

INFORMATION TO USERS

This was produced from a copy of a document sent to us for microfilming. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the material submitted.

The following explanation of techniques is provided to help you understand markings or notations which may appear on this reproduction.

- 1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting through an image and duplicating adjacent pages to assure you of complete continuity.**
- 2. When an image on the film is obliterated with a round black mark it is an indication that the film inspector noticed either blurred copy because of movement during exposure, or duplicate copy. Unless we meant to delete copyrighted materials that should not have been filmed, you will find a good image of the page in the adjacent frame.**
- 3. When a map, drawing or chart, etc., is part of the material being photographed the photographer has followed a definite method in "sectioning" the material. It is customary to begin filming at the upper left hand corner of a large sheet and to continue from left to right in equal sections with small overlaps. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.**
- 4. For any illustrations that cannot be reproduced satisfactorily by xerography, photographic prints can be purchased at additional cost and tipped into your xerographic copy. Requests can be made to our Dissertations Customer Services Department.**
- 5. Some pages in any document may have indistinct print. In all cases we have filmed the best available copy.**

**University
Microfilms
International**

300 N. ZEEB ROAD, ANN ARBOR, MI 48106
18 BEDFORD ROW, LONDON WC1R 4EJ, ENGLAND

8026173

HUSSEIN, HUSSEIN HAMID

THE EFFECTS OF A STRUCTURED PHYSICAL ACTIVITY PROGRAM ON
THE PHYSICAL FITNESS AND SELF-ESTEEM OF TRAINABLE MENTALLY
RETARDED (TMR) INDIVIDUALS

Middle Tennessee State University

D.A.

1980

University
Microfilms
International

300 N. Zeeb Road, Ann Arbor, MI 48106

18 Bedford Row, London WC1R 4EJ, England

THE EFFECTS OF A STRUCTURED PHYSICAL ACTIVITY
PROGRAM ON THE PHYSICAL FITNESS AND
SELF-ESTEEM OF TRAINABLE MENTALLY
RETARDED (TMR) INDIVIDUALS

Hussein Hamid Hussein

A dissertation presented to the
Graduate Faculty of Middle Tennessee State University
in partial fulfillment of the requirements
for the degree Doctor of Arts

August 1980

THE EFFECTS OF A STRUCTURED PHYSICAL ACTIVITY
PROGRAM ON THE PHYSICAL FITNESS AND
SELF-ESTEEM OF TRAINABLE MENTALLY
RETARDED (TMR) INDIVIDUALS

APPROVED:

Graduate Committee:

Jon L. MacBeth
Major Professor

Glen P. Reeder
Committee Member

Wallace R. Taylor
Committee Member

W.S. Solomon
Head of the Department of Health, Physical Education,
Recreation and Safety

Robert C. Adm
Dean of the Graduate School

ABSTRACT

THE EFFECTS OF A STRUCTURED PHYSICAL ACTIVITY PROGRAM ON THE PHYSICAL FITNESS AND SELF-ESTEEM OF TRAINABLE MENTALLY RETARDED (TMR) INDIVIDUALS

by Hussein Hamid Hussein

The present study was undertaken in an effort to determine the effects of a structured physical activity program on the physical fitness and self-esteem for trainable mentally retarded (TMR) individuals, as measured by the AAHPER-Kennedy Foundation Special Physical Fitness Test and Coopersmith's Self-Esteem Inventory (SEI). These two measures were previously found to be significantly related to standard achievement scores of the TMR individuals.

Forty-five TMR persons, twenty-five males and twenty females, ranging in age from six to twenty years, were randomly selected for this study. Ten of the forty-five were enrolled in the Louisa School (6 males and 4 females); thirteen were enrolled in the Daniel-McKee School (8 males and 5 females); and twenty-two (11 males and 11 females)

were from the Adult Activity Center, Murfreesboro, Tennessee. The I.Q.'s of all the subjects ranged between 30 and 50 as measured by the Stanford-Binet (S-B) or the Weschler Intelligence Scale for Children (WISC).

For the purpose of this study, thirty-five subjects were randomly selected as experimental groups (Exp. I and Exp. 2), and the remaining ten subjects of the Louisa School served as the control group. The subjects in each group (Exp. I, II, and Control Group) were randomly sub-divided into three activity units. This was done to allow each unit maximum functioning under the direction of trained physical instructors.

Experimental Groups I and II (Exp. I and Exp. II) participated in a structured physical activity program for nine weeks, each day, five days a week, for forty-five minutes. Control group was to continue with self-initiated, non-specific program under the supervision of regular school instructors. All forty-five subjects completed the program. Improvement in the physical fitness and self-esteem was determined by pretest and posttest scores on the AAHPER-Kennedy Foundation Special Physical Fitness Test items including:

1. Standing Broad Jump (SBJ).
2. Shuttle-Run (SR).
3. Straight Arm Hang (SAH).

4. 50-Yard Dash (50-Yd. D).
5. Softball Throw (SBT).

Improvement was also determined by pre-test and post-test scores on the Self-Esteem Inventory.

The .05 level was utilized to determine significance for the statistical analysis conducted in this study. A two-way classification analysis of variance was computed to determine if significance in physical fitness and self-esteem would develop between the experimental and control groups. The Scheffe method was used to determine the significance between the three groups.

The overall findings indicated that the experimental groups participating in the structured physical activity program significantly improved their mean skill scores on the AAHPER-Kennedy Foundation Special Fitness Test as well as their self-esteem on the Self-Esteem Inventory; whereas, the control group did not improve on the scores of the AAHPER-Kennedy Foundation Special Fitness Test or the Self-Esteem Inventory by Stanley Coopersmith.

This study also revealed significant improvement in both experimental groups. This tends to emphasize the value of the structured physical activity program of physical fitness and to contribute to self-esteem of the TMR individuals.

ACKNOWLEDGEMENTS

This dissertation is dedicated to Dr. Wallace Maples, professor of higher education and a member of the writer's doctoral committee, for his help, guidance, and encouragement.

To Dr. A. H. Solomon for his kind support, deep thoughts, and supervision. Without his encouragement and guidance, this dissertation may have been delayed.

Much credit is due Dr. Jon MacBeth, the writer's major professor, for his guidance and suggestions in developing aspects of this study.

To Dr. Glen P. Reeder, second reader on the writer's committee, special thanks for his supervision and professional input into this study.

The writer wishes to gratefully acknowledge the statistical help rendered by Dr. Robert Prytula, Department of Psychology.

Sincere appreciation and thanks are also due Mr. Michael Ketchen for his help with the statistics.

The writer would also like to thank Mr. Mohammad Ghorbani, Doctor of Arts graduate student, and Mrs. Vicky

Callison, graduate assistant and women's track coach,
for their help in administering the tests.

A great deal of thanks goes to Mrs. Wilma Grant for
typing this research project and to Mrs. Rebecca Smith,
periodical reference librarian at Middle Tennessee State
University, for her aid in my search for sources.

The writer would like to thank the Daniel-McKee
School, The Adult Activity Center, and the Louisa School
and their staff for their help in implementing this study.

To the writer's wife, Pamela, he would like to
express his love and appreciation for her help and
patience during this study.

TABLE OF CONTENTS

	Page
LIST OF TABLES	vi
Chapter	
1. INTRODUCTION	1
STATEMENT OF THE PROBLEM	6
PURPOSE OF THE STUDY	6
PROCEDURES	6
DELIMITATIONS AND LIMITATIONS	7
Delimitations	7
Limitations	8
DEFINITIONS OF TERMS	8
HYPOTHESES	10
2. REVIEW OF THE LITERATURE	12
3. METHOD AND PROCEDURES	29
HYPOTHESES	29
PROCEDURES	29
TEST CRITERIA	34
Description of Test Items	35
STRUCTURED PHYSICAL ACTIVITY PROGRAM	37
STATISTICAL ANALYSIS	45

Chapter	Page
4. ANALYSIS OF DATA	46
5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS . .	60
SUMMARY	60
CONCLUSIONS	62
RECOMMENDATIONS	64
BIBLIOGRAPHY	66

LIST OF TABLES

Table	Page
1. Composition of Training Group	31
2. Results of the AAHPER Post-test: Output for Straight Arm Hang	49
3. Results of the AAHPER Post-test: Output for Shuttle-Run	50
4. Results of the AAHPER Post-test: Output for Broad Jump	52
5. Results of the AAHPER Post test: Output for 50-Yard Dash	53
6. Results of the AAHPER Post-test: Output for Softball Throw	54
7. Results of the Self-Esteem Inventory Post- test: Output for Self-Esteem Test	56
8. Self-Esteem Test: Comparison of Group X Sex Means	57

Chapter 1

INTRODUCTION

Physical educators, recreation educators, and educators of the exceptional student have come to recognize the potential in the mentally retarded and emotionally disturbed individual in areas of physical and motor activities.¹ The best opportunities for successful experiences for the mentally retarded are obtained from their participation in physical education and recreation pursuits. Mentally retarded individuals who have experienced repeated failure in classroom-oriented tasks often find new reassurance and unexpected success in movement experiences.

The trainable mentally retarded child receives the same benefits from play as does the normal child. The trainable mentally retarded child is provided with an opportunity to participate with others, to establish

¹John May Moran and Leonard Harris Kalakian, Movement Experiences for the Mentally Retarded or Emotionally Disturbed Child (Minneapolis: Burgess Publishing Co., 1977).

identity, and to contribute to group goals by engaging in play. Through physical activity, eye-hand coordination may be developed, precise body movements learned, and sensory perception refined.² The trainable mentally retarded child is socialized as he learns to play by the rules and conform to group expectations and controls. These new experiences are immediate and pleasurable to the trainable mentally retarded, and indirectly prepare him/her for adult life. How he/she will perform in an adult role will depend to a great degree upon the attitudes and skills developed through play and exercises.

