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Motor Proficiency of Mentally Retarded Children

Carol H. Doorn

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MOTOR PROFICIENCY OF MENTALLY RETARDED CHILDREN

BY

CAROL H. DOORN

A thesis submitted in partial fulfillment of the requirements for the degree Master of Science, Major in Education, South Dakota State University

1966
This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable as meeting the thesis requirements for this degree, but without implying that the conclusions reached by the candidate are necessarily the conclusions of the major department.

Thesis Adviser

Head, Education Department

Date
PREFACE AND ACKNOWLEDGEMENTS

This paper is an attempt to correlate intelligence and motor proficiency and to determine if remedial physical education will improve motor proficiency significantly. The Oseretsky Tests of Motor Proficiency were used by the author in a test-retest situation during a six month program of remedial physical education.

The author wishes to acknowledge Dr. Stanley Sundet, advisor in the Graduate Division of Education, and Glenn E. Robinson, advisor in the Graduate Division of Physical Education, for assistance and guidance in conducting the study.
# LIST OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>2</td>
</tr>
<tr>
<td>Significance of the Problem</td>
<td>2</td>
</tr>
<tr>
<td>Limitations</td>
<td>3</td>
</tr>
<tr>
<td>Definitions of Terms</td>
<td>3</td>
</tr>
<tr>
<td>II. REVIEW OF LITERATURE</td>
<td>5</td>
</tr>
<tr>
<td>III. PROCEDURE</td>
<td>14</td>
</tr>
<tr>
<td>Testing Periods</td>
<td>14</td>
</tr>
<tr>
<td>Subjects</td>
<td>14</td>
</tr>
<tr>
<td>Description of Remedial Physical Education</td>
<td>14</td>
</tr>
<tr>
<td>Testing Instrument</td>
<td>15</td>
</tr>
<tr>
<td>Description of Tests and Testing Procedures</td>
<td>16</td>
</tr>
<tr>
<td>Pilot Study</td>
<td>17</td>
</tr>
<tr>
<td>IV. TREATMENT AND ANALYSIS OF DATA</td>
<td>18</td>
</tr>
<tr>
<td>Introduction</td>
<td>18</td>
</tr>
<tr>
<td>Reliability of Data</td>
<td>18</td>
</tr>
<tr>
<td>Statistical Procedure</td>
<td>19</td>
</tr>
<tr>
<td>Analysis of Data</td>
<td>19</td>
</tr>
<tr>
<td>V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS</td>
<td>25</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>25</td>
</tr>
<tr>
<td>Discussion of Findings</td>
<td>25</td>
</tr>
<tr>
<td>Conclusions</td>
<td>26</td>
</tr>
<tr>
<td>CHAPTER</td>
<td>PAGE</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Recommendations</td>
<td>27</td>
</tr>
<tr>
<td>Recommendations for Further Study</td>
<td>27</td>
</tr>
<tr>
<td>SELECTED REFERENCES</td>
<td>29</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>32</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. MOTOR TESTS RESULTS</td>
<td>20</td>
</tr>
<tr>
<td>II. STATISTICAL SIGNIFICANCE OF MOTOR PROFICIENCY AFTER REMEDIAL PHYSICAL EDUCATION</td>
<td>21</td>
</tr>
<tr>
<td>III. INTELLIGENCE AND MOTOR LEVEL CORRELATION</td>
<td>21</td>
</tr>
<tr>
<td>IV. COMPARISON OF MOTOR, MENTAL AND CHRONOLOGICAL AGES</td>
<td>22</td>
</tr>
</tbody>
</table>
# List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Comparison of Motor, Mental and Chronological Ages</td>
<td>23</td>
</tr>
<tr>
<td>2. Illustration of Motor Tests Results</td>
<td>24</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Children vary in the degree of intellectual capacity with which they function, ranging from extremely inferior to extremely superior levels. When intellectual capacity is measured by means of an intelligence test a large percentage cluster around the middle portion of the range and by definition are called "average." A small percentage of the normal population are termed "feeble-minded" and an equally small amount are at such a high level to be termed "genius." Between the highest and lowest levels there is a large range—a continuum—which comprises the intervening levels of intellectual capacity.¹

Children range all along this continuum, differing from each other in both the quantity of intelligence they display and the quality of intelligence they display. There is no sharp break along this continuum. For convenience, children who rank below a selected point are feeble-minded. These children who fall within this low range differ among themselves. They do not fall at one point on the scale but range over a large section from the mildly retarded to the

This paper discusses the mentally retarded students who were incapable, because of their limited capacities, of adapting adequately to their environment. Society is becoming more aware of their responsibility in providing adequate programs for the treatment and care of the mentally retarded. According to the United States Department of Health, Education and Welfare, 126,000 or 3 out of every 100 children born in the United States each year are mentally retarded.³

Purpose of the Study

The purpose of the study was to determine the effect of a program of remedial physical education on motor proficiency of mentally retarded children.

