

A STUDY OF PHYSICAL FITNESS AND SELECTED SPORTS SKILLS
OF NORMAL AND EDUCABLE MENTALLY RETARDED GIRLS
ENROLLED IN LEVELLAND JUNIOR HIGH SCHOOL,
LEVELLAND, TEXAS

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We hereby recommend that the thesis prepared under

our supervision by Clara Jane Cole

entitled "A Study of Physical Fitness and Selected
Sports Skills of Normal and Educable Mentally
Retarded Girls Enrolled in Levelland Junior High
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be accepted as fulfilling this part of the requirements for the Degree of
Master of Arts.

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CHAPTER I

ORIENTATION TO THE STUDY

Introduction

Mental retardation is a major national problem--and growing problem. . . . The United States has almost six million retarded men, women, and children. Every year 126,000 newborn babies will become retarded, and the figures are climbing. By 1970, the number of retarded persons in the United States will be close to seven million.¹

These figures cause an increasingly great concern among the citizens of this country. Mentally retarded persons should be provided with opportunities to develop all of their potentialities optimally. Educational standards and employment practices need to be modified so that these persons have adequate opportunities to become financially independent and self-sufficient.

Most school systems in the United States have broadened their curriculums to include special education programs for the mentally retarded children. The basis for such programs for the mentally retarded must be understood by everyone who is involved or associated with it before they can be effective. Ingram says:

¹John Throne, "Everybody's Problem," Journal of Health, Physical Education and Recreation, Vol. 37, No. 4 (April, 1966), p. 24.

The basis for any modern program of education is an understanding of the developmental characteristics and learning processes of the pupils whom it serves. Their development must be understood, too, in relation to the demands that life is likely to make upon them as adults in our society. The educable group throughout their school years need to be regarded as children growing up with basic needs and desires that are common to all children and adolescents in our culture.¹

The basic needs and desires of the mentally retarded are related to the social, mental, physical, and emotional phases of their development. Specifically these needs are:

(1) the need for success and achievement, (2) the need of recognition and approval from others, (3) the need for belonging to a group, (4) the need for activity and new experience, and (5) the need to face reality.²

Mastering a simple task is a natural accomplishment for normal girls; whereas, for retarded girls this accomplishment of a task may be the major highlight in her day's activities. Retarded girls are excited about any achievement whether it is large or small. Opportunities should be made available for these girls to experience some degree of success in learning. Oliver suggests that physical activity is the area most conducive to achievement of success.

There is one big field, however, where it is possible for most mentally handicapped children to experience success in some form or another, namely in the field of physical activity. This is a field where the

¹Christine P. Ingram, Education of the Slow-Learning Child (3rd edition; New York: The Ronald Press Company, 1960), p. 39.

²Ibid., p. 157.

normal yardsticks of achievement are of less importance than personal performance and personal progress.¹

"Mentally retarded children tend to be less curious and to have less initiative to learn than normal children."² Therefore these children may be limited in their play and they may not experience the variety of activities that are participated in by the normal child. Also, the sedentary life which these youngsters lead affects their play habits. Consequently, retarded children possess an explicit need for vigorous physical activity which in turn will provide them with new experiences and worthy ways to use the leisure hours of their day.

"The physical education teacher not only has a responsibility for the education of the mentally retarded child, but an unique contribution to make to that education."³ It is in the area of physical growth and development that retarded children are most similar to the normal children; however, it appears that mentally retarded children do not have the initiative to participate in play on their own--they must be taught to play. It is through the development of big and small muscles, which in turn influences coordination and total fitness, that physical educators can make their greatest

¹James N. Oliver, "Add Challenge With Variety in Activities," Journal of Health, Physical Education and Recreation, Vol. 37, No. 4 (April, 1966), p. 30.

²Ibid., p. 31.

³John J. Jenny, "Physical Education for the Mentally Retarded," Exceptional Children, Vol. 23, No. 4 (January, 1957), p. 146.

contribution towards the total education of mentally retarded children.

The denial of recognition may affect the emotional stability of educable mentally retarded girls. Therefore, a definite need exists for recognition through association with a group, preferably normal classmates. Through these associations, retardates may develop many of the social skills which are necessary for them to take their place in society. Stein emphasizes in this regard: "Lack of acceptance by one's peers leads to solitary and sedentary activities which also influence the total growth and development of the individual."¹

"While the mentally handicapped are not as retarded in their physical or motor development as in their intellectual development, they are somewhat deficient in these areas as well."² Therefore, there is a need for physical activity which will improve the motor coordination of the mentally retarded. These girls tend to fatigue more frequently than normal girls. Activity which involves big and small muscle groups is needed to improve posture and to aid in ameliorating certain physical limitations which may have developed due to inactivity.

¹Julian U. Stein, "A Practical Guide to Adapted Physical Education for the Educable Mentally Handicapped," Journal of Health, Physical Education and Recreation, Vol. 33, No. 9 (December, 1962), p. 30.

²William M. Cruickshank and G. Orville Johnson (eds.), Education of Exceptional Children and Youth (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1953), p. 204.

"The educable mentally retarded children need physical education just as much as normal children."¹

Through physical activity mentally retarded children may learn to satisfy their personal desires. Physical educators need to re-evaluate the aims and objectives of their programs and ascertain that these children are integrated fully into the program.

"Recent trends in research show that the lack of intellectual ability resulting from arrested mental development need not affect the levels of physical fitness and motor development of the retarded."² The results of several studies indicated that educable retarded children had benefited from participation in physical education programs.³ These investigators revealed that some mentally retarded children needed individualized programs; whereas, others profited more from instruction in a regular physical education program.

"The social implications of physical activities point up the responsibility for assisting the retarded child in finding acceptance and companionship."⁴ Many opportunities

¹Elmer W. Weber, Mentally Retarded Children and Their Education (Springfield, Illinois: Charles C. Thomas, Publisher, 1963), p. 228.

²Julian U. Stein, "The Potential of Physical Activity for the Mentally Retarded Child," Journal of Health, Physical Education and Recreation, Vol. 37, No. 4 (April, 1966), p. 25.

³Ibid., p. 26.

⁴Jenny, op. cit., p. 148.

for teaching mentally retarded children acceptable social habits are available through play activities. Also, physical education can enhance feelings of belonging for mentally retarded children through providing individualized programs and offering recognitions for the achievement of certain objectives.

Worthy use of leisure time can be considered a responsibility of physical educators. Mentally retarded children have an excessive amount of leisure time both in childhood and in adulthood. Physical educators need to consider this factor when developing programs for the retarded, whether it is an individual or a class program.

Emotional and mental health implications which physical educators recognize as being of utmost importance in a sound program for normal children are vital factors in programs for the mentally retarded. These factors include the feeling of acceptance which can come through participation in group activities and the relief of frustrations through vigorous activity. Stein summarized this point well by stating that:

Programs and activities in which the retarded child can express himself in nonverbal but concrete, symbolic, and meaningful ways take an even greater meaning. Important contributions to emotional and psychological stability are made through the cathartic values of activity and movement.¹

¹Stein, "The Potential of . . . ," p. 27.

When teaching educable mentally retarded children, the physical educators must remember:

The mission is not to make champion or even talented athletes, but to use the full impact and potential of physical education to enable each individual to become better prepared physically, mentally, emotionally, and socially to take his place in society as a self-sustaining adult who is capable of living the fullest, most satisfying, and worthwhile life possible within the limitations of his handicap.¹

Statement of the Problem

The present investigation entailed a study of the physical fitness, as determined by the American Association for Health, Physical Education and Recreation Youth Fitness Test, and of selected skills in basketball, volleyball, and softball of eight educable mentally retarded girls in relation to that of their thirty-six classmates of normal intelligence in two physical education classes at the Levelland Junior High School in Levelland, Texas, during the spring semester of the academic year of 1965-1966. The data collected concerning each educable mentally retarded student were presented in the form of individual profiles. Upon the basis of the findings, recommendations were made to the principal of the Levelland Junior High School, Levelland, Texas, concerning the feasibility of instruction of educable mentally retarded girls in the physical education classes with the girls of normal intelligence.

¹Stein, "A Practical Guide . . . ," p. 31.

Purposes of the Study

The general purpose of this investigation was to determine whether the educable mentally retarded girls, enrolled in the Levelland Junior High School, Levelland, Texas, were similar enough to their normal classmates to receive optimum benefit from instruction in the regular physical education program.

Specifically, the investigator answered the following questions:

1. Was there a significant difference between the pre- and post-testing scores made by the educable mentally retarded girls and by the normal girls on the American Association for Health, Physical Education and Recreation Youth Fitness Test?
2. Was there a significant gain between the pre- and post-testing scores made by the normal and the educable mentally retarded girls on the American Association for Health, Physical Education and Recreation Youth Fitness Test?
3. Was there a significant difference between the pre- and post-testing scores made by the educable mentally retarded girls and by the normal girls on the: (1) battery of basketball tests; (2) battery of volleyball tests; and (3) battery of softball tests?

4. Was there a significant gain between the pre- and post-testing scores made by the normal and by the educable mentally retarded girls on the: (1) battery of basketball tests; (2) battery of volleyball tests; and (3) battery of softball tests?

Definitions and/or Explanations of Terms

The following definitions and/or explanations applied throughout to assist in understanding this study.

Normal referred to "a child whose age-grade and age-progress status or physical, mental, social, and moral development is average or typical for his age group."¹

Mental retardation was defined as the

. . . subaverage general intellectual functioning which originates during the developmental period and is associated with impairment in adaptive behavior.²

The terms "handicapped" and "retarded" were used synonymously in this investigation. Therefore, the following definition was adhered to:

Educable mentally handicapped are those who, because of retarded intellectual development, are incapable of being educated profitably and

¹Carter V. Good (ed.), Dictionary of Education (2nd edition; New York: McGraw-Hill Book Company, Inc., 1959), p. 89.

²Rick Heber, "Modifications in the Manual on Terminology and Classification in Mental Retardation," American Journal of Mental Deficiency, Vol. 65, No. 4 (January, 1961), p. 499.

efficiently through ordinary classroom instruction but may be expected to benefit from special educational facilities designed to make them economically useful and socially adjusted.¹

In 1960, the Texas Education Agency specified that students, eligible for educable mentally retarded classes, must have "a minimum mental age of 3.5 (intelligence quotient approximately 50-70)."²

Physical fitness, in general, was defined as

. . . the development and maintenance of a strong physique and soundly functioning organs, to the end that the individual realizes his capacity for physical activity, unhampered by physical drains or by a body lacking in strength and vitality.³

Specifically for this study, physical fitness was the physical condition of the body with attention on "arm strength, abdominal strength, speed and agility, leg power, speed, arm power and endurance"⁴ as measured by the American Association for Health, Physical Education and Recreation Youth Fitness Test.

For the purposes of this study, the selected sports skills were basic skills in basketball, volleyball, and

¹Weber, op. cit., p. 52.

²Administrative Guide and State Plan for Special Education (Austin: Texas Education Agency, 1960), p. 7.

³H. Harrison Clarke and David H. Clarke, Developmental and Adapted Physical Education (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963), p. 24.

⁴American Association for Health, Physical Education and Recreation, Physical Fitness Test Norms for College Students (Washington, D. C.: American Association for Health, Physical Education and Recreation, 1961), p. 1.

softball. The specific skills were measured by the tests cited by Broer:¹ basketball--Edgren ball handling, wall pass, and thirty-second shooting; volleyball--thirty-second repeated wall volleys and serving; and softball--overhand throw for distance, underhand throw for accuracy, and batting for distance.

Limitations of the Study

This study was limited to all of the normal girls, thirty-six in number, who were enrolled in the seventh and eighth grades of two selected physical education classes at the Levelland Junior High School in Levelland, Texas, during the spring semester of the academic year of 1965-1966.

The study was limited, also, to the eight educable mentally retarded girls who were enrolled in the special education classes at the Levelland Junior High School in Levelland, Texas, during the spring semester of the academic year of 1965-1966. These girls were enrolled in the regular physical education program.

Another limitation was the measurement of physical fitness by means of the test battery that is endorsed by the American Association for Health, Physical Education and Recreation. The selected sports skills in basketball,

¹Marion R. Broer, "Reliability of Certain Skill Tests for Junior High School Girls," Research Quarterly, Vol. 29, No. 2 (May, 1958), pp. 139-145.

volleyball and softball were measured by the tests cited by Broer.¹

Survey of Related Literature

A comprehensive review of the related literature revealed that no investigation duplicated the present research. The studies, which were reviewed, pertained to educable mentally retarded students and to physical education programs for these children.

In 1963, Killinger studied the effect of an intensified physical fitness program on ten educable mentally retarded girls and thirty normal eighth grade girls enrolled in the Woodrow Wilson Junior High School in Cedar Rapids, Iowa, during the academic year of 1961-1962.² The normal girls, enrolled in the regular physical education program, attended class two or three days each week, alternating physical activity with health instruction. The educable mentally retarded girls, enrolled in the special education classes and a special physical education class, met three times each week throughout the year.

The class periods for each group were fifty minutes in duration with the activity time ranging from thirty to

¹Ibid.

²Delight Killinger, "A Study of the Effect of Intensifying the Emphasis on Physical Fitness in a Class of Educable Mentally Retarded Girls and a Normal Eighth Grade Class of Girls in Physical Education" (unpublished Master's thesis, Department of Physical Education for Women, State University of Iowa, 1963).

thirty-five minutes. Each group participated in the same activities. These included daily exercises, soccer, tennis, deck tennis, volleyball, basketball, trampoline, tumbling, recreational games, softball, track and social dance.

Killinger modified the rules of some of the activities for the educable mentally retarded girls. The Iowa Test of Motor Fitness, administered to each group during the latter part of September, 1961, and early in May, 1962, consisted of sit-ups, shuttle run, standing broad jump, fifty-yard dash, forward bend, bent arm hang, and grasshopper.

Throughout the year in each class, the investigator emphasized physical fitness through group discussions, a varied program of activities, active participation by all students, and several special motivational methods. The public was informed of the importance of physical fitness by discussions at various meetings, demonstrations of the fitness tests at an open house at the school, and invitations extended to the parents to observe the students during their regular class periods.

Killinger computed the mean, standard deviation, and standard error for each test item. The t-test of significance was the statistical measure used to determine the reliability of the data. The t-ratios of 2.821 and 2.462, obtained for the educable mentally retarded and normal girls, respectively, led the author to the rejection of the null hypothesis

. . . that no improvement in fitness was evidenced by either the educable mentally retarded group or the normal eighth grade class as a result of increased emphasis on fitness during the school year.¹

Killinger concluded that each group obtained a significant degree of improvement in some areas of fitness because of the emphasis that was placed on fitness throughout the year. The overall fitness of the students improved but not significantly. The investigator suggested that the emphasis on fitness continue so that a high level of total fitness might be maintained. Another suggestion was that greater attention be placed on certain skills and exercises in order to develop the components of physical fitness which were in need of additional improvement.

The present study and the one by Killinger are similar in that normal and educable mentally retarded girls enrolled in a junior high school were the subjects. The two studies are similar also in that the educable mentally retarded girls were enrolled in special education classes. Another similarity is that the physical fitness of each group of students was determined.

The present study differs from the one by Killinger in that the educable mentally retarded girls serving as subjects participated in the regular physical education program. The present study pertains to physical fitness and

¹Ibid., p. 28.

selected sports skills rather than to physical fitness alone. The two studies differed further in that the data in the present study were reported in the form of individual profiles of the educable mentally retarded girls.

In 1955, Fait and Kupferer conducted a study of two motor achievement tests in relation to the intelligence quotients of mentally retarded children.¹ They compared also the T-scores of the subjects on the two tests with T-scores published for normal children within the same age group. Interpretations of the test scores resulted in suggestions for the planning of physical education activities for mentally retarded children.

The tests, administered to forty-one males with a mean intelligence quotient of 60.9 and a mean age of 15.8, were the vertical jump and the Burpee squat thrust for ten seconds. Fait and Kupferer, recording the best of three trials, scored the vertical jump according to the height reached and the squat thrust on a point basis with one-quarter of a point given for each one-quarter of a cycle completed.

The investigators converted the raw scores into T-scores and compared them with T-scores obtained from a

¹H. F. Fait and H. J. Kupferer, "A Study of Two Motor Achievement Tests and Its Implications in Planning Physical Education Activities for the Mentally Retarded," American Journal of Mental Deficiency, Vol. 60 (1955-1956), pp. 729-732.

normal secondary school group. The mean T-score for the mentally retarded on the vertical jump was 47.68 whereas the mean T-score on the squat thrust was 23.9. The Pearson Product-Moment Method of correlation, with the age factor held constant, was used to determine the relationship between the motor areas and intelligence. There was little or no relation between the vertical jump and the intelligence quotient. A slight relationship was obtained between the intelligence quotient and the squat thrust.

The investigators concluded that the physical education program for mentally retarded students should include a variety of activities. They concluded further that mentally retarded children should be provided with opportunities for physical activity just like normal children. The programs should be similar in content, and the levels of achievement for the mentally retarded children should not be lowered as the practice seems to be today. The achievement level should be related to the degree of success that the mentally retarded children are able to accomplish through participation in the activities.

The present study is similar to the one by Fait and Kupferer in that mentally retarded students were the subjects. Another similarity is that the scores of the mentally retarded students were compared with the scores of normal students. The two studies are similar also in that the present one included suggestions pertaining to the

scheduling of the mentally retarded students in the physical education program.

The present study differs from the one by Fait and Kupferer in that the subjects were mentally retarded girls, ranging in age from twelve to fifteen years. Another difference is that the present study entailed the measurement of both physical fitness and selected sports skills. Fait and Kupferer correlated the motor test scores with the intelligence quotients of the subjects whereas the investigator of the present study did not determine a possible correlation of this kind.

Ehrenburg, in 1963, conducted a study to determine the benefits received by educable mentally retarded girls through participation in a physical education program.¹ The investigator determined the improvement in strength and motor skills and the interest and enjoyment shown by fifteen educable mentally retarded girls enrolled in the special education classes in the Edison High School in Fresno, California, during the academic year of 1962-1963.

The subjects, ranging in age from thirteen to seventeen years and enrolled in a special physical education class, participated in a typical program which included ten to twelve minutes of calisthenics and twenty-eight to

¹Lois Huldah Ehrenburg, "The Benefit to Educable Mentally Retarded Girls by Participation in a Physical Education Program" (unpublished Master's thesis, Division of Education, Fresno State College, 1963).

thirty minutes of sports activities daily. The activities included units in softball, track, basketball and volleyball. The students participated in dancing, badminton, trampoline and swimming at least once each week. A battery of four tests, administered during the third, tenth and seventeenth weeks of the semester, included sit-ups, push-ups, the fifty-yard dash, and the standing broad jump. The investigator compared the tests results with the Fresno City Scale Scores and the California Percentile Scale Scores to evaluate the improvement in strength and skill obtained by each student.

The investigator constructed a questionnaire to identify the preferences of the students in regard to different subjects. The students rated the physical education activities in the order of their preference. The investigator tabulated the students' answers in order to determine which activities and subjects the girls preferred.

