.51**	.54**
2. Originality	.47*	.80**	.52**	.14	.71**	.35	.34	.24	.26	.35	.27	.08	-.12	.38	.20
3. Flexibility	.07	.49*	.83**	.09	.42*	.18	.07	.36	.15	.14	.27	.27	.23	.43*	.39
4. Elaboration	.35	.09	.02	.96**	.57**	.36	.07	-.03	.59**	.29	.48*	.36	-.04	.16	.38
5. Motor Creativity	.60**	.69**	.45*	.59**	.86**	.49*	.34	.22	.53**	.46*	.49*	.29	-.05	.43*	.41*
<u>SEE AND MOVE</u>															
6. Fluency	.46*	-.36	-.03	.36	.48*	.98**	.75**	.32	.79**	.88**	.28	.41*	.27	.45*	.50*
7. Originality	.51**	.45*	-.07	.11	.44*	.71**	.89**	.42*	.51**	.82**	.22	.27	.08	.33	.34
8. Flexibility	.33	.50*	.39	.06	.44*	.46*	.51**	.82**	.34	.53**	.23	.35	.43*	.58**	.52**
9. Elaboration	.48*	.41*	-.06	.60**	.63**	.71**	.56**	.21	.92**	.75**	.33	.34	-.07	.38	.40*
10. Motor Creativity	.57**	.51**	-.04	.31	.58**	.86**	.90**	.44*	.75**	.93**	.30	.36	.10	.44*	.45*
<u>HOOPS AND LINES</u>															
11. Fluency	.42*	.29	.32	.31	.43*	.27	.20	.42*	.20	.25	.95**	.24	.22	.37	.48*
12. Originality	.18	.32	.09	.15	.32	.37	.50*	.30	.33	.47*	.13	.89**	.31	.26	.75**
13. Flexibility	.16	.15	-.06	-.15	.05	.38	.60**	.56**	.17	.49*	.18	.33	.68**	.36	.45*
14. Elaboration	.48*	.54**	.25	.08	.50*	.53**	.53**	.58**	.52**	.59**	.17	.26	.39	.92**	.54**
15. Motor Creativity	.40*	.49*	.20	.17	.48*	.55**	.66**	.56**	.47*	.65**	.35	.83**	.48*	.61**	.88**

* $r > .40$ $p < .05^a$ ** $r > .51$ $p < .01^a$ ^aValues From Wallace and Snedecor's Tables (Guilford, 1965, pp. 580-581)

Correlation coefficients for Move to Sounds III fluency, Move to Sounds III elaboration and Move to Sounds III motor creativity show moderate to low relationships with See and Move IV fluency, See and Move IV originality, See and Move IV elaboration and See and Move IV motor creativity ($r = .61$ to $.52$). Correlation coefficients for See and Move III originality, See and Move III elaboration and See and Move III motor creativity show moderate to low relationships with Move to Sounds IV fluency, Move to Sounds IV originality, Move to Sounds IV elaboration and Move to Sounds IV motor creativity ($r = .63$ to $.51$).

Correlation coefficients for See and Move III flexibility show low relationships with Hoops and Lines IV elaboration ($r = .58$) and Hoops and Lines IV motor creativity ($r = .52$). These relationships are similar to those between See and Move II and Hoops and Lines III and between See and Move II and Hoops and Lines IV (see Table 56, page 232, and Table 57, page 234). Correlation coefficients for Hoops and Lines III flexibility, Hoops and Lines III elaboration and Hoops and Lines III motor creativity show moderate to low relationships with the five variables in See and Move IV ($r = .66$ to $.52$).

Summary and Discussion

Move to Sounds correlation coefficients for the motor creativity variables show high to moderate relationships with the other dimensional variables in all evaluation sessions ($r = .84$ to $.61$). With the exception of Evaluation Session IV, these

relationships appear to be very stable. In Session IV, a low coefficient for flexibility indicates a low and non-significant relationship with motor creativity ($r = .35$). The means and standard deviations for flexibility in Sessions III and IV (see Table 54, page 227, and Table 55, page 229) show very little change above the flexibility means and standard deviations in Session II (Table 53, page 225). The means and standard deviations for other variables appear to double in Sessions III and IV (see Table 54, page 227, and Table 55, page 229). Since the scoring system does not enable the flexibility scores to double, the relationships between flexibility and the other variables decline in Sessions III and IV.

See and Move correlation coefficients between motor creativity and the other dimensional variables reveal different ranges of relationships within the evaluation sessions. Session II coefficients indicate moderate relationships ($r = .69$ to $.74$); Session III coefficients, high to low relationships ($r = .94$ to $.58$); and Session IV coefficients, high to low relationships ($r = .95$ to $.48$). The low coefficients in Evaluation Sessions III and IV reveal low relationships between flexibility and motor creativity. As stated above, the scoring system prevents the flexibility variable from increasing as much as the other motor creativity variables. The means and standard deviations for fluency, originality, elaboration and motor creativity double for each session while the means and standard deviations for flexibility remain approximately at the same level. The

correlation coefficients for See and Move indicate that an increase in the number of testing sessions for the movement performances positively affects the motor creativity variables (except flexibility) in the See and Move task. A definite difference is observed among the motor creativity variables of See and Move within Evaluation Session IV, which includes the combined movement performances of the second, third and fourth testing sessions.

Hoops and Lines correlation coefficients for motor creativity show high to low relationships with the variables within all evaluation sessions. These relationships do not appear to be as stable as the correlation coefficients of the variables in Move to Sounds. Session II coefficients range from $r = .55$ to $.95$; Session III coefficients, $r = .39$ to $.88$; and Session IV coefficients, $r = .50$ to $.91$. Low coefficients for variables in Hoops and Lines indicate low relationships between motor creativity and fluency within all three evaluation sessions. In comparison with the means and standard deviations of the other Hoops and Lines variables (Table 53, page 225; Table 54, page 227, and Table 55, page 229), the fluency score is very low and appears to have very little relationship to the motor creativity score. The unique actions and different combinations of actions (originality) which a subject performs in the Hoops and Lines task is, perhaps, more indicative of her motor creativity score than the number of different responses she performs.

In all three evaluation sessions, originality and elaboration have the highest relationships with motor creativity

for all tasks. Correlation coefficients between motor creativity and originality show eight high relationships ($r = .82$ to $.95$) and one moderate relationship ($r = .74$). Correlation coefficients between motor creativity and elaboration reveal two high relationships ($r = .85$) and seven moderate relationships ($r = .61$ to $.74$). Coefficients correlating motor creativity with fluency reveal two high relationships ($r = .85$ and $.89$); four moderate relationships ($r = .61$ to $.78$); and three low relationships ($r = .39$ to $.55$). Coefficient correlating motor creativity with flexibility show one high relationship ($r = .93$); four moderate relationships ($r = .61$ to $.72$), and four low relationships ($r = .35$ to $.58$). Two fluency coefficients and two flexibility coefficients are not significant at the $.01$ level. Apparently, an increase in the number of testing sessions lowers the relationship between flexibility and motor creativity. Although the motor creativity score increases, the flexibility score remains approximately the same for all three evaluation sessions.

By examining the relationships among the motor creativity task variables in the three evaluation sessions, the best session for each task can be selected. The variables for Move to Sounds have the highest relationships ($r = .86$ to $.61$) with motor creativity in Evaluation Session III, which includes the combined movement performances of two testing sessions (six minutes). The variables for See and Move have the highest relationships with motor creativity in Evaluation Session IV, which includes the combined movement performances of three testing sessions (six

minutes). With the exception of flexibility all variables in See and Move IV have high relationships with motor creativity ($r = .85$ to $.95$). Although flexibility correlates at a low level with motor creativity in See and Move IV, the coefficient is significant at the $.05$ level. As previously stated, the scoring system prevents the flexibility variable from increasing as much as the other variables. The variables in Hoops and Lines have the highest relationship with motor creativity in Evaluation Session II, which includes the movement performances of one testing session (one minute). With the exception of fluency, the variables for Hoops and Lines have high relationships with motor creativity ($r = .85$ to $.95$). Although fluency correlates at a low level with motor creativity ($r = .55$), the coefficient is significant at the $.01$ level.

Correlation coefficients between Evaluation Session II and III reveal four high relationships, ten moderate relationships and one low relationship for the five variables in the three motor creativity tasks. Correlation coefficients between Evaluation Sessions II and IV reveal two high relationships, nine moderate relationships and four low relationships for the five variables in the three motor creativity tasks. Correlation coefficients between Evaluation Sessions III and IV reveal fourteen high relationships and one moderate relationship for the five variables in the three motor creativity tasks. Apparently, the relationships between the five variables in each session increase as the number of testing sessions in the evaluation session

increases. The large number of moderate and low correlation coefficients for the task variables reveal differences between Evaluation Sessions II and IV, whereas the large number of high correlation coefficients for the task variables reveal high similarities between Evaluation Sessions III and IV.