Significance of the Problem

Education for the mentally retarded students presents a problem for educators. These students are placed in Special Education classrooms to provide these children with opportunities for normal social contacts and educationally acceptable experiences. Health, both physical and mental, is an important aspect of the program for the retarded at all stages of development. Education for mental retardates involves physical and mental experiences.

²Ibid., p. 1.

Limitations

1. Six boys and one girl composed the class.

2. The intelligence quotients of the group were determined April, 1965.

3. No effort was made to raise the intelligence quotients; the curriculum was not changed from past instruction in the Special Education classroom.

4. The students' home and school environment was basically unchanged during the study.

5. Mental age is assumed to be a progression in ratio to chronological age.

6. The possibility of the practice effect may have affected a retest with the Stanford Binet Tests.

7. The Oseretsky Tests of Motor Proficiency was the measuring device.

Definitions of Terms

1. Chronological age--the age of the student calculated from actual date of birth.

2. Dynamic coordination of the hands--the ability to perform acts such as maze tracing or using a pair of scissors.

3. General dynamic coordination--the ability to control and move the body simultaneously as described by the examiner.

4. Intelligence quotients--a convenient way of representing the relationship between the child's mental age and
his chronological age. The Stanford Binet formula is
IQ=MA/CA x 100.

5. Mental age—the age established by the Stanford Binet Tests.

6. Mentally retarded students—school age children who have been tested by an agent of the state of South Dakota and declared retarded (an intelligence quotient below 70) or children who are recommended by the same agent for Special Education.

7. Motor age—the age established by the Oseretsky Tests.

8. Motor speed—the time required to perform a motor act.

9. Motor proficiency—or motor aptitude includes muscular control, gross and fine coordination, speed, reaction time, maze tracing and gait analysis.

10. Remedial physical education—learning such basic skills as crawling, walking, skipping, running, jumping, throwing, catching and kicking.

11. Simultaneous voluntary movements—performing two motor acts with the same speed, accuracy or rhythm.

12. Special Education classroom—a classroom with mentally retarded students aged from nine to sixteen.

13. Static coordination—the ability to balance.

14. Synkinesia—the ability to move or perform without superfluous movements.
CHAPTER II
REVIEW OF LITERATURE

Beginning with the work of Seguin in 1846 much emphasis has been placed on educating the mentally retarded through training of the muscular system. Seguin's contribution to education of the mentally retarded student was called the "physiological method" which emphasized "doing things with the hands." Seguin believed specific training of the peripheral nervous system through muscle and sense training would strengthen the receptors and allow impulses to reach the central nervous system more readily. The first task in educating the mentally retarded child was educating the muscular system. Seguin believed activities must satisfy the child's own needs, desires and capacities which was a modern approach in education. The exercises were simple and designed to harmonize all motor functions and develop any part of the body which was weak. Seguin's physiological method was essentially one of sensori-motor training which would "lead the child from the education of the muscular system to that of the nervous system and the senses."  

Many of the methods used by Montessori were refinements

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and adaptations of Seguin's approach. The keynote in the Montessori system was "auto-education" or self-teaching. Activities and materials were so organized and designed that children taught themselves while the teacher withdrew into the background. Didactic materials were used to teach all the senses but taste and smell.\(^5\)

Decroly indicated that education of the mentally retarded child should center around the child and his needs. The program emphasized the child's physical and mental constitution and his needs in terms of food, clothing, vocational training and environment. Decroly emphasized educational games in a natural and informal setting.\(^6\)

Descroedures believed in a thorough diagnosis of mentally defective children and that the mentally defective could be educated in a special class of the public schools. She had the following principles which are representative of modern philosophical trends in education: (1) utilize the natural activity or "learn by doing," (2) create new knowledge through social activities, (3) correlation and association of ideas in a setting more understandable, (4) individualization of instruction, and (5) the utilitarian character of using the learned activity immediately in actual life. Descroedures organized a series of games and

\(^{5}\) Detressa Maria Montessori, Montessori translated by Anne E. George. New York: Frederick A. Stokes Company, 1912.

