THE RELATIONSHIP OF PERCEPTUAL-MOTOR PERFORMANCE AND INTELLECTUAL PERFORMANCE IN EDUCABLE MENTALLY RETARDED CHILDREN

A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE MASTER OF ARTS IN HEALTH,

PHYSICAL EDUCATION, AND RECREATION

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

COLLEGE OF HEALTH,

PHYSICAL EDUCATION, AND RECREATION

BY

MARTHA KATHERINE GLASGOW, B.S.

DENTON, TEXAS

AUGUST, 1971

Texas Woman's University

Denton, Texas

August 19 71

We hereby recommend that the thesis prepared under our supervision by Martha Katherine Glasgow entitled THE RELATIONSHIP OF PERCEPTUAL-MOTOR PERFORMANCE AND INTELLECTUAL PERFORMANCE IN EDUCABLE MENTALLY RETARDED CHILDREN

be accepted as fulfilling this part of the requirements for the Degree of Master of Arts.

Committee:

Glenn A Hayes
Chairman
Virginia Jolly
Bert Ryle Jr

Accepted:
T. L. Morgan
Dean of Graduate Studies

TABLE OF CONTENTS

Page

ACKNOWLEDGEMENTS iii

LIST OF TABLES vi

Chapter

I. INTRODUCTION 1

Statement of Problem
Definition and/or Explanation of Terms
Purpose of the Study
Delimitations of the Study
Survey of Related Literature
Summary

II. PROCEDURES FOLLOWED IN THE DEVELOPMENT OF THE STUDY 17

Sources of Data
Preliminary Procedures
Selection and Description of Instruments
Selection and Description of Intelligence Test
Selection and Description of the Perceptual-Motor Test
Selection of the Subjects
Procedures Related to the Collection and Treatment of Data
Collection of Data Related to Perceptual-Motor Skills
Treatment of the Data
Procedures Related to Writing the Final Written Report
Summary

III. PRESENTATION OF THE DATA 27

Descriptive Data of the Sample Studied on the Selected Tests
Relationship Between the Pearman Modification of Lincoln Revision of the Oseretsky Motor Development Scale and the Wechsler Intelligence Scale for Children
Summary

IV. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDIES 33

Summary
Findings of the Study
Tests of the Hypotheses
Conclusion
Recommendations for Further Studies

APPENDIX A 38

The Lincoln-Oseretsky Motor Development Scale Score Sheet

APPENDIX B 40

Raw Data

APPENDIX C 42

Description and Copy of Perceptual-Motor Tests

BIBLIOGRAPHY 49

LIST OF TABLES

Table		Page
1.	Description of Subjects With Respect to the Wechsler Intelligence Scale for Children and the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale	29
2.	Results of Correlation Coefficients and z Scores Between the Wechsler Intelligence Scale for Children and the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale	31

ACKNOWLEDGEMENTS

The investigator wishes to express sincere gratitude to Dr. Gene A. Hayes, director of this study, for his interest and guidance in the preparation of the study.

Appreciation is also extended to Dr. Virginia T. Jolly and Dr. Berton E. Lyle, Jr. for their invaluable suggestions as members of the thesis committee.

Further acknowledgement is given to the administrators, teachers, principals, and children in the special education classes in the Denton Independent Elementary School System, and the Texas Woman's University Demonstration School, Denton, Texas, whose splendid cooperation cannot be surpassed. Additional gratitude is extended to Mrs. Isabel Speck for her diligent efforts in the final compilation of the study.

The deepest and most sincere acknowledgement is made to the investigator's mother, Mrs. Hugh Gordon Glasgow, Jr., and grandmother, Mrs. John Bridger Thornhill for their encouragement and support at all times.

CHAPTER I

INTRODUCTION

For centuries upon centuries, the mentally retarded child has been lost in society. During the past ten years, the rehabilitation of mentally retarded children and adults has received considerable interest and attention from medical doctors, therapists, educators, and service-oriented groups. Today's research provides evidence that mental retardation is associated with many different types of motor impairment. While intelligence tests, personality tests, behavior rating scales and various scales of physical maturation and fitness have been utilized and studied, the need for further research in motor skills remains apparent. Smith confirms this point in his research when he states:[1]

> Many children who were classified as slow learners were found to possess intelligence quotients that were considerably greater than might be indicated by the low scholastic achievement scores they attained.
>
> Further clinical tests seemed to indicate that no neurological damage was present. But one part of the slow learner syndrome seemed to be poor performance on various test items which were purported to test selected perceptual abilities. In addition to poor performance on scholastic achievement tests and tests of perceptual ability, the slow learner seemed to perform poorly in test items selected to assess motor ability.

---

[1] Hope N. Smith, "Motor Activities and Perceptual Development," Journal of Health, Physical Education, and Recreation, Vol. XXXIII (February, 1968), p. 28.

The business of childhood is play. Most retarded children like to play and when they play they not only have fun, but they develop physically, mentally, emotionally, and socially, frequently beyond the realm of general expectations. The mentally retarded child becomes more outgoing when given the opportunity of using his unskilled movement initially in playful activities. What better opportunity to observe the mentally retarded child than in his recreational activities. From recreational activities the mentally retarded child will be helped by experiencing success and the assurance of recognition to meet his needs. He no longer needs to exhibit his revolting frustrating disturbing actions. The recreational therapist is faced with the problem of choosing those activities which are best adapted to the individual and assist him in his development. The possibility of determining a quick, inherently interesting, inexpensive method of perceptual motor factors that may be given and interpreted by a recreational therapist would be a valuable contribution in planning better recreational programs for the mentally retarded.

Statement of the Problem

The present investigation entailed a study of the relationship between selected perceptual-motor skills and intellectual ability of thirty-six mentally retarded children ranging in chronological age from ten to twelve years and who possess mental intelligence quotients between fifty and

seventy. These children were enrolled in special education classes in the following schools: Congress Elementary and Junior High School, Fred Moore Elementary School, Sam Houston Elementary School, and the Texas Woman's University Demonstration School of Denton, Texas, during the spring semester of the academic year of 1970-1971.

The investigator endeavored to determine the relationship between selected perceptual-motor skills, as measured by the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and intellectual performance as measured by the Wechsler Intelligence Scale for Children.

Definitions and/or Explanations of Terms

To contribute to a clear understanding of the problem, the following definitions and/or explanations of terms were established as frames of reference throughout the study:

Perceptual-Motor Performance: The investigator accepts the following definition by Cratty:

> Perceptual-motor performance refers to a comprehensive approach implying the sensory recognition, mental orientation, and neuromuscular output of motor skills.[2]

Intellectual Performance: The investigator accepts the following definition by Hoerr and Osol:

> Intellectual Performance is the ability to understand or the reasoning power to perceive qualities and attributes of the objective world, and to

---

[2]Bryant J. Cratty, Movement Behavior and Motor Learning (Philadelphia: Lea and Febiger, 1967), p. 39.

> employ purposively a means toward the attainment of an end.[3]

Mental Retardation: The investigator accepts the following definition by the American Association on Mental Deficiency:

> Mental Retardation refers to subaverage general intellectual functioning which originates during the developmental period and is associated with impairment in adaptive behavior.[4]

The Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale:

> In this study the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale will refer to a seven item test used to measure perceptual-motor skills: general static coordination, motor speed, simultaneous voluntary movements, and asynkinesia (lack of precision of movement, or surplus movement).[5]

Wechsler Intelligence Scale for Children:

> In this study the Wechsler Intelligence Scale for Children refers to twelve tests which are divided into two subgroups identified as Verbal and Performance. The tests of the Scale are grouped as follows--Verbal: Information, Comprehension, Arithmetic, Similarities, Vocabulary, Diget Span; Performance: Picture Completion, Picture Arrangement, Block Design, Object Assembly, Coding Mazes. A child's performance is compared with his own age group. The intellectual quotient given his

---

[3]Normand L. Hoerr, and Arther Osol, Blakeston's New Gould Medical Dictionary (New York: McGraw-Hill Book Company Incorporated, 1956), p. 884.