A report of the project on recreation and fitness for the mentally retarded accumulated data concerning physical fitness for the mentally retarded. The report concluded that available scientific evidence supports the following generalizations concerning physical fitness:

1. Physical performance is one area in which the retarded are closest to the normal.
2. Physical proficiency can be acquired with training.
3. The gains of physical fitness are not necessarily associated with sociometric gains.
4. Gains from motor proficiency by the mentally retarded are more associated with intellectual function than in the normal population.

²David Gibson and Roy I. Brown, Managing the Severely Retarded (Springfield, Ill.: Charles C. Thomas, Publishers, 1976).

5. Neglect of physical activity leads to aggravated frustration and depressed functioning.³

Trainable mentally retarded children frequently develop a failure syndrome along with a weak self-concept. The success-oriented and realistic program can foster healthy growth and development, and can help the child to develop a positive self-esteem.⁴ Learning skills in controlling the body, developing stability, discovering oneself, relating and interacting with others and learning about the physical world and his/her body movements are important aspects in child development. In the trainable mentally retarded children, social skills are most frequently poorly developed. Studies have shown that failure (on-the-job) more often results from inadequate social skills than from lack of capability to perform a specific task.

The same basic principles for a structured physical education program for normal children apply to a program for the retarded children.⁵ The program should consist of

³Donald F. Sellin, Mental Retardation: Nature, Needs and Advocacy (Rockleigh, N.J.: Allyn and Bacon, Inc., 1979).

⁴Janet A. Wessel, Programmatic Research Project in Physical Education for the Mentally Retarded Child in the Elementary School, U.S. Educational Resources Information Center, ERIC Document ED 121 039, 1975.

⁵Julia S. Mallory, Trainable Children Curriculum and Procedures (New York: The John Day Co.; an In Text Publisher, 1972).

activities that are physically stimulating and socially constructive. The program should contribute mainly to the child's growth in all areas: physical, social, emotional, intellectual, and aesthetic. Careful planning is necessary.

Contemporary psychomotor researchers are becoming more and more aware that physical education represents a curricular area in which mentally retarded children can enjoy a great deal of success. Investigators have shown the retarded to be capable of displaying marked improvement in levels of physical and motor proficiency.⁶ It appears that most studies agree that this achievement is especially important in view of the frustration and failure which is so often characteristic of retarded children within the school setting. Experiences that provide significant reinforcement are of great importance to this type of child. Activities that can provide successful outcomes call for serious consideration by all disciplines.

Kulcinski found that "a high positive relationship exists between IQ and the ability to perform fundamental muscular tasks among trainable mentally retarded."⁷

⁶Amiel Harrison Solomon, "Motivational and Repeated Trial Effects on Physical Proficiency Performances of Educable Mentally Retarded and Normal Boys" (unpublished Doctoral dissertation, George Peabody College, Nashville, 1968).

⁷Dean C. Funk, "Effects of Physical Education on Fitness and Motor Development of Trainable Mentally Retarded Children," Research Quarterly, 42:30, 1971.

Oliver and Corder found

. . . significant gains in physical fitness and ability as a result of physical education programs ranging from one hour a day for four weeks to two hours and forty-five minutes a day for ten weeks.⁸

Kershner, using trainable mentally retarded children, found that significant gains in motor development were made after a four month program of physical activity.⁹

The responsibility for educating the educable mentally retarded has been accepted primarily by the public schools, while the education of the trainable mentally retarded has been the responsibility of residential or private schools. Therefore, in the early fifties, the National Association for Retarded Children became involved in encouraging and sometimes even forcing the public schools to take the responsibility for the trainable retarded.¹⁰ The problem was taken to state legislatures and to the courts, and it was indicated that the public schools or some state agency operating programs at the local level should provide day schools for most of the trainable retarded.

⁸Funk, p. 31.

⁹Funk, p. 31.

¹⁰B. R. Gearheart, Organization and Administration of Educational Programs for Exceptional Children (Springfield, Ill.: Charles C. Thomas, Publisher, 1974).

STATEMENT OF THE PROBLEM

This study was designed to investigate whether a structured physical activity program would have significant effects upon the trainable mentally retarded (TMR) in relationship to their physical fitness and self-esteem.

PURPOSE OF THE STUDY

Research on the TMR has pointed out the significant effects of physical activity on such items as eye-hand coordination, precise body movements, and heightened sensory perception. The investigator was curious as to the effects of a structured physical activity program for the TMR and how such a program would contribute to the TMR's physical ability and subsequent self-esteem from having developed certain physical skills.

Such a study may not only contribute to the developing awareness and self-esteem of the TMR but may also contribute to the development of general physical activity programs for educators to use with the TMR.

PROCEDURES

The investigator, with the aid of the schools and agencies outlined in the delimitations, has:

1. Tested a selected group of TMR's in relation to their physical abilities.

2. Provided a structured regimen of physical activity for a period of nine weeks.

3. Retested the TMR's for gains or losses made during the testing period.

A control group was utilized for the purposes of comparison and analysis to the gains or losses made within the experimental group.

In addition to the objective measures of physical ability noted during the pre-test period, subjective analysis of behavior and self-esteem was drawn from those educators most closely associated with the TMR's during the study. This was accomplished in order to ascertain whether any positive effects on self-esteem would be forthcoming from a structured physical activity program.

DELIMITATIONS AND LIMITATIONS

Delimitations

1. The population selected for this study was delimited to students designated TMR's in Murfreesboro, Tennessee, enrolled at:

- A. Louisa School
- B. Daniel-McKee School
- C. The Adult Activity Center in Cox Memorial Gymnasium.

2. The study was delimited to the gains or losses made during the nine week investigation.

Limitations

1. The study was limited by the inherent difficulty of working with persons of reduced mental capacity, with I.Q.'s between 30 and 50.
2. The study was limited by the time frame and willingness of the schools, agencies, and personnel to cooperate with the investigation.

DEFINITIONS OF TERMS

Agility--the ability to integrate body parts quickly and accurately.¹¹

Body image--refers to one's picture of one's body as it is found in one's mind.¹²

Coordination--is the elimination of unnecessary movements.¹³

Endurance--the ability to sustain movement for a considerable length of time.¹⁴

Flexibility--the ability to rotate joints fully.¹⁵

¹¹Barbara Guarnieri, Developmental Physical Education Accountability, Educational Resources Information Center, ERIC Document ED 088 255, July, 1974.

¹²J. Salkin, "Body Ego Technique: An Educational Approach to Body Image and Self Identity," Journal of Special Education, 4:69-72, 1967.

¹³Guarnieri.

¹⁴Guarnieri.

¹⁵Guarnieri.

Intelligence quotient (IQ)--the ratio of actual mental age, as measured by intelligence tests, to the mental age which is normal for a particular chronological age. The ratio is multiplied by 100, thus giving an average IQ of 100.¹⁶

Mental retardation--refers to significantly sub-average general intellectual functioning existing concurrently with deficits in adaptive behavior, and manifested during the developmental period.¹⁷

Structured physical activity program--the program that will introduce one to a number of physical and sports skills which will facilitate one's participation in play and make possible a frequent workout, resulting in improved physical fitness.¹⁸

Physical fitness--the ability of an individual to acquire enough resources to meet the demands of daily living, and sufficient reserves to withstand ordinary stresses without causing harmful strain.¹⁹

¹⁶G. Terry Page and J. B. Thomas, International Dictionary of Education (New York: Nicholas Publishing Co.; London: Kegan Page, 1977), p. 179.

¹⁷Wessel, p. 5.

¹⁸Hollis F. Fait, A Manual of Physical Education Activities (Philadelphia: W. B. Saunders Co., 1961), p. 1.

¹⁹Guarnieri.

Relaxation--relief from bodily activity.²⁰

Self-esteem--a personal judgment of worthiness that is expressed in the attitudes the individual holds toward himself.²¹

Strength--muscular power or force.²²

Trainable mentally retarded (TMR)--those children who because of retarded intellectual development, as determined by recognized standardized tests, are incapable of being educated through ordinary classroom instruction or special education facilities for educable mentally retarded children, but who may be expected to benefit from training in a group setting designed to further their social adjustment and economic usefulness in their homes or in a sheltered environment; also refers to that group of mentally retarded obtaining IQ scores from 35 to 50.²³

HYPOTHESES

The two major hypotheses for this study are as follow:

²⁰Guarnieri.

²¹Stanley Coopersmith, The Antecedants of Self-esteem (San Francisco: W. H. Freeman and Company, 1967).

²²Guarnieri.

²³Paintsville Board of Education, Curriculum Guide for Trainable Mentally Retarded, U.S. Educational Resources Information Center, ERIC Document ED 038 785, 1968.

Hypothesis 1. There will be no significant difference in physical fitness scores for the students in the experimental groups and the control group.

Hypothesis 2. There will be no significant difference in self-esteem scores for the students between the experimental groups and the control group in this physical training program.

Chapter 2

REVIEW OF THE LITERATURE

In programming movement experiences for TMR children, physical educators and recreation educators have put emphasis on providing what has come to be known as "education through the physical." The development of physical and motor proficiency has been considered as one of the most unique contributions to man's growth and development because many important values and much knowledge could be derived from movement experiences such as social development, self-concept, enhanced sequential thinking ability, and heightened perceptual awareness.