Correlation coefficients among the motor creativity task variables in the three evaluation sessions reveal the relationships among the tasks in each session. The motor creativity tasks which show the least number of significant relationships with other tasks are Move to Sounds II (three minutes), See and Move II (two minutes) and Hoops and Lines IV (three minutes). The motor creativity tasks which show the highest number of significant relationships with other tasks are See and Move III (four minutes), See and Move IV (six minutes) and Hoops and Lines II (one minute). The variables in Hoops and Lines II have low to moderate relationships with the variables in Move to Sounds III and IV and See and Move III and IV. Apparently, an increase in the number of testing sessions for Hoops and Lines lowers the number of significant relationships between Hoops and Lines III and IV and Move to Sounds II, III and IV and between Hoops and Lines III and IV and See and Move II and III. Correlation coefficients for See and Move II have moderate to low relationships with Move to Sounds II, III and IV. An increase in the number of testing sessions for See and Move raises the number of significant relationships between variables of See and Move III and IV and Move to Sounds II, III and IV.

These correlations suggest several possibilities in task administrative combinations. The correlation coefficients in Evaluation Session II indicate that one testing session may be very appropriate for the Hoops and Lines task. The correlation coefficients for Sessions III and IV indicate the highest relationships among the motor creativity variables for both Move to Sounds and See and Move, but the correlation coefficients among all motor creativity task variables reveal a high number of significant relationships between Hoops and Lines II and Move to Sounds III and IV and between Hoops and Lines II and See and Move III and IV. In order to maintain the need for each movement task in the motor creativity test, the number of significant relationships between the variables of the tasks need to be low. Although the correlation coefficients among the motor creativity variables for Move to Sounds II (three minutes) and See and Move II (two minutes) are not as high as the correlation coefficients in Evaluation Sessions III and IV, the Evaluation Session II coefficients do indicate high and moderate relationships among the Move to Sounds and See and Move variables. Consequently, if three movement tasks are used in the motor creativity test, one testing session for each movement task may be adequate in the administration of the test.

An alternate way of administering the motor creativity test may be to present only two tasks: Move to Sounds III (two testing sessions) and Hoops and Lines II (one testing session). The correlation coefficients between these tasks indicate low relationships for fluency, originality and motor creativity ($r = .52$ to $.58$).

In addition, correlation coefficients among the motor creativity variables for each task reveal that these sessions of Move to Sounds and Hoops and Lines are the best sessions.

A third way of administering the motor creativity test may be to present one task: See and Move IV (three testing sessions). Correlation coefficients among the motor creativity variables indicate that Evaluation Session IV of See and Move is the best session. Furthermore, a number of significant relationships appear between See and Move IV and Move to Sounds III ($r = .52$ to $.61$) and between See and Move IV and Hoops and Lines II ($r = .52$ to $.65$).

SUMMARY

Correlation coefficients for the Training Session data reveal the reliability and objectivity of the three judges in evaluating the five motor creativity variables for the three movement tasks. Reliability correlation coefficients between the first and second evaluations of the fifteen movement performances indicate seven high relationships, seven moderate relationships and one low relationship. Objectivity correlation coefficients among the judges reveal seventeen high relationships, seven moderate relationships and six low relationships for both evaluation sessions. Intrajudge and interjudge percentage agreements show that the judges were consistent in evaluating all dimensions except originality and flexibility and all categories except manipulative movements, level changes and tempo changes. The percentage agreements with respect to these dimensions and categories are high enough to indicate the

potential for improvement, given additional training and instruction in the use of the scoring system.

Reliability correlation coefficients for the Motor Creativity Test data indicate that Move to Sounds is a difficult task to evaluate and See and Move and Hoops and Lines are relatively easy tasks to evaluate. Based upon the number of acceptable reliability correlation coefficients, a greater percentage of high and moderate coefficients are found in See and Move ($r = .97$ to $.69$) and Hoops and Lines ($r = .90$ to $.61$) than in Move to Sounds ($r = .98$ to $.63$). Apparently, the time span of the Move to Sounds task (three minutes) interfered with the judges' abilities to be consistent in their evaluations of the movement performances. Low reliability correlation coefficients ($r = .59$ to $.00$) show that the judges were inconsistent in evaluating three Move to Sounds variables, three See and Move variables and one Hoops and Lines variable.

Objectivity correlation coefficients for the Motor Creativity Test data show that the judges were slightly more consistent in evaluating the movement performances of See and Move than they were in evaluating the other tasks. Low objectivity correlation coefficients ($r = .59$ to $.00$) reveal that the judges were inconsistent in evaluating originality, non-locomotor movements, body parts and tempo changes in all three movement tasks, fluency, flexibility and locomotor movements in Move to Sounds and fluency in Hoops and Lines. With the exception of originality, the means and standard deviations of these variables indicate narrow score ranges. In this scoring system, originality is a very open-ended variable and a high degree of subjective judgment in the evaluation of the variable may account for the low objectivity correlation coefficients.

Correlation coefficients among the variables in the three movement tasks indicate that originality, flexibility and elaboration have the highest relationships with the motor creativity variable. Flexibility relates at a higher level with motor creativity in See and Move and Hoops and Lines than in Move to Sounds. Elaboration has moderate to low relationships with originality and flexibility. Fluency has high to low relationships with motor creativity and moderate to low relationships with originality, flexibility and elaboration. Of the flexibility categories, non-locomotor movements have the highest relationships with motor creativity in Move to Sounds and locomotor movements have the highest relationships with flexibility in See and Move. Manipulative movements have low relationships with motor creativity in Hoops and Lines. Of the four elaboration categories, level changes have the highest relationship with motor creativity in all three movement tasks. Body parts, floor spaces and tempo changes have low relationships with motor creativity and elaboration in Hoops and Lines.

Intrajudge and interjudge percentage agreements indicate that the judges were consistent in evaluating all dimensions except originality and all categories except tempo changes, level changes, locomotor movements, non-locomotor movements and manipulative movements. Percentage agreements also indicate inconsistencies among the judges in evaluating many flexibility subcategories. These low percentage agreements show possibilities of improvement with refinement of the scoring system.

Correlation coefficients for the motor creativity task variables in the three testing-evaluation sessions reveal the relationships among the motor creativity task variables in the three evaluation sessions and suggest the best task combinations for the motor creativity test. In all three evaluation sessions, originality and elaboration emerge as the acceptable motor creativity variables for all tasks. The scoring system prevents flexibility from increasing as much as the other variables. Fluency has a low relationship with motor creativity in the Hoops and Lines task.

Correlation coefficients for the motor creativity task variables indicate that Move to Sounds III (six minutes), See and Move IV (six minutes) and Hoops and Lines II (one minute) are the best tasks. However, correlation coefficients between these task variables show more significant relationships than the coefficients between the variables for Move to Sounds II (three minutes), See and Move II (two minutes) and Hoops and Lines II (one minute). Three different motor creativity test combinations emerge from this examination. The first combination is to administer Move to Sounds II, See and Move II and Hoops and Lines II, which include one testing session for each task. Another test combination is to administer two tasks: Move to Sounds III (six minutes), which includes two testing sessions, and Hoops and Lines II (one minute), which includes one testing session. A third alternative is to administer one task: See and Move IV (six minutes), which includes three testing sessions.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

Nurturing the creative potential within a person should enable him or her to cope with the changing social conditions. Unfortunately, in the past many institutions have stifled rather than nurtured the individual's creative potential. Recent research on creativity has examined the psychological theories which explain the phenomenon of creativity. Some of these theories formulate methodological approaches which include instruments for assessing aspects of creativity. An examination of these assessment tools reveals innumerable differences in assessment procedures and theoretical designs. In comparative studies which have analyzed various aspects of creativity, researchers have stressed the need to utilize assessment tools which have consistent theoretical designs.

The movement experiences in physical education have been recognized as being capable of nurturing creativity within a person. Physical education researchers have examined a phenomenon designated as motor creativity. Some studies have utilized numerous assessment tools for comparing motor creativity with many other kinds of variables. The Wyrick Motor Creativity Test has been widely used in these studies, which have also used the

Torrance Tests of Creative Thinking, Figural and Verbal Forms, to compare motor creativity with verbal creativity and figural creativity. The Wyrick test, which is based upon Guilford's factor-analytic tests of creativity, consists of discrete test items assessing two divergent-production factors: originality and fluency. The Torrance Tests of Creative Thinking consist of complex tasks assessing four divergent-production factors: fluency, originality, flexibility and elaboration. Since these tests appear to have different theoretical designs, the data acquired with these tools may be incomparable.