[4]The American Association on Mental Deficiency, Monography Supplement to American Journal of Mental Deficiency, Second Edition (Springfield, Illinois, 1961), p. 3.

[5]Roger Pearman, "An Analysis of the Lincoln-Oseretsky Motor Development Scale with an Emphasis on the Reduction of Total Test Items" (unpublished Master's thesis, College of Education, Western Kentucky University), 1968.

> performance is a convenient way of expressing his score in terms of the mean and standard deviation of his peers.[6]

Purpose of the Study

The general purpose of the study was to determine if a significant relationship exists between perceptual-motor performance and intellectual performance of educable mentally retarded children. Specifically, the following hypotheses were tested:

1. There is no significant relationship between the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and the Verbal Subgroup of the Wechsler Intelligence Scale for Children.

2. There is no significant relationship between the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and the Performance Subgroup of Wechsler Intelligence Scale for Children.

3. There is no significant relationship between the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and the overall score of the Wechsler Intelligence Scale for Children.

Delimitations of the Study

The study is subject to the following delimitations:

1. The cooperation of the administration of the Denton Independent School System in Denton, Texas.

---

[6]Oscar Krisen Buros, The Sixth Mental Measurement Yearbook (New Jersey: The Gryphon Press, 1965), p. 841.

2. The objectivity, reliability, and validity of the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale.

3. The objectivity, reliability, and validity of the Wechsler Intelligence Scale for Children.

4. The selected sample of thirty-six mentally retarded children from the special education classes in the Denton Independent School System in Denton, Texas.

Survey of Related Literature

An investigation of the studies and related literature reveals that this study does not duplicate any preceding investigation. The following review of completed research studies are presented in the belief that they may be of assistance in the development of the research design or in better understanding the broad areas to be considered.

A. In 1923, Oseretsky[7] undertook a study to establish a metric age scale which would help identify levels of the individual's motor ability. The test consists of eighty-five items which were scored on a pass-fail system. The scale is developed for normal, feeble minded and motor handicapped children ages four to sixteen. For every ten years of age there are six tests of motor proficiency which are concerned with the following areas: general static

---

[7]Nicolaus I. Oseretsky, A Metric Scale for Studying the Motor Capacity of Children, 1923, p. 24. Quoted in Rudolf Lassner, "Annotated Bibliography on the Oseretsky Test of Motor Proficiency", Journal of Consulting Psychology, Vol. 12, 1948, p. 40.

coordination, general dynamic coordination, dynamic manual coordination, speed, simultaneous voluntary movement, and asynkinesia or lack of surplus movement. Oseretsky has two revisions of his scale. One revision in 1929 where the scale was shortened to thirty items and the test was administered on a group basis. The second revision in 1931 is concerned with determining the general motor age and the development of a single motor component.

Efforts to obtain experimental evidence such as reports on adequate sampling, central tendencies of scores, standard deviation, measures of validity and reliability through the American-Soviet Medical Library have been unsuccessful. Trial experience with the Scale suggests that the American population requires modification of some of the tests.

B. In 1951 Sloan[8] conducted a study to measure the relationship between mental deficiency and motor proficiency. Sloan also attempted to demonstrate the applicability of the Oseretsky Test and to determine whether there is a unique pattern of motor proficiency for mental defectives as compared with the patterns of normal children.

The experiment included two groups of subjects. The experimental group included twenty mental patients from the Lincoln State School and Colony who were equally divided as

---

[8]William Sloan, "Motor Proficiency and Intelligence," American Journal of Mental Deficiency, Vol. 55, (1951), pp. 394-405.

to sex. Twenty normal children from Lincoln, Illinois elementary school who were divided as to sex established the control group. The subjects for both groups were randomly selected on the basis of their intelligence quotient and chronological age. The mean intelligence quotient for the experimental group of males was 54.2 which was matched to the mean score of the control group of males which was 105.8. The mean intelligence quotient for the experimental group of females was 56.2 and for the control group of females it was 99.2. To obtain the best measure of performance on the Lincoln Adaptation of the Oseretsky Test of Motor Proficiency the subjects, who were approximately ten years of age, were chosen since the test extends six years in both directions from age ten.

On the basis of inadequate information the entire Oseretsky Proficiency Test from the fourth to the sixteenth year level was administered to each subject.

> The results of Sloan's study revealed that in all six cases there was no difference observed in sex and intelligence but motor proficiency was significantly related to intelligence at the .01 level of confidence. The experimental group which was comprised of mentally retarded subjects revealed that the degree of difficulty varies directly with the complexity of the task.

Sloan not being satisfied with the results of his study decided in 1954[9] to publish a Lincoln-Oseretsky Motor Development Scale Manual. Lincoln's adaptation of Oseretsky

---

[9]William Sloan, Manual for the Lincoln-Oseretsky Motor Development Scale #37018 (Chicago: C. H. Stoelting Company, 1954), p. 63.

Motor Development test was regarded as a reliable source. The thirty-six item test was administered to 380 males and 369 females who were from six to sixteen years of age. From his conclusions Sloan found that sex did not create any differences in motor performance but age was the significant factor in passing the items on the tests.

C. Sandercock and Butler[10] conducted a study to determine if a significant relationship existed between intelligence quotient, and academic progress as measured by the Stanford-Binet (M) test and the three Wechsler Scales. For diagnostic purposes an attempt was made to determine whether the sign patterns derived from subtest scores were consistent within a mentally defective group. Ninety mentally defective children ranging in age from ten to sixteen, who attended the academic school of the Ontario Hospital in Orillia served as subjects for the study. The range of intelligence was from forty-five to eighty-six as measured by the Stanford-Binet test. The testing period was from July to December, 1950.

Scale scores on the Wechsler subtest were computed according to the manual of instructions. These scores were converted into intelligence quotients according to the Wechsler conversion tables. Wechsler's conversion table had a low score of twenty-six which was equal to an intelligence

---

[10]Marian G. Sandercock and Alfred J. Butler, "An Analysis of Mental Defectives On the Wechsler Intelligence Scale for Children," American Journal of Mental Deficiency, Vol. 57, 1952, pp. 100-105.

quotient of forty-six. The investigators used school records to determine the relationship between academic progress and intelligence.

Relationships between the Stanford-Binet Intelligence quotients were computed by the use of product moment correlations and were within the range usually obtained between intelligence tests. Correlations were also made between each of the four measures of intelligence and the academic quotient. The investigators considered this method a means of validating the test of intelligence.

Sandercock and Butler concluded from the results of their study that the high degree of relationship between the Stanford-Binet and the Wechsler Verbal Intelligence Scale for Children indicated that a wider measure of intelligence in mental defectives could be obtained by combining the two tests. Both the Stanford-Binet and Wechsler Intelligence Scale for Children proved to be valid in measuring intelligence but a high measure of intelligence from either test did not always warrant individual academic success. Ten out of eleven subtests significantly indicated that a sign pattern did exist in the scores of the mentally defective group.