From the analysis and interpretation of the test results on the four-item battery, the investigator concluded that the educable mentally retarded girls benefited from the physical education program, particularly in the development of strength and endurance. The students' improvement was negligible on the tests which required skill. The girls obtained higher scores on the California Percentile Score Scale than on the Fresno City Score Scale which was interpreted to mean that the educable mentally retarded girls performed better when the scale was age-related. Another

conclusion was that the girls were more relaxed and willing to participate in activities which would improve their overall fitness when they were in a special class and not compared with normal girls.

The questionnaires led the investigator to conclude that the majority of the educable mentally retarded girls liked physical education and recognized the importance of it. The girls preferred physical education over social studies. The investigator concluded that the educable mentally retarded girls preferred activities in which they were showing progress. Dancing was rated first among their preferences, followed by swimming and trampoline. Volleyball was fourth in overall preference but was rated first among the team sports.

The present study is similar to the one by Ehrenburg in that the educable mentally retarded girls, enrolled in special education classes, were the subjects. Another similarity is that the present study entailed the measurement of the students' ability to perform sit-ups, the fifty-yard dash, and the standing broad jump.

The present study differs from the one by Ehrenburg in that the educable mentally retarded girls ranged in age from twelve to fifteen years and were enrolled in the regular physical education program at the junior high school level. Another difference is that the present study pertained to physical fitness and selected sports skills. The present

study differs further from the one by Ehrenburg in that the investigator did not survey the preferences of the educable mentally retarded girls in regard to physical education activities.

Howe, in 1958, conducted a comparative study to determine the relationship between the outcomes on tests of intelligence and of motor skills of mentally retarded and normal children.¹ The subjects were eighty-six children enrolled in special and regular classes in the public schools in Cedar Rapids, Iowa. The forty-three normal children, selected so that they matched evenly the forty-three mentally retarded children in sex, chronological age, and socioeconomic background, ranged in age from six to twelve years. The mentally retarded boys and girls had intelligence quotient means of 67.5 and 64.5, respectively, whereas the normal boys and girls had means of 99.9 and 97.5, respectively.

The selected motor skills included (1) the Sargent jump, (2) balancing on one foot, (3) tracing speed, (4) tapping speed, (5) dotting speed, (6) grip strength, (7) zig-zag run, (8) fifty-yard dash, (9) squat thrust, (10) ball throw for accuracy and (11) paper and pencil maze tracing. The students practiced the tests until it was

¹Clifford E. Howe, "A Comparison of Motor Skills of Mentally Retarded and Normal Children," American Journal of Mental Deficiency, Vol. 25, No. 8 (April, 1959), pp. 352-354.

evident that each test was understood. The administration of the tests was on an individual basis with each student finishing a particular test before starting another one. This arrangement allowed the students to rest before taking each subsequent test. The investigator recorded the best score of three trials on each test except the fifty-yard dash, in which only one trial was allowed to prevent extreme fatigue.

Howe treated the data statistically according to the age levels and the groups, normal and mentally retarded, by using the F-test of significance to determine the reliability of the statistics. The normal boys were superior to the mentally retarded boys on each test at the .05 'per cent level of confidence. The normal girls exceeded the mentally retarded girls at the .05 per cent level of confidence in all of the tests except the grip strength and the ball throw for accuracy.

Howe concluded that the normal children were superior to the mentally retarded children on the skills measured by the tests administered. Howe concluded also that a structured physical education program should be included in the curriculum of all schools which mentally retarded children attend.

The present study is similar to the one by Howe in that normal and mentally retarded students, enrolled in special and regular classes in a public school, were used as subjects. Another similarity is that two of the tests, the

ball throw for accuracy and the fifty-yard dash, were measured in the present study.

The present study differs from the one by Howe in that the subjects included both normal and mentally retarded girls who ranged in age from twelve to fifteen years. Another difference is that the investigator of the present study did not use intelligence test results, nor did the investigator work with matched pairs of subjects. The normal and mentally retarded girls were not matched according to socio-economic background. Another difference is that the present study pertained to physical fitness and selected sports skills, not motor skills.

In 1958, Broer conducted a study to establish the reliabilities of selected skill tests for junior high school girls.¹ The subjects were 368 girls enrolled in the seventh and eighth grades at the Morgan Junior High School in Seattle, Washington, during the fall semesters of the academic years of 1955-1956 and 1956-1957. The investigator administered the Scott Motor Ability Test, a revised Humiston Motor Ability Test and selected skill tests for basketball, volleyball and softball. The basketball tests consisted of the Edgren ball handling, a wall pass and the thirty-second shooting. The volleyball battery consisted of the thirty-second repeated wall volley test and a serve test. The

¹Broer, op. cit., pp. 139-145.

softball tests included the overhand throw for distance, underhand throw for accuracy, and batting for distance, using a batting tee.

The statistical treatment of the data included the computation of T-scores for each test. The motor ability tests were reliable measures of motor skills but the correlation coefficient of .60 revealed only a slight relationship; therefore, the investigator concluded that the two tests were not measuring the same ability. The repeated wall volley test in volleyball maintained a reliability of .89 for the sum of three trials whereas the reliability for the best of three trials was .94. Twenty trials on the volleyball serve test were necessary to obtain a reliability coefficient of .81. The sum of three trials on the Edgren ball handling test in basketball was reliable with a coefficient of .86 whereas the sum of three trials on the wall pass test was reliable with a coefficient of .90. The thirty-second shooting test revealed a reliability coefficient of .81 when the sum of six trials was used. The reliability coefficient was .94 for the sum of three trials on the overhand throw for distance in softball although the best of three trials was considered reliable. The reliability coefficient for the underhand throw for accuracy was predicated to be .80 when using the sum of thirty trials whereas the average of the three best trials in batting, when correlated with the average of five trials, provided a reliability coefficient of .97.

Broer concluded that, in order to obtain the higher reliability coefficients at this grade level, more trials were necessary. The test results provided high reliability coefficients when subject to the following conditions:

1. The best of two trials on the Humiston Test for Motor Ability.
2. The best of three trials in the basketball throw and standing broad jump on the Scott Motor Ability Test.
3. The sum or best of three trials on the overhand throw for distance in softball.
4. The sum of three trials on the repeated wall volleys in volleyball, the Edgren ball handling, and the wall pass test in basketball.
5. The sum of four or five trials on the tests for basketball shooting and softball batting.
6. The sum of twenty trials on the volleyball serve test.
7. Thirty to forty trials on the underhand softball throw for accuracy.

The present study is similar to Broer's study in that the subjects were junior high school girls. Another similarity is that both studies pertained to skills in basketball, volleyball and softball. The present study entailed the administration of the identical tests used by Broer.

The present study differs from the one by Broer in that the subjects included educable mentally retarded and normal girls. Another difference is that Broer was concerned with motor ability and sports skills whereas the present study pertained to physical fitness and sports skills. The present study was concerned with the ability of the educable mentally retarded girls to perform the specific sports skills in relation to their normal classmates' ability.

Sources of Data

The investigator availed herself of human and documentary sources of data. The human sources were the thirty-six normal girls enrolled in two selected physical education classes in the Levelland Junior High School, Levelland, Texas, and the eight educable mentally retarded girls enrolled in the special education classes and the regular physical education program in the Levelland Junior High School in Levelland, Texas. The administrators and faculty of the Levelland Junior High School, Levelland, Texas, were consulted for information pertaining to certain aspects of the study. Faculty members in the College of Health, Physical Education and Recreation at the Texas Woman's University in Denton, Texas, served as consultants for the study.

Documentary sources included books, periodicals, articles, pamphlets, and bulletins that provided background

material. Theses, dissertations and other unpublished materials that pertained to all aspects of the study were reviewed. Cumulative records were used of the selected subjects, enrolled in the Levelland Junior High School in Levelland, Texas.

Summary

The number of mentally retarded persons in the United States has increased yearly. This increase has provided a need for revision of educational standards and employment practices. Revisions of the above standards have occurred in some areas, particularly in the field of education. Educators have developed special education programs which provide opportunities for the mentally retarded children to meet their individual needs and desires at their own level of achievement. These individual needs and desires must be understood by everyone who is associated with mentally retarded children.

Basic needs and desires of mentally retarded children are considered to be similar to those of normal children. Generally, these needs and desires are considered to be the development of the physical, social, mental, and emotional areas of growth. Mentally retarded children have specific needs and desires in each of these areas of development. Retardates need to learn how to satisfy their own needs and desires in order to take their place in society.

Physical educators can play a vital role in the education of mentally retarded children, particularly in the areas of physical and social development. Mentally retarded children need the opportunity to learn activities which will assist them in satisfying their personal needs and desires. Physical educators need to develop programs which will include activities for these children. Some retarded children need individualized instruction as well as group instruction. Therefore, the emphasis should be on providing activities through which these children can learn to be self-sufficient in society.

The present investigation entailed a study of physical fitness and selected sports skills in basketball, volleyball, and softball, measured by reliable and valid tests, of thirty-six normal girls and eight educable mentally retarded girls enrolled in the Levelland Junior High School in Levelland, Texas, during the academic year of 1965-1966. The educable mentally retarded girls, enrolled in special education classes, participated in the regular physical education program and were classmates of the normal girls.

The general purpose was to determine if the educable mentally retarded girls benefited from instruction in the regular physical education program in relation to the benefit received by their normal classmates. Specific purposes included determining the significant differences and gains

between the pre- and post-test scores on the physical fitness test and the selected sports skills tests within and between the two groups, which were limited to the students enrolled in two selected physical education classes at the Levelland Junior High School in Levelland, Texas.

In Chapter II, the procedures followed in the development of the study are described.

CHAPTER II

PROCEDURES FOLLOWED IN THE DEVELOPMENT OF THE STUDY

Introduction

This research entailed a study of physical fitness and selected sports skills of eight educable mentally retarded girls in relation to their thirty-six normal classmates in two selected physical education classes at the Levelland Junior High School in Levelland, Texas, during the spring semester of the academic year of 1965-1966. The general purpose of this study was to determine if the educable mentally retarded girls benefited from instruction in the regular physical education program. Selected tests were administered on a pre-test and post-test basis. Significant gains and differences within and between the two groups were determined from the results of the tests. Specific background information and the test results concerning each educable mentally retarded girl were presented in the form of individual profiles. Recommendations, based upon the findings, were made to the principal of the Levelland Junior High School in Levelland, Texas, concerning the feasibility of instruction of the educable mentally retarded girls in the regular physical education program.

Preliminary Procedures

Permission was secured from the superintendent of the Levelland Public Schools in Levelland, Texas, to conduct the study during the spring semester of the academic year of 1965-1966. The research design, also, was discussed with the director of secondary education of the Levelland Schools and with the principal of the Levelland Junior High School in Levelland, Texas. After obtaining permission to conduct the study, the investigator surveyed, studied, and assimilated all of the literature pertinent to the study. After reviewing the related literature, it was determined that there was no study identical to this research. The investigator outlined the procedures which were to be followed in the development of the study during the preparation of a tentative outline of the research. Upon obtaining the approval of the thesis committee, the outline was presented in a Graduate Seminar on March 4, 1965, in the College of Health, Physical Education and Recreation at the Texas Woman's University in Denton, Texas. Suggestions, which were made during the Seminar, were incorporated in the outline. A prospectus of the thesis was submitted to the Dean of Graduate Studies at the Texas Woman's University in Denton, Texas.

Selection of the Subjects

Criteria were established for the selection of the educable mentally retarded girls and the normal girls who

served as the subjects for this study. On the basis of the established criteria, the educable mentally retarded girls had to qualify, according to requirements established by the Texas Education Agency, Austin, Texas, and the Levelland Public Schools, Levelland, Texas, for the special education classes for educable mentally retarded students in the Levelland Junior High School in Levelland, Texas. In addition, these girls had to be participants in the regular physical education program. The normal girls were enrolled in either the seventh or eighth grade physical education classes in the Levelland Junior High School in Levelland, Texas. The participating subjects were enrolled in one or the other of the above mentioned physical education classes during the spring semester of the academic year of 1965-1966. The normal girls and the educable mentally retarded girls were classmates in the two selected physical education classes.

Selection of the Instruments

This study entailed the measurement of physical fitness and selected sports skills of the normal girls and the educable mentally retarded girls. Physical fitness, according to the definition accepted for this study, was

. . . the development and maintenance of a strong physique and soundly functioning organs, to the end that the individual realizes his capacity for physical activity, unhampered by physical drains or by a body lacking in strength and vitality.¹

¹Clarke and Clarke, op. cit., p. 24.

Specifically, the investigator was concerned with the measurement of strength, agility, speed, endurance, and power involving the large muscle groups of the body. The following definitions applied to the specific areas:

1. Muscular strength: maximum strength applied in a single muscular contraction.
2. Muscular endurance: ability to continue muscular exertions of sub-maximal magnitude. Example: chinning.
3. Circulatory endurance: moderate contractions of large muscle groups for relatively long periods of time, which require an adjustment of the circulatory-respiratory systems to the activity. Examples: distance running or swimming.
4. Muscular ("explosive") power: ability to release maximum muscular force in the shortest period of time. Example: standing broad jump.
5. Agility: speed in changing body positions or in changing directions. Examples: squat thrusts or dodging run.
6. Speed: rapidity with which successive movement of the same kind can be performed. Example: fifty-yard dash.¹

The selected sports skills encompassed the measurement of an individual's ability to pass and shoot in basketball, to serve and volley in volleyball, and to throw and bat in softball.

The criteria established for the selection of the specific instruments to be used in measuring the physical fitness and selected sports skills of the subjects were:

1. The instruments had to be objective measures of physical fitness and of the selected skills in basketball, volleyball, and softball.

¹H. Harrison Clarke, Application of Measurement to Health and Physical Education (3rd edition; Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1959), p. 222.

2. The instruments had to be reliable measures of physical fitness and of the selected sports skills.
3. The instruments had to be valid measures of physical fitness and selected sports skills.
4. Norms, established for junior high school girls, had to be available for the selected instruments.
5. The physical fitness test had to include the measurement of strength, speed, endurance, agility, and power; while, the sports skills tests had to measure passing and shooting ability in basketball, serving and volleying in volleyball, and throwing and batting ability in softball.
6. The instruments should not require an excessive amount of time or equipment (when administering the tests to a class of approximately thirty students).
7. The instructions for the administration of the tests had to be simple enough that educable mentally retarded girls could understand and follow the directions.

After establishing the criteria for selecting the instruments, the investigator reviewed the published physical fitness tests and skills tests in basketball, volleyball, and softball. A listing of these tests appear in the Appendix. The Youth Fitness Test, endorsed by the

American Association for Health, Physical Education and Recreation, was selected on the basis of the established criteria as the instrument for measuring physical fitness.¹ On the basis of the established criteria, the selected instruments for measuring the basic sports skills were the test batteries for basketball, volleyball, and softball recommended by Broer.²

Description of the Instruments

The Youth Fitness Test consisted of seven items which included modified pull-ups, sit-ups, shuttle run, standing broad jump, fifty-yard dash, softball throw, and 600-yard run. Although the reliability and validity has not been established for the Youth Fitness Test, it is considered a reputable test since it was devised by authorities in the field of physical education under the direction of the American Association for Health, Physical Education and Recreation in Washington, D. C. Norms, based on age and classification index, are available. The items in this battery were administered in the gymnasium or on the playground and required a minimum amount of equipment. Directions for these tests were obtained from the Youth Fitness

¹American Association for Health, Physical Education and Recreation, Youth Fitness Test Manual (Washington, D. C.: American Association for Health, Physical Education and Recreation, 1961).

²Broer, op. cit., pp. 139-145.

Test Manual,¹ published by the American Association for Health, Physical Education and Recreation. A detailed description of each test item appears in the Appendix.

Selected tests for the sports skills included three tests for basketball, two tests for volleyball, and three tests for softball. The basketball battery included the Edgren ball handling test, a wall pass test, and a thirty-second shooting test. The reliability coefficients were .86, .90, and .82, respectively. A serve test and a thirty-second repeated wall volleys test comprised the volleyball battery. Reliability coefficients were .81 for the serve test and .94 for the repeated wall volleys test. The softball battery consisted of an accuracy throw test using an underhand throw, the overhand throw for distance, and batting for distance using a batting tee. The reliability coefficients for this battery were .80, .94, and .97, respectively. The reliability coefficients were established by Broer in 1958.² Directions for these tests were obtained from Broer.³ Descriptions of the above mentioned tests appear in the Appendix of this study.

Administration of the Tests

Students were trained to assist in the administration of the selected tests. The students were not enrolled

¹American Association for Health, Physical Education and Recreation, Youth Fitness Test Manual, pp. 6-13.

²Broer, op. cit.

³Personal correspondence with Marion R. Broer.

in the same sections of the regular physical education program as the selected subjects. Training sessions were held for the assistants before the testing program began. During these sessions the assistants were taught how to score each test, how to record each score, and how to operate a stopwatch. The assistants were used in scoring the tests when more than one student was participating at the same time. Multiple participation tests included sit-ups, shuttle run, and softball throw in the fitness battery, all of the basketball tests, wall volleys in volleyball, and all of the softball tests.

A list of the required equipment for each test was compiled to determine if additional equipment was needed. After compiling the list, Levelland Junior High School's equipment was inventoried and an adequate supply was available. Therefore, additional equipment was not purchased.

One of the specific purposes of the study was to determine the significant differences in physical fitness between the normal girls and the educable mentally retarded girls. The areas of fitness included strength, speed, agility, endurance, and power. A unit of instruction for the conditioning program was developed to insure that the students had equal opportunities to increase their fitness. The unit of instruction appears in the Appendix. Most of the exercises were of a general nature which emphasized the five selected areas of fitness. In some cases, specific

exercises were suggested to individuals with special problems. Ten to fifteen minutes of each class period were devoted to this phase of the study. Two or three general warm-up exercises were done before starting the exercises which pertained to the areas of fitness. Musical recordings were used as an accompaniment to the exercises.

Another specific purpose of the study was to determine the significant differences between the two groups in basketball, volleyball, and softball. Units of instruction were developed for each sport and appear in the Appendix. Thirty to thirty-five minutes of each class period were devoted to the development of selected sports skills. Basic skills were reviewed and taught at the beginning of each activity to insure that each student had an opportunity to learn the skills. Drills, relays, and lead-up games were used to create and maintain an interest in the game while learning the skills. These activities involved a specific skill or skills which pertained to the sport.