The purpose of this study was to develop a tool for measuring the motor creativity of college women. The theoretical construct of the Torrance Tests of Creative Thinking, Figural Form, was used to develop twelve movement tasks for exploratory purposes. The tasks consisted of three types of activities: a warm-up activity with one stimulator, an activity with several stimulators, and an activity with one repeated, traditional stimulator. To determine the construct validity of the motor creativity test, the researcher examined the movement performances which subjects performed in the twelve movement tasks of the exploratory and pilot studies and rated each task on a scale of seven criteria. On the basis of these ratings three tasks were selected for the motor creativity test.

A scoring system was devised to enable judges to describe, analyze and evaluate the movement performances of subjects on five

variables - fluency, originality, flexibility, elaboration and motor creativity, which is a summation of the four other variables.

The motor creativity test, which includes three tasks (Move to Sounds, See and Move and Hoops and Lines), was administered four times to twenty-five college women who were enrolled in the physical education service course program at the University of Oregon. The first administration was used to acquaint the subjects with the tasks, equipment and test administrators. The movement performances from the second, third and fourth testing sessions were recorded on videotapes.

Three judges were trained to describe, analyze and evaluate the movement performances of the subjects who performed in the pilot study. These data were treated statistically to determine the reliability and objectivity coefficients of the judges for the five variables. Also intrajudge and interjudge percentage agreements were determined for the five variables, three flexibility categories and four elaboration categories.

The judges twice evaluated the movement performances of twenty-five subjects in the second testing session of Move to Sounds, See and Move and Hoops and Lines. These two evaluations provided data for determining the reliability and objectivity of the judges in using the scoring system. The objectivity correlation coefficients for both evaluation sessions provided statistical information relating to the level of improvement of the judges' evaluations. Other statistical information resulting

from the treatment of these data included means, standard deviations, intercorrelation coefficients among the variables for each task and intrajudge and interjudge percentage agreements.

One judge, the researcher, also evaluated the movement performances from the third and fourth testing sessions in order to study the effect of increasing the time length for evaluating the movement performances on the task. These evaluations were combined with those of the second testing session to provide scores for each subject on each task in one testing session, two testing sessions and all three testing sessions. The data from these evaluation sessions were treated statistically to determine means, standard deviations and intercorrelation coefficients among the task variables and the evaluation sessions.

Reliability correlation coefficients for the Motor Creativity Test data indicate that Move to Sounds is a difficult task to evaluate and See and Move and Hoops and Lines are easy tasks to evaluate. Based upon the number of acceptable reliability correlation coefficients, a greater percentage of high and moderate coefficients are found in See and Move ($r = .97$ to $.69$) and Hoops and Lines ($r = .90$ to $.61$) than in Move to Sounds ($r = .98$ to $.63$). Apparently, the time span of the Move to Sounds task (three minutes) interfered with the judges' abilities to evaluate consistently the movement performances. Low reliability correlation coefficients ($r = .59$ to $.00$) show that the judges were inconsistent in evaluating three Move to Sounds variables,

Objectivity correlation coefficients for the Motor

Creativity Test data show that the judges were slightly more consistent in evaluating the movement performances of See and Move than they were in evaluating the other tasks. Low objectivity correlation coefficients reveal that the judges were inconsistent in evaluating originality, non-locomotor movements, body parts and tempo changes in all three movement tasks, fluency, flexibility and locomotor movements in Move to Sounds and fluency in Hoops and Lines. With the exception of originality, the means and standard deviations of these variables indicate narrow score ranges. In this scoring system originality is a very open-ended variable and a high degree of subjective judgment in the evaluation of the variable may account for the low objectivity correlation coefficients.

Correlation coefficients among the variables in the three movement tasks indicate that originality, flexibility and elaboration have the highest relationships with the motor creativity variable. Flexibility relates at a higher level with motor creativity in See and Move and Hoops and Lines than in Move to Sounds. Elaboration has moderate to low relationships with originality and flexibility. Fluency has high to low relationships with motor creativity and moderate to low relationships with originality, flexibility and elaboration. Of the flexibility categories, non-locomotor movements have the highest relationships with motor creativity in Move to Sounds and locomotor

movements have the highest relationships with flexibility in See and Move. Manipulative movements have low relationships with motor creativity in Hoops and Lines. Of the four elaboration categories, level changes have the highest relationships with motor creativity in all three movement tasks. Body parts, floor spaces and tempo changes have low relationships with motor creativity and elaboration in Hoops and Lines.

Intrajudge and interjudge percentage agreements indicate that the judges were consistent in evaluating all dimensions except originality and all categories except tempo changes, level changes, locomotor movements, non-locomotor movements and manipulative movements. Low percentage agreements show that the judges were inconsistent in evaluating thirty of the fifty-one flexibility sub-categories (59 percent).

Correlation coefficients for the motor creativity tasks in the three testing-evaluation sessions reveal that elaboration and originality have the highest relationships with motor creativity in all tasks. Flexibility fails to correlate moderately with motor creativity in the third and fourth evaluation sessions of the three tasks. Apparently, the scoring system prevents the flexibility score from increasing as much as the other variables. For all three evaluation sessions of the Hoops and Lines task, fluency correlates low with motor creativity.

Correlation coefficients for the motor creativity task variables in the three testing-evaluation sessions identify Move

to Sounds III (six minutes), See and Move IV (six minutes) and Hoops and Lines II (one minute) as the best tasks in all three sessions. However, Move to Sounds II (three minutes), See and Move II (two minutes) and Hoops and Lines II (one minute) appear to be the best task combinations in the motor creativity test, since the correlation coefficients among the tasks variables show a low number of significant relationships. Another task combination for the motor creativity test is identified as Move to Sounds III (six minutes) and Hoops and Lines II (one minute). A third alternative for the motor creativity test is to administer one task: See and Move IV (six minutes).

CONCLUSIONS

Within the limitations of this study, the following conclusions can be drawn:

1. Based upon the theoretical construct of the Torrance Tests of Creative Thinking, Figural Form, the motor creativity test, composed of three tasks (Move to Sounds, See and Move and Hoops and Lines), is a valid tool for measuring the motor creativity of college women.
2. Although the motor creativity test is a valid tool, the scoring system, which enables judges to describe, analyze and evaluate the movement performances of subjects, needs further refinement

in order to be an objective and reliable system for evaluating motor creativity.

3. The motor creativity test should be used with caution as a tool for measuring motor creativity until the scoring system is revised and proven to be a reliable and objective system for evaluating motor creativity.

RECOMMENDATIONS FOR FURTHER STUDY

The researcher hopes that this study will encourage additional research relating to motor as well as other kinds of creativity. Some suggestions which might improve the reliability and objectivity of the scoring system are as follows:

1. Similar flexibility sub-categories might be grouped into one category rather than duplicated in the three flexibility categories of locomotor movements, non-locomotor movements and manipulative movements.
2. The procedures for evaluating the elaboration category might be changed so that tempo changes and level changes can be observed and evaluated separately.
3. The procedures for determining the originality score might be simplified by identifying the flexibility sub-categories of unique actions and

attaching the value points for the unique action to the flexibility sub-category. This procedure might enable a judge to evaluate originality without describing each movement response.

4. The procedures for evaluating the Move to Sounds task might be simplified by developing a check list which a judge can use to evaluate originality, flexibility and elaboration without describing every movement response the subject performs.

The present motor creativity test also offers a number of other opportunities for research. Some suggestions are as follows:

1. The motor creativity test might be administered to a large sample of subjects in order to develop percentile scores for the test.
2. A study might investigate the possibilities of administering the motor creativity test to students of all age groups, particularly those in kindergarten through twelfth grade.
3. Several studies might provide information pertaining to the validity of the motor creativity test.
 - a. Comparing motor creativity as measured by this test with verbal creativity and figural creativity as measured by the Torrance Tests of Creative Thinking.

participating in physical education activities such as movement education experiences, dance, synchronized swimming. The results of these evaluations might be compared with the results of the motor creativity test which has been administered to the same group of subjects.

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APPENDIXES

APPENDIX A**Information Sheets and Consent Forms
for Subjects in the Studies**

INFORMATION SHEET FOR THE STUDY
ON THE MOVEMENT TASKS

The purpose of this study is to acquire movement performance data on twelve movement tasks and to acquire a videotape recording for training judges to evaluate movement responses.