It has long been determined that one means of differentiating TMR persons from the "normal" population is social behavior. Capohianco and Cole emphasized the importance of the utilization of the environmental unknown aspects to develop higher level play behavior.¹

¹Dennis R. Knapczyk and Judith O. Yoppi, "Development of Cooperative and Competitive Play Responses in Developmentally Disabled Children," American Journal of Mental Deficiency, 80:245, December, 1975.

Piaget considered play as developing concurrently with a child's cognitive ability.² Davison, Ferster and DeMeyer, and Lovaas, Schaeffer, and Simmons have demonstrated the efficiency of optimum methodology in developing social behavior in emotionally handicapped children.³ Nordgren, Nordgren and Blackstrom, Rarick, Widdop and Broadhead, and Stein recommended regular participation in effective physical training programs in order to help insure optimal work performance of the mentally retarded individual.⁴

The primary goal of a physical training program is to produce physical and physiological changes that develop strength and muscular endurance, stamina, and heart/lung endurance and flexibility.⁵

Due to the restriction of education of the TMR child, it has been suggested that the TMR child can be taught only those skills and activities which are routine

²Knapczyk and Yoppi, p. 245.

³Knapczyk and Yoppi, p. 246.

⁴A. Eugene Coleman and M. M. Ayoub, "Assessment of the Physical Work Capacity of Institutionalized Mentally Retarded Males," American Journal of Mental Deficiency, 80: 634, May, 1976.

⁵Janet A. Wessel, Programmatic Research Project in Physical Education for the Mentally Retarded Child in the Elementary School, U.S. Educational Resources Information Center, ERIC Document ED 121 039, 1975.

and that any amount of thinking or the making of valuable judgments are beyond his capacity.⁶

Studies by Rarick and Dobbins have indicated that there are no differences between mentally retarded children and normal children in factor structures of their motor domains.⁷ The studies also show that some mentally retarded children are well above the means of normal children, indicating that deficiency is not solely a function of sub-normal intelligence.

The development of motor skills and performance of trainable mentally retarded children is similar but slower than normal children.⁸

The TMR child develops intellectually at approximately 1/3 to 3/5 the rate of the average child. At six years of age the TMR child is mentally like children of between two and four years.⁹

The age of thirteen and older of TMR children seems to be significant in that they are more aware of their body and its position in space than TMR's below this age.

⁶Kern County Superintendent of Schools, Bakersfield, California, Trainable Mentally Retarded Individual Behavioral Assessment Guide, U.S. Educational Resources Information Center, ERIC Document ED 109 848, 1974.

⁷Michael A. Orfitelli, An Approach to Mainstreaming the Handicapped Child with the Nonhandicapped Child, U.S. Educational Resources Information Center, ERIC Document 164 507, 1978.

⁸Wessel, p. 18.

⁹Bryant J. Cratty, Developmental Sequence of Perceptual-Motor Tasks (Mountain-View, Calif.: Peek Publications, 1967), p. 7.

An increasing number of studies found that significant improvement in the mental and social functioning of TMR's can be elicited by regular participation in group games. The degree of improvement which can be expected by trainable mentally retarded in motor tasks depends a great deal upon the complexity of the task.

A structured physical fitness program is especially important to the TMR since research studies have indicated that retarded children have lower fitness levels than the typical children, and the need for physical fitness activities can not be overemphasized.¹⁰ The primary goal in order to achieve social leisure and work capacity in the retarded individual is to develop optimal physical fitness. The status of good physical fitness of the TMR person will allow that individual to participate in sports and games as well as to work successfully without fatigue.

Selection of physical fitness activities for the TMR individual must be based on that person's needs, depending upon the fitness components of strength and muscular endurance, heart/lung endurance, flexibility, and relaxation.¹¹ Oliver found evidence that physical education

¹⁰Wessel, p. 157.

¹¹Wessel, p. 157.

programs raise the IQ of the mentally retarded.¹² Fait's study revealed that increased motor proficiency of trainable mentally retarded individuals may lead to the possibility of increasing intellectual skills such as simple crafts or manual labor.¹³

The trainable mentally retarded person can gain through the recreational activity of satisfying life which contributes to structured physical, social, and psychological aspects.¹⁴ Studies have indicated that the development of sensory motor skills aids the intellectual learning process for the TMR as he is then able to relate a great number of experiences.¹⁵

The TMR individual usually lacks muscle coordination, as well as the experience of physical activity in a group. Physical activity helps the TMR person to relieve emotional tensions. It also plays a significant role in providing relaxation and developing better coordination of large and small muscles.¹⁶ Physical activity programs should be in

¹²Barbara Guarnieri, Activities in Developmental Physical Education, U.S. Educational Resources Information Center, ERIC Document ED 088 256, 1973, p. 4.

¹³Guarnieri, Activities . . . , p. 5.

¹⁴Guarnieri, Activities . . . , p. 5.

¹⁵Guarnieri, Activities . . . , p. 12.

¹⁶Oklahoma State Department of Education, A Guide for Teachers of Trainable Mentally Retarded Children, U.S. Educational Resources Information Center, ERIC Document ED 038 814, 1968, p. 22.

the daily schedule for all age groups. For activities such as walking, skipping, running, hopping, and tiptoeing, music is helpful.

According to Fait, a large percentage of TMR students have shown positive improvement in motor ability and behavior as a result of exposure to a well planned and realistic program of physical education.¹⁷ For some, great positive changes are made in a short time; for others, change is more gradual, extending over long periods of time. Improvement to some degree can be expected in most of the students, especially among students who have never had the opportunity to participate in motor activities.

Play and recreation are very important to the education, training, and therapy of TMR individuals.¹⁸ As a result of the active participation of TMR's in their activities, there are gains in physical well-being, redirection of drives, guidance in emotional development, and establishment of socially acceptable attitudes. Along with therapeutic values, the TMR individual gains greater

¹⁷Hollis F. Fait, Curriculum Guide for Teaching Physical Education to the Profoundly and Severely Retarded, U.S. Educational Resources Information Center, ERIC Document ED 039 670, 1969, p. 10.

¹⁸Paintsville Board of Education, Curriculum Guide for Trainable Mentally Retarded, U.S. Educational Resources Information Center, ERIC Document ED 038 785, 1968, p. 2.

feelings of satisfaction and reaches a higher level of social maturity.

Fait suggests that, in order to plan a realistic physical education program that can make maximum contributions to the improvement of physical fitness of the mentally retarded, one must determine the level of the person's physical fitness and those areas of fitness in which he is deficient.¹⁹ After participation for a specific length of time in a program of physical education activities planned to meet the needs of the TMR, which were mentioned, an evaluation is necessary to determine the success of the program as indicated by the amount of physical fitness improvement.

Too often, physical education and recreation programs for TMR children become inadequate as a result of fitting the child to a program with little regard for the child's identification of his present level of physical functioning.²⁰

Funk conducted a study to determine the effect of physical education programs on the physical fitness and

¹⁹Hollis F. Fait, Physical Fitness Test Battery for Mentally Retarded Children (Trainable and Educable), U.S. Educational Resources Information Center, ERIC Document ED 039 671, 1967, p. 1.

²⁰Robert E. Johnson, Thomas A. Burton, and John W. Swann, "Procedures for Evaluating Physical Functioning in Trainable Mentally Retarded Children," Training School Bulletin, 67:78, August, 1970.

motor development of a group of children classified as trainable mentally retarded. An experimental group had thirty minutes of physical education for fifty-eight consecutive days. The control group had free play or recreational activity under teacher control during this time. The investigator used two fitness test items, shuttle-run and sit-ups. The result of this study was that the experimental group showed significant improvement.²¹

A study conducted by James Miller and Robert Throop has shown that motor and perceptual abilities in mentally retarded children and in normal children are organized in the same way, and that the development of those abilities follows similar development curves, although at lower levels for mentally retarded children than for normal children. The study further suggested that "TMR can profit by many of the same kind of motor experiences as normal children."²²

The physical activity program must present a variety of activities directed toward the special needs of the mentally retarded.²³ Mentally retarded child performance

²¹Dean C. Funk, "Effects of Physical Education on Fitness and Motor Development of Trainable Mentally Retarded Children," Research Quarterly, 42:30, 1971.

²²James F. Miller and Robert K. Throop, Investigation of the Effects of an Aquatics Program on the Psycho-Motor Function of Trainable Mentally Retarded Children, U.S. Educational Resources Information Center, ERIC Document ED 047 470, November, 1970, p. 9.

²³Miller and Throop, p. 25.

depends upon the child's functional ability, ranging from motor skills to leisure activities. The skills must be demonstrated to the children so they will enjoy performing them. Demonstration of the skills is also important in achieving interests in their performance. For the TMR child, games that reinforce cognitive concepts, such as letter, color, symbol, and size, recognition should be incorporated into activities.

According to Fait, the poor performance of the TMR child is due mainly to a lack of opportunity to participate in play activity.²⁴ The well designed program under the administration of an enthusiastic teacher indicates noticeable improvements in physical fitness of the TMR child can be achieved.²⁵

Studies by Sloan, Malpass, and Frenus and Rarick have shown that the most important benefits that can be gained by the retarded child are the success experiences through the activities which can play a major role in the reassurance of the retarded child's motor inferiority when compared to age equivalent normal children on various fine

²⁴Hollis F. Fait, Special Physical Education Adapted, Corrective, and Development (Philadelphia: W. B. Saunders Co., 1978), p. 228.