D. In 1968 Pearman[11] conducted a study to decrease the overall testing time for the administration of the Lincoln-Oseretsky Motor Development Scale. By reducing the

---

[11]Roger Pearman, "An Analysis of the Lincoln-Oseretsky Motor Development Scale with an Emphasis on the Reduction of Total Test Items" (unpublished Master's thesis, College of Education, Western Kentucky University), 1968.

thirty-six test items to seven test items the scale would be conducive to general usage, and better reliability would be established. The investigator used fifty-five students who were in the fourth, fifth and sixth grades from the Training School at Western Kentucky University in Bowling Green, Kentucky. The subjects were between the ages of nine years six months and eleven years five months. Subjects were selected in accordance with age established by the Lincoln-Oseretsky Motor Development Scale.

Data were collected from surveys of related periodicals, theses, and dissertations. The Lincoln-Oseretsky Motor Development Scale was administered on an individual basis from December 11th, 1967 through February 6th, 1968. Fifty-three psychomotor tests were administered with 159 points representing the maximum number of points to be scored.

The statistical treatment used in the analysis of the collection of the data were, the Pearson-Product-Moment of Correlation. Duplication of measures within the battery of tests were eliminated by the use of an item intercorrelation. Pearman selected the arbitrary figure of 0.40 to indicate a high correlation. Seven groups, each containing three items, had intercorrelations higher than 0.40 between the groups. Pearman concluded that these seven test items were a reliable assessment of an individual's perceptual-motor ability.

E. In 1968 Costen undertook a study pertaining to the relationship of selected perceptual-motor skills and and academic achievement. Sixty fourth grade children who

attended elementary schools in Denton, Texas, during the academic year of 1967-68 served as subjects for the study.[12]

Results gained from the Kuhlmann-Anderson Test of intelligence and the Wide Range Achievement Test established the means of selection for two groups known as the achievers and underachievers. Costen chose the Purdue Perceptual-Motor Survey and the Lincoln-Oseretsky Motor Development Scale as measures of selected perceptual-motor skills.

The investigator determined several findings for the achievers. After her statistical treatment of her data she found that reading was significantly related to general dynamic coordination. Spelling did not correlate significantly with any of the perceptual-motor subtests. Arithmetic was significantly related to body image and differentiation, ocular control, and simultaneous voluntary movements. The total score on the Wide Range Achievement Test was significantly related to balance and posture, and general dynamic coordination.

Significant relationships resulted for all subjects on the subtests of the Wide Range Achievement Tests and the subtest of the Purdue-Motor Survey and Lincoln-Oseretsky Motor Development Scale. Differences occurred in all cases between correlation coefficients for the underachievers. More differentation was indicated on the Lincoln-Oseretsky

---

[12]Bettye Windham Costen, "A Study of the Relationship Between Perceptual-Motor Skills and Academic Achievement in Fourth Grade Children" (unpublished Ph.D. dissertation, the Texas Woman's University), 1968.

Motor Development Scale than on the Purdue Perceptual-Motor Survey. The achievers had a positive correlation between the Purdue-Motor Survey and the Lincoln-Oseretsky test. Even though the underachievers had a positive correlation their correlation was not statistically significant. Both groups correlation coefficient between the Purdue Perceptual-Motor Survey and the Lincoln-Oseretsky Motor Development Scale was statistically significant at the .01 level.

Costen concluded from the results of her study that the relationship between perceptual-motor skills and academic achievement were too low to be of predictive value. On perceptual-motor skills achievers performed significantly better than the underachievers.

F. Herndon[13] undertook a study in 1969-70 to determine the relationship between perceptual-motor skills and intellectual ability of forty-six kindergarten age children. The subjects were attending the Texas Woman's University Demonstration School kindergarten and the senior kindergarten of the Selwyn School of Denton, Texas. These subjects were selected on the basis that they had no known uncorrected visual or auditory handicaps, must be of kindergarten age, from age five years one month to six years two months and be enrolled in kindergarten of the Texas Woman's University Demonstration School or the senior kindergarten of the Selwyn School in Denton, Texas.

---

[13]Daisy Herndon, "The Relationship of Perceptual-Motor Ability and Intellectual Ability in Kindergarten-age Children." (Unpublished thesis, Texas Woman's University), 1970.

Intellectual ability was measured by the Kuhlmann-Anderson Measure of Academic Potential. Perceptual-motor skills were measured by the Herndon modification of the Figure Reproduction Test by Singer and Brunk and the Pearman modification of the Lincoln Revision of the Oseretsky Motor Development Scale. The Kuhlmann-Anderson Measure of Academic Potential Test is a standarized test which is widely acceptable and is the group test that was administered to both schools in two sessions. The Figure Reproduction Test by Singer and Brunk was selected because it was a simple, quick, inherently interesting, and inexpensive test of perceptual-motor skills for kindergarten age children. The Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and the Kuhlmann-Anderson Measure of Academic Potential Test had a positive but not sufficiently high correlation. Herndon found that the Singer-Brunk Figure Reproduction Test and the Kulhmann-Anderson Measure of Academic Potential Test had a negative low insignificant correlation for predictive purposes. The investigator suggested that similar studies be done along these same methods since her study was a small representation of the population.

Summary

The present investigation was developed in an attempt to establish the relationship between perceptual-motor performance as measured by the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and intellectual performance as measured by the Wechsler

Intelligence Scale for Children of educable mentally retarded children. The thirty-six mentally retarded children ranged in chronological age from ten to twelve years and possessed a mental intelligence quotient between fifty and seventy. These subjects were enrolled in the special education classes of Congress Elementary and Junior High School, Fred Moore Elementary School, Sam Houston Elementary School, and the Texas Woman's University Demonstration Elementary School, Denton, Texas, during the spring semester of the 1970-1971 academic year. The testing was conducted over a period of two weeks. Research of this nature is needed to aid in the development of better therapeutic recreational programs. A primary purpose of a therapeutic recreational program is to discover each individual's strengths and weaknesses, and attempt to eliminate their weakness by emphasizing their strengths. In order to make accurate evaluations the therapeutic recreation specialist needs current information disclosing the individual's physical and mental status. By use of a quick, inherently interesting, and inexpensive method of perceptual-motor testing, the therapeutic recreation specialist can better determine where corrective and/or developmental efforts should be applied to further the individual's physical and recreational needs.

In the foregoing chapter the investigator defined the terms used throughout the study, and listed the limitations imposed upon the various aspects of the study. Three hypotheses were stated. A review of selected related literature

has indicated that no previously completed investigation duplicates the present one. In the following chapter the investigator will discuss the procedures followed in the development of the study.

CHAPTER II

PROCEDURES FOLLOWED IN THE DEVELOPMENT OF THE STUDY

The present investigation entailed a study of the relationship between intellectual performance and perceptual-motor performance of thirty-six educable mentally retarded children enrolled in the special education classes of Congress Elementary and Junior High School, Fred Moore Elementary School, Sam Houston Elementary School, and the Texas Woman's University Demonstration School of Denton, Texas, during the 1970-1971 academic year. The Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale,[1] and the Fifth Edition of the Wechsler Intelligence Scale for Children (WISC)[2] were used to measure the variables of perceptual-motor skills and intelligence.

In this chapter the investigator will present procedures followed in the development of the study. The procedures will be reported under the following headings: source of data, preliminary procedures, selection and description of

---

[1] Roger Pearman, "An Analysis of the Lincoln-Oseretsky Motor Development Scale with an Emphasis on the Reduction of Total Test Items" (unpublished Master's thesis, College of Education, Western Kentucky University), 1968.