The subjects will be fifteen women in the undergraduate professional physical education program at the University of Oregon. Each movement task will be presented to five subjects. A movement task is an environmental setting containing stimuli to generate movement responses (i. e., obstacle course; moving a ball in the room, moving different ways on, under, and over beams, and so forth). The subject will be encouraged to move in different ways; to use as many different body parts as possible in the movement; to use different kinds of actions in the movement; and to think of ways of moving that no one else will think of. The anonymity of all subjects will be preserved by referring to the various performances as "Movement Responses of Subject 1," "Movement Responses of Subject 2," "Movement Responses of Subject 3," and so forth. Each subject will respond to the task alone and in the presence of two videotape operators and the director of the study. The subject will wear a leotard, tights, and no shoes. She will be given a two- to fifteen-minute rest period between each movement task. At the completion of the testing session, the subject may view her performance on the videotape.

The subject's movement performances which are recorded on videotape will be described in a written form for analysis and evaluation. The data for each task will enable the director of the study to select three movement tasks for the final study and to use the videotape recording to train judges in subsequent studies pertaining to movement response analysis. Upon request, each subject may acquire the results of the study.

CONSENT FORM FOR THE PILOT STUDY
ON THE MOVEMENT TASKS

I have received a full and satisfactory explanation of the study pertaining to the pilot study on movement task performances. On the basis of this information I am aware of the following procedures in the study:

1. I will be exposed to various movement tasks and encouraged to respond to the tasks with new and different movements.
2. My movement performances will be recorded on videotape; described on audiotape; and transcribed to a written form for analyzation and evaluation.
3. The videotapes of the movement performances will be used to train judges to evaluate movement performances in subsequent studies.
4. My anonymity will be preserved by referring to my performance as "Movement Responses of Subject (number)."
5. I will be able to view my performance at the end of the testing session; and upon request, I may acquire the results of the total study.

I will agree to follow the described procedures with the right of censorship over my contribution and withdrawal from the study at any time.

NAME OF PARTICIPANT

DATE

INFORMATION SHEET FOR THE STUDY OF MOVEMENT
PERFORMANCES ON THREE MOVEMENT TASKS

The purpose of this study is to acquire data on the ways in which people move to three movement tasks. Subproblems are to analyze the theoretical construction of the tasks; to construct a scoring system for analyzing and evaluating the movement performances; to establish the reliability of the scoring system in analyzing and evaluating the movement performances; and to compare the movement performance data with the results of three written tests. A movement task is an environmental setting containing stimuli to generate movement responses (i. e., obstacle course; moving a ball in a room; moving different ways on, under, and over beams, and so forth).

The subjects will be twenty-five women in the service course program in the Department of Physical Education at the University of Oregon. Each subject will be exposed to each of the three tasks at four different testing sessions. Two testing sessions will occur the first week and two in the second week.

At each testing session the subject will be encouraged to move in different ways; to use as many different body parts as possible in the movement; to use different kinds of actions in the movement; and to think of ways of moving that no one else will think of. The anonymity of all subjects will be preserved by referring to the various performances as "Movement Responses of Subject 1," "Movement Responses of Subject 2," "Movement Responses of Subject 3," and so forth. Each subject will respond to the task alone and in the presence of two videotape operators and the director of the study. The subject will wear a leotard, tights, and no shoes. She will be given a two-minute rest period between each movement task. At the completion of the first testing session the subject may view her performance on the videotape. The performances on the second, third, and fourth testing sessions may be observed at the completion of the study.

A fifth testing session will be held for approximately one hour and at this time all subjects will take three paper and pencil tests. These tests, which are relatively easy, purport to identify various personality characteristics. The results of these tests will be compared with the movement performance data.

The subjects' movement performances which are recorded on the videotapes will be described in a written form for analyzation and evaluation. The data from the three written tests will be compared with the movement performance data. All of the data of this study will be stored for comparative purposes with subsequent studies and for training judges to analyze and evaluate movement performances.

CONSENT FORM FOR THE STUDY OF MOVEMENT
PERFORMANCES ON THREE MOVEMENT TASKS

I have received a full and satisfactory explanation of the study pertaining to movement performances of three movement tasks. On the basis of this information I am aware of the following procedures in the study:

1. I will be exposed to three movement tasks at four different testing sessions; and at each session I will be encouraged to respond to the tasks with new and different movements.
2. My movement performances will be recorded on videotape and described in a written form for analyzation and evaluation.
3. I will be given three written tests which purport to identify various personality characteristics. This data may be used for comparative purposes with the movement performance data.
4. My anonymity will be preserved by referring to my performance on the movement tasks as "Movement Responses of Subject (number)" and my responses on the written tests as "Written Responses of Subject (number)."
5. I will be able to view my performance at the end of the first testing session; and upon request, I may view the second, third, and fourth testing sessions at the completion of the study.
6. All data in this study will be stored for comparative purposes with subsequent studies and for training judges to analyze and evaluate movement performances.
7. Upon request, I may receive a copy of the results of the study.

I agree to follow the described procedures with the right of censorship over my contribution and withdrawal from the study at any time.

NAME OF PARTICIPANT

DATE

APPENDIX B

**Descriptions and Instructions of
the Twelve Movement Tasks**

DESCRIPTIONS AND INSTRUCTIONS OF
THE TWELVE MOVEMENT TASKS

GROUP I TASKS

Move to Sounds

Task Description. The subject listens to a recording of sounds and imagines ways of moving to the various sounds. The sounds consisting of excerpts from "Evolutions - Ballet Suite" (Badings and Raaijmakers, 1961) are recorded on an audiotape. The subject is encouraged to move in as many different ways as possible; to move in ways which no one else will think of; and to use as many different body parts and kinds of actions as possible in the movement. The time limit for this task is three minutes.

Instructions. "As you listen to this recording of sounds, imagine how you can move to the various sounds. How many different ways can you move to these sounds? Try to use as many different body parts and different kinds of actions as you can in your movements. Can you perform movements which no one else will think of?" (The recording is played for three minutes or until the subject insists that she has completed the activity.)

Move with Ball

Task Description. The subject is given a ten-inch playground ball and encouraged to move the ball in the room in as many different ways as possible; to use as many different body parts and kinds of actions as possible in moving the ball; and to move the ball in ways which no one else will think of. The subject is given three minutes to complete the task.

Instructions. "How many different ways can you move this ball? Can you think of ways of moving the ball which no one else will think of? See how many different body parts and different kinds of actions you can use in manipulating the ball anywhere in this room."

Move with Hoop

Task Description. The subject is given a hula-hoop and encouraged to move the hoop in the room in as many different ways as possible; to use as many different body parts and kinds of actions as possible while moving with the hoop; and to think of ways of moving the hoop which no one else will think of. The subject has three minutes to perform the task.

Instructions. "How many different ways can you move this hula-hoop in this room? See how many different body parts and different kinds of actions you can use to move the hoop; and try to think of ways of moving the hoop which no one else will think of."

Move with Rope

Task Description. The subject is given a jump rope and encouraged to move the rope in the room in as many different ways as possible; to use as many different body parts and kinds of actions as possible in moving with the rope; and to think of ways of moving with the rope which no one else will think of. The time limit for this task is three minutes.

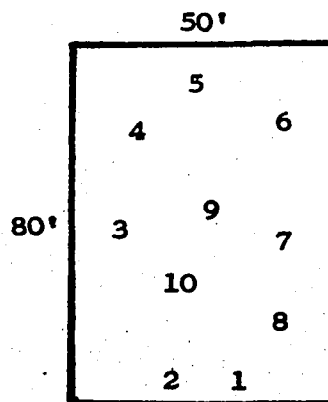
Instructions. "How many different ways can you move with this rope in this room? Try to think of ways of moving the rope which no one else will think of; and see how many different body parts and different kinds of actions you can use in the movements."

GROUP II TASKS

Obstacle Course

Task Description. This task consists of ten stations, each station having a stimulator. The stations may be arranged in any order in the room but the order is consistent for each testing session. Station stimulators may be changed in order to adjust to the situation's available facilities.

<u>Station</u>	<u>Stimulator</u>
1	Step Ladder
2	Horizontal Ladder
3	Diagonal Rope Attached to Beam and Horse
4	Chair
5	Horizontal Bar
6	Four Hula-Hoops
7	Climbing Rings
8	Swedish Box
9	Big Rubber Tube
10	Six Indian Clubs



The subject selects a station to begin the task. She is encouraged to move in as many different ways as possible at each station; to think of ways of moving at the station which no one

else will think of; and to use as many different body parts and different kinds of actions as she can at each station. The stations do not have to be selected in numerical order. The time limit for this task is three minutes.