\(^{6}\) Kirk and Johnson, *op. cit.*, p. 82.
exercises to develop the senses relating to sight, hearing, muscular sense, touch, taste and smell and in addition to this, physical activities. She stated that mentally retarded children are both physically and mentally defective. Descroedres believed physical education was important because mental retardates must develop: (1) an adequate physique, (2) good movement of the body, (3) motor coordination, (4) moral training, (5) self confidence and (6) ease in performance of daily activities.\(^7\)

One of the earliest investigations of the relationship between motor ability and intelligence was made by Bagley in 1900. Teachers' estimates were the measures used for mental ability and Bagley concluded there was an inverse relationship between motor and mental ability.\(^8\) Later studies refuted this finding because intelligence tests were available and used as the measure of mental ability.\(^9\)

In 1916 Doll was enthusiastic about the possibility of using anthropometric measures as a diagnostic tool for mental defectives. Doll suggested that the use of height, weight and grip be combined and used as a relatively simple

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auxiliary method for examination of mental retardates. However, later research has failed to demonstrate much value in using these measures in the diagnosis of the mentally deficient child. 10

Scores obtained from tests of both motor ability and intelligence are closely related in young children. Farmer was one of the first psychologists to call attention to this fact in 1927. Many test items at the pre-school level for intelligence are essentially motor tasks. Farmer conducted a study to find the correlation between reaction time and intelligence among a group of 978 subjects with an age range of three months to twenty one years. Among the young children there was a high correlation between intelligence and the results on motor ability tests. This correlation became less with increasing age. It was Farmer's opinion that motor tests for young children "are not really tests of motor ability but of intelligence" since with a partially developed intelligence it is only the intelligent children who understand what is required of them in a motor test. As the children get older, this factor of intelligence ceases to become important and the tests become more adequate measures of motor ability. 11


Goodenough studied the development of the process of reaction time from early childhood to maturity. Goodenough found only a slight relationship between scores on the tests of intelligence and the reaction time of a simple stimulus. There were sex differences in favor of the male even in the measurements taken during early childhood.\(^{12}\) In regard to gross motor skills Goodenough feels that mentally retarded children are awkward and clumsy in their movements and they do not use their strength effectively.\(^{13}\)

Manual dexterity was studied by Cantor and Stacey using the Purdue Pegboard. The authors concluded that people whose intelligence quotients were below 60 would generally be unable to perform tasks involving manual dexterity.\(^{14}\)

Sherman believes mentally retarded children, if given the proper training will be as adequate as the normal child in gross motor skills. Skills involving crawling, standing, walking, skipping, running, jumping, throwing, catching and kicking should be stressed. The following neuromuscular skills should be developed: coordination, agility, speed,


accuracy, physical efficiency, alertness, balance and stamina.\textsuperscript{15}

According to Tredgold after a study of retarded girls and boys, "even the best of the retarded children with remarkably few exceptions attain the precision and neatness of movement which the normal well trained child is capable." Tredgold also stressed the inability of retarded children to adapt to their environment.\textsuperscript{16}

According to Carey there is little or no correlation between the motor abilities of normal and mentally retarded students. Carey studied fourth, fifth and sixth grade boys in an elementary school.\textsuperscript{17}

McCloy and Young, in their book of tests and measurements, found "almost no relationship...between intelligence quotients and measures of physical ability." The authors continued "for an indication of ability in physical skills, intelligence quotients are useless scores, at least within the zone of normality that is maintained in today's public


\textsuperscript{17}Robert A. Carey, \textit{A Comparison of the Oseretsky Tests of Motor Proficiency with Selected Motor Ability Tests on Boys at the Elementary Level}. Doctor's Dissertation, University of Indiana, 1954.
In a study by Sloan twenty feeble-minded and twenty normal subjects were administered the Oseretsky Tests of Motor Proficiency. Subjects were matched according to age and sex. A significant difference was found at all subtests. From his study Sloan concluded that intelligence was related to motor proficiency.\textsuperscript{19}

Rabin used the Oseretsky Tests of Motor Proficiency on a control and an experimental group and found significant improvement of motor proficiency made by the experimental group.\textsuperscript{20}