The pre-test administration of the physical fitness test, scheduled for the first three weeks of the spring semester of the academic year of 1965-1966, began on January 18, 1966, with the students taking part in the standing broad jump event. The jumping area was a ten-foot mat. Three student assistants aided in administering this test by watching the starting line and by measuring each jump. Each student was allowed three trials which were

recorded to the nearest foot and inch on the score card. On January 19, the shuttle run was administered with each student having two trials. In an attempt to motivate the students to perform at their highest level of ability, the students competed against each other in pairs while two student assistants timed them. Since two trials were allowed, each member of the group participated in one trial before starting the second trial in order to permit more time for rest between trials. Participation in the pull-ups was on January 20, with one trial allowed each student. The height of the doorway bar was recorded to insure that the bar could be placed at the same height when the time for the post-testing session arrived. The administration of the sit-up test was delayed until January 24, because of the dismissal of school due to inclement weather. Four student assistants aided in administering this test by holding the students' feet and counting the number of completed sit-ups. One trial was allowed. Mats were used rather than the floor. Extremely inclement weather postponed the completion of the physical fitness battery until March. The students participated in the fifty-yard dash on March 10. A fifty-yard straight-away was marked on the playground. Two student assistants timed the subjects as they raced against each other. The assistants were instructed not to start the stopwatch until the student had started her first step. This procedure was considered to be more effective

in eliminating the hesitation start which is prevalent when inexperienced students are instructed to start on a signal. On the same day, the students competed in the softball throw for distance. Lines were marked five feet apart on the playground. Five student assistants marked the three trials for each student and measured them to the nearest foot. One assistant recorded the throw on the score cards. The 600-yard run was administered on March 11. The students participated in pairs during this event. One-half of the students completed the run while their partners listened for the time as they crossed the finish line. Two student assistants recorded the times, in minutes and seconds, as the students completed the test.

The post-test administration of the physical fitness test was scheduled for the last three weeks of the spring semester of the academic year of 1965-1966. On April 25, 1966, because of inclement weather, the testing period began with the events which were to be administered in the gymnasium to guarantee that, when the weather cleared, there would be sufficient time for the softball unit outdoors. The administration of the post-testing was conducted under similar conditions to those followed during the pre-testing. Actual days of testing were scattered more during the post-testing period than during the pre-testing period because of the weather and in order to have a specified number of instructional days for the softball unit. One

test, the softball throw for distance, was administered after the completion of the softball unit. The dates for the post-testing sessions during the spring of 1966 were:

1. standing broad jump -- April 25
2. shuttle run -- April 26
3. pull-ups -- April 27
4. fifty-yard dash -- May 3
5. sit-ups -- May 9
6. 600-yard run -- May 13
7. softball throw -- May 19.

The pre-test and post-test administration of the physical fitness battery required a total of thirteen days. This number of days represented one test each day with the exception of the pre-tests of the fifty-yard dash and the softball throw for distance which were administered on the same day. Short class periods on the day of the post-test of the fifty-yard dash resulted in having to use another day for the softball throw.

Pre-test sessions in basketball started on January 25, 1966, with the administration of the wall pass test. Three targets were marked on the walls in the gymnasium to permit three students to participate at the same time. This arrangement was used in order to conserve time and to prevent the students from being embarrassed if they were not performing at their highest level of ability. Two student assistants, working together at each station, scored

and recorded the results of the test. One student assistant operated the stopwatch and timed each trial. A student was not permitted to take the second trial until all students had completed their first trial of the test. Organizing the class in this manner prevented fatigue and motivated the students to try to improve their scores on the succeeding trials. Participation in the pre-test of the thirty-second shooting test was on January 26. Two basketball goals were available; therefore, two students could participate in the test at the same time. Four student assistants, working in pairs, assisted in administering this test. One assistant at each station called out the score while the other one recorded the score. Another student assistant timed the trials with a stopwatch. Fatigue was considered a factor which might possibly affect the results of this test. After everyone in the class had completed one trial, the other trials were administered on the same plan of rotation. On January 27, the students participated in the Edgren ball handling test. Three targets were constructed on the walls in the gymnasium, which allowed three students to participate at the same time. Three pairs of student assistants aided in the administration of the test. While one assistant in each pair called fouls and recorded the score, the other one called the score out loud. Another assistant operated the stopwatch. To prevent fatigue, the same rotation

procedure for trials was used during this test as described for the previous testing sessions.

The unit on basketball consisted of sixteen days of instruction between the pre-test and post-test administrations of the selected battery. Post-tests were administered on the following days:

1. wall pass -- February 21
2. thirty-second shooting -- February 22
3. Edgren ball handling -- February 23.

Procedures during the post-testing sessions were the same as those used in the pre-testing period. All of the conditions were as similar to the pre-test situations as were possible.

Participation in the selected volleyball test battery was to precede and succeed the instructional unit for this sport. Testing started on March 1, 1966, with the administration of the repeated wall volleys test. Six student assistants aided in giving this test at the three stations marked on the gymnasium walls. One assistant, at each station, called the number of hits while the other one recorded them. The seventh assistant operated the stopwatch during the session. The serve test required two days, March 2, and March 3, for completion because of the number of trials allowed each student. The lines, which divided the court into three areas, were marked on the court. A change was required in distance between the lines due to

the difference in the length of the court available for use in this study. Another change in the administration of this test consisted of allowing each student to take two trials of ten serves each, rather than twenty consecutive serves. This arrangement conserved time and prevented fatigue. Student assistants, one at each baseline, called line violations. The investigator called out the score for each serve, while another student assistant recorded the scores. Class members took turns retrieving the balls.

The volleyball unit consisted of eighteen days of instruction in the basic skills and techniques necessary for participation in this sport. Post-testing sessions, scheduled after the completion of the instructional unit, required three days. These days were: April 4, for the repeated wall volleys; and April 5 and April 6, for the serving test. The investigator followed the same procedures during the post-testing as obtained during the pre-test sessions.

Three tests comprised the battery for the third sport, softball. The administration of the first test, overhand throw for distance, took place on April 13, 1966. An area on the playground was marked off with lines every five feet. Three student assistants spotted the three throws where the ball hit the ground. Another assistant measured each throw to the nearest five-foot line and reported the distance to another assistant who recorded the throw on the

score card. Other classmates recovered the softballs and returned them to the starting line. On April 14, the students participated in the underhand accuracy throw. This test, administered in the gymnasium where two targets were constructed on the walls, consisted of three trials of ten consecutive throws each. The number of throws for each student made it necessary to use two days to complete the test. The second day of testing was April 15. Two student assistants, assigned to each target, aided in administering this test. One recorded the score as the other one called it out. On April 18, the final test in this battery was administered--batting for distance. Using the same area that had been used for the overhand throw for distance, three student assistants aided in the administration of this test by marking the place where the ball hit the ground. One assistant measured the hit, to the nearest five-foot line; while, another assistant recorded the distance of the hit on the score card.

Following fourteen days of instruction, the students repeated the softball battery in the post-test sessions. The underhand throw for accuracy was conducted on May 17 and May 18, following the same procedures that existed during the pre-test administration. Participation in the overhand throw for distance was on May 19. At the same time the softball throw on the physical fitness test was given. The two tests were combined into one administration to provide

an extra day for instruction in softball. Complications did not occur since the directions for both tests were basically the same. The only difference between the two tests which did occur was the measurement of the distance the ball traveled. During the testing session, the distance was recorded to the nearest foot as required for the softball throw on the physical fitness test. After completing the testing session, the investigator rounded the score to the nearest five-feet as required for scoring the overhand throw for distance in the softball test battery. On May 20, the students participated in the batting for distance test. The procedures on this day were the same as during the pre-test administration.

A total of thirteen days was spent on the pre-test and post-test administrations of the physical fitness tests. The selected skill test batteries for basketball, volleyball, and softball required nineteen days. Thirty-two days were spent in the testing sessions during which time thirty separate tests were administered. One class period was used to complete each test with the exception of two tests which required two days each--the serve in volleyball and the underhand throw for accuracy in softball.

Treatment of Data

The investigator constructed two individual score cards for recording the raw test scores. One score card was used for recording the pre-test and post-test scores on the

physical fitness test and the basketball test battery. The pre-test and post-test scores on the volleyball test battery and the softball test battery were recorded on the second card. Each score card included a list of the different events which constituted the batteries. Columns were provided for recording the score for each trial of every event. The number of columns varied, depending on the number of trials the student was allowed on each particular test. The final score, recorded in a separate column, consisted of either the best of the trials or the sum of the trials. Examples of the two score cards appear in the Appendix.

Student assistants recorded the results of the various tests as the trials were completed. If the final score was a composite score of several trials it was impossible to record it at the time of the completion of the last trial. Therefore, the investigator figured all of the final scores and recorded them in the proper column on the score card at a later date. The final scores were verified several times to eliminate any possible mathematical errors, particularly where the final score consisted of the sum of several trials. Since there were numerous scores on the card, a different color of ink was used, when recording the final score, to facilitate tabulation of the data. The final scores were key punched on computer cards for the statistical treatment of the data.

Three procedures were pertinent to the study in regard to the statistical treatment of the data. Significant differences between the pre-test and the post-test scores of the two groups, the normal students and the educable mentally retarded students, composed one of the statistical treatments of the data. Another phase of the research was to determine the significant gains made by the normal girls and by the educable mentally retarded girls between the pre-test and the post-test scores on the various test batteries. The third statistical treatment of the data consisted of determining the significant differences between the two participating groups. The statistical treatment included computing the mean, standard error of the mean, and standard deviation of the mean for the scores of each group on each test. To determine if there were significant differences and gains existing within and between groups, the Fisher t-test of significance was used as the statistical measure and the formula appears in the Appendix.

Profiles for the Educable Mentally Retarded Students

An outline was developed as a guide for writing the individual profiles of the educable mentally retarded girls. Incorporated in their profiles were age, intelligence quotients, and the pre-test and post-test scores for each of the test batteries. Comparisons of the mean test scores for both participating populations were made to determine

how the educable mentally retarded girls scored in relation to the normal girls. The profiles also included the investigator's observations made during each class period. Conclusions were drawn with respect to how the educable mentally retarded girls scored in relation to the normal girls and whether they were benefiting from the instruction in the regular physical education program.

During their physical education class, the educable mentally retarded girls were observed carefully in order to obtain their reactions to the various activities and other situations which were pertinent to the study. This information, recorded by the investigator in anecdotal form, included favorable and/or unfavorable comments about each activity, statements about classmates, and any other comments which were considered of possible value. Pertinent information about the subjects was recorded after each class period.

Summary

In this chapter the investigator explained the preliminary procedures which were necessary before initiating the research design. The criteria were stated for the selection of the subjects and of the various test batteries. The instruments used in this study were described by the investigator. The administration of the selected tests included the training of student assistants and the pre-test and post-test administrations of the selected test batteries.

The treatment of the data included the development of score cards for recording the subject's raw scores for each test. Statistical treatment of the data consisted of the computation of the mean, standard error of the mean, and standard deviation of the mean for the various tests. In determining the significant differences and gains within and between the two groups, the Fisher t-test of significance was applied for each test. An outline was designed to aid in the writing of the individual profiles of the educable mentally retarded girls.

In Chapter III the results of the statistical treatment of the data are presented in tabular form and accompanied by an analysis and interpretation of the findings. Also, a presentation and discussion of the individual profiles of the eight educable mentally retarded students may be found in this chapter.

CHAPTER III

ANALYSIS AND INTERPRETATION OF THE FINDINGS

Introduction

This research included the administration of the American Association for Health, Physical Education and Recreation Youth Fitness Test and selected skills tests for basketball, volleyball, and softball, on a pre- and post-test basis, to thirty-six normal girls and eight educable mentally retarded girls. The subjects were classmates in two selected physical education classes at the Levelland Junior High School in Levelland, Texas during the spring semester of the academic year of 1965-1966.

The thirty-six normal girls ranged in age from eleven to fifteen years with a mean age of 12.622 years. Intelligence quotients for these girls ranged from 71 to 129 with a mean quotient of 101.027. These girls were enrolled in either the seventh or eighth grade physical education classes; their physical education experience varied from no previous experience to the completion of three semesters in an organized program. One-half of the girls had completed previous units in basketball, volleyball, and softball. The other half of the group were beginning their instruction in the three sports.

The eight educable mentally retarded girls ranged in age from twelve to sixteen years with a mean age of 14.331 years. These girls had intelligence quotients which ranged from 50 to 70 with a mean quotient of 63.5. Although these students were enrolled in special education classes, they were assigned to participate in one or the other of the selected physical education classes. Before this research was undertaken most of these girls had participated in the regular physical education program. Two of the girls obtained their first experience in an organized physical education program during the fall semester of the academic year of 1965-1966. The other six girls had participated in the program prior to the academic year of 1965-1966. Their experience ranged from two to five semesters of physical education, which included previous experience in basketball, volleyball, and softball.

Analysis of the Youth Fitness Test and Broer's Sports Skills Test

The general purpose of this study was to determine if the educable mentally retarded girls benefited from instruction in the regular physical education program. The investigator was interested in obtaining the answers to the following questions from the analysis and interpretation of the data:

1. Was there a significant difference between the pre- and post-testing scores made by the educable

mentally retarded girls and by the normal girls on the American Association for Health, Physical Education and Recreation Youth Fitness Test?

2. Was there a significant gain between the pre- and post-testing scores made by the normal and the educable mentally retarded girls on the American Association for Health, Physical Education and Recreation Youth Fitness Test?
3. Was there a significant difference between the pre- and post-testing scores made by the educable mentally retarded girls and by the normal girls on the (1) battery of basketball tests, (2) battery of volleyball tests, and (3) battery of softball tests?
4. Was there a significant gain between the pre- and post-testing scores made by the normal and the educable mentally retarded girls on the (1) battery of basketball tests, (2) battery of volleyball tests, and (3) battery of softball tests?

One comparison of the data, made by the investigator, was to consider the two groups as one total group composed of forty-four subjects to determine the significant gains between the pre-test mean scores and the post-test mean scores. To determine if there were significant gains, the investigator computed the mean, standard error of the means, and standard deviation of the means of the pre-test and post-test raw

scores on the Youth Fitness Test and Broer's sports skills tests. The Fisher t-test of significant differences was used to determine the probability of significance of the difference between the means. The findings, which pertain to the gains between the pre- and post-test mean scores of the total group, appear in Table 1 on pages 54 and 55.

Significant gains on the Youth Fitness Test were obtained for two tests--pull-ups and sit-ups. The t-values obtained for pull-ups and sit-ups were 2.790 and 2.833, respectively, which were above the 2.660 required for significance at the .01 level of confidence, as shown in Table 1. For the basketball battery, significant gains were obtained for each test. The groups obtained t-values of 3.394 and 2.989 on the Edgren ball handling test and the thirty-second shooting test, respectively, which were above the 2.660 which is required for significance at the .01 level of confidence. On the number of passes completed during the wall pass test, a t-value of 2.076 was obtained. Since a t-value of 2.000 is required for significance at the .05 level of confidence, the difference between the means on this test was considered significant. A t-value of 2.533 was obtained on the difference between the means on the scores of the wall pass test. The t-value, 2.533, was above the required 2.390 for significance at the .02 level of confidence. On the softball tests, a significant difference was shown in the underhand throw. The t-value was 2.086, which was above the 2.000 required for

TABLE 1

SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE PRE- AND POST-TEST MEAN
SCORES OF THE FORTY-FOUR STUDENTS ON THE YOUTH FITNESS
TEST AND BROER'S SPORTS SKILLS TESTS

Tests	Pre-Test			Post-Test			t-Value	
	Mean	S. E.	S. D.	Mean	S. E.	S. D.	t	P
Youth Fitness Test								
Pull-ups	21.227	1.442	9.457	26.750	1.359	8.913	2.790	.01
Sit-ups	29.773	2.000	13.113	37.341	1.774	11.630	2.833	.01
Shuttle run	11.764 ^c	.156 ^c	1.024 ^c	11.736 ^c	.141 ^c	.923 ^c	.095	
Standing broad jump	4.591 ^a	.111 ^a	.729 ^a	4.674 ^a	.107 ^a	.701 ^a	1.102	
Fifty-yard dash	8.505 ^c	.149 ^c	.976 ^c	8.409 ^c	.148 ^c	.967 ^c	.428	
Softball throw	67.545 ^a	2.769 ^a	18.160 ^a	69.636 ^a	2.886 ^a	18.926 ^a	.522	
Six-hundred-yard run	2.764 ^b	.071 ^b	.463 ^b	2.719 ^b	.071 ^b	.463 ^b	.403	
Basketball Tests								
Ball handling	27.864	1.010	6.625	32.977	1.120	7.347	3.394	.01
Passes--wall pass	52.909	1.100	7.211	56.159	1.115	7.313	2.076	.05
Score--wall pass	241.450	6.438	42.215	264.800	6.597	43.257	2.533	.02
Thirty-second shooting	24.000	.924	6.062	28.773	.889	5.826	2.989	.01

TABLE 1--Continued

Tests	Pre-Test			Post-Test			t-Value	
	Mean	S. E.	S. D.	Mean	S. E.	S. D.	<u>t</u>	<u>P</u>
Volleyball Tests								
Repeated volleys	11.932	.840	5.509	14.023	1.123	7.366	1.491	
Serve	29.023	2.812	18.440	34.432	2.553	16.738	1.425	
Softball Tests								
Overhand throw	67.386 ^a	2.739 ^a	17.963 ^a	69.886 ^a	2.860 ^a	18.754 ^a	.631	
Batting	170.230 ^a	14.064 ^a	92.227 ^a	219.770 ^a	14.455 ^a	94.788 ^a	2.454	.02
Underhand throw	43.409	2.705	17.740	50.636	2.167	14.211	2.086	.05

Note:

Code:

t-Value Required for Significance:

.05 = 2.000

.02 = 2.390

.01 = 2.660

a - Feet

b - Minutes and Seconds

c - Seconds and Tenths of a
Second

significance at the .05 level of confidence. A t -value of 2.454 was obtained on the batting for distance test and was significant at the .02 level of confidence.

Table 2, on pages 57 and 58, reveals the significant differences between the pre-test and post-test average mean scores between the two groups on the Youth Fitness Test and Broer's sports skills tests. The means of the raw scores were computed along with the standard error of the means and the standard deviation of the means. The t -test was used to determine the significant differences.