Instructions. "Ten different stations are set up in this room. (Point out the stations to the subject.) How many different ways can you move from station to station using the different objects at each station? See if you can think of ways of moving your body and the object which no one else will think of. Try to use as many different body parts and different kinds of actions as you can while moving."

See and Move (Objects)

Task Description. Six sequences of moving objects are on a film. These movement sequences are designed so that the movement of the object is incomplete. The subject views each movement sequence. After a movement sequence, the subject is encouraged to think of ways of moving in relation to the moving object. The subject tries to think of as many ways as possible to complete the movement; to think of ways of moving which no one else will think of and to use different body parts and different kinds of actions in the movement. The time limit for this task is twenty seconds for each movement sequence.

Instructions. "Observe how the various objects move in each of these film sequences. How can you move in relation to the object's movement? How many different actions and body parts can you use in your movements? Try to think of ways of moving with the object which no one else will think of."

See and Move (Subjects)

Task Description. Six sequences of people performing various movements are on film. These movement sequences are designed so that the movement in each sequence is incomplete. The subject views each movement sequence. After a movement sequence, the subject is encouraged to think of ways in which the person in the film completes the movement sequence. The subject tries to think of as many different ways as possible to complete the movement; to think of ways which no one else will think of and to use different body parts and different kinds of actions in the movement.

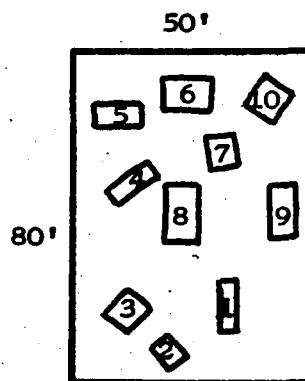
Instructions. "Look at the movements which the person is doing on this film. Can you show me how the movement is completed? How many different actions and body parts can you

use in your movements? Try to think of ways of completing the movement which no one else will think of."

Boxes

Task Description. Ten boxes of equipment are placed about the room. The subject selects a box at which to begin the task. At each box she finds new ways of using the equipment in the box, including the box, if she so desires. The subject is encouraged to use as many different body parts and different kinds of actions as possible. She should think of uses for the equipment which no one else will think of.

<u>Box</u>	<u>Equipment</u>
1	Wands
2	Football
3	Beanbags
4	Ropes
5	Scarfs
6	Table Tennis Ball and Paddle
7	Deck Tennis Ring
8	Hockey Stick and Fluff Ball
9	Playground Ball and Ball Sack
10	Paddle Ball Racket and Playground Ball



Instructions. "Ten boxes of equipment are set up in this room. As you move from box to box try to think of new ways of using the equipment in the boxes. Try to think of ways of using the equipment which no one else will think of. Try to move from box to box in ways which no one else will move. Use different body parts and different kinds of actions with your movements and with your use of the equipment."

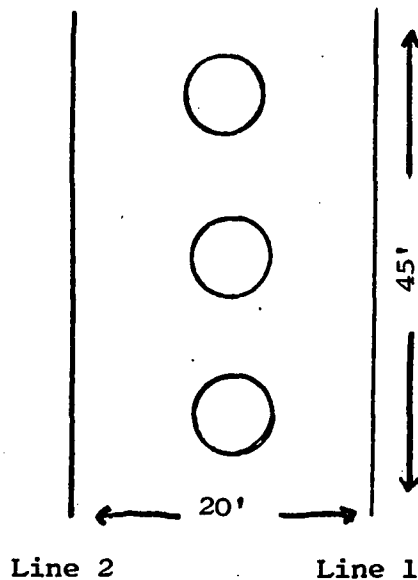
GROUP III TASKS

Hoops and Lines

Task Description. Two parallel lines twenty feet apart, each line forty-five feet long, are set up in the room. Three hoops are placed between the lines and ten feet apart. The subject is encouraged to move from Line 1 to Line 2 in as many

different ways as possible so that she goes either in or through one or more of the hoops. She tries to think of ways of moving into or through the hoops which no one else will think of. Also she tries to use as many different body parts and different kinds of actions as she can in moving from line to line. The time limit for this task is one minute.

Instructions. "How many different ways can you move from Line 1 to Line 2 and go in or through the various hoops? (Point out the lines to the subject.) See how many different body parts and actions you can use and try to think of ways of moving which no one else will think of."



Hoops

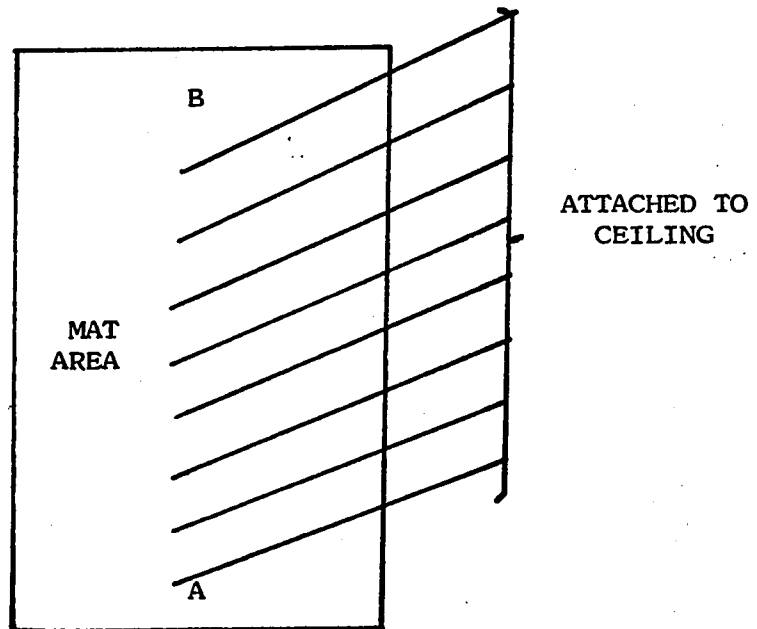
Task Description. Twenty hoops are scattered on the gymnasium floor. The subject moves from hoop to hoop using as many of the hoops as she possibly can. She tries to think of ways of moving her body and the hoop which no one else will think of and to use different body parts and different kinds of actions in her movement performance. The time limit for this task is one minute.

Instructions. "Twenty hoops are scattered in this room. How many different ways can you move from hoop to hoop? Think of ways of moving which no one else will think of. Try to use as many different body parts and as many different kinds of actions as you can possibly think of."

Ropes

Task Description. Eight ropes are hanging from the ceiling. Mats are under the rope area. The subject moves from rope to rope between points A and B. On each rope the subject attempts a new way of moving in relation to the rope. She uses as many different body parts as possible, performs as many different kinds of actions as she can, and tries to think of ways of moving which no one else will think of. The time limit for this task is one minute.

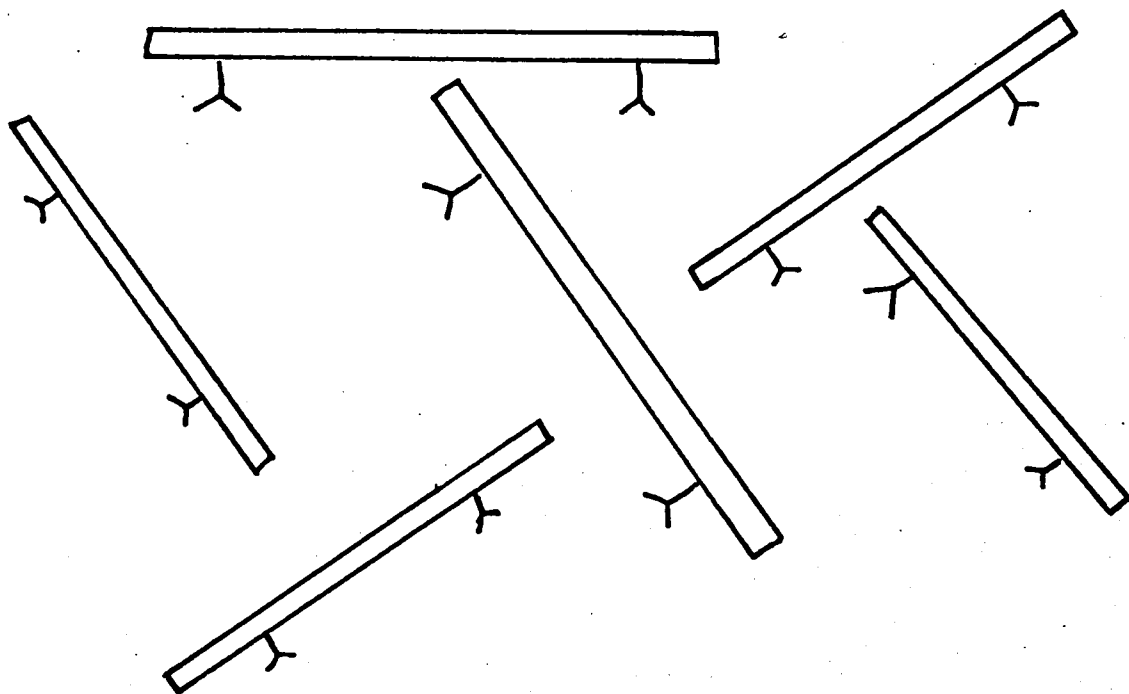
Instructions. "In this task you move from rope to rope using as many different movements as you can possibly think of. Try to think of different ways of moving on each rope - ways which no one else will think of. Use different body parts and different kinds of actions. When you get to the last rope turn around and start over. Keep moving from rope to rope until the time is up."