To achieve optimum growth, development and adjustment according to Jennings, mentally retarded students should be enrolled in regular physical education classes only after consideration of teacher attitudes, maturity of other students, class size and the individual ability to succeed in class. Suggestions for suitable games and


activities for the mentally retarded were made by
Jennings. 21

Beaber compared the performance of three groups on
four simple motor skills. He used a mentally retarded
group, a second group of normal children with the same
mental age and a third group of normal children with the
same chronological age. Beaber concluded that mental
retardates are almost identical to their mental age group
in skill performance but are consistently inferior to the
group with the same chronological age. 22

Head compared 74 normal students and 73 mental
retardates and found the retarded children were con­
sistently inferior on four selected motor skills. He
suggested further study be done to determine where
intelligence or lack of it affects motor proficiency. 23

In a study by Howe in 1957, a direct relation of low
motor proficiency and intelligence was found. 24

21 Elizabeth Ann Jennings, An Analysis of the Adjustment
Problems of the Mentally Retarded With Implications for
Physical Education. Unpublished Master's Thesis, University
of Southern California, 1959.

22 James B. Beaber, The Performance of Educable Mentally
Retarded and Intellectually Normal Children on Selected Motor
Tasks Involving Simple Motor Performance. Doctor's Disser­
tation, Syracuse University, 1961.

23 Dwayne G. Head, A Comparison of Motor Abilities of
Normal and Mentally Retarded Children. Unpublished Master's

24 Howe, op. cit.
A group of twenty four mentally retarded boys were studied by Corder. The group was divided into three subgroups: (1) eight were the control group, (2) eight were designated "officials" to help the investigator, and (3) eight were given two months of physical training with the help of the "officials." The boys were measured during the program on (a) intellectual development, (b) physical development and (c) social status. The training group made significant gains over both groups except in social development and no change was made of this level by any group.25

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CHAPTER III
PROCEDURE

The purpose of the study was to determine the effect of a remedial physical education program on the motor proficiency of mental retardates. The subjects, the remedial program, the testing instrument and testing procedure are described in this chapter.

Testing Periods

The Oseretsky Tests of Motor Proficiency were administered by the author at the beginning of the study in November, 1965; a retest was given in February, 1966; and a final test was administered in May, 1966.

Subjects

The mentally retarded students were in a Special Education classroom in a public school in eastern South Dakota. The students ranged in chronological age from nine to sixteen and their intelligence quotients ranged from 62 to 82. Due to the limited ability of the six boys and one girl, the writer observed the classroom for four hours prior to the study. Handedness, class attentiveness and reaction to a stranger were noted.

Description of the Remedial Physical Education Program

After the first testing, the students participated in a remedial physical education program instructed and planned by the author. The search of literature indicated
that skills involving crawling, standing, walking, skipping, running, jumping, throwing, catching and kicking should be stressed. The literature also indicated that an attempt should be made to develop the following neuro-muscular skills: coordination, agility, speed, accuracy, physical efficiency, alertness and balance. Games, calisthenics, rhythmics and stunts were learned by the students. The class met for the most part in the regular Special Education classroom, on the school playground or in the gymnasium. Each student had a minimum of sixty minutes of remedial physical education each week.

Daily plans of remedial physical education are not outlined as a formal program because of the students' inability to adapt to new situations, an apparent lack of interest in school, short attention span, regressive possibilities and lack of prior physical education activity. The investigator changed the program daily to meet the students' needs, interests and experiences.

Testing Instrument

Limited study has been completed in the area of motor ability of mentally retarded students. The writer chose to use the Oseretsky Tests of Motor Proficiency for the following reasons: (1) The age range of the test is from four to sixteen years which compares favorably with the mental age of mental retardates. Hutt and Gibby state
"No other test published at this date covers the specific area of motor ability and motor age as the Oseretsky Tests do."\textsuperscript{26} Anastasi writes "The test is suitable with feeble-minded who are often retarded in their motor functions."\textsuperscript{27} The author in reviewing the literature failed to find other tests which could apply to this study.

(2) The tests had to be easily understood by the mental retardates.

(3) The test battery had to be easily and accurately scored by the investigator. In the writer's opinion, the Oseretsky Tests of Motor Proficiency met these requirements.

**Description of Test and Test Procedure**

The test was administered to each student individually and demonstrations and verbal instructions were given by the author in the test room. Each student began the tests at the lowest motor age level or base and progressed as far as his or her ability would allow. The student would advance to the test item on the next age level if he or she had completed the item on the preceding level successfully.