²⁵Fait, Special Physical Education Adapted, Corrective, and Development, p. 230.

gross motor tests.²⁶ Bruce, Sengstock, Sullivan, and Carter, who worked with the AAHPER Youth Fitness Test, have reported that "the trend lines representing motor maturation are strikingly similar to those of corresponding comparison groups."²⁷

According to Hilsendager, Kand, and Mann, the physical fitness of trainable mentally retarded and emotionally disturbed children provides the strength and vitality which enable them to live effectively.²⁸ The improvement of the strength in the mentally retarded child's body will delay the onset of fatigue and also will give the child a feeling of enjoyable life.

The person who does not have the strength and endurance can not cope with many facets of living, and can not perform as well as one who gives his/her body proper consideration by participating in certain activities and sports.²⁹ Physical fitness usually gives the mentally retarded child a feeling of security and self-confidence.

²⁶Amiel Solomon, "Demonstrating Physical Fitness Improvement in the EMR," Exceptional Children, 11:179-181, November, 1967.

²⁷Solomon, "Demonstrating Physical Fitness Improvement in the EMR," p. 177.

²⁸Donald R. Hilsendger, Harold J. Kand, and Lester Mann, "The Buttonwood Farms Project: A Physical Education-Recreation Program for Emotionally Disturbed and Mentally Retarded Children," Journal of Health, Physical Education and Recreation, n.v.:46, March, 1968.

²⁹Hilsendger, Kand, and Mann, p. 46.

Lack of physical fitness limits the trainable mentally retarded child's exploration and deprives the child of important stimuli necessary as a human being. The freedom of movement provides a feeling of confidence, achievement, and success which the handicapped child needs. According to Joe Brown, University of Kentucky, who tested thirty-eight TMR children (22 boys and 16 girls) enrolled in the education and training program at the Blue Grass School for Retarded in Lexington, Kentucky, none of the children have had any previous training in physical skills. It was found that "children who participated in physical activity programs failed fewer tests than those children who did not participate in any physical education activities."³⁰

After eight weeks of clinical physical education, Chasey reported major gains in the physical proficiency of the trainable mentally retarded boys. Similar findings were made by Corder after twenty days of a physical education program. Hayden found that through participation of a physical education program severely mentally retarded boys and girls made significant improvement in the areas of

³⁰Joe Brown, "Ratio of Physical Development as a Factor in Performance of Retarded Boys on Physical Fitness," Training School Bulletin, 65:7-11, May, 1968.

strength and endurance. Carrol and Abshur, Nunley, and Stein obtained similar results.³¹

According to John N. Drowatzky, the physical activity program for the mentally retarded should consist of a variety of different games and activities ranging from simple to complex.³² It is necessary that the program include instruction in physical fitness, sports, skills, games, and recreational activities. The foundation of the program is often entirely physical fitness.

Barsch and Kephart indicated that "perceptual-motor training must occupy a central role in remedial programs for the educationally handicapped child."³³ Webb states that, "if body image and self-concept are to develop in the trainable mentally retarded child, they must be encouraged through externally imposed stimulation."³⁴

Johnson, Fretz, and Johnson, after conducting a six-week physical development program for seventy-four mentally retarded children, concluded that notable changes were seen

³¹William C. Chasey and Wannan Wyrick, "Effects of a Physical Developmental Program on Psychomotor Ability of Retarded Children," American Journal of Mental Deficiency, 75:566-570, 1971.

³²John W. Drowatzky, "Physical Education for the Brain-Injured Child," The Physical Educator, 22:76-77, May, 1965.

³³Miller and Throop, p. 10.

³⁴Miller and Throop, p. 9.

in the children by their parents, clinicians, and the children themselves.³⁵ The changes in this self-concept suggest that an individualized physical development program can be an important value in the total functioning of the child but, according to the investigators, there is no measure of self-concept readily available which is applicable to such a range of children. In some proportion and degree, all retarded children have all the innate physical characteristics (aptitudes and capacities) of the normal child. These capacities definitely can be measured.³⁶

According to Stein and Pangle, significant gains in physical fitness, athletic achievement, and strength have been reported by experimental studies. Physical fitness in one was improved with only twenty days, one hour per day, of class participation.³⁷ One can only conclude from the evidence that the mentally retarded can be expected to demonstrate physical proficiency improvement as a function

³⁵W. R. Johnson, B. R. Frenz, and Julia A. Johnson, "Changes in Self-Concepts During a Physical Education Program," Research Quarterly, 39:560-565, October, 1968.

³⁶John H. Jenny, "Physical Education for the Mentally Retarded," Exceptional Children, 23:146-148, January, 1957.

³⁷Julian V. Stein and Roy V. Pangle, "What Research Says About Psychomotor Function of the Retarded," Journal of Health, Physical Education and Recreation, 34:36-38, April 1966.

of program instruction and participation like normal children.

Seltzer, Schonfeld, Cruickshank, and Bayley have indicated that "body build and concomitant perceptions of body build may play an important role in the self-concept and precepts of others among mentally retarded persons."³⁸ Herb indicated that, "despite the importance of global concepts of feelings about one's self in contemporary personality theory, one can only speculate about the self-esteem of the mentally retarded."³⁹

According to Cratty, who conducted a pre-posttest battery prior to a program of motor education lasting five weeks, the thirteen retarded children were asked certain questions of which their answers indicated a negative self-esteem. After a five month program of motor training, the children indicated, as a group, a significant shift toward a more positive self-concept in their feelings about the way they looked, their appearance, and their school. Also, the study revealed a significant improvement in physical skills.⁴⁰

³⁸J. R. Staffieri, "Body Image Stereotypes of Mentally Retarded," American Journal of Mental Deficiency, 72:841, 1968.

³⁹Staffieri, p. 841.

⁴⁰Bryant J. Cratty, Motor Activity and the Education of Retardets (Philadelphia: Lea and Febiger, 1974), p. 48.

The findings by Donald A. Turnquist and Stanley S. Marzolf indicated deficiencies in the mentally retarded's motor ability in comparison to the average individuals. The investigators suggest that if other studies support these findings a modified physical education program would be needed.⁴¹

Research done by Stein and Pangle indicates that the mentally retarded can be expected to demonstrate physical proficiency after program participation and instruction.⁴² Motor ability is more or less likely to be proficient while the mentally retarded achieve more in areas of simple rather than complex neuro-muscular movement.

Stein also indicated that a program of developmental activities is needed which will be suited to the individual's interests, capabilities, and limitations.⁴³ This program should be aimed at aiding the person to become better prepared to take one's place in society and live a life as satisfying and as full as possible within the limitations of his/her handicap.

⁴¹D. A. Turnquist and S. S. Marzolf, "Motor Abilities of Mentally Retarded Youth," Journal of Health, Physical Education and Recreation, 37:36-38, April, 1966.

⁴²Julian Stein and Roy Pangle, "What Research Says About Psychomotor Functions of the Retarded," Journal of Health, Physical Education and Recreation, 37:36-38, April, 1966.

⁴³Julian V. Stein, "Adaptive Physical Education for the Educable Mentally Handicapped," Journal of Physical Education and Recreation, 33:31, December, 1962.

Fait and Kupferer's study of forty-one male students whose IQ's ranged from 42 to 87 suggest that the activity program for the mentally retarded should vary from that offered to normal children. The same types of games should not be provided for them while activities providing the same type of experiences in which they will feel successful are important.⁴⁴

According to Dubin, the two areas of learning where the teachers can reach the mentally retarded child best are physical education and music.⁴⁵ Activities must be simple enough to be understood by the students.

The findings of Oliver's study of two groups of twenty boys, one group the experimental and the other the control group, in which the experimental group underwent ten weeks of physical conditioning while the control group went about their usual activity of two lessons a week, indicated not only an improvement in physical quality but also in the mental characteristics of the boys. They became

⁴⁴Hollis F. Fait and Harriet J. Kupferer, "A Study of Two Motor Achievement Tests and Its Implications in Planning Physical Education Activities for the Mentally Retarded," The American Journal of Motor Deficiency, 60: 729-732, 1956.

⁴⁵Harry N. Dubin, "Some Observations on the Place of Physical Education and a Health Program in Building a Program for the Mentally Retarded Child," American Journal of Motor Deficiency, 59:6-12, 1954.

ego-involved, and their personal relationships with others improved.⁴⁶

Howe's study comparing mentally retarded and normal children's performances on a variety of motor skill tasks suggests that a structured physical education program may be necessary for the curriculum for the mentally retarded.⁴⁷

⁴⁶James N. Oliver, "The Effect of Physical Conditioning Exercises and Activities on the Mental Characteristics of Educationally Sub-Normal Boys," British Journal of Educational Psychology, 28:155-65, June, 1958.

⁴⁷Clifford E. Howe, "A Comparison of Motor Skills of Mentally Retarded and Normal Children," Exceptional Children, 25:352-54, April, 1969.

Chapter 3

METHOD AND PROCEDURES

HYPOTHESES

The two major hypotheses for this study were as follow:

Hypothesis 1. There will be no significant difference in physical fitness scores for the students in the experimental groups and the control group.

Hypothesis 2. There will be no significant difference in self-esteem scores for the students between the experimental groups and the control group in this structured physical activity program.

PROCEDURES

This study represented forty-five TMR persons, twenty-five males and twenty females, with ages ranging from six to twenty years; all were randomly selected for this purpose. Ten of the forty-five were enrolled in the Louisa School, six males and four females, ranging in age from nine to sixteen years. Thirteen individuals were enrolled in the Daniel-McKee School, eight males and five females, ranging

in age from six to eighteen years. Twenty-two individuals, eleven males and eleven females, ranging in age from eighteen to twenty years, were from the Adult Activity Center at Cox Memorial Gymnasium in Murfreesboro, Tennessee.

The investigator checked the school records in order to identify those individuals whose I.Q.'s would range between 30 and 50, as measured by the Stanford-Binet (S-B) or the Weschler Intelligence Scale for Children (WISC).