Beams

Task Description. Two medium-size wooden beams and four small wooden beams are placed on the floor. The subject moves from beam to beam as many times as possible until the time is consumed. The subject tries to think of ways of moving in relation to the beam which no one else will think of. She uses as many different body parts and different kinds of actions as she can possibly think of. The time limit for this task is one minute.

Instructions. "See how many times you can complete the cycle of moving around on these six beams. Try to think of ways of moving in relation to the beam - ways which no one else will think of. Use as many different body parts and kinds of actions as you possibly can."



APPENDIX C**Evaluation and Originality Worksheets****Definitions of Categories and Sub-Categories
in Flexibility Dimension**

EVALUATION WORKSHEET
MOTOR CREATIVITY TEST FOR COLLEGE WOMEN

MOVEMENT TASK SEE AND MOVE
SUBJECT NUMBER 1 SESSION 1
TAPE NUMBER 1 (075-101) JUDGE I

SCORES	FLUENCY	15
	ORIGINALITY	20
	FLEXIBILITY	15
	ELABORATION	28
	MOTOR CREATIVITY	78

RESPONSES = 26	F.U.	ORIG.	FLEXIBILITY = 15									
FIRST TWENTY-SECOND OBSERVATION <u>Bend knees, stretch legs, lift leg, shift</u> to other side.	1	1	LOCOMOTOR MOVEMENTS = 4 Walking Running ✓ (11111 000000000) Jumping ✓ (1111 000) Hopping ✓ (1111 00000000)* Leaping Skip/Gallop/Sliding Turning Rotating into/in Inverted Position									
<u>Lower trunk to curl position (floor). Rise, stretch arms, lift stretched leg sideways. (Repeats 1)</u>	1	①										
SECOND TWENTY-SECOND OBSERVATION <u>Bend hips, stretch arms, touch, (hand) floor, lift stretched leg, (balance)</u>	1	② 2	Bouncing Pushing/Pulling Falling Rolling ✓ (11)* NON-LOCOMOTOR MOVEMENTS = 11 Balancing ✓ (11 0)* Curling/Bending ✓ (111111111 000000000) Stretching ✓ (1111111111 000000000) Arching Twisting Turning (Stationary) Pivoting Swinging ✓ (11 000) Swaying Circling ✓ (1 00)* Opening/Closing Lifting ✓ (1111111111 000000000000000) Lowering ✓ (11111 000) Kicking Flinging Shaking/Vibrating Bouncing (Stationary) Pushing/Pulling ✓ (1)* Falling Rising ✓ (11 00) Lunging Shifting ✓ (11)* Grasping ✓ (1)									
<u>On hands and knee, stretch and lift bent leg.</u>	1											
<u>Lower trunk to floor, (roll) to shoulder stretch leg, bent leg.</u>	1	1										
<u>Rise, lift arms (stretch), lift leg, (balance) (Repeats 1)</u>	1	1										
<u>On side, lift leg (stretched)</u>	1											
THIRD TWENTY-SECOND OBSERVATION <u>In curl position, stretch trunk, jump, stretch arms.</u>	1	1										
<u>Stretch trunk, lift leg sideways, stretch arms, (hop) (Repeats 1)</u>	1	1										
<u>(Roll) stretch trunk, jump, stretch arm</u>	1	1										
FOURTH TWENTY-SECOND OBSERVATION <u>Run backwards, lift arms, (hop) bent knee, (shift) direction, (Repeats 11)</u>	1	① 2	MANIPULATIVE MOVEMENTS Grasping/Holding Throwing Catching Striking Kicking Lifting Lowering Pushing Pulling Swinging Rotating Rolling Turning Twisting Sliding Bouncing									
<u>Run sideways, lift arms, (hop) with bent knee, lower trunk to curl position.</u>	1	① 1										
FIFTH TWENTY-SECOND OBSERVATION <u>Run backwards, lift and (circle) arms jump, (Repeats 11), lower trunk.</u>	1	① 1										
<u>Run, swing arms, jump, lower trunk, jump with bent knees, lower trunk.</u>	1	①										
SIXTH TWENTY-SECOND OBSERVATION <u>Run, lift bent knee, (hop) and swing arms in opposition. (Repeats 111)</u>	1	① 1	ELABORATION = 28 BODY PARTS USED = 10 Head ✓ Trunk ✓ Neck ✓ Hips ✓ Shoulders ✓ Legs ✓ Arms ✓ Knees ✓ Elbows ✓ Ankles ✓ Wrists ✓ Feet ✓ Hands ✓ Toes ✓ Fingers ✓ Heels ✓									
			USE OF FLOOR SPACE = 1 <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table> CHANGES IN LEVEL = 16 11111 11111 11111 1 CHANGES IN TEMPO = 1									

* These actions were valued at one point on originality.

DESCRIPTIONS OF CATEGORIES AND SUB-CATEGORIES
IN THE FLEXIBILITY DIMENSION

LOCOMOTOR MOVEMENTS

Movement patterns which enable the subject to lose contact with the Floor and/or to progress from one space to another space.

WALKING

The act of changing the base of support from one body part to another so that in each change there is a phase of double support of the body (e.g., steps; stepping sideways, forwards, backwards; walking on the hands; walking on all fours; crawling).

RUNNING

The act of rapidly changing the base of support from one body part to another so that in each change there is a phase of no support of the body (e.g., running sideways, forwards, backwards).

JUMPING

The act of projecting the body vertically and horizontally by pushing off with either foot and landing on both feet simultaneously.

HOPPING

The act of projecting the body upward, vertically or horizontally, by pushing off on one foot and landing on the same foot.

LEAPING

The act of projecting the body upward, either vertically or horizontally, by pushing off on one foot and landing on the other foot.

SKIPPING/GALLOPING/
SLIDING

Uneven rhythmic movement patterns which combine a walk and a hop, a run and a hop, or a walk and a close step. "The gallop consists of a step with the leading foot and a closing with the opposite foot. . . . The slide . . . consists of a step and close and is usually performed in a sideward direction. . . . The slide has a smooth, flowing quality while the gallop is more forceful and staccato. . . . The skip is a combination of a step

and hop executed on the same foot, and has a springy, joyful, rather carefree quality." (Souder and Hill, 1963:142-143)

TURNING

The act of horizontally rotating the body around its own axis while projecting the body into the air or while changing from one base of support to another. In this movement pattern the feet are the major basis of support (e.g., quarter turns, half turns, full turns, spins).

ROLLING

The act of vertically rotating the body and body parts around its own axis. In this movement pattern a curled or stretched position of the trunk will be the major basis of support (e.g., forward, backward, sideways roll in a curled position; a sideways roll in a stretched position; and/or combinations of these).

ROTATING INTO AND IN AN INVERTED POSITION

The act of changing the base of body support from the feet to the hands (e.g., cartwheels, handstands, handsprings, walkovers).

BOUNCING

The act of forcefully propelling the body in some direction (forward, sideward, backward) by applying downward motion of the body part and receiving immediate rebound action of the same body part.

PUSHING/PULLING

The act of pressing a body part(s) against the floor in order to move the total body along the floor.

FALLING

The act of losing a balanced position of the body by releasing energy and regaining a new balanced position at another level in space (e.g., stumbling, uncontrolled locomotor movements which result in a new balanced position).

NON-LOCOMOTOR MOVEMENTS

(1) Movement patterns of one or more body parts which occur while the body remains in place. (2) Movement patterns which occur to certain body parts while the total body is traveling through space.