The areas tested were: (1) general static coordination, (2) dynamic coordination of hands, (3) general

\textsuperscript{26}Hutt and Gibby, *op. cit.*, p. 220.

\textsuperscript{27}Anastasi, *op. cit.*, p. 299.
dynamic coordination, (4) motor speed, (5) simultaneous voluntary movements and (6) synkinesia. Some of the tests involve handedness and the author was aware of the preferred hand prior to the testing.

The students were classified in rank order of intelligence for identification.

The items of the Oseretsky Tests of Motor Proficiency for each level may be found in the Appendix. The scoring procedure follows the test items.

Pilot Study

Prior to the administration of the tests for this investigation, a pilot study involving five normal children with chronological ages of three to seventeen was completed. The author administered and scored the tests to become familiar with the scoring procedure.
CHAPTER IV
TREATMENT AND ANALYSIS OF DATA

Introduction

This investigation attempted to determine motor improvement, if any, of mentally retarded students if participating in a remedial physical education program. The motor test results were also correlated to motor proficiency.

Seven mentally retarded students, six boys and one girl, were the subjects. The chronological age range was nine to sixteen; the intelligence quotients ranged from 62 to 82. The Oseretsky Tests of Motor Proficiency were given in a test-retest situation.

Reliability of Data

A pilot test was given to provide the evaluation and scoring technique for the author to use throughout the test administrations. Larson suggested to apply the directions consistently. The important thing is to get the tasks accomplished and evaluate the results on a systematic basis.28 The writer followed the test directions while administering and scoring the tests.

28LeRoy Larson, Ph.D., Professor of Special Education, Division of Education and Psychology, Northern State College, Aberdeen, South Dakota. Personal correspondence dated November 9, 1965.
Statistical Procedure

Statistical procedure as recommended by Garrett were used in this study. Mean scores were computed for the three motor levels. The significance of the difference between the means of the (1) first and second levels, (2) first and third levels and (3) second and third levels were found. If t ratios were statistically significant at, or beyond, the five percent level of confidence, the null hypothesis was rejected. In determining if a linear correlation of motor proficiency and intelligence existed, the following "rules" were used as the guide to interpret the correlation coefficients: 30

- r from .00 to ±.20 very low or negligible
- r from ±.20 to ±.40 low; present but slight
- r from ±.40 to ±.70 substantial or marked
- r from ±.70 to ±1.00 high to very high

A comparison of motor age, mental age and chronological age was made. The mental age was computed by the Stanford Binet Tests formula with the assumption that mental age progresses in ratio to chronological age.

Analysis of Data

The motor level results are recorded in Table I. The statistical significance of remedial physical education is shown in Table II. The correlation coefficients are found

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30 Ibid., p. 100.
Motor, mental and chronological ages are compared in Table IV.

Table I is a tabulation of motor proficiency scores. Motor I indicates the Oseretsky Test level established at the beginning of the study, Motor II is the retest after three months of remedial physical education and Motor III at the end of the study. The scores are tabulated in months. Group means are also shown.

**TABLE I**

**MOTOR TESTS RESULTS**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Motor I</th>
<th>Motor II</th>
<th>Motor III</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>52</td>
<td>89</td>
<td>112</td>
</tr>
<tr>
<td>Two</td>
<td>64</td>
<td>82</td>
<td>93</td>
</tr>
<tr>
<td>Three</td>
<td>57</td>
<td>66</td>
<td>81</td>
</tr>
<tr>
<td>Four</td>
<td>70</td>
<td>81</td>
<td>102</td>
</tr>
<tr>
<td>Five</td>
<td>48</td>
<td>56</td>
<td>67</td>
</tr>
<tr>
<td>Six</td>
<td>66</td>
<td>78</td>
<td>95</td>
</tr>
<tr>
<td>Seven</td>
<td>50</td>
<td>52</td>
<td>63</td>
</tr>
<tr>
<td>Group Means</td>
<td>58.14</td>
<td>72.0</td>
<td>87.57</td>
</tr>
</tbody>
</table>

Table II shows the statistical significance of motor proficiency before, during and after the remedial physical education program. To be statistically significant at the
.05 level of confidence, a critical ratio of 2.45 was necessary; 3.71 to be statistically significant at the .01 level. All three critical ratios (t) were statistically significant beyond the .01 level of confidence. The null hypothesis was rejected.