[2] David Wechsler, Wechsler Intelligence Scale for Children, New York, New York: The Psychological Corporation, 1949.

intelligence test, selection and description of the perceptual-motor test, selection of the subjects, procedures related to the collection and treatment of data, collection of data related to perceptual-motor skills, treatment of the data, and the procedures related to writing the final written report. A summary concludes the chapter.

Sources of Data

Both human and documentary sources were utilized in the development of the present study. The human sources included thirty-six educable mentally retarded children who were in the chronological age range of ten to twelve years and who possessed the mental intelligence of fifty and seventy. These children were enrolled in the elementary special education classes at Congress Elementary and Junior High School, Fred Moore Elementary School, Sam Houston Elementary School, and the Texas Woman's University Demonstration School of Denton, Texas, during the 1970-1971 academic year. Other human sources enlisted were school administrators, classroom teachers, and authorities from the Texas Woman's University in the areas encompassed by the study.

The documentary sources consisted of books, pamphlets, periodicals, bulletins, research studies, cumulative school records, the Wechsler Intelligence Scale for Children, and the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale.

Preliminary Procedures

A series of preliminary procedures were completed prior to the collection of data. Among these were the reviewing of related literature, conferring with qualified persons regarding various aspects of the study, selecting the instruments to be utilized in the collection of data, determining criteria for the inclusion of children in the study, developing and presenting a tentative outline for the study in a Graduate Seminar, revising the outline on the basis of suggestions offered by committee members, filing a prospectus in the Office of the Dean of Graduate Studies, and formulating plans for recording the data to be collected.

Selection and Description of Instruments

The data relating to intellectual performance and perceptual-motor performance were collected through the administration of standardized tests. The standard criteria of reliability, validity, objectivity, and administrative feasibility served as the basis for selecting each instrument.

Selection and Description of Intelligence Test

A number of tests for measuring intelligence have been standarized and are recognized as being reputable instruments for use with the educable mentally retarded. The majority of intelligence tests are used in school situations and because of necessity are group tests. However, it is the presumption of the investigator that intelligence tests

administered on an individual basis yields a more exact result of the individual's performance. The Wechsler Intelligence Scale for Children was selected for use in the present study because it met the criteria established by the investigator and it possesses several very attractive features as evidenced by Fraser's statement:

> It is easy to give, the material is compact and very accessible, and the testing time varies much less than that in the Stanford-Binet; . . . it has the advantage of two scores, Verbal and Performance, and discrepancies between these scores may be of great value. . . . A child's performance is compared not with that of children older or younger than himself, but only with that of his own age group.[3]

Delp discusses further advantages of the WISC:

> . . . materials are interesting to children, spiral material is easily handled and contains clear directions and tables; there are good norms derived from good statistical bases. . . .[4]

The WISC has been standardized over a five-year period of experimental try outs, field testing, and statistical analysis.[5] The test is appropriate for educable mentally retarded children from the age of five through the age of fifteen years. The WISC, which takes between one hour to an hour and a half to administer, must be administered by a qualified psychologist. Consequently, the investigator

---

[3]Elizabeth D. Fraser, "Review of the Wechler Intelligence Scale for Children," The Fifth Mental Measurements Yearbook (Highland Park, New Jersey: The Gryphon Press, 1959), p. 416.

[4]Harold A. Delp, "Review of the Wechsler Intelligence Scale for Children," The Fourth Mental Measurements Yearbook (Highland Park, New Jersey: The Gryphon Press, 1953), p. 363.

[5]David Wechsler, Wechsler Intelligence Scale for Children, New York, New York: The Psychological Corporation, 1949, p. 1.

acquired the present 1971 spring semester test scores for the subjects from the Denton Independent School System.

The investigator discovered in the literature that a coefficient of correlation for reliability of 0.86 to 0.90 for Performance Subgroup Tests and a 0.88 to 0.96 for Verbal Subgroup Tests was obtained. The test manual for the WISC also recorded a coefficient of correlation of 0.92 to 0.94 for the Full Scale Score.[6] No validity figures for the test were quoted in the manual, and for information on this vital point, the investigator referred to the current literature. From the literature the investigator only found non-valid information concerning the validity of the WISC. Data produced by small scale investigations and reported in the literature suggest that the WISC and the Stanford-Binet are correlated at least to the 0.80 level of significance and differed little in their ability to predict academic attainment.[7]

Selection and Description of the Perceptual-Motor Test

Prior to the selection of the test to be employed in the measuring of perceptual-motor performance, the investigator surveyed the related literature to identify the components that were suppositions for inherent perceptual and

---

[6] Ibid., p. 13.

[7] Arden N. Frandsen and Jay B. Higginson, "The Stanford-Binet and the Wechsler Intelligence Scale for Children," Journal of Consulting Psychology, Vol. 15, (1951), pp. 236-238.

motor functions. The following criteria were established for the selection of a perceptual-motor instrument to be utilized. The test should: test areas designated as perceptual-motor in nature; consist of behavior familiar to all children; be reliable, valid, and objective; yield results when administered to educable mentally retarded subjects; be administered on an individual basis; possess numerical scoring criteria which is based on a time factor and is clear enough not to elicit subjective evaluations; and should not endure, or depend upon, learned responses. A pilot study was conducted and the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale was found to be acceptable.

Upon the basis of the foregoing criteria, the investigator with the approval of the thesis committee, selected the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale as a measure of perceptual-motor performance for the present study. A copy of the test with a full description is presented in Appendix C.

The Oseretsky Motor Development Scale strives to measure general static coordination, dynamic manual coordination, general dynamic coordination, motor speed, simultaneous voluntary movements, and asynkinesia (lack of percision of movement, or surplus movement). In revising the instrument, Sloan excluded forty-nine of the original eighty-five items. Of those eliminated, many lacked reliability; some appeared too culturally or intellectually loaded; others entailed the possibility of physical injury; and others required expensive

equipment. The remaining thirty-six items constitute the Lincoln-Oseretsky Motor Development Scale.[8]

On the basis of statistical analysis, Pearman eliminated forty-two of Sloan's forty-nine items. The Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale was computed by Pearman to have the reliability coefficient of 0.86.[9] By using seven items from the Lincoln Revision of the Oseretsky Motor Development Scale, Pearman assumed item validity to be similar to the original test. The time necessary to administer the Scale to each subject was approximately fifteen minutes. Scoring was objective; items were scored on a three point scale depending upon the number of trials to pass a specific skill. Items are primarily novel skills, and learned responses are not believed to be elicited.[10]

Selection of the Subjects

The following criteria were utilized in the selection of subjects. Each subject must: (1) be in the chronological age range of ten to twelve years of age, (2) possess the

---

[8]Bettye Windham Costen, "A Study of the Relationship Between Perceptual-Motor Skills and Academic Achievement in Fourth-Grade Children" (unpublished Ph.D. dissertation, the Texas Woman's University), p. 67.

[9]Roger Pearman, "An Analysis of the Lincoln-Oseretsky Motor Development Scale with an Emphasis on the Reduction of Total Test Items" (unpublished Master's thesis, College of Education, Western Kentucky University), 1968, p. 77.

[10]Daisy Herndon, "The Relationship of Perceptual-Motor Ability and Intellectual Ability in Kindergarten-Age Children." (unpublished thesis, the Texas Woman's University), 1970, p. 21.

mental intelligence quotient of fifty to seventy, (3) have no visual or auditory handicaps, (4) be enrolled in the Denton Independent School System in Denton, Texas, (5) have cumulative records and intelligence tests completed during the 1970-1971 school year.