- BALANCING** The act of maintaining one's equilibrium on an unstable base of support (one or two hand support, one foot support, shoulder support, head support, elbow support positions).
- CURLING/BENDING** The act of bending the spine or whole body forward into a rounded position or the act of flexing the body or body part(s).
- STRETCHING** The act of lengthening and/or extending the body or body part(s).
- ARCHING** The act of hyperextending the back, head, neck area, or spine, so that there is an inverse curve in the trunk area.
- TWISTING** The act of crossing body parts or entwining body parts, and/or distorting the trunk area of the body into different positions.
- TURNING** The act of horizontally rotating the body or body part(s) around its axis while maintaining a relatively stationary body position (e.g., spinning, half turns, full turns, quarter turns, circling, or rotating a body part at the joint area).
- PIVOTING** The act of turning on one foot or two feet while maintaining a wide stance. Usually impetus is given by one foot while the other foot remains in place.
- SWINGING** The act of moving various body parts (head, arm, trunk, legs) on a curved line which is initiated by a forceful impulse or by a falling motion. Swings may be executed with pendular, circular, or loop-design actions. Pendular and circular swings have one accent on each phase of the swing, whereas the loop-design is a figure-eight motion with an accent on each loop. (Brown and Sommer, 1969:220)
- SWAYING** A pendular form of swinging the trunk from side to side, an oscillating motion of the trunk, hips, and body parts, or a waving action of the body and its parts.

- OPENING/CLOSING** The act of moving the body parts towards and away from each other on the same plane.
- LIFTING** A sustained action of raising a body part(s) to a higher level.
- LOWERING** A sustained action of changing the position of a body part(s) from an extended, or flexed position to a resting position (e.g., lifting and lowering the leg, lifting and lowering the arm).
- KICKING** The act of moving the leg and foot with a sudden thrust in a direct movement path (forward, sideward, backward).
- FLINGING** A sudden thrust of the arm and/or hand in a direct movement part forward, backward, sideward.
- SHAKING/VIBRATING** The act of moving the body and/or body part(s) back and forth with short, jerky movements (staccato).
- BOUNCING** The act of forcefully thrusting a body part(s) in a downward motion followed by an immediate rebound action of the movement. This movement pattern is performed in a stationary position.
- PUSHING/PULLING** A sustained motion in which a body part applies a strong force against the floor or other body parts.
- FALLING** A sudden release of energy in the body and/or body part(s) resulting in a major change in balanced position of the body (e.g., suddenly flexing the knees and lowering the trunk from a stretched standing position, suddenly curling the body and body parts from an extended position to a kneeling or sitting position).
- RISING** The act of lifting the body, or body part(s), from a lower level to a higher level. It usually involves sustained action (e. g., falling and rising of the trunk by flexing the knees).

- LUNGING** The act of suddenly thrusting the leg and foot forward (sideward or backwards) and changing the base of support from a small base to a large base of support.
- CIRCLING** The sustained act of rotating the body and/or body part(s) (SLOWLY) in a horizontal or vertical direction.
- SHIFTING** The act of changing the body parts performing the response movement (e.g., changing hands while swinging the rope; hopping over the rope while alternating feet) and/or the act of reversing direction while the body and/or body part(s) are performing the movement response (e.g., jumping while swing-rotating the rope forward, reverse the swing-rotating rope and jump).
- GRASPING** The act of contacting another body part while performing the major action in the movement response.
- MANIPULATIVE**
MOVEMENTS Movement patterns which occur in relationship to an object while the body is performing locomotor or non-locomotor movements.
- GRASPING/HOLDING** The act of contacting an object which is in a resting state.
- THROWING** The act of giving impetus to an object so that it moves in a direction and at a speed relative to the force expended.
- CATCHING** The act of receiving a moving object by absorbing the force of impact through the body parts involved.
- BOUNCING** The act of giving impetus to an object so that its direction and speed initiate an immediate rebound action.
- STRIKING** The act of suddenly thrusting the body part (arm, fist, hand, head, shoulder, elbow, hip) towards a moving or stationary

object and giving the object impetus to move in a certain direction and at a certain speed.

KICKING

The act of suddenly thrusting a body part (leg, foot, and knee) towards a moving or stationary object and giving the object impetus in a certain direction and at a certain speed.

LIFTING

The act of picking up or raising an object from a lower level to a higher level while maintaining contact with the object.

LOWERING

The act of putting down or changing the level of an object from a high level to a lower level while maintaining contact with the object.

PUSHING

The act of applying sustained force towards an object while maintaining contact with the object.

PULLING

The act of applying sustained force away from the object while maintaining contact with the object.

SWINGING

The act of moving an object in a curved line which is initiated by a forceful impulse or by a falling motion. Swings may be executed with pendular, circular, or loop-design actions. Pendular and circular swings have one accent on each phase of the swing, whereas the loop-design is a figure-eight motion with an accent on each loop. (Brown and Sommer, 1969:220)

ROTATING

The act of moving an object in a vertical plane around the body or body part(s).

ROLLING

The act of giving impetus to an object so that it rotates vertically along the floor.

TURNING

The act of giving impetus to an object and causing it to revolve in place (e.g., quarter turn, half turn, full turn, spin).

TWISTING

The act of entwining, wrapping, crossing an object around the body or body part(s).

SLIDING

The act of moving an object up and down the body and/or body part(s) while the body and/or body part(s) is performing the movement response (e.g., sliding the hoop from wrist to shoulder while rotating it around the arm).

APPENDIX D**Exploratory Studies Opinionnaires
and Task Evaluations**

AN OPINIONNAIRE ABOUT THE MOVEMENT TASKS

November 17, 1971

TASK _____

Indicate your reaction to the task by answering the following questions. Circle your answers.

1. Was there too much time for performing the task? YES NO

2. Was there too little time for performing the task? YES NO

3. Was the time limit for doing this task just right? YES NO

4. If you had your choice, how many seconds or minutes would you have preferred for doing this task? Circle one or write-in your answer.

15 sec.	30 sec.	1 min.	1½ min.	2 min.
2½ min.	3 min.	3½ min.	4 min.	4½ min.
5 min.	OTHERS: _____			

5. Was the task fun to do? YES NO
 Why or why not?

6. Did you find the task challenging? YES NO
 Why or why not?

AN OPINIONNAIRE ABOUT THE MOVEMENT TASKS

November 18, 1971

TASK _____

Indicate your reaction to the task by answering the following questions. Circle your answers.

1. Was the time limit for doing this task just right? YES NO

2. If you had your choice, how many seconds or minutes would you have preferred for doing this task? Circle one or write-in your answer.

15 sec.	30 sec.	1 min.	1½ min.	2 min.
2½ min.	3 min.	3½ min.	4 min.	4½ min.
5 min.	OTHERS: _____			

3. Was the task fun to do? YES NO
Why or why not?

4. Did you find the task challenging? YES NO
Why or why not?

5. How would you have preferred to have done this task?

Alone	With One Other	With Two Others
With Three Others		With how many? _____

6. Would you like to repeat this task? YES NO
Why or why not?

SUBJECTS' EVALUATION OF THE TASK IN GROUP I

Moving to Sounds (Six subjects)

Was the task fun to do? YES 6 NO 0

"I really liked this one, At least the music gave you ideas of movement."

"It was fun in some ways - trying to imitate sounds that I heard."

". . . it was easier to express yourself."

". . . I really like listening to sounds, it intrigues me."

Did you find the task challenging? YES 7 NO 1

Moving with a Rope (Eight subjects)

Was the task fun to do? YES 7 NO 1

". . . it was free."

"It gave me a chance to create something I had never done before."

". . . you could move with rope, use it for decoration, and didn't have to constantly utilize it."

"It was kind of fun - would have been better if we had known ahead of time what was expected."

Did you find it challenging? YES 6 NO 1

Moving with a Ball (Three subjects)

Was the task fun to do? YES 3 NO 0

"Learn new things."

"Because you could move faster, I think you could be more creative."

"Because it made you think in terms of creativeness in using a ball."

Did you find the task challenging? YES 3 NO 0

Moving a Hoop in Space (One subject)

Was the task fun to do? YES 1 NO 0

"Resulted in extemporaneous movements which strengthened my imagination.

Did you find the task challenging? YES 1 NO 0

"There aren't too many things I know to do with a hoop."

SUBJECTS' EVALUATION OF THE TASKS IN GROUP IIObstacle Course (Seven subjects)

Was the task fun to do? YES 7 NO 0

"There was a variety of equipment to work with."
 "Because there were so many variations of things to do."

"I enjoyed having the freedom to choose what type of obstacle I wanted to perform on, and what time I preferred."