**TABLE II**

**STATISTICAL SIGNIFICANCE OF MOTOR PROFICIENCY AFTER REMEDIAL PHYSICAL EDUCATION**

<table>
<thead>
<tr>
<th></th>
<th>MeanD</th>
<th>SEMD</th>
<th>t</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Tests I and II</td>
<td>12.4</td>
<td>3.07</td>
<td>4.04</td>
<td>.01</td>
</tr>
<tr>
<td>Motor Tests I and III</td>
<td>29.4</td>
<td>5.66</td>
<td>5.19</td>
<td>.01</td>
</tr>
<tr>
<td>Motor Tests II and III</td>
<td>15.6</td>
<td>1.85</td>
<td>8.43</td>
<td>.01</td>
</tr>
</tbody>
</table>

The correlation coefficients are found in Table III. The three motor test levels are correlated to intelligence and the coefficients are interpreted by the "rules" as stated.

**TABLE III**

**INTELLIGENCE AND MOTOR LEVEL CORRELATION**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Test I and Intelligence</td>
<td>-.11</td>
<td>negligible</td>
</tr>
<tr>
<td>Motor Test II and Intelligence</td>
<td>.67</td>
<td>substantial</td>
</tr>
<tr>
<td>Motor Test III and Intelligence</td>
<td>.78</td>
<td>high</td>
</tr>
</tbody>
</table>
Table IV shows the comparison between the motor, mental and chronological ages at the end of the study. The ages are tabulated in months.

TABLE IV

COMPARISON OF MOTOR, MENTAL AND CHRONOLOGICAL AGES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Motor III</th>
<th>Mental</th>
<th>Chronological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject One</td>
<td>112</td>
<td>143</td>
<td>175</td>
</tr>
<tr>
<td>Subject Two</td>
<td>93</td>
<td>105</td>
<td>140</td>
</tr>
<tr>
<td>Subject Three</td>
<td>81</td>
<td>99</td>
<td>138</td>
</tr>
<tr>
<td>Subject Four</td>
<td>102</td>
<td>115</td>
<td>164</td>
</tr>
<tr>
<td>Subject Five</td>
<td>67</td>
<td>117</td>
<td>175</td>
</tr>
<tr>
<td>Subject Six</td>
<td>95</td>
<td>126</td>
<td>204</td>
</tr>
<tr>
<td>Subject Seven</td>
<td>63</td>
<td>88</td>
<td>142</td>
</tr>
<tr>
<td>Group Mean</td>
<td>87.57</td>
<td>113.28</td>
<td>162.57</td>
</tr>
</tbody>
</table>

The difference between the Motor III mean and the mental age mean is 25.71 months. The difference between the Motor III means and the chronological mean is 75 months.

Figure 1 illustrates by graph the comparisons of motor, mental and chronological ages.

Figure 2 illustrates the differences between Motor I, Motor II and Motor III.
FIGURE 1
COMPARISON OF MOTOR, MENTAL AND CHRONOLOGICAL AGES

One Two Three Four Five Six Seven
SUBJECTS

Motor III
Mental
Chronological
FIGURE 2

ILLUSTRATIONS OF MOTOR TESTS RESULTS

Subject:

Motor I

Motor II

Motor III
CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Statement of the Problem

The purpose of this study was to ascertain if a six month program of remedial physical education would improve the motor level of mentally retarded students. The measuring instrument was the Oseretsky Tests of Motor Proficiency. A correlation coefficient of motor level and intelligence quotient was also computed.

The motor characteristics measured were (1) general static coordination, (2) dynamic coordination of the hands, (3) general dynamic movements, (4) motor speed, (5) simultaneous voluntary movements and (6) synkinesia.

Discussion of Findings

The findings of this study indicate an improvement of motor proficiency after remedial physical education. The improvement was statistically significant beyond the one percent level of confidence.

The correlation found between motor ability and intelligence quotients indicate a substantial to high relationship.

The comparison of motor, mental and chronological ages indicate that mental retardates function physically as well as mentally at their mental age level.

Figure 1 indicates the students function at a mental
and motor level lower than their chronological age level.

Improvement on the individual motor level is indicated by Figure 2.

Conclusions

Results as listed in Table I indicate motor proficiency improvement of the group as well as individual improvement.

Table II indicates motor improvement was statistically significant at the .01 level of confidence for the group after participating in the remedial physical education program.