Table 2 shows that the normal girls obtained a significant gain on two tests in the Youth Fitness Test. A t -value of 2.171 for the shuttle run was above the required 2.000 for a significance at the .05 level of confidence. On the six-hundred-yard run, a t -value of 3.541 was obtained. This value was above the 3.460 which is required for significance at the .001 level. These two events were timed and the lower average mean test score represented an improvement. The educable mentally retarded girls had higher average mean test scores on sit-ups and the softball throw than the normal girls; but the differences were not significant. On the basketball tests, a t -value of 2.946, significant at the .01 level of confidence, revealed that the normal girls had a significant gain over the educable mentally retarded girls in this skill. No significant differences existed between the average mean test scores for the two

TABLE 2

SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE PRE- AND POST-TEST AVERAGE MEAN
SCORES* OF THE THIRTY-SIX NORMAL STUDENTS AND THE EIGHT EDUCABLE
MENTALLY RETARDED STUDENTS ON THE YOUTH FITNESS TEST
AND BROER'S SPORTS SKILLS TESTS

Tests	Normal Students			Retarded Students			t-Value	
	Pre- and Post-Tests			Pre- and Post-Tests			t	P
	Mean (Average)	S. E.	S. D.	Mean (Average)	S. E.	S. D.		
Youth Fitness Test								
Pull-ups	24.042	1.059	8.920	23.750	3.185	12.337	.086	.05
Sit-ups	32.819	1.523	12.835	36.875	3.372	13.058	1.095	
Shuttle run	11.604 ^c	.093 ^c	.785 ^c	12.406 ^c	.362 ^c	1.404 ^c	2.171	
Standing broad jump	4.714 ^a	.069 ^a	.581 ^a	4.266 ^a	.279 ^a	1.081 ^a	1.532	
Fifty-yard dash	8.325 ^c	.082 ^c	.687 ^c	9.050 ^c	.427 ^c	1.653 ^c	1.659	
Softball throw	66.889 ^a	1.862 ^a	15.692 ^a	76.250 ^a	7.008 ^a	27.140 ^a	1.291	.001
Six-hundred-yard run	2.655 ^b	.049 ^b	.410 ^b	3.132 ^b	.126 ^b	.486 ^b	3.541	
Basketball Tests								
Ball handling	31.694	.771	6.500	24.688	2.252	8.723	2.946	.01
Passes--wall pass	54.764	.792	6.672	53.500	2.655	10.283	.455	
Score--wall pass	254.540	4.707	39.664	246.750	15.858	61.418	.471	
Thirty-second shooting	26.764	.645	5.432	24.688	2.485	9.624	.801	

TABLE 2--Continued

Tests	Normal Students			Retarded Students			t-Value	
	Pre- and Post-Tests			Pre- and Post-Tests			t	P
	Mean (Average)	S. E.	S. D.	Mean (Average)	S. E.	S. D.		
Volleyball Tests								
Repeated volleys	13.347	.757	6.376	11.312	1.878	7.273	1.003	
Serve	32.125	2.009	16.927	29.938	5.540	21.455	.370	
Softball Tests								
Overhand throw	66.944 ^a	1.849 ^a	15.577 ^a	76.250 ^a	6.920 ^a	26.802 ^a	1.299	
Batting	194.860 ^a	11.104 ^a	93.564 ^a	195.620 ^a	28.639 ^a	110.920 ^a	.025	
Underhand throw	47.375	1.778	14.981	45.438	5.728	22.184	.324	

*Average Mean Scores--add the pre- and post-test means and divide by two for the average mean score.

Note:

Code:

t-Value Required for Significance:

.05 = 2.000

.01 = 2.660

.001 = 3.460

a - Feet

b - Minutes and Seconds

c - Seconds and Tenths of a
Second

groups in the volleyball and softball batteries; although, the average mean test scores of the educable mentally retarded girls were higher than those of the normal girls on two softball tests--the overhand throw for distance and batting for distance.

Specifically, the investigator wanted to know the answer to the question: Was there a significant difference between the pre-test and post-test mean scores made by the normal girls and the educable mentally retarded girls on the Youth Fitness Test? To determine the answer, the mean, standard error of the mean, and standard deviation of the mean were computed for each test. The t-values were obtained by applying the t-test of significance to the data. Table 3, on pages 60 and 61, gives the significant differences between the pre- and post-test mean scores for each group participating in the study.

On the pre-test administration of the Youth Fitness Test, there was only one significant difference between the two groups of girls as depicted in Table 3. The normal girls, on the 600-yard run, obtained a t-value of 3.031, which was above the 2.704 required for significance at the .01 level of confidence. This test, along with the shuttle run and fifty-yard dash, was a timed event, therefore, the lower score represented the better score. The normal girls approached a significant difference on the shuttle run test; while, the educable mentally retarded girls approached a

TABLE 3

SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE PRE- AND THE
POST-TEST MEAN SCORES OF THE THIRTY-SIX NORMAL STUDENTS
AND THE EIGHT EDUCABLE MENTALLY RETARDED
STUDENTS ON THE YOUTH FITNESS TEST

Tests	Pre-Test					
	Normal Students			Retarded Student		
	Mean	S. E.	S. D.	Mean	S. E.	S.
Pull-ups	21.139	1.456	8.616	21.625	5.012	13.
Sit-ups	28.222	2.098	12.412	37.250	5.052	13.
Shuttle run	11.625 ^c	.139 ^c	.842 ^c	12.375 ^c	.533 ^c	1
Standing broad jump	4.662 ^a	.099 ^a	.585 ^a	4.271 ^a	.412 ^a	1
Fifty-yard dash	8.400 ^c	.129 ^c	.762 ^c	8.975 ^c	.566 ^c	
Softball throw	65.917 ^a	2.634 ^a	15.585 ^a	74.875 ^a	4.587 ^a	12
Six-hundred- yard run	2.671 ^b	.069 ^b	.407 ^b	3.184 ^b	.165 ^b	

Note:

t-Value Required for Significance:

.05 = 2.021

.02 = 2.423

.01 = 2.704

TABLE 3--Continued

t-Value		Post-Test						t-Value	
		Normal Students			Retarded Students				
t	P	Mean	S.E.	S.D.	Mean	S.E.	S.D.	t	P
1.299		26.944	1.393	8.239	25.875	4.150	10.982	.303	
1.811		37.528	1.928	11.405	36.500	4.484	11.864	.218	
1.865		11.583 ^c	.120 ^c	.711 ^c	12.425 ^c	.496 ^c	1.313 ^c	2.377	.05
1.337		4.766 ^a	.095 ^a	.563 ^a	4.260 ^a	.378 ^a	1.000 ^a	1.835	
1.471		8.250 ^c	.099 ^c	.584 ^c	9.125 ^c	.604 ^c	1.694 ^c	2.327	.05
1.270		67.861 ^a	2.698 ^a	15.959 ^a	77.625 ^a	10.844 ^a	28.693 ^a	.879	
3.031	.01	2.639 ^b	.069 ^b	.407 ^b	3.080 ^b	.188 ^b	.498 ^b	2.527	.02

Code:

a - Feet

b - Minutes and Seconds

c - Seconds and Tenths of a Second

significant difference on sit-ups. Also, the educable mentally retarded girls obtained a higher mean score on the softball throw than the normal girls did.

Significant differences were obtained on three tests during the post-test administration of the Youth Fitness Test by the normal girls. The t -values for the shuttle run and the fifty-yard dash were 2.377 and 2.327, respectively. These values were above the required 2.021 for significance at the .05 level of confidence. A t -value of 2.527 for the 600-yard run was significant at the .02 level since the t -value was more than the required 2.423. An inspection of Table 3 shows that the educable mentally retarded girls had a higher post-test mean score on the softball throw than the normal girls had.

The next question of concern to the investigator pertained to any significant gains between the pre-test and the post-test scores of the Youth Fitness Test by either group. Computations of the means, standard errors of the means, and standard deviations of the means were made to determine the significant gains. The t -test of significance was used to determine the probability level. The computations are shown in Table 4 on pages 63 and 64.

Table 4 indicates that the normal girls obtained a significant gain in sit-ups. A t -value of 2.660 is required for significance at the .01 level of confidence. Therefore, the obtained t -value of 3.278 is above the required value.

TABLE 4

SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE PRE- AND POST-
TEST MEAN SCORES OF THE THIRTY-SIX NORMAL STUDENTS AND
OF THE EIGHT EDUCABLE MENTALLY RETARDED
STUDENTS ON THE YOUTH FITNESS TEST

Normal Students

Tests	Pre-Test			Post-Test		
	Mean	S.E.	S.D.	Mean	S.E.	S
Pull-ups	21.139	1.456	8.616	26.944	1.393	8.
Sit-ups	28.222	2.098	12.412	37.528	1.928	11
Shuttle run	11.625 ^c	.139 ^c	.842 ^c	11.583 ^c	.120 ^c	
Standing broad jump	4.662 ^a	.099 ^a	.585 ^a	4.766 ^a	.095 ^a	
Fifty-yard dash	8.400 ^c	.129 ^c	.762 ^c	8.250 ^c	.099 ^c	
Softball throw	65.917 ^a	2.634 ^a	15.585 ^a	67.861 ^a	2.698 ^a	
Six-hundred- yard run	2.671 ^b	.069 ^b	.407 ^b	2.639 ^b	.069 ^b	

Note:

t-Value Required for Significance:

.05 = 2.000

.01 = 2.660

.001 = 3.460

TABLE 4--Continued

Retarded Students

-Value		Retarded Students						t-Value	
		Pre-Test			Post-Test				
t	P	Mean	S.E.	S.D.	Mean	S.E.	S.D.	t	P
.299		21.625	5.012	13.341	25.875	4.150	10.982	.676	
.278	.01	37.250	5.052	13.367	36.500	4.484	11.864	.104	
.221		12.375 ^c	.533 ^c	1.411 ^c	12.425 ^c	.496 ^c	1.313 ^c	.064	
.748		4.271 ^a	.412 ^a	1.091 ^a	4.260 ^a	.378 ^a	1.000 ^a	.016	
.912		8.975 ^c	.566 ^c	1.498 ^c	9.125 ^c	.604 ^c	1.694 ^c	.164	
.521		74.875 ^a	4.597 ^a	12.135 ^a	77.625 ^a	10.844 ^a	28.693 ^a	.773	
.327		3.184 ^b	.165 ^b	.436 ^b	3.080 ^b	.188 ^b	.498 ^b	.388	

Code:

a - Feet

b - Minutes and Seconds

c - Seconds and Tenths of a Second

The normal girls improved their mean scores on each of the seven test items during the post-test administrations although the improvements were not statistically significant. The educable mentally retarded girls did not make a significant gain on any of the tests. Improvement was evidenced on pull-ups, softball throw, and 600-yard run.

Table 5, on pages 66 and 67, shows the significant differences between the pre-test mean scores and the post-test mean scores by the normal girls and by the educable mentally retarded girls on Broer's sports skills tests. The computations included the means, standard errors of the means, and standard deviations of the means. Significant differences were determined by the t-test of significance. The levels of probability of the significance were obtained from applying this statistical procedure.

As shown in Table 5, the normal girls obtained a significant difference on the pre-test administration of the ball handling test in the basketball battery. The t-value, 2.929, was above the required 2.704 for significance at the .01 level of confidence. On the tests in the volleyball and softball batteries, there were no significant differences. A higher mean score was obtained by the educable mentally retarded girls on the overhand throw in the softball battery.

Observation of the data of the post-test mean scores shows that the only significant difference occurred on the ball handling test in the basketball battery. The normal

TABLE 5

SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE PRE- AND POST-
TEST MEAN SCORES OF THE THIRTY-SIX NORMAL STUDENTS AND
THE EIGHT EDUCABLE MENTALLY RETARDED STUDENTS
ON BROER'S SPORTS SKILLS TESTS

Tests	Pre-Test					
	Normal Students			Retarded Students		
	Mean	S.E.	S.D.	Mean	S.E.	S
Basketball Tests						
Ball handling	29.167	.940	5.560	22.000	2.796	7.
Passes--						
wall pass	53.556	1.097	6.487	50.000	3.608	9.
Score--						
wall pass	244.722	6.563	38.824	226.750	19.710	52
Thirty-second shooting	24.556	.888	5.252	21.500	3.065	8.
Volleyball Tests						
Repeated volleys	12.333	.871	5.153	10.125	2.379	6
Serve	29.917	3.098	18.330	25.000	6.499	17
Softball Tests						
Overhand throw	65.933 ^a	2.563 ^a	15.161 ^a	74.375 ^a	9.563 ^a	25
Batting	172.361 ^a	15.778 ^a	93.344 ^a	160.625 ^a	30.226 ^a	7
Underhand throw	44.000	2.656	15.713	40.750	9.038	

Note: t-Value Required for Significance:

.05 = 2.021

.02 = 2.423

.01 = 2.704

TABLE 5--Continued

t-Value		Post-Test						t-Value	
		Normal Students			Retarded Students				
t	P	Mean	S.E.	S.D.	Mean	S.E.	S.D.	t	P
Basketball Tests									
2.929	.01	34.222	1.079	6.383	27.375	3.240	9.572	2.528	.02
.443		56.028	1.099	6.500	57.000	3.664	9.695	.327	
1.177		264.361	6.424	38.006	266.527	22.527	59.607	.135	
1.259		28.972	.772	4.567	27.875	3.537	9.360	.459	
Volleyball Tests									
.998		14.361	1.214	7.181	12.500	2.847	7.533	.626	
.662		34.333	2.503	14.810	34.875	8.607	22.773	.079	
Softball Tests									
1.182		68.056 ^a	2.652 ^a	15.691 ^a	78.125 ^a	9.996 ^a	26.450 ^a	1.340	
.315		217.361 ^a	1.468 ^a	86.831 ^a	230.625 ^a	45.070 ^a	119.254 ^a	.344	
.450		50.750	2.223	13.152	50.125	6.620	17.517	.108	

Code:

a - Feet

girls obtained a t -value of 2.528, which was above the 2.423 which is required for significance at the .02 level of confidence. A slightly higher mean score was obtained by the educable mentally retarded girls on the two tests which pertained to the wall pass in the basketball battery. On the other two test batteries, the educable mentally retarded girls obtained slightly higher mean scores on the serve test, the overhand throw, and batting for distance, as shown in Table 5.

Table 6, on pages 69 and 70, answers the question: Was there a significant gain between the pre- and post-testing scores made by the normal and the educable mentally retarded girls on the (1) battery of basketball tests; (2) battery of volleyball tests, and (3) battery of softball tests? Statistical computations included the means, standard errors of the means, and standard deviations of the means. The level of probability of the significance was obtained from using the Fisher t -test of significance.

Table 6 reveals significant gains for the normal girls on three of the four basketball tests. On the ball handling test, the normal group obtained a t -value of 3.547 which was above the 3.460 that is required for significance at the .001 level of confidence. The t -value of 2.145, obtained on the score of the wall pass test, was significant at the .05 level because the t -value was higher than the required 2.000. The group obtained a t -value of 3.702 on the thirty-second

TABLE 6

SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE PRE- AND P
TEST MEAN SCORES OF THE THIRTY-SIX NORMAL STUDENTS AND
THE EIGHT EDUCABLE MENTALLY RETARDED STUDENTS
ON BROER'S SPORTS SKILLS TESTS

Normal Students					
Tests	Pre-Test			Post-Test	
	Mean	S.E.	S.D.	Mean	S.E.
Basketball Tests					
Ball handling	29.167	.940	5.560	34.222	1.079
Passes--					
wall pass	53.556	1.097	6.487	56.028	1.099
Score--					
wall pass	.722	6.563	38.824	264.361	6.424
Thirty-second					
shooting	24.556	.898	5.252	28.972	.772
Volleyball Tests					
Repeated					
volleys	12.333	.871	5.153	14.361	1.214
Serve	29.917	3.098	18.330	34.333	2.503
Softball Tests					
Overhand throw	65.833 ^a	2.563 ^a	15.161 ^a	68.056 ^a	2.652 ^a
Batting	172.361 ^a	15.778 ^a	93.344 ^a	217.361 ^a	1.468 ^a
Underhand					
throw	44.000	2.656	15.713	50.750	2.223

Note: t-Value Required for Significance:

.05 = 2.000

.01 = 2.660

.001 = 3.460

TABLE 6--Continued

Retarded Students

t-Value		Retarded Students						-Value	
		Pre-Test			Post-Test				
<u>t</u>	<u>P</u>	Mean	S.E.	S.D.	Mean	S.E.	S.D.	<u>t</u>	<u>P</u>
Basketball Tests									
.547	.001	22.000	2.796	7.399	27.375	3.240	8.572	1.175	
1.570		50.000	3.608	9.547	57.000	3.664	9.695	1.405	
.145	.05	226.750	19.710	52.153	266.750	22.527	59.607	1.250	
3.702	.001	21.500	3.065	8.109	27.875	3.537	9.360	1.274	
Volleyball Tests									
1.338		10.125	2.379	6.294	12.500	2.847	7.533	.599	
.093		25.000	6.499	17.197	34.875	8.607	22.773	.856	
Softball Tests									
.594		74.375 ^a	9.563 ^a	25.303 ^a	78.125 ^a	9.996 ^a	26.450 ^a	.254	
2.059	.05	160.625 ^a	30.226 ^a	79.978 ^a	230.625 ^a	45.070 ^a	119.254 ^a	1.207	
1.922		40.750	9.038	23.915	50.125	6.620	17.517	.783	

Code:

a - Feet

shooting test. A t -value of 3.460 is required for significance at the .001 level of confidence. In the softball battery, a significant gain was obtained by the normal group on the batting for distance. The t -value of 2.059 was higher than the required 2.000 for significance at the .05 level of confidence.

As depicted in Table 6, significant gains were not obtained by the educable mentally retarded girls on any of the test batteries. Of interest to the investigator was the fact that this group improved the mean score for each test. According to the obtained t -values, the greatest amount of improvement appeared in the basketball battery.

Individual Profiles on the Educable Mentally Retarded Students

Individual profiles were written for each educable mentally retarded girl. These profiles included age, intelligence quotients, and pre- and post-test scores for each of the test batteries. Comparisons were made between the pre- and post-test mean scores of the two groups and the pre- and post-test raw scores of each educable mentally retarded girl to determine if these students benefited from instruction in the regular physical education program.

Student AA

Student AA was 14.10 years old and had an intelligence quotient of 70. Having participated in the regular

physical education program for four semesters before this study was undertaken, she had had previous experience in the sports which were included in the test batteries. AA was interested in physical education and participated enthusiastically in the various activities during the semester. Physical activity was not limited to the class period as she reported, to the investigator, the various games and sports that she took part in outside of school. AA was accepted by her normal classmates, who were delighted to have her on their team because of her ability.

Table 7, page 73, provides the reader with a composite picture of AA's pre- and post-test performance record on the seven Youth Fitness Test items and the nine sports skills tests constructed by Broer. In addition, the table shows whether the subject's scores were above the mean of the normal group, above the mean of the educable mentally retarded group, and/or both groups for each of the tests administered. This table indicates that AA's scores were all above the pre-test mean scores of the retarded group with the exception of the score on pull-ups. On this test, she was a fraction, .625, below the group. Therefore, this student scored above the pre-test average mean score of the retarded group on fifteen of the sixteen tests which were administered.

The results of the post-administration of the tests showed that AA improved or retained her scores on all but

TABLE 7

PRE- AND POST-TEST SCORES FOR STUDENT AA ON THE YOUTH
FITNESS TEST AND SPORTS SKILLS TESTS COMPARED WITH
TEST MEANS OF THE TWO GROUPS

Tests	Pre-Test Score	Post-Test Score
Youth Fitness Test		
Pull-ups	21.000	21.000
Sit-ups	50.000***	50.000***
Shuttle run	11.200***	11.400***
Standing broad jump	6.000***	6.000***
Fifty-yard dash	7.800***	7.800***
Softball throw	97.000***	100.000***
Six-hundred-yard run	2:400***	2:300***
Basketball Tests		
Ball handling	34.000***	35.000***
Passes--wall pass	52.000**	64.000***
Score--wall pass	244.000**	316.000***
Thirty-second shooting	28.000***	33.000***
Volleyball Tests		
Repeated volleys	15.000***	18.000***
Serve	52.000***	70.000***
Softball Tests		
Overhand throw	95.000***	100.000***
Batting	305.000***	420.000***
Underhand throw	75.000***	72.000***

*Raw score above the mean for the normal group.