Each of the three main groups (Exp. I, Exp. II, and Control Group) were randomly sub-divided into three activity units. This was done to allow each unit maximum functioning under the direction of the physical education teachers who implemented a structured physical activity program. Data on each sub-group were collected during regularly scheduled school hours for both school samples, as well as the Adult Activity Center.

For the purposes of this study, thirty-five subjects of Daniel-McKee and the Adult Activity Center were selected as experimental groups (Exp. I and Exp. II), and the remaining ten subjects of the Louisa School served as the control group (see Table 1). All forty-five subjects who participated in this study were tested in relationship to

Table 1
Composition of Training Groups

Group	Title	Name of Schools	No. of Subjects
I	Experimental 1	Daniel-McKee	13
II	Experimental 2	Adult Activity Center	22
III	Control Group	Louisa School	10
Total No. Subjects			45

their use of their physical abilities before participation in the selected physical activity program.

Pretest: The investigator used the AAHPER-Kennedy Foundation Special Fitness Test and Record Form used to record the results. Three Doctor of Arts graduate students majoring in physical education helped the investigator perform the pretest (also the posttest discussed later).

The investigator spent a sufficient amount of time training the graduate students before the pretest was given to the forty-five subjects. The teachers who taught the physical education program were trained by the investigator. The pretest (as well as the posttest discussed later) was performed in the football stadium at Middle Tennessee State

University or at Cox Memorial Gymnasium in Murfreesboro, Tennessee, depending upon the weather. Four physical education teachers employed at the Adult Activity Center taught the physical activity program at the Center for nine weeks, five days a week, for forty-five minutes each day, to those subjects attending that school. The investigator also gave the Self-Esteem Inventory (SEI) by Stanley Coopersmith to all forty-five students two weeks after the start of the program. The investigator made sure that the subjects understood all the activities and exercises of the program.

The class began at 11:00 each day and ended at 11:45 a.m. at Cox Memorial Gymnasium. In the Daniel-McKee School, three physical education teachers taught the physical activity program for nine weeks, five days a week, for forty-five minutes each day. The first class began at 10:00 a.m. and ended at 10:45 a.m. The second class began at 12:30 a.m. and ended at 1:15 p.m., and the third class began at 1:15 p.m. and ended at 2:00 p.m. at Daniel-McKee.

The structured physical activity program began on March 31 and ended on June 1, 1980. The investigator recorded any absences of students and teachers each day during the program. A log was kept on each student, recording how he/she felt about the program. This log was

used to aid the investigator in determining changes in the self-esteem of the students. The program included a variety of activities and exercises to improve the TMR's specific physical abilities such as coordination, agility, endurance, strength, flexibility, and relaxation. The program was taught to the experimental groups only by physical education teachers employed at the Daniel-McKee School and the Adult Activity Center. All forty-five subjects continued and completed the program.

Posttest: Posttests were given on June 1, 1980, to all forty-five subjects for four days. After nine weeks, the posttest for Exp. I, Exp. II, and Control Group was given in order to determine the gains or losses made during the nine weeks of participation in the program. The control group was utilized for the purpose of comparison and analysis to the gains or losses made within the experimental groups. The control group participated in random, self-initiated daily activity under the supervision of regular instructors.

In addition to the objective measures of physical activity previously noted, subjective analyses of behavior and self-esteem of the subjects were drawn from those educators most closely associated with the subjects during this study. Two weeks after the beginning of the physical

activity program and after the investigator made sure that the students were aware of the different exercises being given by the teachers, the investigator gave all forty-five subjects a self-esteem inventory (SEI) by Stanley Coopersmith. This inventory consisted of twenty-five self-esteem questions. The investigator properly recorded all answers of the subjects. The questions were explained to the subjects by the teachers of the physical activity program. After the teachers were relatively sure the subjects understood the questions, the questionnaires were administered to them. At the end of the program, the same self-esteem inventory was given to all of the subjects and administered by the teachers and the investigator. This was done in order to ascertain whether any positive effects on self-esteem resulted from a structured physical activity program.

TEST CRITERIA

The test items developed for inclusion in the physical fitness battery for the TMR were adopted from test items that have been indicated to measure some aspects of physical fitness in normal individuals. All of the test items chosen meet the following criteria:

1. The purpose of the test was to measure the physical aspects (characteristics) that contribute greatly to the level of motor performance of these individuals.

2. The tests were easy to administer as well as simple to score, and are objective and reliable.

3. Each test determined a range of scores relative to each subject of each item.

4. Each test evaluated (measured) a different factor of physical fitness of each TMR individual.

Description of Test Items

The pretest and posttest were administered in three to five days in order to measure the subject's physical abilities:

1. Standing Broad Jump (SBJ)--to measure explosive leg power.

2. Shuttle-Run (SR)--to measure speed and agility.

3. Straight Arm Hang (SAH)--to measure dynamic strength.

4. 50-Yard Dash (50-Yd. D)--to measure speed and agility.

5. Softball Throw (SBT)--to measure explosive arm strength.

A brief description of the five physical proficiency items are as follow:

Standing Broad Jump: A person performing the standing broad jump should stand with feet several inches apart, behind the starting line, arms behind him, and knees bent. In a single movement he swings his body forward, with the goal in mind to jump as far as possible. After the jump is made, it is measured to the nearest inch of impact back to the starting line.

Shuttle-Run: Two lines twenty-five feet apart are marked off on any flat running surface. Two wooden blocks measuring 2" x 2" x 4" are placed at the end of the line opposite the student's starting point. At the starting signal the subject runs to the opposite end, picks up one of the two blocks, and takes it back to the starting point. He repeats this action, only now he is to pick up the remaining block and carry it over the line (not throw it). The time is recorded to the nearest tenth of a second.

Straight Arm Hang: A bar is placed just high enough to allow a person to hang full length without his feet touching the ground. Upon starting, the person hangs from a bar with arms fully extended, palms forward. He tries to hold this position as long as possible. The moment he starts to drop, his time is stopped and recorded to the nearest tenth of a second.

50-Yard Dash: Runners are shown the starting and finishing lines. Runners may use any starting position they wish, provided they are behind the starting line. At the

starting signal, they run to the finishing line. Time is recorded to the nearest tenth of a second.

Soft Ball Throw: A regulation twelve-inch softball is used. The person tries to throw the softball overhanded as far as possible without stepping over the starting line. The person throws three times before any throw is recorded. The distance of the throw is recorded to the nearest foot. A throw that is more than six inches is recorded as the next highest foot; a throw that is less than six inches is recorded as the next lowest foot.

STRUCTURED PHYSICAL ACTIVITY PROGRAM

This program was applied to trainable mentally retarded subjects in the Daniel-McKee School and the Adult Activity Center in Murfreesboro, Tennessee, for forty-five minutes each day, five days a week, for nine weeks, to determine the influence of this program on the TMR's physical fitness and self-esteem.

1. Flexibility (Monday)

Goal: To increase the maximum range of movement: stretching, swinging, and swaying.

A. Neck: Twist head 90 degrees. From standing position, feet apart, hands on hips.

Subject turns head to the left on count 1 and to the front on count 2, to the right on count 1 and to the front on count 2 (10 times).

- B. Waist: From standing position, feet apart, arms on side of legs. Slide hand to the left toe as far down as possible, on count of 1; on count of 2 subject returns to the first position. On count 3, subject slides his right hand to the right toe as far down as possible. On count 4, subject returns to his starting position (10 times).
- C. Hips: From standing position, feet apart, touch toes and return to starting position.
Subject tries to bend and touch toes without bending the knees on count 1. On count 2, subject returns to the standing position (8 times).
- D. Arm: From standing position, feet apart, horizontal arm swing, palms up, palms down.
Subject raises arms out to his sides and swings them in a circular motion (10 times).
- E. Back: From standing position, legs apart, hands on hips.
Subject twists trunk to left and right sides: On count of 1, subject twists trunk as far as possible to the left side, and, on count of 2, subject returns to the starting position. On count of 3, twist trunk to the right side as far as possible. On count 4, subject returns to the starting position (10 times).

F. Legs: From standing position, feet apart, arms on side of legs, sit-ups.

Subject on count 1 bends knees in squatting position without raising heels. On count 2, subject rises to the standing position (10 times).

2. Body Coordination (Tuesday)

Goal: To develop the flow of movement in sequences.

(Movement Pattern)

A. Standing on one foot to the count of 3, 5, and then 10. Alternate to the other foot, from standing position, hands on hips.

Subject stands on one foot and on count of 3 subject switches to the other foot. Repeat the exercise with counts of 5 and then 10.

B. Standing on one foot, but with eyes closed.

Subject stands with eyes closed on one foot and on count of 3 subject switches to the other foot. Repeat the exercise with counts of 5 and 10.

C. Hop on one foot and then the other foot. From standing position, hands on hips.

Subject hops 10 hops on left foot and then 10 hops on right foot. Gradually increase to 20 hops on each foot.

D. Jumping Jacks--5 and increasing to 10 and then 20.

Subject jumps to feet apart position, clapping hands together above his head, and on count of 2

subject returns to starting position, bringing hands to the sides.

- E. Free exercise. From standing position, arms to the side.

Subject walks forward and bends the knees with every step.

- F. Rope on ground. From standing position, feet together, hands on hips.

Subject jumps over rope on both feet and turns around and jumps back (5 times).

- G. Rope on ground. From standing position, feet together, hands on hips.

Subject jumps sideways over the rope with both feet and jumps back again (5 times).

3. Strength (Wednesday)

Goal: To promote muscular power of the body.