Procedures Related to the Collection and Treatment of Data

The data upon which the present investigation was based were obtained through the following techniques: permission was obtained from the administration of the Denton Independent Public School System to conduct the present study within it's system; available documentary materials were studied; the Pearman Modification of the Lincoln Revision of the Oseretsky Test for Perceptual Motor Performance was administered.

Data pertaining to intelligence as measured by the WISC was collected from the records of the Department of Special Education which is a branch of the Denton Independent School System. The investigator did not have the appropriate qualification for administering the WISC, therefore, the WISC scores were obtained from the student's records which are kept by the Denton Independent School System. Testing for the WISC was administered one week prior to the investigator's study. Data pertaining to perceptual-motor performance were gathered by administering the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale individually to the subjects in the study. By testing seven

to nine subjects daily, the investigator completed all of the required testing in six days.

Collection of Data Related to Perceptual-Motor Skills

The data related to perceptual-motor skills were collected through the administration of the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale. The total raw scores for each of the subtests were used. Scores were determined on a zero to three point scale. If a subject completed a skill within a specified time he earned from one to three points, but if the subject failed to complete the skill he received no points. A perfect raw score was a total of thirty-three points.

Treatment of the Data

Three hypotheses were tested through the application of the Pearson Product-Moment Coefficient of Correlation which measures all relationships. The results of the tests of the hypotheses appear in Chapter IV.

Procedures Related to Writing the Final Written Report

Upon completion of the statistical treatment of the data and the testing of the hypotheses of the study, the report was summarized, and a conclusion and the implications of the study were discussed. The final procedures included making recommendations for further studies, compiling a bibliography, and developing an Appendix.

Summary

The procedures followed in the development of the study were presented in this chapter. Preliminary procedures involved the selection of instruments and the selection of subjects.

The following instruments were selected to be used in this study: the Wechsler Intelligence Scale for Children to measure intelligence, and the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale to measure perceptual-motor performance.

Subjects selected for the study were thirty-six elementary school special education students ranging in chronological age of ten to twelve years and who possessed a mental intelligence quotient of between fifty and seventy. These students were enrolled in Congress Elementary and Junior High School, Fred Moore Elementary School, Sam Houston Elementary School, and the Texas Woman's University Demonstration School of Denton, Texas.

Procedures for treating the data consisted of selecting the appropriate statistical technique. All data were treated by the Pearson Product-Moment Coefficient of Correlation. Significance of the coefficients of correlation were determined through the use of appropriate tables.

The final procedures included those related to summarizing and writing the final report. In Chapter III the investigator will present the data.

CHAPTER III

PRESENTATION OF THE FINDINGS

In this chapter the data obtained from this study will be presented. Tabular and narrative formats are provided to aid in the interpretation.

The purpose of the study was to determine if a significant relationship exists between selected tests that may be used by therapeutic recreation specialists and other professionals working with the mentally retarded to measure perceptual-motor performance and intellectual performance of educable mentally retarded children. Most perceptual-motor tests are clinical tests which require special training and long periods of time to administer. The perceptual-motor test used in the present study is the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale, which is derived from the well-known Lincoln-Oseretsky Motor Development Scale Test. This test was selected because it met the stated criteria for selection of a test to accomplish the purpose of the study; it was economical of time and it is a valid and reliable test. The Wechsler Intelligence Scale for Children Test was selected to measure intellectual performance on the basis of the stated criteria.

Descriptive Data of the Sample Studied on the Selected Tests

The results of the three scores obtained on the Weschler Intelligence Scale for Children (Verbal Subgroup Tests, Performance Subgroup Tests, Full Scale Score) for the participants from Congress Elementary and Junior High School, Fred Moore Elementary School, Sam Houston Elementary School, and the Texas Woman's University Demonstration School of Denton, Texas, were higher than the population as represented in the Test Manual of the WISC. On the Verbal Subgroup Tests the mean Intelligence Quotient for the participants in the present study was 57.67 and the standard deviation was 7.64. The standard error of the mean for the participants was 1.27. For the Performance Subgroup Tests the recorded mean Intelligence Quotient for the participants was 69.14 with a standard deviation of 9.01. The standard error of the mean was reported to be 1.50. The results of the Full Scale Score of the WISC identifies the mean Intelligence Quotient for the subjects as 64.50 with a standard error of the mean of 1.14. These data are presented in Table 1, page 29.

In accordance with a theory of intelligence which stresses the comparison of a child with his chronological age peers, The Intelligence Quotients for the Wechsler Intelligence Scale for Children have been derived separately for each age. It was predetermined that the mean Intelligence Quotient should be 100 and the standard deviation would be 15. A conversion of sums of Scaled Scores (scale scores with

TABLE 1

DESCRIPTION OF SUBJECTS WITH RESPECT TO THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN AND THE PEARMAN MODIFICATION OF THE LINCOLN REVISION OF THE OSERETSKY MOTOR DEVELOPMENT SCALE

Test	Mean	Standard Deviation	SEM
PLO	21.06	4.72	0.75
WISC:			
Verbal	57.67	7.64	1.27
Performance	69.14	9.01	1.50
Full Scale	64.50	6.81	1.14

a mean of 10 and a standard deviation of 3) was simply a process of setting the average sum of obtained scores equal to 15 and making transformations accordingly.[1] The standard error of the means obtained from this study cannot be compared to those scores recorded in the WISC Manual because the scores in the manual are categorized into age groups for every three months of age. In the present study the investigator grouped all subjects together and recorded the scores for one age group from ten to twelve years of age.

There is no data with which to compare the results of perceptual-motor performance of educable mentally retarded children between the ages of 10 and 12 years as measured by the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale. The mean for this test

[1] David Wechsler, Wechsler Intelligence Scale for Children Manual (New York, New York: The Psychological Corporation 1949), p. 15.

on the subjects measured was 21.06. The standard deviation was 4.72 and the standard error of the mean was 0.75. These data are presented in Table 1, page 29.

Relationship Between the Pearman Modification of Lincoln Revision of the Oseretsky Motor Development Scale and the Wechsler Intelligence Scale for Children

The relationship between intellectual performance as measured by the Weschsler Intelligence Scale for Children and perceptual-motor performance as measured by the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale was studied through the correlation of the Verbal, Performance, and Full Scale scores of the WISC and the total score of the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale. The Pearson Product-Moment Technique was used to determine the coefficient of correlation. The resulting coefficient of correlation between the Verbal Subgroup Tests of the WISC and the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale was 0.74 which is significant at the .001 level of confidence, indicating a high correlation between the two tests. The relationship between the Performance Subgroup Tests of the WISC and the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale was computed by the Pearson Product-Moment Technique and it was determined that a coefficient of correlation of 0.95 exists between the two variables. This correlation is significant at the .001 level of confidence. A

correlation was also computed between the Full Scale Score of the WISC and the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale. The use of the Pearson Product-Moment Technique produced a coefficient of correlation of 0.83 which is significant at the .001 level of confidence. These data are presented in Table 2.

TABLE 2

RESULTS OF CORRELATION COEFFICIENTS AND z SCORES BETWEEN THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN AND THE PEARMAN MODIFICATION OF THE LINCOLN REVISION OF THE OSERETSKY MOTOR DEVELOPMENT SCALE

(N = 36)

	WISC		
	Verbal	Performance	Full Scale
PLO	0.74*	0.95*	0.83*
	z = 4.48	z = 5.68	z = 4.91

*Significant at the .001 level

It appears that perceptual-motor performance as measured by the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and intellectual performance as measured by the Verbal, Performance, and Full Scale Scores of the Wechsler Intelligence Scale for Children are highly related. This relationship between the Performance Subgroup Tests of the WISC and the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale is significant at the .001 level of confidence.