**Raw score above the mean for the educable mentally retarded group.

***Raw score above the mean for the normal group and for the educable mentally retarded group.

two tests. On the Youth Fitness Test, her score on the shuttle run was .2 of a second slower than her pre-test score. The other test was the underhand throw for accuracy in the softball battery. AA's post-test score was three points below her pre-test score. AA scored above the post-test mean scores of the retarded group on fifteen of the tests. She scored 4.875 below the group on pull-ups. When comparing the pre- and post-test scores, AA improved or maintained her scores on fourteen tests.

Comparisons of the raw scores for Student AA and the pre-test mean scores of the normal group on the pre-administration of the Youth Fitness Test gave the higher scores to AA, with the exception of pull-ups. She was .139 below mean score of the normal population. This student was above the pre-test average mean score of the normal group on the ball handling test and the thirty-second shooting test. She scored below the normal girls on the other tests. The differences were 1.556 passes completed and .722 on the score on the wall pass test. AA's pre-test scores on the volleyball and softball batteries were higher than the means of the normal group. Student AA scored above the pre-test mean scores of the normal population on thirteen of the sixteen tests.

On the post-administration of the Youth Fitness Test, the normal group's mean scores were below the raw scores of AA with one exception. The exception was pull-ups

in which the normal group completed 5.944 more pull-ups than this student. AA's raw scores on the sports skills tests were higher than the post-test mean scores of the group. Overall, this student obtained scores which were higher than the post-test mean scores of the normal group on fifteen of the sixteen tests.

Improvement was obtained by AA on the majority of the selected tests between the pre- and post-test administrations. She scored lower on both administrations of pull-ups on the Youth Fitness Test than the mean scores of the two populations. The indication was that individual help was needed to improve muscular endurance and arm strength. During the two administrations of the selected sports skills tests, this student scored above the mean scores of the two groups except on the pre-testing of the basketball wall pass test. She was slightly below the mean of the normal population, but her improvement was greater than that of the normal group. The investigator concluded that, even though AA was older than the normal group, she was similar enough to her normal classmates in physical ability to benefit from the instruction which was given in the regular physical education program.

Student BB

Student BB had an intelligence quotient of 70 and was 15.7 years old. She had participated in the regular

physical education program for three semesters. Being older than the normal population could have been a factor which affected her attitude toward physical education. She appeared not to be interested in any activity, whether it was a lead-up game, relay, drill, or sport. After the class started playing any one of the sports, her attitude changed. The conditioning program was difficult for her. The normal girls accepted her, and they got along well together.

In Table 8, page 77, the reader may readily observe BB's pre- and post-test performance record on the seven items of the Youth Fitness Test and the nine sports skills tests. In addition, the table shows whether the subject's scores were above the mean of the normal group, above the mean of the educable mentally retarded group, and/or both groups for each of the tests administered. This table indicates that BB's scores were above the pre-test mean scores of the retarded group with two exceptions. On the Youth Fitness Test, this student scored below the retarded group on pull-ups with a difference of 7.625. There was a difference of 2.000 on the ball handling test in the basketball battery. BB scored above the pre-test mean scores of the retarded group on fourteen of the sixteen tests.

Comparisons of BB's scores and the post-test mean scores of the retarded group show that she outscored the group on thirteen of the tests. She scored below the mean on standing broad jump in the fitness battery, with a

TABLE 8

PRE- AND POST-TEST SCORES FOR STUDENT BB ON THE YOUTH
FITNESS TEST AND SPORTS SKILLS TESTS COMPARED WITH
TEST MEANS OF THE TWO GROUPS

Tests	Pre-Test Score	Post-Test Score
Youth Fitness Test		
Pull-ups	14.000	31.000***
Sit-ups	50.000***	50.000***
Shuttle run	11.400***	12.400**
Standing broad jump	4.750***	4.000
Fifty-yard dash	8.600**	9.000**
Softball throw	80.000***	83.000***
Six-hundred-yard run	3:100**	3:030**
Basketball Tests		
Ball handling	20.000	24.000
Passes--wall pass	55.000***	67.000***
Score--wall pass	251.000***	323.000***
Thirty-second shooting	28.000***	36.000***
Volleyball Tests		
Repeated volleys	11.000**	17.000***
Serve	26.000**	40.000***
Softball Tests		
Overhand throw	80.000***	85.000***
Batting	190.000***	195.000
Underhand throw	54.000***	54.000***

*Raw score above the mean for the normal group.

**Raw score above the mean for the educable mentally retarded group.

***Raw score above the mean for the normal group and for the educable mentally retarded group.

difference of .260. On the ball handling test of the basketball tests, BB was below the post-test mean score of the retarded group. The difference was 3.375. The third difference occurred on the batting for distance test in the softball battery. She scored 35.625 below the mean of the retarded group on this test. Overall BB scored higher than the retarded group on thirteen tests.

When comparing pre-test scores of BB to the pre-test mean scores, she was below the group on six tests. Three of the tests were in the Youth Fitness Test. The differences were 7.139 on pull-ups, .2 on the fifty-yard dash, and .429 on the 600-yard run. BB was outscored by 14.222 when competing in the ball handling test. This student was below the normal group by differences of 1.333 on the repeated volleys and 3.917 on the serve test, which comprised the volleyball battery. After the pre-test sessions, it was determined that BB's scores were higher than the mean scores of the normal group on ten tests.

BB scored below the post-test mean scores of the normal population on four of the items on the Youth Fitness Test. The differences were .817 on the shuttle run, .766 on the standing broad jump, .750 on the fifty-yard dash, and .391 on the 600-yard run. BB's score on the ball handling test, in the basketball battery, was 10.222 points below the mean score of the normal group. On the batting for distance test in the softball battery, this student scored below the

mean score of the normal group with a difference of 22.361. During the post-testing sessions, BB obtained scores on ten tests which were higher than the mean scores of the normal group.

Improvement was achieved by BB on eleven of the sixteen tests between the pre- and post-testing sessions. She maintained her scores on two tests and showed no improvement on three tests. When her scores were compared to the mean scores of the normal group, BB was below the mean on six tests during each administration. These six tests were the ones which required speed, agility, and/or endurance. It was concluded that she was weak in these areas and needed a program which would lead to improving these fitness areas. Another conclusion was that, even though the weaknesses were present, BB did benefit from the instruction in the regular physical education program. An individualized program, which could be participated in outside of class, would be beneficial to this student.

Student CC

Student CC was 15.9 years old and had an intelligence quotient of 62. Previous experience had been obtained by her since she had participated in the regular physical education program for five semesters prior to this research. She was well liked by the normal and retarded girls. She enjoyed associating with her classmates. CC appeared to be

very interested in the sports which were taught, particularly basketball. Extra effort was exerted by this student to help her team win the games, especially interclass games.

Table 9, page 81, contains a composite picture of CC's pre- and post-test performance record on the seven Youth Fitness Test items and the nine sports skills tests. This table indicates that CC's scores were all above the pre-test mean scores of the retarded group with the exception of three tests. Two of the differences occurred on the Youth Fitness Test--pull-ups and sit-ups. The differences were 7.625 on pull-ups and 16.250 on sit-ups. CC's score on the batting for distance test was 50.625 below the mean of the retarded group. Therefore, the pre-test scores of CC were above the means of the retarded group on thirteen of the selected tests.

On the post-administration of the tests, CC's scores were all above the mean scores of the retarded group with the exception of pull-ups and sit-ups. The differences were 12.875 on pull-ups and 8.500 on sit-ups. Comparisons of the pre- and post-test scores showed that CC achieved improvement on thirteen tests. Her scores did not improve for pull-ups, repeated volleys, and the underhand throw for accuracy.

Table 9 reveals that CC's scores were below the pre-test mean scores of the normal group on seven tests. On the Youth Fitness Tests the differences included 7.139 on

TABLE 9

PRE- AND POST-TEST SCORES FOR STUDENT CC ON THE YOUTH
FITNESS TEST AND SPORTS SKILLS TESTS COMPARED WITH
TEST MEANS OF THE TWO GROUPS

Tests	Pre-Test Score	Post-Test Score
Youth Fitness Test		
Pull-ups	14.000	13.000
Sit-ups	21.000	28.000
Shuttle run	12.000**	11.000***
Standing broad jump	4.417**	4.750**
Fifty-yard dash	7.800***	7.600***
Softball throw	97.000***	105.000***
Six-hundred-yard run	3:150**	3:070**
Basketball Tests		
Ball handling	28.000**	38.000***
Passes--wall pass	64.000***	68.000***
Score--wall pass	310.000***	326.000***
Thirty-second shooting	31.000***	37.000***
Volleyball Tests		
Repeated volleys	23.000***	22.000***
Serve	50.000***	53.000***
Softball Tests		
Overhand throw	95.000***	105.000***
Batting	110.000	380.000***
Underhand throw	74.000***	65.000***

*Raw score above the mean for the normal group.

**Raw score above the mean for the educable mentally retarded group.

***Raw score above the mean for the normal group and for the educable mentally retarded group.

pull-ups, 7.222 on sit-ups, .375 on the shuttle run, .246 on the standing broad jump, and .479 on the 600-yard run. CC was below the mean for the normal population by 1.167 on the ball handling test. On the batting for distance, she scored below the mean of the normal group by 62.361.

During the post-administration of the tests, CC scored higher than the mean scores of the normal group on twelve of the sixteen tests. The differences occurred on four of the Youth Fitness Test items. CC's scores were below the mean scores by 13.944 on pull-ups, 9.528 on sit-ups, .016 on standing broad jump, and .431 on the 600-yard run.

Between the two testing periods, improvement was obtained by CC on thirteen tests. The tests in which improvement was not achieved were pull-ups, repeated volleys, and the underhand throw for accuracy. She was below the pre- and post-test mean scores for both groups on pull-ups and sit-ups. This indicated a weakness in muscular endurance and arm and shoulder and abdominal strength. An individualized program was needed to improve this weakness. On the sports skills tests, CC scored above the mean scores for each group on both test administrations, with the exception of two tests. The investigator concluded that, on the basis of the test results, this student benefited from the instruction which was given in the regular physical education program.

Student DD

Student DD was 16.8 years old and had an intelligence quotient of 61. She enjoyed associating with her classmates and got along well with them. DD had participated in the regular physical education program for four semesters prior to the spring semester of the 1965-66 academic year. The activities were difficult for her, but she was willing to try any of them. Improving her ability in any activity was important to her. In order to improve, DD came in before class started to obtain additional practice and instruction. She was very excited about any degree of improvement. Team sports appeared to be very difficult for her, while individual and dual activities were of interest to her.

Table 10, page 84, contains a composite picture of DD's pre- and post-test performance record on the seven Youth Fitness Test items and the nine sports skills tests constructed by Broer. This table indicates that DD's scores were all below the pre-test mean scores of the retarded group. Differences on the Youth Fitness Test items were: 14.625 on pull-ups, 20.250 on sit-ups, 2.825 on the shuttle run, 1.438 on the standing broad jump, 3.325 on the fifty-yard dash, 33.875 on the softball throw, and .916 on the 600-yard run. DD was below the pre-test mean scores of the retarded group on the basketball tests with differences of 8.000 on the ball handling, 14.000 on the wall pass, 74.750 on the wall pass score, and 9.500 on the thirty-second

TABLE 10

PRE- AND POST-TEST SCORES FOR SUBJECT DD ON THE YOUTH
FITNESS TEST AND SPORTS SKILLS TESTS COMPARED WITH
TEST MEANS OF THE TWO GROUPS

Tests	Pre-Test Score	Post-Test Score
Youth Fitness Test		
Pull-ups	7.000	15.000
Sit-ups	17.000	17.000
Shuttle run	15.200	15.200
Standing broad jump	2.833	2.833
Fifty-yard dash	12.400	13.000
Softball throw	41.000	40.000
Six-hundred-yard run	4:100	4:100
Basketball Tests		
Ball handling	14.000	17.000
Passes--wall pass	36.000	41.000
Score--wall pass	152.000	169.000
Thirty-second shooting	12.000	17.000
Volleyball Tests		
Repeated volleys	2.000	2.000
Serve	7.000	2.000
Softball Tests		
Overhand throw	40.000	40.000
Batting	100.000	80.000
Underhand throw	6.000	20.000

*Raw score above the mean for the normal group.

**Raw score above the mean for the educable mentally retarded group.

***Raw score above the mean for the normal group and for the educable mentally retarded group.

shooting. On the volleyball tests, the differences were 8.125 and 18.000 on the repeated volleys and serves, respectively. The scores for DD, on the softball test, differed from the mean scores of the group by 34.375 on the overhand throw, 60.625 on batting, and 34.750 on the underhand throw.

DD improved her scores on six of the sixteen tests between the two testing sessions. As found at the end of the pre-testing, this student's post-test scores were all lower than the post-test mean scores of the educable mentally retarded group. The differences on the Youth Fitness Test were: 10.875 on pull-ups, 19.500 on sit-ups, 2.775 on the shuttle run, 1.427 on the standing broad jump, 3.875 on the fifty-yard dash, 37.625 on the softball throw, and 1.020 on the 600-yard run. On the basketball battery, the differences were 10.375 on the ball handling test, 16.000 on the wall pass test, 97.750 on the wall pass score, and 10.875 on the thirty-second shooting test. Differences on the volleyball tests were 10.500 on the repeated volleys and 32.875 on the serves. On the softball battery, DD's scores were lower than the retarded group's mean scores by 38.125 on the overhand throw, 150.625 on batting, and 30.125 on the underhand throw.

Comparisons of DD's pre-test scores with the pre-test mean scores of the normal population showed that this student scored below the group on every test. The

differences on the Youth Fitness Test were 14.139 on pull-ups, 9.222 on sit-ups, 3.575 on the shuttle run, 1.829 on the standing broad jump, four on the fifty-yard dash, 24.917 on the softball throw, and 1.429 on the 600-yard run. Differences on the basketball tests were 15.176 on ball handling, 17.556 passes on the wall pass, 92.722 on the wall pass score, and 12.556 on the thirty-second shooting. DD's scores, on the volleyball tests, differed from the mean scores of the normal group by 10.330 on repeated volleys and 22.917 on serves. On the softball battery, the differences were 25.833 on the overhand throw, 72.361 on the batting test, and thirty-eight on the underhand throw test.

Post-test scores for DD were below the post-test mean scores of the normal group on each of the sixteen tests. DD was below the mean scores of the group on the Youth Fitness Test by 11.944 on pull-ups, 20.528 on sit-ups, 3.617 on the shuttle run, 1.933 on the standing broad jump, 5.250 on the fifty-yard dash, 27.861 on the softball throw, and 1.461 on the 600-yard run. Differences between this student's scores and group's mean scores, on the basketball tests, included 14.222 on ball handling, 15.028 on wall pass, 95.361 on the wall pass score, and 11.972 on thirty-second shooting. On the volleyball tests, the normal group obtained mean scores which were higher than DD's scores by 12.361 and 32.333, respectively, on the repeated volleys and serve. The differences on the softball tests were 28.056

on the overhand throw, 137.361 on the batting for distance, and 30.750 on the underhand throw.

Overall, DD improved her pre-test scores on six tests. She maintained her pre-test scores on six tests, also. Even with the slight improvement, she scored below the mean scores of the two population groups during both administrations of the tests. The investigator concluded that DD was very weak in the fitness areas of strength, agility, speed, endurance, and power involving the large and small muscles of the body. The ability to pass and shoot in basketball, to volley and serve in volleyball, and to throw and bat in softball was in need of improvement.

Apparently, DD benefited from the instruction in the regular physical education program due to the fact that some improvement was obtained by her. The investigator concluded that, although improvement was obtained by her, DD was not similar enough to her normal classmates to benefit optimally from instruction given in the regular program. She needed an individualized program in which she would be able to improve her fitness and sports ability to her highest potential level.

Student EE

Student EE had an intelligence quotient of 50 and was fifteen years old. Having participated in the physical education program for five semesters before the spring semester of the academic year of 1965-66, she knew her

classmates, and they got along well together. Some of the activities, especially the conditioning program, did not interest her. EE had to be encouraged to participate. Competitive games, which were played after school between classes, motivated her to try to improve her ability. In order to improve, this student came in for additional practice and instruction before school.

In Table 11, page 89, the reader may readily observe a composite picture of EE's pre- and post-test performance record on the seven Youth Fitness Test items and the nine sports skills tests constructed by Broer. This table indicates that EE's scores were all below the pre-test mean scores of the retarded group. Differences on the Youth Fitness Test were 13.625 on pull-ups, 7.250 on sit-ups, 1.725 on the shuttle run, 1.771 on the standing broad jump, 1.025 on the fifty-yard dash, 39.875 on the softball throw, and .116 on the 600-yard run. On the basketball tests, EE was below the mean scores of the retarded group by twelve on ball handling, twelve passes on wall pass, 77.750 on the wall pass score, and 15.500 on thirty-second shooting. This student was below the mean scores of the retarded group by 3.125 and 25.000 on the repeated volleys and serve test, respectively, in the volleyball battery. The pre-test mean scores of the group were higher than EE's scores on the softball tests with differences of 39.375 on the overhand throw, 125.625 on batting, and 23.750 on the underhand throw.

TABLE 11

PRE- AND POST-TEST SCORES FOR SUBJECT EE ON THE YOUTH
FITNESS TEST AND SPORTS SKILLS TESTS COMPARED WITH
TEST MEANS OF THE TWO GROUPS

Tests	Pre-Test Score	Post-Test Score
Youth Fitness Test		
Pull-ups	8.000	13.000
Sit-ups	30.000*	27.000
Shuttle run	14.100	13.400
Standing broad jump	2.500	3.083
Fifty-yard dash	10.000	10.200
Softball throw	35.000	33.000
Six-hundred-yard run	3:300	3:310
Basketball Tests		
Ball handling	10.000	14.000
Passes--wall pass	38.000	46.000
Score--wall pass	149.000	182.000
Thirty-second shooting	6.000	10.000
Volleyball Tests		
Repeated volleys	7.000	3.000
Serve	0.000	0.000
Softball Tests		
Overhand throw	35.000	35.000
Batting	35.000	90.000
Underhand throw	17.000	26.000

*Raw score above the mean for the normal group.

**Raw score above the mean for the educable mentally retarded group.

***Raw score above the mean for the normal group and for the educable mentally retarded group.

EE improved her scores on nine tests between the two administrations. Even though gains were made, this student scored below the mean scores of the retarded group on the post-test administrations. Differences on the Youth Fitness Test were 12.875 on pull-ups, 9.500 on sit-ups, .975 on the shuttle run, 1.177 on the standing broad jump, 1.075 on the fifty-yard dash, 34.625 on the softball throw, and .260 on the 600-yard run. The differences on the basketball tests were 13.375 on ball handling, 11.000 on wall pass, 84.750 on the wall pass score, and 17.875 on the thirty-second shooting. EE's scores on the volleyball tests were below the mean scores of the retarded group by 9.500 on repeated volleys and 34.875 on the serve. On the softball tests, this student was below the mean of the group by 43.125 on the overhand throw, 140.625 on the batting for distance, and 24.125 on the underhand throw.