- A. Head rolling: From standing position, legs apart, hands on hips.

Subject begins with head in dropped position, chin on chest and then turns it to the left, then back, then to the right, reverse (5 times).

- B. Arm circling: Stand straight with feet slightly apart, head up and arms fully extended to the sides. Without allowing elbows to bend, subject makes circling motion from shoulders. Do this forward and backward (10 times).

- C. Arm flapping (fly like a bird): Stand straight with feet slightly apart, arms extended and elbows kept straight.

Subject flaps arms up and down (5 times), then arms extended to the front, flap arms back at shoulder level as far as they will go forward (10 times).

- D. Trunk twist: Start with feet at shoulder distance apart and arms out to sides, without moving feet. Subject twists as far around to the left as possible, using arms to help, then twists to the right as far as possible (10 times).

- E. Trunk stretch: Stand with feet shoulder distance apart.

Subject bends down and touches toes without bending knees and then reaches for the ceiling with arms outstretched above head. Bend back as far as possible and let the head fall back to look at the ceiling (10 times).

4. Agility (Thursday)

Goal: To develop the ability to move in space.

- A. One foot hop.

Subject stands on one foot and grasps the other foot behind the back with the hand, stands still, hops forward, then backward, then hops, turning to the left and right (5 times).

- B. Mat rolls: Lay on the back, feet together, and arms to the sides.

Subject rolls to the left on count 1 and on count 2 subject returns to starting position, then rolls to the right on count 3, on count 4 subject returns to starting position.

- C. Jump and turn: From standing position, feet together, hands on hips.

Subject jumps and turns to left side on count 1, then on count 2 jumps and turns to starting position, on count 3 jumps and turns to the right side, and on count 4 returns to starting position (8 times).

5. Endurance (Friday)

Goal: To improve the time the person can use his maximum strength.

- A. From standing position, feet slightly apart, hands on hips.

Subject breathes deeply (1 minute).

- B. From standing position, feet together, both arms close to body, arms bent at elbows.

Subject runs in place for two minutes.

- C. From standing position, feet together, hands on hips.

Subject raises the heels off the floor, then toes (toe/heel rock).

- D. From lying position, arms to the side of the body.

Subject raises left leg as far as possible without

bending knee, then returns it back to the floor, then raises right leg as far as possible, then returns it to the floor without bending knee (10 times).

E. Forward and back bends: Stand erect, feet together, hands on hips.

Subject bends forward at the waist on count 1 (keeping erect not bending knees); on count 2 returns to starting position; on count 3 bends backward at the waist, keeping head erect, not bending the knees; and on count 4 returns to starting position (8 times).

F. Indian Chief: stand tall, cross feet, fold arms, keeping body erect.

Subject sits slowly on the floor, raises in the same manner (5 times).

6. Relaxation (Some of these exercises can be done each day)

Goal: To increase the ability to control the body in a relaxed position as well as in an unrelaxed position.

A. Head rotation:

Subjects sit cross-legged and rotate their heads in as large circles as possible. The movement must be very slow for maximum stretch, the trunk and shoulders remain still (5 times).

B. Trunk rotation:

Subjects sit cross-legged and rotate upper body and shoulders as well as the head. The movement should be very slow (5 times).

C. Rag doll exercise:

Subjects sit on the floor and each pretends he is a rag doll.

This exercise should be done with eyes both open and closed (1 minute).

D. Rag doll fall:

Subjects practice falling like a rag doll. This can only be done on a mat and after the children have been shown how a rag doll falls (teacher demonstrates with a rag doll) (5 times).

E. Body relaxation:

Subjects lie on their backs, relaxed. They slowly raise their arms to a vertical position, then they relax the muscles and let their arms drop to the floor (5 times).

This program's exercises and activities were administered and conducted under the supervision of trained physical education teachers in the schools aforementioned. The investigator used the proper technique in order to train the physical educators.

STATISTICAL ANALYSIS

A two-way classification analysis of variance was done in this study for the three groups randomly divided by: (1) separating males from females and (2) using the Scheffes. Pretests were administered to males and females.

The program was conducted for a period of nine weeks, after which time data were collected for this period. Posttests were then administered with an analysis of variance for repeated measures on two factors: schools-- two experimental groups and one control group; and sex-- male versus female.

Since there was a difference in the number of males and females, an unweighted means, ANOVA analysis, was administered. A comparison of the significance of main effects and interaction was done by Scheffe modes. Each test was analyzed separately, using the .05 level of significance.

Chapter 4

ANALYSIS OF DATA

The major hypotheses tested in this study were as follow:

Hypothesis 1. There will be no significant differences in physical fitness scores for the students in the experimental groups and the control group.

Hypothesis 2. There will be no significant difference in self-esteem scores between the experimental groups and control group in this physical activity program.

At the beginning of the study, each of the three randomly assigned groups was given two tests, the AAHPER-Kennedy Foundation Special Physical Fitness Test and the Self-Esteem Inventory (SEI) by Stanley Coopersmith. At the conclusion, posttests were administered by the investigator to all three groups.

Since the purpose of this study was to determine whether a structured physical activity program would have significant effects upon the trainable mentally retarded (TMR) individuals in relation to their physical fitness and self-esteem, the statistical analysis was in the form of

analysis of variance for repeated measures on one factor.

The results of the calculations and their interpretations appearing in this chapter include the analysis of variance between groups and sexes, the analysis and interpretation of data, and discussion of results.

A two-way classification analysis of variance was computed to determine if a significance in physical fitness and self-esteem would develop between the experimental and control groups. The .05 level of significance was the critical level of rejection. The instruments used were the AAHPER-Kennedy Foundation Special Fitness Test and the Self-Esteem Inventory (SEI) by Stanley Coopersmith. The Scheffe method was used to determine the significance between the three groups. The following section shows the results of the pre- and posttests of both instruments.

In order to determine if differences in physical fitness and self-esteem improvement varied between the three groups (Experimental I, II, and Control Group), the data were analyzed and the following statements were formulated:

1. The analysis of variance showed that there was a significant increase in the results obtained on the pre-posttests for the AAHPER-Kennedy Foundation Special Physical Fitness Test by Experimental Groups I and II. The results are shown in Tables 2, 3, 4, 5, and 6.

The group by sex analysis of variance of the Straight Arm Hang Scale (AAHPER-Kennedy Foundation Special Physical Fitness Test) indicated that the group main effect was significant. Specific comparison revealed that Experimental Group II was significantly different from Experimental Group I and the Control Group. Experimental Group I also indicated significant difference from the Control Group. The results are shown in Table 2.

2. Tables 2, 3, 4, 5, and 6 show that there was a significant interaction between the results of Experimental Groups I and II and the Control Group which did not participate in a planned physical activity program. This would indicate that improvement in the experimental groups was the result of a planned program.

The group by sex analysis of variance of the Shuttle-Run Scale (AAHPER-Kennedy Foundation Special Physical Fitness Test) indicated that the group main effect was significant. Specific comparison revealed that Experimental Group I was significantly different from Experimental Group II and the Control Group. Experimental Group II also indicated a significant difference from the Control Group. The results are shown in Table 3.

The group by sex analysis of variance of the Broad Jump Scale (AAHPER-Kennedy Foundation Special Physical Fitness Test) indicated that the group main effect was significant. Specific comparison revealed that

Table 2

Results of the AAHPER Post-test: Output
for Straight Arm Hang

(Analysis of Variance Summary Table)

Source	DF	Mean Square	F-Ratio	Prob.
Groups (A)	2	2413.62	13.558	< 0.001
Sex (B)	1	0.899400		
AB	2	15.5825		
Between Error	39	180.684		

Harmonic Mean = 6.497

Straight Arm Hang: Comparison of Group Mean:
Table (2)

	Exper. II	Exper. I	Control
	27.36	12.86	.13
Exp. II 27.36	--	14.50* (9.51)	27.23** (28.22)
Exp. I 12.86			12.63 (4.99)
Control .13			

*p < .05
**p < .01

F.05 = 6.46 F-ratio = (6.46) required for significance
at the .05 level

F.01 = 10.36 F-ratio = (10.36) required for significance
at the .01 level

1. The top entry (14.50) is the difference between the group means.
2. The bottom entry (9.51) is the F-value for that difference.

Degree of freedom for this table is 2.39.

Table 3

Results of the AAHPER Post-test: Output
for Shuttle-Run

(Analysis of Variance Summary Table)

Source	DF	Mean Square	F-Ratio	Prob.
Groups (A)	2	398.878	19.162	< 0.001
Sex (B)	1	8.40435		
AB	2	13.8537		
Between Error	39	20.8157		

Harmonic Mean = 6.497

Shuttle-Run Test: Comparison of Group Mean:
Table (3)

	Exper. I	Exper. II	Control
	-10.53	-5.95	.50
Exp. I	-10.53	--	4.58* (8.24)
Exp. II	-5.95	--	6.45** (13.74)
Control	.50	--	--

*p < .05
**p < .01

F.05 = 6.46

F.01 = 10.36

1. The top entry is the difference between the group means.
2. The bottom entry is the F-value for that difference.

Degree freedom for this table is 2.39.

Experimental Group II was significantly different from Experimental Group I and the Control Group. Experimental Group I also indicated a significant difference from the Control Group. The results are shown in Table 4.

The group by sex analysis of variance of the 50-Yard Dash Scale (AAHPER-Kennedy Foundation Special Physical Fitness Test) indicated that the group mean effect was also significant. Specific comparison revealed that Experimental Group I was significantly different from Experimental Group II and the Control Group. Experimental Group II also indicated a significant difference from the Control Group. The results are shown in Table 5.