Did you find the task challenging? YES 7 NO 0

"I wanted to be able to think of more but got frustrated because I couldn't."

"I had to use my imagination."

Boxes (Six subjects)

Was the task fun to do? YES 6 NO 0

"It created more thought and was exciting to discover what was in each box."

"It was a creative activity and it really made you think."

Did you find the task challenging? YES 6 NO 0

"Because the equipment was such basic stuff, it made it more of a challenge to think of things to do."

See and Move to Objects (One subject)

Was the task fun to do? YES 1 NO 0

"It was but my imagination was bad I ran out of things to do."

Did you find the task challenging? YES 1 NO 0

". . . I had to try to think of new things. I didn't do very well."

See and Move to Subjects (Three subjects)

(Was the task fun to do? YES 3 NO 0

"It inspired your imagination."

"It helps with your interaction with other people."

". . . there were too many things that gave me the same idea."

Did you find the task challenging? YES 3 NO 0

SUBJECTS' EVALUATION OF THE TASKS IN GROUP IIIHoops and Lines (Four subjects)

Was the task fun to do? YES 2 NO 2

"It was not that interesting. Nothing really to work with."

"I felt like I was an idiot to not be able to think how to get through the hoops."

"It was up to you of what you wanted and you could be creative with no limitations."

". . . I think it's fun playing hoops."

Did you find the task challenging? YES 1 NO 3

Hoops (Four subjects)

Was the task fun to do? YES 2 NO 2

"Haven't played with hoop in long time."

"It was different and there were no restrictions on what could or should be done."

"It didn't cause any fun or excitement."

"Hoops were awkward and my mind didn't work with them."

Did you find the task challenging? YES 2 NO 1

"I had trouble of thinking of actions."

"It takes too much effort."

". . . to think of what to do spontaneously is difficult."

Ropes (Seven subjects)

Was the task fun to do? YES 1½ NO 4½

"Fun trying to think of new things to do with ropes."

". . . I don't like to play with ropes anyway."

"It was rather limited and wasn't too exciting."

Did you find the task challenging? YES 5 NO 2

". . . I'm not skilled enough to perform the creative things I thought of."

". . . I've never had to think of things to do like that."

"I couldn't think of anything to do."

Beams (Two subjects)

Was the task fun to do? YES 2 NO 0

"It was using your imagination."

"Because the different heights and sizes offer a variety of things to work on."

Did you find the task challenging? YES 1 NO 1

"I did things I could normally do."

". . . you had to be careful not to fall while concentrating."

APPENDIX E

**Unique Actions for Move to Sounds, See
and Move and Hoops and Lines**

UNIQUE ACTIONS FOR
HOOPS AND LINES

ACTIONS IN RESPONSES	VALUE POINTS JUDGES	FIRST EVALUATION SESSION									SECOND EVALUATION SESSION									
		ONE			TWO			THREE			ONE			TWO			THREE			
		I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	
LOCOMOTOR MOVEMENTS																				
Walking																				
Running																				
Jumping																				
Hopping		x	x	x								x		x						
Leaping								x	x	x				x					x	x
Skip/Gallop/Sliding			x										x							
Turning																				
Rolling					x	x	x							x	x	x				
Rotating into/in Inverted Position								x		x								x		x
Bouncing								x										x		x
Pushing/Pulling		x	x				x			x	x			x	x					
Falling									x									x	x	x
NON-LOCOMOTOR MOVEMENTS																				
Balancing									x	x								x		x
Curling/Bending																				
Stretching			x																	
Arching														x						
Twisting					x	x	x					x	x				x			
Turning(Stationary)			x											x						
Pivoting					x				x					x					x	
Swinging			x		x		x						x		x			x		
Swaying		x				x						x							x	
Circling						x			x				x		x			x		x
Opening/Closing		x		x			x					x	x	x						
Lifting																				
Lowering																				
Kicking										x									x	x
Flinging																			x	
Shaking/Vibrating																				
Bouncing(Stationary)																				
Pushing/Pulling					x	x				x								x	x	x
Falling									x											
Rising																				
Lunging																				
Shifting						x		x						x			x			
Grasping						x													x	
MANIPULATIVE MOVEMENTS																				
Grasping/Holding		x															x			
Throwing		x	x	x								x	x	x						
Catching						x	x	x						x			x			x
Bouncing									x		x									x
Striking																				
Kicking										x										x
Lifting																				
Lowering																				
Pushing						x	x	x	x									x		x
Pulling						x	x	x						x	x	x				
Swinging												x							x	
Rotating																				
Rolling						x		x		x				x				x		x
Turning		x	x					x					x	x				x		
Twisting		x						x										x		x
Sliding						x								x	x	x				

APPENDIX F

**Range of Scores for Variables in Move to
Sounds, See and Move and Hoops and Lines**

RANGE OF SCORES FOR VARIABLES
IN MOVE TO SOUNDS (N=25)

Session I Variables	Judge I		Judge II		Judge III	
	High Score	Low Score	High Score	Low Score	High Score	Low Score
Fluency	19	10	18	9	20	9
Originality	60	5	58	16	47	8
Flexibility	23	12	24	12	23	11
Locomotor movements	8	2	7	3	7	3
Non-locomotor movements	17	9	18	8	16	8
Elaboration	50	17	52	16	52	18
Body parts	14	9	16	8	16	10
Floor spaces	6	1	6	2	7	1
Level changes	28	0	13	0	27	0
Tempo changes	12	3	18	3	15	2
Motor creativity	133	52	132	60	142	61
<u>Session II Variables</u>						
Fluency	19	10	18	11	22	9
Originality	53	13	50	14	46	10
Flexibility	23	13	25	14	19	13
Locomotor movements	7	2	7	3	8	3
Non-locomotor movements	17	8	19	9	13	8
Elaboration	47	21	46	17	48	20
Body parts	16	9	15	8	16	12
Floor changes	7	2	7	2	7	3
Level changes	26	0	24	0	23	0
Tempo changes	17	4	17	3	15	2
Motor creativity	128	65	130	58	126	61

RANGE OF SCORES FOR VARIABLES
IN SEE AND MOVE (N=25)

Session I Variables	Judge I		Judge II		Judge III	
	High Score	Low Score	High Score	Low Score	High Score	Low Score
Fluency	18	7	15	8	20	8
Originality	38	9	38	8	37	5
Flexibility	24	14	24	13	22	12
Locomotor movements	9	3	11	3	9	4
Non-locomotor movements	16	9	15	9	16	8
Elaboration	48	17	48	15	45	21
Body parts	15	8	16	7	16	11
Floor spaces	5	1	5	2	8	2
Level changes	26	2	27	2	24	2
Tempo changes	5	0	5	1	7	1
Motor creativity	115	54	108	45	103	48
<u>Session II Variables</u>						
Fluency	17	8	15	8	19	6
Originality	49	10	44	9	39	2
Flexibility	24	15	24	12	23	11
Locomotor movements	9	4	11	3	9	3
Non-locomotor movements	15	10	15	9	16	8
Elaboration	48	20	48	14	45	22
Body parts	15	8	15	7	16	12
Floor spaces	7	1	7	2	6	2
Level changes	29	2	29	2	21	2
Tempo changes	6	0	7	1	5	0
Motor creativity	111	58	108	43	118	46

RANGE OF SCORES FOR VARIABLES
IN HOOPS AND LINES (N=25)

Session I Variables	Judge I		Judge II		Judge III	
	High Score	Low Score	High Score	Low Score	High Score	Low Score
Fluency	11	4	9	4	12	5
Originality	31	7	28	8	27	8
Flexibility	21	10	22	9	21	11
Locomotor movements	8	1	8	2	7	2
Non-locomotor movements	10	3	9	3	11	3
Manipulative movements	9	0	9	0	9	0
Elaboration	32	15	32	18	34	19
Body parts	13	7	15	8	16	11
Floor spaces	6	3	6	2	6	3
Level changes	9	1	9	1	10	2
Tempo changes	6	1	6	1	6	0
Motor creativity	89	44	88	44	90	47
<u>Session II Variables</u>						
Fluency	12	5	9	4	11	6
Originality	37	10	25	8	33	9
Flexibility	24	10	21	11	23	13
Locomotor movements	7	2	9	2	7	2
Non-locomotor movements	10	2	9	3	11	4
Manipulative movements	10	0	10	0	10	0
Elaboration	30	14	32	16	34	20
Body parts	15	7	14	8	16	11
Floor spaces	6	2	6	2	9	3
Level changes	9	1	9	1	9	2
Tempo changes	6	1	5	1	5	0
Motor creativity	103	42	81	42	99	50