Further inspection of Table 11 discloses that EE obtained scores which were all below the pre-test mean scores of the normal group with the exception of sit-ups. Differences on the Youth Fitness Test included 13.139 on pull-ups, 2.475 on the shuttle run, 2.162 on the standing broad jump, 1.600 on the fifty-yard dash, 30.917 on the softball throw, and .629 on the 600-yard run. On the basketball tests, the group's mean scores differed from EE's scores by 19.167 on ball handling, 15.556 passes and a score of 95.722 on the wall pass, and 18.556 on the

thirty-second shooting. In volleyball, the differences were 5.333 for repeated volleys and 29.917 on serves. The differences on the softball tests were 30.833 on the overhand throw, 137.361 on batting, and 27.000 on the underhand throw.

Comparisons of EE's post-test scores with the post-test mean scores of the normal population revealed that this student was below the group on all of the tests. EE was below the group by 13.944 on pull-ups, 10.528 on sit-ups, 1.817 on shuttle run, 1.693 on standing broad jump, 1.950 on the fifty-yard dash, 34.861 on the softball throw, and .671 on the 600-yard run. On the basketball tests, the differences were 20.222 on ball handling, 10.028 passes on wall pass, 82.361 on the wall pass score, and 28.972 on thirty-second shooting. EE's scores were below the mean scores of the normal group on the volleyball tests by 11.361 on repeated volleys and 34.333 on the serve. On the softball tests, the normal group outscored this student by 35.056 on the overhand throw, 127.361 on batting, and 24.750 on the underhand throw.

EE's scores, overall, were below the mean scores of the populations on the two administrations of the selected instrument with one exception. She improved her scores on nine tests. The investigator concluded that EE was weak in all of the areas of fitness and in the basic skills in basketball, volleyball, and softball. EE was not similar enough to the normal students to benefit from the instruction in

the regular physical education program. A program designed to meet her individual needs was needed by this student so she could improve her fitness level and sports ability to the highest possible degree.

Student FF

Student FF was 14.11 years old and had an intelligence quotient of 69. She had participated in the physical education program for five semesters before the spring semester of the academic year of 1965-66. She was acquainted with some of her normal classmates and got along well with them. Her participation was very good. FF was eager to improve her ability in the different activities. At times she was critical of her own ability. Because of her interest, this student tried very hard to improve her skill. She was willing to accept and to try any suggestion which might possibly lead to improvement.

In Table 12, page 93, the reader may readily observe a composite picture of FF's pre-test and post-test performance record on the seven Youth Fitness Test items and the nine sports skills tests constructed by Broer. This table indicates that FF's scores were above the pre-test mean scores of the retarded group on seven tests. Two differences occurred on the Youth Fitness Test--14.875 on the softball throw and .086 on the 600-yard run. On the basketball tests, FF was below the group on every test. The differences were 2.500 on the thirty-second shooting, 23.750 on the wall pass

TABLE 12

PRE- AND POST-TEST SCORES FOR SUBJECT FF ON THE YOUTH
FITNESS TEST AND SPORTS SKILLS TESTS COMPARED WITH
TEST MEANS OF THE TWO GROUPS

Tests	Pre-Test Score	Post-Test Score
Youth Fitness Test		
Pull-ups	40.000***	40.000***
Sit-ups	50.000***	39.000***
Shuttle run	11.000***	11.400***
Standing broad jump	4.750***	4.083
Fifty-yard dash	8.400**	8.200***
Softball throw	60.000	64.000
Six-hundred-yard run	3:270	3:240
Basketball Tests		
Ball handling	19.000	28.000**
Passes--wall pass	47.000	52.000
Score--wall pass	203.000	248.000
Thirty-second shooting	19.000	23.000
Volleyball Tests		
Repeated volleys	4.000	5.000
Serve	26.000**	35.000***
Softball Tests		
Overhand throw	60.000	65.000
Batting	175.000***	175.000
Underhand throw	23.000	44.000

*Raw score above the mean for the normal group.

**Raw score above the mean for the educable mentally retarded group.

***Raw score above the mean for the normal group and for the educable mentally retarded group.

score, and 3.000 on ball handling and the number of passes on the wall pass test. On the volleyball tests, this student scored below the group by 6.125 on the repeated volleys. She was below the mean scores of the group on two softball tests. These differences were 14.375 on the overhand throw and 17.750 on the underhand throw.

Student FF improved or maintained her scores on thirteen of the tests between the two testing sessions. On the post-test administration of the Youth Fitness Test, this student scored below the post-test mean scores of the retarded group on three tests. The tests and differences were .177 on the standing broad jump, 13.625 on the softball throw, and .160 on the 600-yard run. Improvement was obtained by FF on the four basketball tests. She scored above the post-test mean score of the retarded group on one test, ball handling. The differences on the other tests were 5.000 on the number of passes on the wall pass test, 18.750 on the wall pass score, and 4.875 on the thirty-second shooting. On the volleyball tests, FF's score on the repeated volleys was below the mean of the group by 7.500. FF's scores were below the post-test mean scores of the retarded group on all of the softball tests. The differences were 13.125 on the overhand throw, 55.625 on batting, and 6.125 on the underhand throw. Overall, FF scored below the retarded group on ten tests.

Table 12 indicates that FF's scores were above the pre-test mean scores of the normal group on five tests. She was below the means of the normal group on two items on the Youth Fitness Test. The differences were 5.917 on the softball throw and .599 on the 600-yard run. On the basketball tests, differences occurred on every test, in favor of the normal group. The differences included 10.167 on ball handling, 6.556 passes on wall pass, 41.772 on wall pass score, and 5.556 on the thirty-second shooting. FF's scores, on the volleyball tests, were below the group's means by 12.333 and 29.917 on the repeated volleys and serves, respectively. Comparisons of the softball tests revealed that this student was below the mean of the normal group on two tests--overhand throw by 5.933 and underhand throw by 21.000. Overall, FF's scores were below the pre-test mean scores of the normal group on ten of the sixteen tests.

FF scored above the mean scores of the normal group on five tests during the post-administrations of the tests. On the Youth Fitness Test, FF's scores were below the means of the normal group on three tests. The differences were .666 on the standing broad jump, 3.861 on the softball throw, and .601 on the 600-yard run. On the basketball tests, the scores for this student were below the post-test mean scores of the normal group. The differences were 6.222 on ball handling, 4.023 on the number of passes on the wall pass, 16.361 on the wall pass score, and 5.972 on the thirty-

second shooting. FF's score on the repeated volleys test, in the volleyball battery, was below the mean of the group by 9.361. This student obtained scores which were below the mean scores of the normal group on the post-administration of the softball tests. Included in the differences were 3.056 on the overhand throw, 42.361 on batting, and 6.750 on the underhand throw. On the sixteen tests, FF's scores were below the post-test average mean scores of the normal group on eleven tests.

This student improved her scores on eleven tests between the two testing periods. Scores for two tests remained the same. FF's scores were lower than the mean scores on both groups on approximately one-half of the selected tests. The majority of the differences occurred on the sports skills tests, which indicated a lack of ability in the basic skills of volleyball, softball, and basketball. She scored consistently low on two items in the Youth Fitness Test, which signified a weakness in arm power and endurance. Although improvement was obtained, it was not significant enough in relation to the two groups' mean scores. Therefore, the investigator concluded that FF was not similar enough to the normal students to benefit from the instruction which was given in the regular physical education program.

Student GG

Student GG was 13.10 years old and had an intelligence quotient of 67. One semester of physical education had been completed prior to this investigation. Her classmates accepted her, and they got along well together. She tried to please everyone with whom she associated. At times she was critical of her ability in the various physical education activities. GG demonstrated interest in all sports and activities in which she participated during class. GG's participation in sports was not limited to the class period. Periodically, she reported the sports and games in which she participated outside of school. GG was concerned about her ability and tried to improve it throughout the semester.

Table 13, page 98, depicts a composite picture of GG's pre- and post-test performance record on the seven Youth Fitness Test items and the nine sports skills tests constructed by Broer. This table shows that GG's scores were above the pre-test mean scores of the retarded group on nine tests. GG was below the means of the retarded group on three items on the Youth Fitness Test. The differences were .125 on the shuttle run, .436 on the standing broad jump, and .225 on the fifty-yard dash. On the volleyball tests, this student was below the pre-test mean scores of the retarded group by 3.125 on repeated volleys and 6.000 on serves. GG's score on the underhand throw was below the

TABLE 13

PRE- AND POST-TEST SCORES FOR STUDENT GG ON THE YOUTH
FITNESS TEST AND SPORTS SKILLS TESTS COMPARED WITH
TEST MEANS OF THE TWO GROUPS

Tests	Pre-Test Score	Post-Test Score
Youth Fitness Test		
Pull-ups	40.000***	40.000***
Sit-ups	50.000***	50.000***
Shuttle run	12.500	13.000
Standing broad jump	3.833	4.000
Fifty-yard dash	9.200	9.400
Softball throw	80.000***	89.000***
Six-hundred-yard run	3:150**	3:010**
Basketball Tests		
Ball handling	23.000**	25.000
Passes--wall pass	50.000	53.000
Score--wall pass	238.000**	257.000
Thirty-second shooting	25.000***	33.000***
Volleyball Tests		
Repeated volleys	7.000	13.000**
Serve	19.000	29.000
Softball Tests		
Overhand throw	80.000***	90.000***
Batting	240.000***	315.000***
Underhand throw	35.000	63.000***

*Raw score above the mean for the normal group.

**Raw score above the mean for the educable mentally retarded group.

***Raw score above the mean for the normal group and for the educable mentally retarded group.

mean of the group by 5.750. Overall, this student was below the mean of the retarded group on six tests; while, one score, number of passes on the wall pass test, equaled the pre-test mean score of the group.

Comparisons of GG's post-test scores with the post-test mean scores of the retarded group revealed that she scored above the group on nine tests. On the Youth Fitness Test, GG's scores were below the mean scores of the group on three tests--.575 on the shuttle run, .260 on the standing broad jump, and .275 on the fifty-yard dash. This student's scores were below the mean scores of the group on three of the basketball tests. The differences were 2.375 on ball handling, 4.00 passes on the wall pass, and 9.750 on the wall pass score. GG's score was below the mean of the retarded group on the serve test, in the volleyball battery, by 5.875. Overall, this student was below the post-test mean scores of the retarded group on seven tests. Between the two administrations of the tests, GG improved her scores on twelve tests, and maintained her scores on pull-ups and sit-ups, where she was able to perform the maximum number that were allowed on the tests.

Further inspection of Table 13 reveals that GG's scores were above the pre-test mean scores of the normal group on six of the tests. This student was below the mean scores of the group on four items on the Youth Fitness Test.

The differences were .875 on the shuttle run, .827 on the standing broad jump, eight-tenths of a second on the fifty-yard dash, and .479 on the 600-yard run. On the basketball tests, GG's scores were below the pre-test mean scores of the normal group by 6.167 on ball handling, 3.556 passes on the wall pass, and 6.722 on the wall pass score. This student scored below the means of the group on both volleyball tests. The differences were 5.333 and 10.917 on repeated volleys and serves, respectively. GG's score on the underhand throw test, in the softball battery, was nine points below the pre-test mean score of the normal group. Overall, GG's scores were below the mean scores of the normal group on ten tests during the pre-test administrations.

On the post-administrations of the test batteries, GG's scores were above the post-test mean scores of the normal group for seven tests, as shown in Table 13. This student had scores which were lower than the mean scores of the group on four of the items on the Youth Fitness Test. The tests and differences were 1.417 on the shuttle run, .766 on the standing broad jump, 1.150 on the fifty-yard dash, and .371 on the 600-yard run. GG's scores were lower than the mean scores of the normal population on three of the basketball tests. Differences included 9.222 on ball handling, 3.023 passes on the wall pass, and 7.361 on the ball pass score. This student scored below the post-test mean scores of the group on the volleyball tests by 1.361

on the repeated volleys and 5.333 on the serves. GG's scores were below the post-test average mean scores of the normal group on nine of the sixteen tests.

GG improved her scores on twelve tests. This student, also, obtained the maximum score on two tests during both administrations. Her scores indicated weaknesses in endurance, agility, and speed. These weaknesses were noticeable, particularly during the sports skills testing. The investigator concluded that, when considering the previous experience in physical education, GG benefited from the instruction which was given in the regular physical education program. Even though she was similar to her normal classmates, this student needed a supplementary program which was designed to assist in improving her fitness in addition to participating in the regular physical education program.

Student HH

Student HH was 12.10 years old and had an intelligence quotient of 60. Her classmates accepted her, and they got along well together. This student had participated in the regular physical education program for one semester before this investigation was undertaken. HH was extremely interested in physical education. She was eager to learn any activity to the best of her ability. HH played very hard to help her team in any way she could. Interclass games were exciting to her.

In Table 14, page 103, the reader may readily observe a composite picture of HH's pre- and post-test performance record on the seven Youth Fitness Test items and the nine sports skills tests constructed by Broer. This table indicates that the scores for HH were above the pre-test mean scores of the retarded group for thirteen tests. On the Youth Fitness Test, HH's score on sit-ups was 7.250 below the mean score of the group. This student scored below the mean of the retardates by 5.000 on the serves in the volleyball battery. The batting test, in the softball battery, represented the remaining difference. She scored lower than the mean of the group by 30.625.

HH improved her scores on twelve tests between the testing sessions. In comparison with the post-test mean scores of the retarded group, this student's scores were all above the group's score with two exceptions. Sit-ups, in the Youth Fitness Test, was one exception. HH scored below the group's mean by 5.500. The other exception was the batting test in the softball battery. A difference of 40.625 was obtained on this test.

Further inspection of Table 14 reveals that HH's scores were above the pre-test mean scores of the normal group on nine tests. On the Youth Fitness Test, her scores were below the means of the normal group on one test. There was a difference of .329 on the 600-yard run. This student scored below the means of the group on two of the basketball

TABLE 14

PRE- AND POST-TEST SCORES FOR STUDENT HH ON THE YOUTH
FITNESS TEST AND SPORTS SKILLS TESTS COMPARED WITH
TEST MEANS OF THE TWO GROUPS

Tests	Pre-Test Score	Post-Test Score
Youth Fitness Test		
Pull-ups	29.000***	34.000***
Sit-ups	30.000*	31.000
Shuttle run	11.600***	11.600**
Standing broad jump	5.083***	5.333***
Fifty-yard dash	7.600***	7.800***
Softball throw	109.000***	107.000***
Six-hundred-yard run	3:000**	2:580***
Basketball Tests		
Ball handling	28.000**	38.000***
Passes--wall pass	58.000***	65.000***
Score--wall pass	267.000***	313.000***
Thirty-second shooting	23.000**	34.000***
Volleyball Tests		
Repeated volleys	12.000**	20.000***
Serve	20.000	50.000***
Softball Tests		
Overhand throw	110.000***	105.000***
Batting	130.000	190.000
Underhand throw	42.000**	57.000***

*Raw score above the mean for the normal group.

**Raw score above the mean for the educable mentally retarded group.

***Raw score above the mean for the normal group and for the educable mentally retarded group.

tests. The tests and differences were 1.167 on the ball handling and 1.556 on the thirty-second shooting. HH's scores were below the pre-test mean scores of the normal group by .333 on repeated volleys and 9.917 on the serves. On the softball tests, differences occurred on two tests. This student was below the means of the group by 42.361 on the batting and 2.000 on the underhand throw. Overall, HH's scores were below the pre-test mean scores of the normal population on seven of the sixteen tests.

Perusal of Table 14 reveals that HH's post-test scores were above the post-test mean scores of the normal group for thirteen of the tests. HH scored below the mean of the group by 6.528 on sit-ups and .017 on the shuttle run, which were included in the Youth Fitness Test. On the softball battery, this student scored below the post-test mean score of the normal group by 20.361 on the batting test.

HH improved her scores on twelve tests between the two administrations of the selected batteries. Therefore, the investigator concluded that this student benefited from the instruction which was given in the regular physical education program. Another conclusion was that, since HH appeared to be similar to her normal classmates, she should continue participating in the regular program.

Summary

In Chapter III, the investigator included the analysis and interpretation of the findings of this research. The

data, obtained during the pre- and post-administrations of the Youth Fitness Test and Broer's Sports Skills Tests, were presented in tabular form. A written and tabular profile of each educable mentally retarded student was included in this chapter.

The summary, conclusions, and recommendations for future studies are reported in Chapter IV. Also, included in the following chapter are the implications for conducting a physical education program for educable mentally retarded students.

CHAPTER IV

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS FOR FUTURE STUDIES

This chapter includes the summary, conclusions, and recommendations for future studies. Also, implications for conducting a physical education program for educable mentally retarded girls are presented.

A variety of opportunities need to be provided for the increasing number of mental retardates in order that they may become more self-sufficient in society. One forward step in this direction has been the revision of the educational standards to include the mentally retarded children in the schools' programs. Anyone associated with a program for mentally retarded children must understand that these children have basic needs and desires which are similar to those of normal children. Generally, the basic needs and desires of retardates are considered to be the social, mental, physical, and emotional phases of development.

Because mentally retarded children learn to face reality through success and achievement, available opportunities must be provided that will result in successful experiences for these children. Mentally retarded children

do not obtain the numerous play experiences that normal children have because of the sedentary life they lead. Recognition and association with a group, preferably normal children, is another definite need of retardates. Physical activity is another need of mentally retarded children if they are to improve their level of physical fitness. These desires and needs may be met through physical activity, which in turn, will aid in the contributions that mentally retarded children may make to society.

Important roles can be played by physical educators in assisting these children to satisfy their basic needs and desires. The development of big and small muscles, which influence total fitness, is one area in which physical educators are capable of making a contribution to the total education of retardates. Play activities provide excellent opportunities for teaching mentally retarded girls acceptable social habits. In the area of emotional development, the implications which are important in programs for normal girls are equally important in programs for mentally retarded girls. Vast amounts of leisure time present the retardate with another problem which physical educators can assist in solving by teaching individual and dual activities. While each of the above needs and desires may be satisfied through physical activity, physical educators must remember that their main objective should be to assist mentally retarded girls in reaching their maximum level of ability.

This investigation entailed the administration of a physical fitness test and selected skills tests in basketball, volleyball, and softball, on a pre-test and post-test basis, to eight educable mentally retarded girls and thirty-six normal girls in two selected physical education classes at the Levelland Junior High School in Levelland, Texas, during the spring semester of the academic year of 1965-1966. Individual profiles were written on each of the educable mentally retarded girls.

The general purpose of this investigation was to determine if the educable mentally retarded girls were similar enough to their normal classmates to benefit from instruction in the regular physical education program. Secondary purposes included determining the significant differences and gains obtained by each group between the pre- and post-test administrations.