The group by sex analysis of the Softball Throw Scale (AAHPER-Kennedy Foundation Special Physical Fitness Test) indicated that the group mean effect was significant. Specific comparison revealed that Experimental Group II was significantly different from Experimental Group I and the Control Group. Experimental Group I also indicated a significant difference from the Control Group. The results are shown in Table 6.

3. The analysis of variance showed that there was a significant increase in the results obtained on the pre-posttests for the Self-Esteem Inventory by Experimental Groups I and II. The results are shown in Table 7.

4. Further analysis of variance showed that there was a significant increase in the results obtained on

Table 4

Results of the AAHPER Post-test: Output
for Broad Jump

(Analysis of Variance Summary Table)

Source	DF	Mean Square	F-Ratio	Prob.
Groups (A)	2	608.015	12.022	< 0.001
Sex (B)	1	3.26733		
AB	2	66.0638	1.306	0.282
Between Error	39	50.5760		

Harmonic Mean = 6.497

Broad Jump: Comparison of Group Mean:
(Table 4)

		Exper. II 14.11	Exper. I 4.69	Control .81
Exp. II	14.11	--	9.42** (14.34)	13.30** (24.05)
Exp. I	4.69		--	3.88 (1.68)
Control	.81			--

*p < .05
**p < .01

F.05 = 6.46
F.01 = 10.36

1. The top entry is the difference between the group means.
2. The bottom entry is the F-value for that difference.

Degree of freedom for this table is 2.39.

Table 5

Results of the AAHPER Post-test: Output
for 50-Yard Dash

(Analysis of Variance Summary Table)

Source	DF	Mean Square	F-Ratio	Prob.
Groups (A)	2	76.1277	16.226	< 0.001
Sex (B)	1	2.47521		
AB	2	5.93692	1.265	0.293
Between Error	39	4.69174		

Harmonic Mean = 6.497

50-Yard Dash: Comparison of Group Mean:
(Table 5)

		Exper. I	Exper. II	Control
		-3.05	-2.73	1.29
Exp. I	-3.05	--	.32 (.18)	4.34** (22.70)
Exp. II	-2.73		--	4.02** (23.70)
Control	1.29			--

*p < .05
**p < .01

F.05 = 6.46
F.01 = 10.36

1. The top entry is the difference between the group means.
2. The bottom entry is the F-value for that difference.

Degree of freedom for this table is 2.39.

Table 6

Results of the AAHPER Post-test: Output
for Softball Throw

(Analysis of Variance Summary Table)

Source	DF	Mean Square	F-Ratio	Prob.
Groups (A)	2	844.921	20.907	< 0.001
Sex (B)	1	1.05701		
AB	2	21.2824		
Between Error	39	40.4133		

Harmonic Mean = 6.497

Softball Throw: Comparison of Group Mean
(Table 6)

	Exper. II	Exper. I	Control
	16.14	7.21	.05
Exp. II 16.14	--	8.93** (16.14)	16.09** (44.06)
Exp. I 7.21		--	7.16* (7.17)
Control .05			--

*p < .05
**p < .01

F.05 = 6.46
F.01 = 10.36

1. The top entry is the difference between the group means.
2. The bottom entry is the F-value for that difference.

Degree of freedom for this table is 2.39.

pre-posttests by Experimental Groups I and II for the Self-Esteem Inventory as compared with the group X sex means (Table 8).

The group by sex analysis of variance on the Self-Esteem scores indicated that both the group main effect and the group by sex interaction effect were significant. Specific comparison (Scheffe Test) indicated that Experimental Group II was significantly different from Experimental Group I and the Control Group. Experimental Group I also differed significantly from the Control Group. Comparison among the interaction means suggested that the interaction was due to the Experimental Female Group I and the males in Group II significant differences from the female Control Group. The results are shown in Tables 7 and 8.

5. The analysis of variance showed that there was no significant interaction or improvement in the control group during the study.

A review of the analysis of data show the findings did not support the overall null hypotheses that no significant difference in physical fitness scores or self-esteem scores would result between the experimental groups and the control group.

The findings showed that the experimental groups participating in the structured physical activity program

Table 7

Results of the Self-Esteem Inventory Post-test:
Output for Self-Esteem Test

(Analysis of Variance Summary Table)

Source	DF	Mean Square	F-Ratio	Prob.
Groups (A)	2	127.963	22.008	< 0.001
Sex (B)	1	0.221499		
AB	2	23.0685	3.968	0.026
Between Error	39	5.81428		

Harmonic Mean = 6.497

Self-Esteem Test: Comparison of Group Mean
(Table 7)

	Exper. II	Exper. I	Control
	5.36	4.99	-.25
Exp. II 5.36	--	.37 (.19)	5.61** (38.26)
Exp. I 4.99		--	5.24** (26.92)
Control -.25			--

*p < .05
**p < .01

F.05 = 6.36
F.01 = 10.36

1. The top entry is the difference between the group mean.
2. The bottom entry is the F-value for that difference.

Degree of freedom for this table is 2.39

Table 8
Self-Esteem Test: Comparison of Group X Sex Means

		Exp. I F 6.60	Exp. II M 6.00	Exp. II F 4.73	Exp. I M 3.38	Control M .50	Control F -1.00
Exp. I, F.	6.60	--	.60 (.21)	1.87 (2.07)	3.22 (5.49)	6.10 (17.47)	7.60* (22.09)
Exp. II, M.	6.00		--	1.27 (1.53)	2.62 (5.47)	5.00 (20.22)	7.00* (24.74)
Exp. II, F.	4.73			--	1.35 (1.45)	4.23 (11.96)	5.73 (16.58)
Exp. I, M.	3.38				--	2.88 (4.90)	4.38 (8.81)
Control, M.	.50					--	1.50 (.93)
Control, F.	-1.00						--

*p .05
**p .01

F.05 = 20.40
F.01 = 36.55

1. The top entry is the difference between the group means.
2. The bottom entry is the F-value for that difference.

Degree of freedom for this table is 1.39

significantly improved their mean skill scores on the AAHPER-Kennedy Foundation Special Physical Fitness Test, as well as their self-esteem on the Self-Esteem Inventory (SEI); whereas, the control did not improve on the scores of the AAHPER-Kennedy Foundation Special Fitness Test or the scores of the Self-Esteem Inventory by Stanley Coopersmith. Thus, the null hypothesis is rejected at the .05 level. These findings tend to support the theory that a structured physical activity program would improve the physical fitness and self-esteem discussed earlier in this study. Support by other studies, in the review of literature section, indicated there were advantages of using a detailed developmental assessment of motor activities as a basis for improving physical fitness and self-esteem of the trainable mentally retarded individual.

The study also revealed a significant improvement in both experimental groups. This tends to emphasize the value of the planned physical activity program of physical fitness and to contribute to self-esteem.

It seems apparent that differences do exist in the relationship between the physical fitness improvement in trainable mentally retarded individuals and the type of motor development program employed. In analyzing the data, however, the interrelations and complexities of the variables were brought into focus. This in itself was

suggestive of the findings in the literature indicating that well planned and structured physical activity programs would be beneficial and important to the physical and social development of mentally retarded individuals.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY

This study assessed the effects of a structured physical activity program upon the trainable mentally retarded individuals in relationship to physical fitness and self-esteem.

Three main groups consisting of forty-five TMR persons comprised the subjects for this study. Twenty-five males and twenty females, ages six to twenty years, were selected from three area schools in Murfreesboro, Tennessee. Ten of the forty-five were enrolled in the Louisa School, six males and four females, ranging in age from nine to sixteen years. Thirteen individuals were enrolled in the Daniel-McKee School, eight males and five females, ranging in age from six to eighteen years. Twenty-two individuals, eleven males and eleven females, ranging in age from eighteen to twenty years, were enrolled in the Adult Activity Center at Cox Memorial Gymnasium. The investigator checked the school records in order to identify those individuals whose I.Q.'s would range between 30 and 50 as

measured by the Stanford-Binet (S-B) or the Weschler Intelligence Scale for Children (WISC).

For the purposes of this study, thirty-five subjects of the Daniel-McKee School and the Adult Activity Center were selected as experimental groups (Exp. I and Exp. II), and the remaining ten subjects of the Louisa School served as the control group. All forty-five subjects were randomly selected for the purpose of this study by the method of placing their names in a container and picking them from the container. The two main experimental groups (Exp. I and Exp. II) were randomly sub-divided into activity units by the same method. This was done to allow each unit maximum functioning under the direction of the physical education teachers who implemented the structured physical activity program. Data on each group were collected during regularly scheduled school hours for both school samples as well as for the Adult Activity Center. The thirty-five subjects (Exp. I and Exp. II) who were selected as experimental groups participated in a structured physical activity program conducted during their regularly scheduled school day for forty-five minutes each day for nine weeks. The control group participated in random self-initiated activity.

The structured physical activity program began on March 31 and ended on June 1, 1980. Pre- and posttests

were given to all forty-five subjects for three to five days. The structured physical activity program included the TMR's specific physical abilities such as coordination, agility, endurance, strength, flexibility, and relaxation. The program was taught to the experimental groups (Exp. I and Exp. II) only by qualified physical education teachers employed at the Daniel-McKee School and the Adult Activity Center.

The instruments used to assess the improvement of physical fitness were the AAHPER-Kennedy Foundation of Special Physical Fitness Test and the Self-Esteem Inventory. The tests were administered prior to and at the end of the program.