Summary

The correlation of coefficient produced through the use of the Pearson-Product-Moment Technique indicated that a highly significant relationship existed between the three subgroup test scores of the Wechsler Intelligence Scale for Children and the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and vice versa. The correlations produced between these variables was found to be significant at the .001 level.

Chapter IV will present a summary of the study, a test of the hypotheses, a conclusion to the study, and recommendations for further studies will also be presented.

CHAPTER IV

SUMMARY, CONCLUSION, AND RECOMMENDATIONS FOR FURTHER STUDIES

Summary

The present investigation concerned a study of the relationship between perceptual-motor performance and intellectual performance of thirty-six educable mentally retarded children. The subjects were enrolled in the special education classes from Congress Elementary and Junior High School, Fred Moore Elementary School, Sam Houston Elementary School, and the Texas Woman's University Demonstration School of Denton, Texas, during the academic year of 1970-1971.

The Wechsler Intelligence Scale for Children was employed to measure intellectual performance. The Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale was used to measure perceptual-motor performance. The Wechsler Intelligence Scale for Children is an accepted standardized test which is administered on an individual basis. The investigator of the present study lacked a proper background to administer the WISC and, therefore, acquired the data from the 1971 school records. The Denton Independent School System employed professional

personnel to administer the WISC one week prior to the administration of the Pearman Modification of the Lincoln Oseretsky Motor Development Scale by the investigator. The Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale is a relatively new test. Pearman suggests that the sufficiently high correlation with the Lincoln Revision of the Oseretsky Motor Development Scale assured that his modified test could be used by any professional. By using Pearman's modified test rather than the entire battery of test included in the Lincoln Revision of the Oseretsky Motor Development Scale, the therapeutic recreation specialist or other professionals would save valuable time and save the school some expense. The results of the two tests were treated with the Pearson Product-Moment Technique to determine coefficients of correlation between the tests.

Findings of the Study

The findings of the study include the following:

1. The correlation between the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and the WISC Verbal subgroup tests were moderately high for predictive purposes ($r = 0.74$).

2. The correlation between the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and the WISC Performance subgroup tests were a highly significant relationship for predictive purposes ($r = 0.95$).

3. The correlation between the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development

Scale and the WISC Full Scale Score was a highly significant relationship for predictive purposes (r = 0.83).

Tests of the Hypotheses

Upon the basis of the results of the study the following hypotheses were tested:

> Hypothesis I - There is no significant relationship between the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and the Verbal subgroup tests of the Wechsler Intelligence Scale for Children.

A significant coefficient of correlation (r = 0.74), was found between the two tests, therefore, the Null hypothesis was rejected.

> Hypothesis II - There is no significant relationship between the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and the Performance subgroup tests of the Wechsler Intelligence Scale for Children.

The highly significant correlation coefficient (r = 0.95), was found between the two tests, therefore, the Null hypothesis was rejected.

> Hypothesis III - There is no significant relationship between the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and the Full Scale Score of the Wechsler Intelligence Scale for Children.

The high significant correlation coefficient (r = 0.83), between the two tests in the study led to the rejection of the Null hypothesis.

Conclusion

The Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and the Wechsler

Intelligence Scale for Children appear to be highly correlated and, therefore, the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale can be used by the therapeutic recreation specialist, and other professionals, to screen the mentally retarded according to the existing intellectual performance. The Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale is simple to construct and administer. It is believed that the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale should be a preferred test for the therapeutic recreation specialist.

Recommendations for Further Studies

The present investigation was necessarily limited in scope. Varied approaches and research designs are needed to resolve questions related to perceptual-motor proficiency and intelligence; therefore, the following recommendations for further studies are offered:

1. Testing a larger sample of educable mentally retarded subjects to determine coefficients of correlation for reliability and validity.

2. Comparing educable mentally retarded children with normal children who are the same chronological age with respect to perceptual-motor skills and intelligence as determined by the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale and the Wechsler Intelligence Scale for Children.

3. Studying the relationship of a wide variety of tasks of perceptual discrimination and the attainment of skills of educable mentally retarded children in various recreational games, dances, and sports.

4. Studying the relationships of a wide variety of tasks in perceptual discrimination and motor skills of educable children with extreme levels of skill in various recreational games, dances, and sports.

APPENDIX A

THE PEARMAN MODIFICATION OF THE LINCOLN-OSERETSKY MOTOR DEVELOPMENT SCALE

SCORE SHEET

Name _____ Age _____

School _____ Physical Defects _____

Date _____ Score _____

ITEM	DESCRIPTION	R-L	TRS.	PTS.	NOTES
16	Describing circles in the air				
31	Tap feet and describe circles				
13	Making a ball				
18	Placing coins and matchsticks				
5	Touching fingertips				
14	Winding thread				
17	Tapping paper				

Score on WISC test: Verbal _____
Performance _____
Full Scale _____

Date WISC test was given _____

APPENDIX B

RAW DATA

Subject Number	WISC Verbal Raw Scores	WISC Performance Raw Scores	WISC Full Scale Raw Scores	PLO Raw Scores
1	76	70	70	26
2	61	64	59	29
3	62	80	70	22
4	69	64	63	19
5	61	71	62	22
6	53	89	67	25
7	69	76	70	17
8	76	62	67	25
9	69	75	69	18
10	75	55	62	21
11	66	72	66	23
12	73	69	70	21
13	56	54	51	27
14	69	55	59	21
15	69	75	69	28
16	62	67	61	19
17	58	76	64	21
18	65	53	55	19
19	70	76	70	26
20	70	71	67	24
21	74	61	64	10
22	62	46	50	10
23	58	54	52	16
24	57	61	55	27
25	61	54	54	25
26	56	54	51	28
27	46	60	50	14
28	72	69	68	25
29	52	54	50	15
30	77	71	70	24
31	72	64	65	19
32	57	65	57	21
33	65	74	66	17
34	63	62	59	16
35	67	61	61	18
36	58	60	59	20

APPENDIX C

DESCRIPTION OF PERCEPTUAL-MOTOR TEST

Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale

Administration of the Test. Equipment consisted of the kit for the Lincoln-Oseretsky Motor Development Scale, a stopwatch, a well-lighted, relatively spacious room free from extraneous objects, a table and chair suited to the child's height. Physical conditions for testing were ideal.

The directions for the administration of each of the following seven items of the Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale were taken directly from the Manual for the Lincoln-Oseretsky Motor Development Scale:[1]

Test Item 5 Touching Fingertips
Test Item 13 Making a Ball
Test Item 14 Winding Thread
Test Item 16 Describing Circles in the Air
Test Item 17 Tapping
Test Item 20 Placing Matchsticks in a Box
Test Item 31 Tap Feet and Describe Circles

The Pearman Modification of the Lincoln Revision of the Oseretsky Motor Development Scale is presented on the following five pages.

---

[1]William Sloan, Manual for the Lincoln-Oseretsk Motor Development Scale Chicago: The Stoelting Company, 1954).

PEARMAN MODIFICATION OF THE LINCOLN REVISION OF THE OSERETSKY MOTOR DEVELOPMENT SCALE[1]

Original test contained 85 items each on a progressive basis in order to provide a developmental scale; this was shortened to 30 items by Oseretsky.