The definitions and/or explanations of terms were given in Chapter I. These terms included normal, mental retardation, educable mentally handicapped, physical fitness, and selected sports skills.

This study was limited to the thirty-six girls of normal intelligence who were enrolled in the seventh and eighth grades in two selected physical education classes at the Levelland Junior High School in Levelland, Texas, during the spring semester of the academic year of 1965-1966. The eight educable mentally retarded girls were enrolled in the

special education classes at the Levelland Junior High School, Levelland, Texas, during the spring semester of the academic year of 1965-1966, and were participants in the regular physical education program. Another limitation of the study was the selected tests for measuring physical fitness and sports skills.

Five studies were summarized and reported as illustrative of many previous studies related to physical education and the mentally retarded.

Human and documentary sources of data were used by the investigator. The human sources included the thirty-six normal girls and the eight educable mentally retarded girls. Other human sources were administrators and faculty members of the Levelland Junior High School, Levelland, Texas, and faculty members in the College of Health, Physical Education and Recreation at the Texas Woman's University in Denton, Texas. Documentary sources included books, periodicals, articles, pamphlets and bulletins. Additional sources utilized were theses, dissertations, unpublished materials, and the cumulative records of the selected subjects.

The procedures which were followed in the development of this study were presented and discussed in Chapter II under the following headings: Preliminary Procedures, Selection of the Subjects, Selection of the Instruments, Description of the Instruments, Administration of the Tests, Treatment of the Data, and Development of Profiles for the Educable Mentally Retarded Students.

Preliminary procedures included securing permission from the superintendent of the Levelland Public Schools in Levelland, Texas, to conduct the study during the spring semester of the academic year of 1965-1966. After obtaining permission to conduct the study, the investigator reviewed and studied all available pertinent literature. After reviewing the literature, the procedures followed in the development of the study were formulated into a tentative outline and presented in a Graduate Seminar in the College of Health, Physical Education and Recreation at the Texas Woman's University in Denton, Texas. A prospectus of the study was submitted to the Dean of Graduate Studies at the Texas Woman's University in Denton, Texas.

The subjects for this study were selected according to the criteria established by the investigator. The eight educable mentally retarded girls were enrolled in the special education classes and the regular physical education program in the Levelland Junior High School in Levelland, Texas. The thirty-six normal girls were enrolled in either the seventh or eighth grade classes in the Levelland Junior High School in Levelland, Texas, and were classmates with the educable mentally retarded girls in the selected physical education classes.

The criteria for the selection of the instruments and the description of these tests were presented in Chapter II. The American Association for Health, Physical Education and Recreation Youth Fitness Test was selected as the instrument

for measuring physical fitness. This test consisted of seven physical fitness items. Sports skills were measured by the tests for basketball, volleyball, and softball recommended by Broer.¹ The basketball battery included the Edgren ball handling test, wall pass test, and thirty-second shooting test. A serve test and a repeated wall volleys test comprised the volleyball battery. The softball battery consisted of an underhand accuracy throw, the overhand throw for distance, and batting for distance using a batting tee.

The preparation for the administration of the tests included training student assistants, taking an equipment inventory, and developing units of instruction for the conditioning program, basketball, volleyball, and softball. Pre-test administration of the physical fitness test began on January 18, 1966, and continued for four class periods. Three tests were not administered until March, 1966, because of inclement weather. Post-test administrations of the Youth Fitness Test began on April 25, 1966. The two administrations of the Youth Fitness Test required a total of thirteen days. Pre-test administrations in basketball began on January 25 and the post-test administration began on February 21. Each of the three tests required one class period which resulted in a total of six days being used for testing. Participation in the pre-test administration of the volleyball tests began on March 1. The post-test

¹Broer, op. cit.

administration of this instrument started on April 4. Three days were required for each administration. On April 13, the students began participating in the pre-test administration of the softball tests. Four days were needed to complete the tests. Also, the post-test administration of the softball tests required four days, with May 17 being the first test day. A complete description of the test administrations was presented in the latter part of Chapter II.

Construction of two score cards constituted one part of the treatment of the data. The statistical treatment of the data included computing the mean, standard error of the mean, and standard deviation of the mean for the scores, of each group, on each of the sixteen tests. The Fisher t-test of significance was used to determine if there were significant differences and gains existing within and between the groups.

Profiles for the educable mentally retarded girls were written. Each profile included age, intelligence quotients, and the pre- and post-test scores for the various test batteries. During their physical education class, the educable mentally retarded girls were observed carefully by the investigator in order to obtain their reactions to the various activities and other situations which were pertinent to the study.

An analysis and interpretation of the findings were presented in Chapter III. General information pertaining to

each of the groups, in addition to individual profiles on the educable mentally retarded girls, was included. The statistical treatment of the data included the computation of the means, standard errors of the means, and standard deviations of the means of the pre- and post-test scores of the two groups. The t-test of significance was used to determine the probability of significance of the difference between the means of the groups on each test. In summarizing the treatment of the data, the following findings provided the investigator with the answers to the questions that were designated in this chapter:

1. Significant Gains Between the Pre- and Post-Test Mean Scores of the Forty-Four Students on the Youth Fitness Test and Broer's Sports Skills Tests:

- A. Significant gains were obtained by the total group on pull-ups and sit-ups on the Youth Fitness Test. The group was not able to claim significant gains on the other items, even though improvement was obtained.
- B. The total group obtained significant gains on each of the basketball tests.
- C. On the volleyball tests, the group was not able to claim significant gains on either test, although their post-test mean scores were higher mathematically than their pre-test mean scores.

D. Significant gains were obtained by the group on the underhand throw and the batting test in the softball battery. Improvement was made on the overhand throw test but it was not a significant amount.

2. Significant Differences Between the Pre- and Post-Test Average Mean Scores of the Thirty-Six Normal Students and the Eight Educable Mentally Retarded Students on the Youth Fitness Test and Broer's Sports Skills Tests:

- A. Significant differences were obtained by the normal girls on the shuttle run and the 600-yard run on the Youth Fitness Test. The educable mentally retarded girls had a higher average mean score on sit-ups and softball throw than the normal girls, but the difference was not significant.
- B. On the basketball battery, the normal girls were able to claim a significant difference on the ball handling test.
- C. Neither group obtained a significant difference on the volleyball battery.
- D. The educable mentally retarded girls obtained higher average mean scores on the overhand throw and batting test than the normal girls. Neither group was able to claim a significant difference.

3. Significant Differences Between the Pre- and Post-Test Mean Scores of the Thirty-Six Normal Students and the Eight Educable Mentally Retarded Students on the Youth Fitness Test:

- A. The only significant difference on the pre-test mean scores occurred on the 600-yard run by the normal students. Higher mathematical mean scores were obtained by the educable mentally retarded girls on pull-ups, sit-ups, and softball throw.
- B. The normal girls obtained a significant difference on the post-test mean scores on the shuttle run, fifty-yard dash, and 600-yard run. On the softball throw, the educable mentally retarded girls had the higher mean scores, mathematically, but the difference was not significant.

4. Significant Gains Between the Pre- and Post-Test Mean Scores of the Thirty-Six Normal Students and the Eight Educable Mentally Retarded Students on the Youth Fitness Test:

- A. A significant gain was made by the normal girls on sit-ups. Improvement was achieved on each of the other tests but not to a significant degree.

- B. The educable mentally retarded girls did not obtain a significant gain on any test.

Mathematical gains were obtained on pull-ups, softball throw, and 600-yard run.

5. Significant Differences Between the Pre- and Post-Test Mean Scores of the Thirty-Six Normal Students and the Eight Educable Mentally Retarded Students on Broer's Sports Skills Tests:

- A. On the pre-test and post-test mean scores, the normal girls were able to claim a significant difference on the ball handling test in the basketball battery.
- B. Neither group could claim a significant difference on the pre-test mean scores on the volleyball and softball batteries. The educable mentally retarded girls had the higher mathematical pre-test mean score on the overhand throw for distance in the softball battery.
- C. Significant differences were not obtained on the post-test administrations of the volleyball and softball batteries. Mathematically higher post-test mean scores were obtained by the educable mentally retarded group on the volleyball serve test and two softball tests--overhand throw and batting.

6. Significant Gains Between the Pre- and Post-Test Mean Scores of the Thirty-Six Normal Students and of the Eight Educable Mentally Retarded Students on Broer's Sports Skills Tests:
- A. The normal girls obtained significant gains on three basketball tests--ball handling, wall pass score, and thirty-second shooting.
 - B. Significant gains were not made by the normal students on the volleyball tests; although, the mean scores improved between the two test administrations.
 - C. On the softball tests, a significant gain was obtained by the normal girls on the batting test. The mean scores on the other two tests improved but not significantly.
 - D. Improvement was obtained by the educable mentally retarded students on each test in the three sports skills batteries; but, it was not significant. The t -values provided evidence that the greatest amount of improvement occurred in the basketball battery.

The following summaries are based on the data presented in the profiles on the eight educable mentally retarded girls.

Student AA, 14.10 years old, had an intelligence quotient of 70. She had participated in the regular physical

education program for four semesters prior to participating in this study. On the pre-test administration of the test batteries, she scored above the mean scores of both groups on thirteen of the sixteen tests. During the post-test administration of the tests, AA scored higher on fifteen of the sixteen tests than the mean scores for either group. The scores indicated that AA needed help to improve muscular endurance and arm strength since she scored lower on both administrations of pull-ups on the Youth Fitness Test than the mean scores of the two populations. On the basis of the test results, the investigator concluded that AA was similar enough to her normal classmates to benefit from the instruction that was given in the regular physical education program.

Student BB was 15.7 years old and had an intelligence quotient of 70. She had participated in the regular physical education program for three semesters. BB scored above the pre-test mean scores of the retarded group on fourteen tests; while, scoring above the pre-test mean scores of the normal group on ten tests. On the post-test administration of the selected batteries, BB outscored the educable mentally retarded group on thirteen tests and the normal group on ten of the sixteen tests. There were three tests on which she did not improve her scores. The conclusion was that even with weaknesses in three fitness areas, BB was similar enough to the normal students to benefit from the instruction in the regular physical education program.

Student CC was 15.9 years old and had an intelligence quotient of 62. Previous experience included five semesters of physical education prior to this research. In comparison to the educable mentally retarded group, she scored above the pre-test mean scores of the group on thirteen tests. On the post-test administration, there were fourteen tests in which CC outscored the educable mentally retarded group. This student obtained nine pre-test scores which were above the pre-test mean scores of the normal group. During the post-test administration, CC scored higher than the post-test mean scores of the normal group on twelve tests. Overall, improvement was obtained by CC on thirteen of the sixteen tests. The investigator concluded that CC benefited from the instruction which was given in the regular physical education program.

Student DD, 16.8 years old, had an intelligence quotient of 61. Having participated in the physical education program for four semesters prior to this study, the sports used in this investigation were not new experiences for her. DD scored below the pre- and post-test mean scores of the educable mentally retarded group and the normal group on every test. She improved her scores on six of the selected tests. The conclusion was that, although improvement was made on some tests, DD was not similar enough to the normal girls to benefit from the instruction in the regular physical education program.

Student EE had participated in the regular physical education program for five semesters prior to the spring semester of the academic year of 1965-1966. She was fifteen years old and had an intelligence quotient of 50. EE scored below the pre-test and post-test mean scores of the two populations on every test except one. On the pre-test administration of sit-ups, on the Youth Fitness Test, she scored above the mean score of the normal group. Between the two test administrations, EE improved her scores on nine of the selected tests. The investigator concluded that EE was not similar enough to the normal girls to benefit from the instruction in the regular physical education program.

Student FF, participant in the regular physical education program for five semesters previously, was 14.11 years old and had an intelligence quotient of 69. In comparison to the educable mentally retarded group, FF outscored the group on seven tests during the pre-test administrations and on six tests during the post-test administrations of the selected tests. There were five tests on which FF obtained higher pre-test and post-test scores than the pre- and post-test mean scores of the normal group. Improvement was obtained on eleven tests.

Student GG was 13.10 years old and had an intelligence quotient of 67. Having completed only one semester of physical education prior to this study, obtaining instruction in an organized physical education program was a new

experience for her. Her pre- and post-test scores on nine of the selected tests were above the pre- and post-test mean scores of the educable mentally retarded group. Comparisons of GG's scores and the pre- and post-test mean scores of the normal group revealed that she scored above the group on six and seven tests, respectively. Overall, GG improved her scores on twelve tests and obtained the maximum score on two tests. The investigator concluded that GG benefited from the instruction in the regular physical education program.

Student HH, 12.10 years old, had an intelligence quotient of 60. She had participated in the regular physical education program for one semester before this investigation was undertaken. HH's pre- and post-test scores were above the pre- and post-test mean scores of the educable mentally retarded group on thirteen and fourteen tests, respectively. Her pre-test scores were higher on nine tests than the pre-test mean scores of the normal group. On the post-test administrations, she scored above the post-test mean scores of the normal group on thirteen tests. Overall, HH improved her scores on twelve of the sixteen tests. The conclusion was that HH benefited from the instruction and should continue participating in the regular physical education program.

Conclusions

On the basis of the interpretation of the findings, the investigator drew the following conclusions:

1. The forty-four students made significant gains between the pre-test mean score and the post-test mean score for pull-ups and sit-ups in the Youth Fitness Test, the four basketball tests, and the underhand throw and batting in the softball battery. Mathematical gains were obtained by the total group on the other eight tests.
2. Significant differences were obtained by the normal girls, between the pre- and post-test average mean scores of the two groups, on the shuttle run and 600-yard run in the Youth Fitness Test and on ball handling in the basketball battery.
3. Neither group was able to claim significant differences between the pre- and post-test average mean scores on the other thirteen tests; although, the educable mentally retarded girls obtained higher mean scores, mathematically, on sit-ups and the softball throw in the Youth Fitness Test and on the overhand throw and batting in the softball battery.
4. On the pre-test mean scores on the Youth Fitness Test, the normal girls were able to claim a significant difference on the 600-yard run. The educable mentally retarded girls obtained pre-test mean scores on pull-ups, sit-ups, and

softball throw, which were mathematically higher than the normal girls' scores.

5. The normal girls obtained significant differences on the post-test mean scores on the shuttle run, fifty-yard dash, and 600-yard run on the Youth Fitness Test. A mathematical difference was achieved by the educable mentally retarded girls on the post-test mean scores on the softball throw.
6. The only significant gain between the pre- and post-test mean scores on the Youth Fitness Test was obtained on sit-ups by the normal girls.
7. Significant gains were not made by the educable mentally retarded girls between the pre- and post-test mean scores on the Youth Fitness Test; although, mathematical gains were obtained on pull-ups, softball throw, and the 600-yard run.
8. The only significant difference on either administration of Broer's Sports Skills Tests was obtained by the normal girls on the pre-test and post-test administrations of the ball handling test in the basketball battery.
9. The educable mentally retarded girls obtained a higher mathematical pre-test mean score on the overhand throw in the softball battery than the normal girls. On the post-test mean scores,

mathematical differences occurred on the two wall pass tests in the basketball battery, the serve test in the volleyball battery, and the overhand throw and batting in the softball battery in favor of the educable mentally retarded group.

10. Significant gains between the pre- and post-test mean scores were obtained by the normal girls on four of Broer's Sports Skills Tests--ball handling wall pass score, and thirty-second shooting in basketball and batting in softball. Mathematically, improvement was obtained on the other five tests.
11. The educable mentally retarded girls did not obtain significant gains between the pre- and post-test mean scores of Broer's Sports Skills Tests. Gains were obtained, mathematically, on all nine tests with the greatest gains appearing in the results of the basketball tests.

Implications

Based upon the conclusions of this study, the investigator derived the following implications:

1. The total group improved their physical fitness in the areas of arm and abdominal strength. Also, significant improvement was made on the

basketball tests and the underhand throw and batting in the softball battery. Slight improvement was achieved by the total group on the other eight tests.

2. The significant differences between the pre- and post-test average mean scores indicated that the normal girls had developed better skills involving speed, agility, endurance, and coordination than the educable mentally retarded girls.
3. There was no significant difference between the pre- and post-test mean scores on the remaining thirteen tests in the ability of the two populations. Mathematical differences between the pre- and post-test mean scores implied that the educable mentally retarded girls were able to perform activities involving abdominal strength and arm power better than the normal girls.
4. The pre-test mean scores on the Youth Fitness Test indicated that the normal girls were able to perform endurance activities significantly better than the educable mentally retarded girls. Higher mathematical pre-test mean scores implied that the educable mentally retarded girls, possibly, were stronger in performing events which involved abdominal strength, arm power, and arm strength.

5. On the post-test mean scores on the Youth Fitness Test, the normal girls improved significantly more than the educable mentally retarded girls in the areas of agility, speed, and endurance. Mathematically, the educable mentally retarded girls improved their ability in the area of arm power more so than the normal girls.
6. Comparisons of the pre- and post-test mean scores on the Youth Fitness Test implied that the normal girls significantly improved in the area of abdominal strength.
7. The physical fitness of the educable mentally retarded girls was not improved significantly during the investigation; however, slight improvement was obtained in the areas of arm strength, arm power, and endurance.
8. On the pre- and post-test administrations of Broer's Sports Skills Tests, the only significant difference occurred on ball handling in the basketball battery which implied that the normal girls were stronger in the skills required for this test than the educable mentally retarded girls. Also, it indicated that the normal girls significantly improved the skills which were involved in performing the ball handling test.

9. The educable mentally retarded girls were slightly stronger in arm power than the normal girls on the pre-test mean scores of the over-hand throw in the softball battery. Also, the educable mentally retarded girls, mathematically, scored higher than the normal girls on five tests during the post-test administrations of Broer's Sports Skills Tests.
10. The normal girls significantly improved their scores between the pre- and post-test administrations on four of Broer's Sports Skills Tests. These girls slightly improved their scores on the other five tests.
11. Significant gains were not made by the educable mentally retarded girls on Broer's Sports Skills Tests which indicated that these girls did not improve their ability in the sports. However, the mathematical gains indicated that there was a slight improvement in sports skills ability, particularly in basketball.

Implications for Conducting a Physical Education Program for Educable Mentally Retarded Girls

Based on the findings of this research, the investigator derived the following implications for conducting a physical education program for educable mentally retarded girls:

1. A thorough knowledge of the students' abilities to perform basic motor skills is needed before permitting educable mentally retarded girls to participate in the regular program.
2. Intensified instruction is needed for educable mentally retarded girls to obtain optimum benefit from participation in the regular physical education program.
3. Educable mentally retarded girls should not be expected to reach ability levels as high as normal girls; but they should be encouraged to strive toward their highest potential ability level.
4. Educable mentally retarded girls, functioning within a group structure, have individual needs and desires that are extremely different, more so than among a group of normal girls, and these needs and desires should be considered individually when conducting a program for educable mentally retarded girls.

Recommendations for Future Studies

Several recommendations for future studies occurred to this investigator during the development of this study.