The correlation coefficients are found in Table III. Employing the "rules" as stated, a low negative correlation existed between the first motor level and intelligence. A substantial correlation was found at the time of the second testing and a high correlation existed at the end of the study. These results indicate that the higher the intelligence quotient, the higher the motor learning level.

The results indicated in Table IV show that the motor level mean of the students at the end of the study was 25.73 months below their mental level. The motor level mean was 75 months below their chronological level. This finding would indicate that mental retardates' motor functions are relative to their mental age level but are below their chronological age level.
Recommendations

1. Because of their apparent motor deficiency in areas measured by the Oseretsky Tests, mentally retarded students should be provided a remedial physical education program.

2. It was indicated by the graphic presentations, that mental retardates showed progress in motor proficiency. It is the writer's opinion that through proper training mentally retarded children can attain reasonable motor proficiency in relation to their mental age.

3. Because of their limited motor abilities, physical education for the mentally retarded students should be planned with emphasis on basic skills.

Recommendations for Further Study

1. It is recommended that this study be repeated with a larger sample.

2. The boy-girl ratio should be equal to determine sex differences, if any.

3. A comparative study of results of a remedial physical education program over a year or longer period could be conducted to determine if mentally retarded students ever reach or surpass their mental age level.

4. A factor analysis of motor weaknesses as indicated by other tests as well as the Oseretsky Tests could be studied to determine what areas, if any, are consistently
weaker among mental retardates.

5. A study of the Oseretsky Tests of Motor Proficiency should be completed to determine reliability and validity. Norms for mentally retarded and normal children should be established for the test.
SELECTED REFERENCES


DESCRIPTION OF OSERETSKY TEST ITEMS

Tests for Four Years

1. To remain standing, eyes closed, for fifteen seconds.
2. To touch the point of the nose alternately with the right and left index fingers, eyes closed.
3. To jump up and down (hop) in the same place, keeping feet together, seven or eight times in five seconds.
4. To put twenty coins in a box, spending no more than fifteen seconds.
5. To describe circles (in the air) with the index fingers of both hands for ten seconds, with the arms extended horizontally at the sides.
6. To clasp the examiner's right hand, first with the right hand, then with the left, and finally with both hands.

Tests for Five Years

1. To stand in an upright position on tip-toe, for ten seconds, eyes open.
2. To roll up a square of silk (thin) paper five centimeters square with the fingers so as to form a small ball.
3. To hop on one foot for a distance of five meters, eyes open.
4. To roll thread on a spool.
5. To put at least ten matchsticks in a box simultaneously with the right and left hands.
6. To clench the teeth and show them by parting the lips.

Tests for Six Years

1. To remain standing, weight on one leg only, for ten seconds, eyes open.
2. To throw a ball (eight centimeters in diameter) at a target (twenty five centimeters by twenty five centimeters).
3. To jump, with the feet together, and without losing body balance, over a rope placed twenty centimeters high.
4. To draw perpendicular lines.
5. To walk about the room (at will on the part of the child) holding in the left hand a spool of thread which is to be rolled on the right index finger.
6. To strike a table-top forcefully several times with a mallet.
Tests for Seven Years

1. To balance on tip-toe for ten seconds, while bending forward from the hips at right angles.
2. To trace through two mazes with a pencil.
3. To walk a line two meters long, eyes open.
4. To distribute playing cards in four piles.
5. While seated, to tap the floor alternately with the right foot and then the left foot in any rhythm which the child may elect.
6. To knit the eyebrows.

Tests for Eight Years

1. To maintain a crouched position on tip-toe for ten seconds, arms extended horizontally at the sides, eyes closed.
2. To touch all the finger tips of one hand successively with the thumb (of the same hand), beginning with the little finger and repeating in reverse order.
3. To push a matchbox with one (the preferred) foot for a distance of five meters, holding up one (the other) foot as in a hopping position.
4. After running a distance of five meters, to pick up a matchbox placed on a table, take out four matchsticks, form a square with them, and immediately fold a sheet of paper which is also on the table, then returning to the starting place.
5. To tap the floor rhythmically with the sole of the foot performing the movement alternately with the feet. At the same time, the corresponding index fingers are to tap the top of the table placed in front of the child.
6. To wrinkle the forehead, without executing other movements.