P. 13 It appears that the tests were categorized on the basis that if at least 90% of the children in the next age group passed an item, the item was included.

P. 25 According to Sloan: Because of high correlations with age (.87 with boys; .88 with girls) the scale may be considered a developmental scale.

Pearman suggested
7 item test demanding single limb activity with r of .88

Also a 7 item test, four of which demanded dual limb performance, with r of .86

16. Describing Circles in the Air

Equipment: None.
Number of trials: One.
Directions: S should be seated with both arms extended horizontally at the sides and the hands clenched except for the index fingers which are extended. S describes circle with both index fingers simultaneously. Say: Let's sit down and stretch your hands out like this. Now don't move your arm or wrist but make nice circles in the air with both your fingers like this. (E demonstrates.)

Scoring criteria: Movement must be executed by the fingers only, the rest of the arm should remain essentially motionless. The circles should be easily recognized and should be of approximately the same diameter. Both fingers should work in unison and the movement must be continued for 10 seconds. If S's performance does not meet these criteria the test is failed.

---

[1]Pearman, Roger. "An Analysis of the Lincoln-Oseretsky Motor Development Scale with an Emphasis on the Reduction of Total Test Items." (unpublished M.A. thesis, College of Education, Bowling Green, Kentucky, August 1968.)

Points: + on 1st trial = 3
on 1st trial = 0

31. Tapping Feet and Describing Circles with Fingers

Equipment: None.
Number of trials: One.
Directions: S is seated with arms extended horizontally at sides with feet touching the floor. S is to tap floor alternately with right and left feet in any rhythm, and simultaneously describe circles with the index finger of each hand. E demonstrates, saying: Let's see if you can do two things at the same time. Make a fist with this finger stretched out like this. Now stretch your arms out like this. Now see if you can make circles with both your fingers while you tap your feet at the same time like this. Do not move your hand around--just your fingers should make the circles.
Scoring criteria: The subject's performance should last at least 15 seconds. The trial is failed if there are changes in rhythm in any of the motor acts, or if figures other than circles are described. Circles should be made with finger only, and not by the hands.
Points: + on 1st trial = 3
- on 1st trial = 0

13. Making a Ball

Equipment: Cigarette papers.
Number of trials: Two with each hand.
Directions: S is seated and told to roll a piece of cigarette paper into a ball with the fingers of one hand. Say: Let's see how quickly you can make a paper ball, with the fingers of one hand, like this (E demonstrates). Give me the ball when you are through. The two trials are given in succession for each hand. The test is performed first with the preferred hand and then with the other hand. In no instance should one hand assist the other in the task nor should the paper be rolled while the hand is touching the table.
Scoring criteria: Time limits, a maximum of 15 seconds is allowed for each trial. E may stop S if the ball is made successfully before the 15 second limit. The ball of paper should be fairly perfect and compact. The score for each hand is the mean number of seconds for the two trials. The test is passed for a hand if a ball is made within the time limits given below.
Points: Each hand is scored separately as follows:

Right Hand

Male	Female
0 to 6 seconds = 3	0 to 7 seconds = 3

Right Hand

Male	Female
7 to 9 seconds = 2	8 to 9 seconds = 2
10 to 12 seconds = 1	10 to 12 seconds = 1
13 or more seconds = 0	13 or more seconds = 0

Left Hand

Male	Female
1 to 6 seconds = 3	0 to 7 seconds = 3
7 to 8 seconds = 2	8 to 9 seconds = 2
9 to 11 seconds = 1	10 to 11 seconds = 1
12 or more seconds = 0	12 or more seconds = 0

18. Coins and Matchsticks

Equipment: Two boxes, 20 matchsticks, 20 pennies.
Number of trials: One.
Directions: The two wooden boxes are placed two inches apart on the table in front of the subject within easy reach of each arm. To the subject's right of the right hand box, 20 matchsticks are placed in a heap, to the left of the left hand box, the 20 pennies are placed in a heap. S is to place the matches in the right hand box and the pennies in the left hand box using both hands simultaneously. The matches and pennies must be placed, not thrown into the box. Say: I want to see how quickly you can do this stunt. When I say go you are to take coins in your left hand, one at a time, and put them into the box on your left. At the same time, you are to take matchsticks, one at a time, with your right hand and place them in the box on your right. You must do both things at the same time. Do you understand? (E demonstrates, placing two or three coins and sticks into the boxes simultaneously, and then returning these pieces to the piles before beginning the tests.) Ready, go! E records time to complete the task.
Scoring criteria: The score depends upon the time to complete the task. If S does not place the pieces into the boxes simultaneously, if he throws the pieces into the boxes or if he picks up more than one piece at a time he is to be corrected verbally by E.
Points:

Male	Female
0 to 29 seconds = 3	0 to 26 seconds = 3
30 to 39 seconds = 2	27 to 38 seconds = 2
40 to 49 seconds = 1	39 to 50 seconds = 1
50 or more seconds = 0	50 or more seconds = 0

5. Touching Fingertips

Equipment: None
Number of Trials: Two (if necessary) for each hand.
Directions: S is to touch all the fingertips of one hand in succession with the thumb of the same hand beginning with the little finger. The test is then repeated in reverse order, starting with the index finger. Say: Let me see you touch your fingertips with your thumb. E demonstrates. Start with your little finger and touch each finger in order like this. Then go back again to the little finger this way. You do it. That's fine. Now let's try it with your other hand.
Scoring criteria: A trial consists of S touching each finger successively and repeating the test in reverse order. There is a five-second time limit for each trial. A trial is failed if S touches a finger more than once, touches two fingers at the same time with the thumb, or if he skips one or more fingers. The test is passed if one of two trials is successful for each hand. If a second trial is necessary the test should be repeated on the same hand before the other hand is tested.
Points: Each hand is scored separately as follows:

+ on 1st trial = 3
on 1st trial, = on 2nd trial = 2
- on both trials = 0

14. Winding Thread

Equipment: A spool of thread.
Number of trials: One trial with each hand.
Directions: The thread should be allowed to unwind to a distance of six-and-one-half feet and should be fastened securely on one end of the spool. The thread should be unwound when given to S. S. should take the thread between the thumb and index finger of the preferred hand and the spool in the other hand. Say: Let's see how fast you can wind this thread on to the spool. Ready, go! S. should be cautioned against excessively moving the hand holding the spool. After the trial with the preferred hand, the task is repeated with the other hand. Say, Now do the same thing with the other hand.
Scoring criteria: E notes the exact time S takes to wind the thread. The maximum time limit for a trial is 30 seconds. The test is passed for a hand if the thread is completely wound on the spool within the time limits given below.