CONCLUSIONS

A significant difference of improvement in physical fitness between the experimental groups and the control group, using the AAHPER-Kennedy Foundation Special Physical Fitness Test, was found. In other words, Experimental Groups I and II participating in a structured physical activity program for nine weeks witnessed significant gains in physical fitness, while the control group participating in a self-initiated activity, non-specific program did not show significant improvement. At the same time, there was also improvement between the experimental groups and the control group on the Self-Esteem Inventory. The results of

the AAHPER-Kennedy Foundation Special Physical Fitness Test suggest that the development of physical fitness is perhaps a function of the type of program in which a person participates.

The fact that the control group participated in a self-initiated activity did not show a significant difference in physical fitness improvement as measured by the AAHPER-Kennedy Foundation Special Physical Fitness Test or Self-Esteem Inventory. This would suggest that:

1. A structured physical activity program dealing with the specific motor activity was more effective in improving the physical fitness than participation in a self-initiated activity. This is supportive of the literature relating to specific effects of a physical education program for the physical fitness of the TMR individual.

2. Participating in a structured physical activity program was more effective in improving self-esteem than participation in a self-initiated activity. This is also supportive of the literature relating to specific effects of self-esteem improvement as a result of a physical activity program.

In conclusion, it appears that the structured physical program was significantly related to the improvements in physical fitness and self-esteem. These results lend support to its effectiveness and to the use of a structured physical activity program as a basis of

curriculum development for the trainable mentally retarded individuals. This study may also contribute to the development of the higher education curriculums as part of the effort toward developing programs for the TMR's education and social preparation for a better life in our democratic society.

RECOMMENDATIONS

Based upon the results of this study, physical fitness and self-esteem can be significantly influenced by participation in a structured physical activity program. However, it is recommended that:

1. Physical educators, recreation educators, and researchers of the exceptional student utilize this sequential approach in curriculum designed for the trainable mentally retarded individuals in order to improve their physical fitness and self-esteem.

2. A variety of assessment tools be developed or refined as well as standardized so they can be utilized to measure the development of physical fitness.

3. A concentrated effort between the physical educators and special educators be made in order to put together a curriculum development of physical education for the trainable mentally retarded individuals.

4. A larger number of subjects be utilized in order to have a greater sample of trainable mentally retarded

subjects to better generalize findings for the TMR population.

5. An extended period of time be used for the implementation of the study.

6. Schools or agencies be found for the purpose of the study that will give full cooperation of staff, administrators, and teachers to implement the program of study.

BIBLIOGRAPHY

BIBLIOGRAPHY

A. BOOKS

- Coopersmith, Stanley. The Antecedants of Self-esteem. San Francisco: W. H. Freeman and Company, 1967.
- Cratty, Bryant J. Developmental Sequence of Perceptual-Motor Tasks. Mountain-View, Calif.: Peek Publications, 1967.
- _____. Motor Activity and the Education of Retardets. Philadelphia: Lea and Febiger, 1974.
- Fait, Hollis F. A Manual of Physical Education Activities. Philadelphia: W. B. Saunders Co., 1961.
- _____. Special Physical Education Adapted, Corrective, and Development. Philadelphia: W. B. Saunders Co., 1978.
- Gearheart, B. R. Organization and Administration of Educational Programs for Exceptional Children. Springfield, Ill.: Charles C. Thomas, Publisher, 1974.
- Gibson, David, and Roy I. Brown. Managing the Severely Retarded. Springfield, Ill.: Charles C. Thomas, Publishers, 1976.
- Mallory, Julia S. Trainable Children Curriculum and Procedures. New York: The John Day Co.; an In Text Publisher, 1972.
- Moran, John May, and Leonard Harris Kalakian. Movement Experiences for the Mentally Retarded or Emotionally Disturbed Child. Minneapolis: Burgess Publishing Co., 1977.
- Page, G. Terry, and J. B. Thomas, International Dictionary of Education. New York: Nicholas Publishing Co.; London: Kegan Page, 1977.

Sellin, Donald F. Mental Retardation: Nature, Needs and Advocacy. Rockleigh, N.J.: Allyn and Bacon, Inc., 1979.

B. PERIODICALS

Brown, Joe. "Ratio of Physical Development as a Factor in Performance of Retarded Boys on Physical Fitness," Training School Bulletin, 65:7-11, May, 1968.

Chasey, William C., and Wannan Wyrick. "Effects of a Physical Developmental Program on Psychomotor Ability of Retarded Children," American Journal of Mental Deficiency, 75:566-570, 1971.

Coleman, A. Eugene, and M. M. Ayoub. "Assessment of the Physical Work Capacity of Institutionalized Mentally Retarded Males," American Journal of Mental Deficiency, 80:634, May, 1976.

Drowatzky, John N. "Physical Education for the Brain-Injured Child," The Physical Educator, 22:76-77, May, 1965.

Dubin, Harry N. "Some Observations on the Place of Physical Education and a Health Program in Building a Program for the Mentally Retarded Child," American Journal of Motor Deficiency, 59:6-12, 1954.

Fait, Hollis F., and Harriet J. Kupferer, "A Study of Two Motor Achievement Tests and Its Implications in Planning Physical Education Activities for the Mentally Retarded," The American Journal of Motor Deficiency, 60:729-732, 1956.

Funk, Dean C. "Effects of Physical Education on Fitness and Motor Development of Trainable Mentally Retarded Children," Research Quarterly, 42:30, 1971.

Hilsendger, Donald R., Harold J. Kand, and Lester Mann. "The Buttonwood Farms Project: A Physical Education-Recreation Program for Emotionally Disturbed and Mentally Retarded Children," Journal of Health, Physical Education and Recreation, n.v.:46, March, 1968.

Howe, Clifford E. "A Comparison of Motor Skills of Mentally Retarded and Normal Children," Exceptional Children, 25:352-54, April, 1969.

- Jenny, John H. "Physical Education for the Mentally Retarded," Exceptional Children, 23:146-148, January, 1957.
- Johnson, Robert E., Thomas A. Burton, and John W. Swann. "Procedures for Evaluating Physical Functioning in Trainable Mentally Retarded Children," Training School Bulletin, 67:78, August, 1970.
- Johnson, W. R., B. R. Frenz, and Julia A. Johnson. "Changes in Self-Concepts During a Physical Education Program," Research Quarterly, 39:560-565, October, 1968.
- Knapczyk, Dennis R., and Judith O. Yoppi. "Development of Cooperative and Competitive Play Responses in Developmentally Disabled Children," American Journal of Mental Deficiency, 80:245, December, 1975.
- Oliver, James N. "The Effect of Physical Conditioning Exercises and Activities on the Mental Characteristics of Educationally Sub-Normal Boys," British Journal of Educational Psychology, 28:155-65, June, 1958.
- Salkin, J. "Body Ego Technique: An Educational Approach to Body Image and Self Identity," Journal of Special Education, 4:69-72, 1967.
- Solomon, Amiel. "Demonstrating Physical Fitness Improvement in the EMR," Exceptional Children, 11:179-181, November, 1967.
- Staffieri, J. R. "Body Image Stereotypes of Mentally Retarded," American Journal of Mental Deficiency, 72:841, 1968.
- Stein, Julian V. "Adaptive Physical Education for the Educable Mentally Handicapped," Journal of Physical Education and Recreation, 33:31, December, 1962.
- _____, and Roy V. Pangle. "What Research Says About Psychomotor Function of the Retarded," Journal of Health, Physical Education and Recreation, 37:36-38, April, 1966.
- Turnquist, D. A., and S. S. Marzolf, "Motor Abilities of Mentally Retarded Youth," Journal of Health, Physical Education and Recreation, 37:36-38, April, 1966.

C. PAPERS, REPORTS, AND UNPUBLISHED MATERIALS

Fait, Hollis F. Curriculum Guide for Teaching Physical Education to the Profoundly and Severely Retarded. U.S. Educational Resources Information Center. ERIC Document ED 039 670, 1969.

_____. Physical Fitness Test Battery for Mentally Retarded Children (Trainable and Educable). U.S. Educational Resources Information Center. ERIC Document ED 039 671, 1967.

Guarnieri, Barbara. Activities in Developmental Physical Education. U.S. Educational Resources Information Center. ERIC Document ED 088 256, 1973.

_____. Developmental Physical Education Accountability. U.S. Educational Resources Information Center. ERIC Document ED 088 255, July, 1974.

Kern County Superintendent of Schools, Bakersfield, California. Trainable Mentally Retarded Individual Behavioral Assessment Guide. U.S. Educational Resources Information Center. ERIC Document ED 109 848, 1974.

Miller, James F., and Robert K. Throop. Investigation of the Effects of an Aquatics Program on the Psycho-Motor Function of Trainable Mentally Retarded Children. U.S. Educational Resources Information Center. ERIC Document ED 047 470, November, 1970.

Oklahoma State Department of Education. A Guide for Teachers of Trainable Mentally Retarded Children. U.S. Educational Resources Information Center. ERIC Document ED 038 814, 1968.

Orfitelli, Michael A. An Approach to Mainstreaming the Handicapped Child with the Nonhandicapped Child. U.S. Educational Resources Information Center. ERIC Document 164 507, 1978.

Paintsville Board of Education. Curriculum Guide for Trainable Mentally Retarded. U.S. Educational Resources Information Center. ERIC Document ED 038 785, 1968.

Solomon, Amiel Harrison. "Motivational and Repeated Trial Effects on Physical Proficiency Performances of Educable Mentally Retarded and Normal Boys." Unpublished Doctoral dissertation, George Peabody College for Teachers, Nashville, Tenn., 1968.

Wessel, Janet A. Programmatic Research Project in Physical Education for the Mentally Retarded Child in the Elementary School. U.S. Educational Resources Information Center. ERIC Document ED 121 039, 1975.