Tests for Nine Years

1. To remain standing for ten seconds, eyes closed, weight on the right leg, left knee bent at right angles.
2. (Boys). To throw a ball at a target placed at a distance of two and one half meters.
2. (Girls). To cut out a circle five centimeters in diameter, with a scissors.
3. (Boys). To jump, without losing body balance, over a rope placed at a height of forty centimeters.
3. (Girls). To jump as high as possible, at the same time clapping the hands three times.
4. To leaf through a book, page by page, for fifteen seconds.
5. To tap the floor alternately with the two feet, in a rhythm selected by the child; as the right foot taps the floor, the index fingers of both hands should tap the table.
6. To close the right eye, open it, and after five seconds close the left eye.

Tests for Ten Years

1. To balance for fifteen seconds on tip-toe, eyes closed.
2. (Boys). To cut out a circle.
2. (Girls). To throw a ball at a target placed at a distance of two and a half meters.
3. (Boys). To jump under the same conditions described for test number 3 for girls of nine years.
3. (Girls). To jump without losing body balance over a rope placed at a height of 40 centimeters.
4. With 40 matchsticks, to make four piles at the corners of a square area 15 centimeters on a side. Each pile should contain 10 matchsticks.
5. To make dots (tapping) simultaneously with two pencils, one in either hand, on two sheets of plain (blank) paper placed one beside the other.
6. To close the right eye, open it, and, after five seconds close the left eye.

Tests for Eleven-Twelve Years

1. (Boys). To stand motionless for ten seconds, eyes open, weight on the left leg, placing the sole of the right foot against the inside of the left knee.
1. (Girls). To balance for ten seconds, eyes open, on tip-toe on the right (and then the left) foot.
2. To catch, in one hand, a ball eight centimeters in diameter thrown by the examiner.
3. (Boys). To jump onto a chair seat forty-five to fifty centimeters high.
3. (Girls). To jump, striking the heels with the hands at the same time.
4. To push a needle through a special kind of sieve. (To punch a pin through a design of perforations).
5. To perform the problem of the preceding test, with both hands simultaneously.
6. To close (and open) the hands alternately.

Tests for Thirteen-Fourteen Years

1. (Boys). To balance for ten seconds, eyes open, on tip-toe on the right and left foot.
1. (Girls). To stand motionless for ten seconds, eyes open, weight on the left leg, placing the sole of the
right foot against the inside of the left knee.
2. (Boys). To balance a rod on the right thumb.
2. (Girls). To place the fleshy part of the right thumb against that of the left index finger, and that of the left thumb against that of the right index finger, following with the movements indicated.
3. (Boys). To jump, striking the heels with the hands at the same time.
3. (Girls). To jump onto a chair seat forty five to fifty centimeters high.
4. To make dots (by tapping) with a pencil point on a sheet of plain paper.
5. To place in two boxes simultaneously, with both hands, at least ten coins in the left-hand box and ten matchsticks in the one at the right.
6. To close the right and left eyes alternately for ten seconds.

Test for Fifteen-Sixteen Years

1. (Boys). To stand motionless for ten seconds, eyes closed, weight on the left leg, placing the sole of the right foot against the inside of the left knee.
1. (Girls). To balance for ten seconds, on tip-toe, first on the right foot and then on the left foot.
2. (Boys). To place the fleshy part of the right thumb against that of the left index finger, and that of the left thumb against that of the right index finger, thereafter following certain described movements.
2. (Girls). To balance a rod on the index finger.
3. To jump, maintaining balance, over a stationary rope.
4. At a given signal, and as quickly as possible, the subject should lie down on the floor on his back, extend his arms straight out horizontally to his shoulders, get up and run a distance of five meters to a chair placed a meter and one half from a table; take the chair, carry it to the table, and sit down. On the table there should be a pair of small objects, pencils or erasers, placed seventy five centimeters apart. The subject should change their places by interchanging one for the other. The change should be made using both hands at the same time. As soon as the change is made, he should take a pencil and paper that have been previously placed in the center of the table and draw three crosses.
5. To draw, with both hands simultaneously, on two sheets of plain paper placed side by side, vertical lines on one at the left and crosses on the one at the right.
6. To open and close the hands alternately (simultaneously) bending the open hand toward the closed one.
Scoring Procedure

In order to calculate the motor age, one should take as a base age the lowest age at which the subject accomplishes successfully all the tests in the group. To this the tester should add up to ten years inclusive, two months for every item successfully completed and one month for every one half item successfully completed. From eleven years forward each item is valued at four months and every one half item is two months.