Right Hand

Male	Female
0 to 11 seconds = 3	0 to 11 seconds = 3

Male	Female
12 to 15 seconds = 2	12 to 14 seconds =
16 to 19 seconds = 1	15 to 20 seconds = 1
20 or more seconds = 0	21 or more seconds = 0

Left Hand

Male	Female
0 to 13 seconds = 3	0 to 14 seconds = 3
14 to 17 seconds = 2	15 to 20 seconds = 2
18 to 21 seconds = 1	21 to 26 seconds = 1
22 or more seconds = 0	27 or more seconds = 0

17. Tapping

Equipment: Four sheets of plain paper approximately $8\frac{1}{2}$ x 11 inches. Blunt pencil.
Number of trials: Two trials each hand.
Directions: S is seated at a table on which there is a sheet of plain paper. He rests his right forearm on the table, and takes the blunt pencil in his hand. At a given signal, he is to tap the paper with the pencil as quickly as he can, but is to avoid hitting in the same spot more than once. The dots may be made anywhere on the paper. Only the hand may be moved. Gross movements of the arm are not permissible. Say: I want to see how many dots you can make on this paper with this pencil. You may move your hand, but you may not move your arm from the table. Be careful not to tap twice in the same place. Ready, go!
Scoring criteria: Time limit for each trial is 15 seconds. The score for each hand is the mean number of dots made on the two trials.
Points: Each hand is scored separately as follows:

Right Hand	Left Hand
80 or more dots = 3	70 or more dots = 3
70 to 79 dots = 2	60 to 69 dots = 2
60 to 69 dots = 1	50 to 59 dots = 1
0 to 59 dots = 0	0 to 49 dots = 0

BIBLIOGRAPHY

Books

Buros, Oscar Krisen "Review of the Wechsler Intelligence Scale for Children." The Sixth Mental Measurement Yearbook. New Jersey: The Gryphon Press, 1965.

Cratty, Bryant J. Movement Behavior and Motor Learning. Philadelphia: Lea and Febiger, 1967.

Delp, Harold A. "Review of the Wechsler Intelligence Scale for Children." The Fourth Mental Measurement Yearbook. Highland Park, New Jersey: The Gryphon Press, 1953.

Fraser, Elizabeth. "Review of the Wechsler Intelligence Scale for Children." The Fifth Mental Measurement Yearbook. Highland Park, New Jersey: The Gryphon Press, 1959.

Hoerr, Normand L. and Osol, Arther. Blakeston's New Gould Medical Dictionary. New York: McGraw-Hill Book Company Inc., 1956.

Sloan, William. Manual for the Lincoln-Oseretsky Motor Development Scale. Chicago: C. M. Stoelting Company, 1954.

Wechsler, David. Manual for the Wechsler Intelligence Scale for Children. New York, New York: The Psychological Corporation, 1949.

Periodicals

Chasey, William C. and Wyrick, Wareen. "Effect of a Gross Motor Develomental Program on Form Perception Skills of Educable Mentally Retarded Children." The Research Quarterly, XLI (October 1970), 345-352.

Clif, Marguerite. "A Developmental Approach to Perceptual-Motor Experiences." Journal of Health Physical Education Recreation, XLI (April 1970), 34-37.

Frandsen, Arden N. and Higginson, J. B. "The Stanford-Binet and the Wechsler Intelligence Scale for Children." Journal of Consulting Psychology, XV (June, 1951), 236-238.

Fretz, Bruce R., Johnson, Warren R. and Johnson, Julia A. "Intellectual and Perceptual Motor Development as a Function of Therapeutic Play." The Research Quarterly, XL (December, 1969), 687-691.

Gire, Eugenia. "The Relationship Between Measures of Motor Educability and the Learning of Specific Motor Skills." The Research Quarterly, XIII (March, 1942), 43-53.

Herkowitz, Jacqueline. "A Perceptual-Motor Training Program to Improve the Gross Motor Abilities of Preschoolers." Journal of Health Physical Education Recreation, XLI (April, 1970), 38-42.

Kiphard, Ernst J. "Behavioral Integration of Problem Children Through Remedial Physical Education." Journal of Health Physical Education Recreation, XLI (April, 1970), 45-47

McCloy, C. H. "A Preliminary Study of Factors in Motor Educability." The Research Quarterly, XI (May, 1940), 30-39.

McCormick, James. "The Role of Perceptual-Motor Training in Therapeutic Recreation Programs for the Mentally Retarded." Therapeutic Recreational Journal, V (Second Quarter, 1971), 63-66.

Newman, Robert J. and Loss, Frank M. "Differences Between Verbal and Performance IQ's with Mentally Defective Children on the Wechsler Intelligence Scale for Children." Journal of Consulting Psychology, XIX (No. 1, 1955), 16.

Oseretsky, Nicolaus I. "A Method of Group Rating of Motor Abilities in Childhood and Youth." Gosmedizat, Moscow, (Original in Russian), 1929, p. 60, quoted in Lassner, Rudolf, "Annotated Bibliography of the Oseretsky Tests of Motor Proficiency, Journal of Consulting Psychology, XII (1948), 37-47.

Oseretsky, Nicolaus I. A Metric Scale for Studying the Motor Capacity of Children, 1923, p. 24, quoted in Rudolf Lassner, "Annotated Bibliography on the Oseretsky Tests of Motor Proficiency." Journal of Consulting Psychology, XII (1948), 40.

Sandercock, Marian, and Butler, Alfred J. "An Analysis of the Performance of Mental Defectives on the Wechsler Intelligence Scale for Children." American Journal of Mental Deficiency, LVII (July, 1952), 100-105.

Singer, Robert N. and Burk, Janson W. "Relation of Perceptual Motor Ability and Intellectual Ability in Elementary School Children." Perceptual and Motor Skills, XXIV (June, 1967), 967-970.

Sloan, William. "Motor Proficiency and Intelligence." American Journal of Mental Deficiency, LV (January 1951), 394-405.

Smith, Hope. "Implications for Movement Education Experiences Drawn from Perceptual-Motor Research." Journal of Health Physical Education Recreation, XLI (April, 1970), 30-33.

Smith, Hope M. "Motor Activity and Perceptual Development." Journal of Health Physical Education Recreation, XXXIX (February, 1968), 28-35.

Stacey, Chalmers L. and Levin, Janice. "Correlation Analysis of Scores of Subnormal Subjects on the Stanford-Binet and Wechsler Intelligence Scale for Children." American Journal of Mental Deficienc-, LV (April, 1951 , 590-597.

Stroud, James B. and Blommers, Paul. "Correlation Analysis of WISC and Achievement Test." The Journal of Educational Psychology, XLVIII (January, 1957), 18-26.

The American Association on Mental Deficiency, Monography Supplement to American Journal of Mental Deficiency, 1961.

The Project on Recreation and Fitness for the Mentally Retarded American Association for Health, Physical Education, and Recreation. "Activity Programs for the Mentally Retarded." Journal of Health Physical Education Recreation, XXXVII (April, 1966).

Wellman, Elizabeth B. "The Validity of Various Tests as Measures of Motor Ability." The Research Quarterly, VI (March, 1935), 19-25.

Unpublished Materials

Costen, Bettye Windham. "A Study of the Relationship Between Perceptual-Motor Skills and Academic Achievement in Fourth-Grade Children." Unpublished Ph.D. dissertation, College of Health, Physical Education, and

Recreation, the Texas Woman's University, Denton, Texas, 1968.

Herndon, Daisy E. "The Relationship of Perceptual-Motor Ability and Intellectual Ability in Kindergarten-Age Children." Unpublished thesis, College of Health, Physical Education, and Recreation, the Texas Woman's University, Denton, Texas, 1970.

Oseretsky, Nicolaus I. "Methods of Investigating Motor Components." Zietschrift fur Angewandte Psychologie, IVII, (1931), p. 162, English Translation by Elizabeth Lang, unquoted in Thams, Paul Fredrik, "A Factor Analysis of the Lincoln-Oseretsky Motor Development Scale." (Unpublished Ph.D. dissertation, University of Michigan, 1955).

Pearman, Roger. "An Analysis of the Lincoln-Oseretsky Motor Development Scale with an Emphasis on the Reduction of Total Test Items." Unpublished Master of Science Thesis, College of Education, Western Kentucky University, Bowling Green, Kentucky, 1968.