1. Studies to determine the levels of competencies that children with various degrees of retardation

may obtain in physical fitness and/or various sports.

2. The development of curriculum guides for physical educators pertaining to the activities in which educable mentally retarded children can participate successfully.
3. The development of curriculum guides, designed by physical educators, for use by classroom teachers in directing physical education for trainable and educable mentally retarded children.
4. Studies to determine the relationship of not participating in a specific sport, over a period of time, on the previously learned skills of educable mentally retarded children.
5. Studies to determine the differences in sports skills between institutionalized and non-institutionalized mentally retarded children.
6. Studies to determine the feasibility of scheduling normal and educable mentally retarded girls in the same physical education classes in the public schools in activities other than those represented in this research.

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APPENDIX

LEVELLAND PUBLIC SCHOOLS

1103 HOUSTON

LEVELLAND, TEXAS 79336

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July 21, 1965

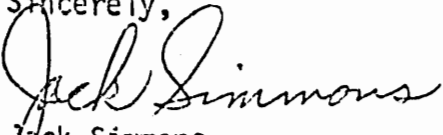
Miss Jane Cole
Rayzor Hall
306 South Locust
Denton, Texas 76204

Dear Miss Cole:

We will be pleased to assist you in your research study. As soon as you have decided on the procedures you will employ in gathering your data, please submit a proposal to both Mr. Newman and me.

I hope that you are having a good summer. Levelland is right up to par -- dry and hot.

Sincerely,


Jack Simmons
Superintendent

JS/np

SELECTED PHYSICAL FITNESS BATTERIES

REVIEWED BY THE INVESTIGATOR

1. The Magnusson Test consists of the bent arm hang, push-ups, flexibility reach, and sit-ups.¹ This battery is for boys and girls. T-scales for both groups are available. The correlation coefficients range from .77 to .90.
2. The Indiana Physical Fitness Test is a battery for high school boys and girls.² The test includes push-ups, straddle chins, squat thrusts, and vertical jump. The validity coefficient is .77. Norms are available.
3. The Metheny Test for Girls consists of a front roll, back roll, and jumping half turns.³ The correlation coefficient is .868.

¹M. Gladys Scott and Esther French, Measurement and Evaluation in Physical Education, (Dubuque, Iowa: William C. Brown, 1959), pp. 295, 297, 299, and 312, quoting Lucille I. Magnusson, "The Effect of a Specific Activity Program on Children with Low Muscular Fitness," (Doctoral Dissertation, State University of Iowa, 1957).

²H. Harrison Clarke, Application of Measurement to Health and Physical Education, (3rd ed., Englewood Cliffs: New Jersey: Prentice-Hall, Inc., 1959), pp. 230-231, quoting State of Indiana, Physical Fitness Manual for High School Girls, Bulletin Number 136, rev. ed., Department of Public Instruction, Indiana, pp. 21-29.

³Eleanor Metheny, "Studies of the Johnson Test as a Test of Motor Educability," Research Quarterly, Vol. 9, No. 4 (December, 1938), pp. 105-114.

4. The Elementary School Motor Fitness Test is an adaption of the Indiana Fitness Test.¹ The test is for boys and girls in grades four through eight. The test includes push-ups, squat thrust for twenty-seconds, straddle chins, and vertical jump. A validity coefficient of .77 was obtained. Norms, using the classification index, are available.
5. The JCR Test was devised by B. E. Phillips for college men.² The test consists of the vertical jump, chinning, and one-hundred-yard shuttle run. Reliability coefficients range from .91 to .97; while, the validity coefficients range from .59 to .90. Six sigma scales are available.
6. The Division of Girls and Womens Sports test consists of two batteries.³ The long battery includes the standing broad jump, basketball throw, potato race, sit-ups, pull-ups, ten-second squat thrusts, and squat thrusts for thirty-seconds. The short battery is comprised of sit-ups, standing broad jump, basketball throw, push-ups or pull-ups, and potato race or squat thrusts for ten seconds. The validity and reliability coefficients were not given. Six-sigma scoring scales are available.

¹C. C. Franklin and N. G. Lehsten, "Indiana Physical Fitness Tests for the Elementary Level (Grades 4 to 8)," The Physical Educator, Vol. 5, No. 3 (May, 1958), pp. 38-45.

²B. E. Phillips, "The JCR Test," Research Quarterly, Vol. 18, No. 1 (March, 1937), pp. 12-29.

³Eleanor Metheny (Chairman, Committee Report), "Physical Performance Levels for High School Girls," Journal of Health, Physical Education and Recreation, Vol. 16, No. 6 (June, 1945), pp. 308-311.

7. The Oregon Motor Fitness Test is composed of hanging in arm-flexed position, standing broad jump, and crossed-arm curl-ups.¹ A multiple correlation, ranging from .91 to .95, was obtained for this battery. T-scales are available for boys and girls in grades seven through twelve.
8. The Buxton Fitness Test includes forward bending reach, lower back extension, upper back extension, sit-ups with knees flexed, sit-ups with knees straight, vertical jump without arm action, and bent-arm hang.² The reliability coefficients ranged from .83 to .93.

¹Clarke, op. cit., pp. 231-233.

²Doris Buxton, "Extension of the Kraus-Weber Test," Research Quarterly, Vol. 28, No. 3 (October, 1957), pp. 210-217.

SELECTED SPORTS SKILLS TESTS REVIEWED

BY THE INVESTIGATOR

Basketball Skill Test Batteries.

1. The Division of Girls and Womens Sports established a battery which consists of three, four, or five tests for high school girls.¹ The three-item battery includes a test for measuring one's ability to dribble the ball, the modified Edgren ball handling test, and a run and pass test. The four-item battery adds a twelve-foot shooting test to the previously mentioned tests. The five-item battery includes a test for guarding and the other four tests. The reliability of these tests range from .71 to .95 with the guarding test obtaining the highest coefficient. The Edgren ball handling test maintained a validity coefficient of .60; while the coefficient for the other tests was .46.
2. Johnson's Basketball Ability Test is a three-item battery for high school boys.² The battery includes

¹Phyllis Cunningham, "Basketball Skill Tests for High School Girls," Basketball Guide, ed. Mildred J. Barnes, (Washington, D. C.: American Association for Health, Physical Education and Recreation, 1965), pp. 31-36.

²Donald K. Mathews, Measurement in Physical Education (2nd ed., Philadelphia: W. B. Saunders Co., 1963), pp. 169-171, quoting L. William Johnson, "Objective Test in Basketball for High School Boys" (unpublished Master's thesis, State University of Iowa, 1934).

a dribble test, a field-goal speed test, and a basketball throw for accuracy test. The reliability coefficient was .89; while, the obtained validity coefficient was .88.

3. The Leilich battery consists of three items for college women.¹ The battery includes the bounce and shoot test, half-minute shooting, and the push pass test. Norms are available.
4. Knox's battery for high school boys consists of the dribble shoot, speed dribble, penny-cup, and speed pass.² Knox obtained individual reliabilities that ranged from .579 to .904. The reliability coefficient for the entire battery was .88.
5. A battery for college women and secondary school girls, constructed by Dyer, Schurig, and Apgar, includes four tests -- moving target, Edgren ball handling, bounce and shoot, and free jump and reach.³ The reliabilities ranged from .57 to .95, individually; while, the entire battery obtained a coefficient of .90 for junior high school girls. The validities

¹Ibid., pp. 167-169, quoting Avis Leilich, "The Primary Components of Selected Basketball Tests for College Women (Doctoral Dissertation, Indiana University, 1952).

²Ibid., pp. 171-173, quoting Robert Dawson Knox, "An Experiment to Determine the Relationship between Performance in Skill Tests and Success in Playing Basketball" (unpublished Master's thesis, University of Oregon, 1937).

³Joanna T. Dyer, Jennie C. Schurig, and Sara L. Apgar, "A Basketball Motor Ability Test for College Women and Secondary School Girls," Research Quarterly, Vol. 10, No. 3 (1939), pp. 128-147.

ranged from .55 to .86 on the individual tests and was .87 to .91 for the entire battery. T-scales are available.

Volleyball Tests

1. Brady's test for college men consists of repeated wall volleys for one minute.¹ The reliability coefficient was .925; while the validity coefficient was .86.
2. Bassett, Glassow, and Locke constructed a battery for college women which included a repeated wall volley test and a serve test.² The obtained reliability coefficients were .89 and .84, respectively. The validity coefficients were .51 on the repeated wall volleys and .79 on the serve test.
3. The French-Cooper battery for high school girls includes a serve test and repeated wall volleys for fifteen seconds.³ The reliability and validity coefficients for the serve test were .68 and .63, respectively. The authors obtained a reliability coefficient of .89 and a validity coefficient of .51 on the repeated wall volley test.

¹George F. Brady, "Preliminary Investigations of Volleyball Playing Ability," Research Quarterly, Vol. 16, No. 1 (March, 1945), pp. 14-17.

²Gladys Bassett, Ruth Glassow, and Mabel Locke, "Studies in Testing Volleyball Skills," Research Quarterly, Vol. 8, No. 4 (December, 1937), pp. 60-72.

³Esther L. French and Bernice I. Cooper, "Achievement Tests in Volleyball for High School Girls," Research Quarterly, Vol. 8, No. 2 (May, 1937), pp. 150-157.

4. The Russell-Lange test is a modified version of the battery by French and Cooper for junior high school girls.¹ The battery includes a serve test and repeated wall volleys for thirty seconds. The reliabilities for the two tests ranged from .870 to .915; while, the validity coefficients were .677 on the serve test and .80 on the repeated wall volleys. Sigma scales are available for this battery.
5. A volleyball pass test was constructed by Liba and Stauff for college women.² The authors modified the test for junior high school girls. The reliability coefficient was .81 for eighth grade girls. The authors did not attempt to establish the validity of this test.

Softball Batteries

1. The Division of Girls and Womens Sports established a battery which includes the following: (1) fielding grounders, (2) fielding fly balls, (3) repeated throws, (4) throwing for distance, (5) throwing for speed and accuracy, (6) batting pitched balls, (7) batting tee test, (8) baserunning

¹Naomi Russell and Elizabeth Lange, "Achievement Tests in Volleyball for Junior High School Girls," Research Quarterly, Vol. 11, No. 4 (December, 1940), pp. 33-41.

²Marie R. Libia and Marilyn R. Stauff, "A Test for the Volleyball Pass," Research Quarterly, Vol. 34, No. 1 (March, 1963), pp. 56-63.

to first base, (9) baserunning to second base, and (10), pitching.¹ The reliability and validity of these tests have not been established at the present time.

2. The O'Donnell Softball Skill Test is a six-item battery for high school girls.² The battery includes the following tests: (1) batting a pitched ball thrown from forty-feet away, (2) throwing for accuracy up to sixty feet, (3) catching a line ball up to sixty-feet away from the thrower, (4) catching a ground ball up to sixty-feet away from the thrower, (5) catching a fly ball up to 140-feet away, and (6) throwing for distance. This battery is, mainly, for classification of students.

Softball Tests

1. The repeated throws for thirty-seconds yielded a reliability coefficient of .84 when the test was administered to junior high school girls.³ The validity coefficient was .64.
2. The throw for distance test maintained reliability and validity coefficients of .95 and .81, respectively,

¹Dorothy R. Mohr, "Skill Testing," Softball Guide, ed. Norma Smith (Washington, D. C.: American Association for Health, Physical Education and Recreation, 1962), pp. 44-47.

²Raymond A. Weiss and Marjorie Phillips, Administration of Tests in Physical Education (St. Louis: The C. V. Mosby Company, 1954), pp. 247-252, quoting Doris J. O'Donnell, "Validations of Softball Skill Tests for High School Students" (unpublished Master's thesis, School of Health, Physical Education and Recreation, Indiana University, August, 1950).

³M. Gladys Scott and Esther French, Measurement and Evaluation in Physical Education (Dubuque, Iowa: William C. Brown Company, Publishers, 1959), pp. 199-202.

when the subjects were junior high school girls.¹

3. The batting test for distance by Fox and Young is for college women.² The reliability coefficient was .87; while, the validity coefficient was .64.
4. The batting tee test by Davis was administered to college women.³ The investigator obtained a validity coefficient of .33. The reliability coefficient was .90.

¹Ibid., pp. 202-203.

²Margaret G. Fox and Olive G. Young, "A Test of Softball Batting Ability," Research Quarterly, Vol. 25, No. 1 (March, 1954), pp. 26-27.

³Scott and French, op. cit., pp. 207-209, quoting Rosemary Davis, "The Development of an Objective Softball Batting Test for College Women," (unpublished Master's thesis, Illinois State Normal University, 1951).

DESCRIPTION OF THE YOUTH FITNESS TEST BY
THE AMERICAN ASSOCIATION FOR HEALTH,
PHYSICAL EDUCATION AND RECREATION*

PULL-UPS (modified)

Equipment: a door-way bar or a bar that is braced and can be adjusted.

Description: With the bar at the correct height, the student holds on to it with an overhand grasp. The feet are extended under the bar until the arms form a right angle with the body. From this position, the student pulls herself up, using only her arms, until she touches the bar with her chest. After touching the bar, she lowers her body to the starting position. This is repeated as many times as possible.

Rules:

1. The body must remain in a straight line.
2. The arms are the only part of the body that can be used to pull the body up.
3. The chest must touch the bar.
4. The student must return to the starting position before repeating the test.
5. Pull-ups do not count if the student violates any of the above rules.

*American Association for Health, Physical Education and Recreation, Youth Fitness Test Manual (Washington, D. C.: American Association for Health, Physical Education and Recreation, 1961), pp. 5-13.

Scoring: One point is scored for each correct pull-up. The final score is the number of completed pull-ups.

SIT-UPS

Equipment: floor or mats

Description: The subject is in a supine position with her feet apart. Her hands are placed behind her neck with the fingers interlocked. While a partner holds her feet, the subject sits up. Upon sitting, the head and shoulders are turned so the subject can touch the right elbow to the left knee. After touching the knee, the subject returns to the starting position. This is repeated as many times as possible. Touching the knees is alternated between the right and left knees throughout the performance.

Rules: 1. The heels must remain in contact with the mat.

2. The hands must remain on their original point of contact with the neck.

3. Fingers must remain interlocked.

4. The knees may be bent, slightly, when touching with the elbow; but, otherwise must be kept straight.

5. The subject must maintain the pattern and speed at which she started. Resting is not permitted.

6. The subject must alternate when touching the knees.

7. Sit-ups do not count when a violation occurs.

8. Fifty sit-ups is the maximum number.

Scoring: Each completed sit-up scores one point. The final score is the number of correctly completed sit-ups.

SHUTTLE RUN

Equipment: two parallel lines marked thirty-feet apart, two objects approximately two by two by four inches, and a stopwatch.

Description: The objects are placed on one of the lines. The subjects are behind the other line. On the signal, the subject runs and picks up one object. She returns to the starting line and places the object on the line. Then, she returns and gets the remaining object and runs back across the starting line.

Rules: 1. The stopwatch is started on the signal and continues to run until the subject crosses the finish line with the last object.

2. Subjects should be encouraged to run as fast as possible.

3. Subjects must wear tennis shoes.

4. Starting lines should be alternated to economize on time.

5. Two trials are allowed with a rest period between them.

Scoring: The final score is the best trial, recorded to the nearest tenth of a second.

STANDING BROAD JUMP

Equipment: a jumping mat that is at least ten feet long and a tape measure.

Description: The subject stands behind the starting line. The subject is allowed to bend her knees and swing her arms in order to gain momentum. When she is ready, she jumps, flat-footed, as far as she can.

- Rules:
1. The subject should be encouraged to fall forward if she feels that she is losing her balance.
 2. Measurement of the jump is from the starting line to the part of the body that is nearest the starting line.
 3. Each subject is allowed three trials.
 4. Subjects should be reminded that arm movement helps in jumping.

Scoring: The final score is the farthest jump, recorded to the nearest foot and inch.

FIFTY-YARD DASH

Equipment: stopwatches and an unobstructed area.

Description: The subjects, in position behind the starting line, begin running on the signal. They continue running as fast as possible until the finish line has been crossed.

- Rules:
1. The subject should not slow down until the finish line is crossed.
 2. Better results are obtained when two students are tested at the same time.
 3. The time is recorded from the signal until the student crosses the finish line.

Scoring: The score is recorded to the nearest tenth of a second.

SOFTBALL THROW

Equipment: several softballs, tape measure, wooden sticks, and an unobstructed area with lines marked every five feet.

Description: Standing behind the restraining line, the subject throws the softball as far as she can. A wooden stick is placed in the ground where the ball first hits it. If one of the remaining two throws are farther, the stick is moved to that place.

Rules: 1. An overhand throw must be used for each of the three consecutive trials.

2. The throw is measured to the nearest foot.

Scoring: The farthest throw is the final score.

SIX-HUNDRED-YARD RUN

Equipment: an unobstructed area and a stopwatch.

Description: The students line up behind the starting line. On the signal they begin running the 600-yard area. One-half of the students participate at the same time. While one partner is running, the other one is responsible for obtaining her score as the timer calls out the time.

Rules: 1. The subjects should be encouraged to run even though it is permissible to walk.

2. The object is to complete the test as fast as possible.

3. Only one trial is allowed.

Scoring: The score is recorded in minutes and seconds, to the nearest second.

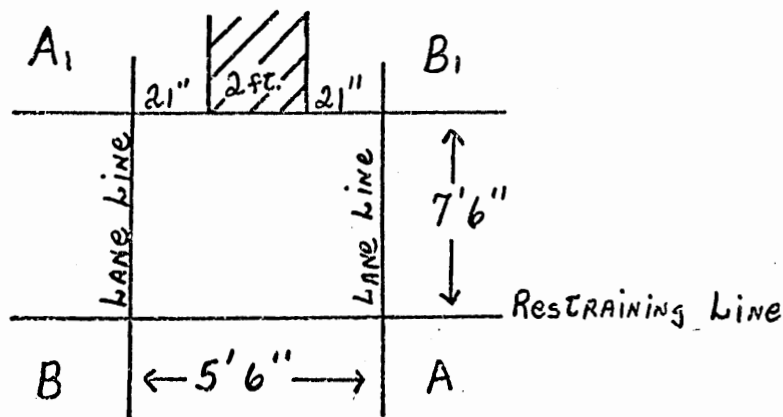
DESCRIPTION OF BROER'S SPORTS SKILLS TESTS*

Basketball

Edgren Ball Handling

Equipment: unobstructed wall, basketballs, and a stopwatch

Markings: A restraining line is marked on the floor, seven and one-half feet from the wall and parallel to it. Two division lines are marked five and one-half feet apart and perpendicular to the restraining line. Two parallel lines are marked on the wall two feet apart in the center of the area.



Description: The subject stands in area A and throws to area A₁, which are diagonally opposite each other. The throw is repeated from area B to area B₁. This procedure is completed as many times as possible in thirty seconds. Any type of pass may be used. The ball may be allowed to bounce before it is caught. Three thirty-second trials are allowed.

*Personal Correspondence from Marion R. Broer.

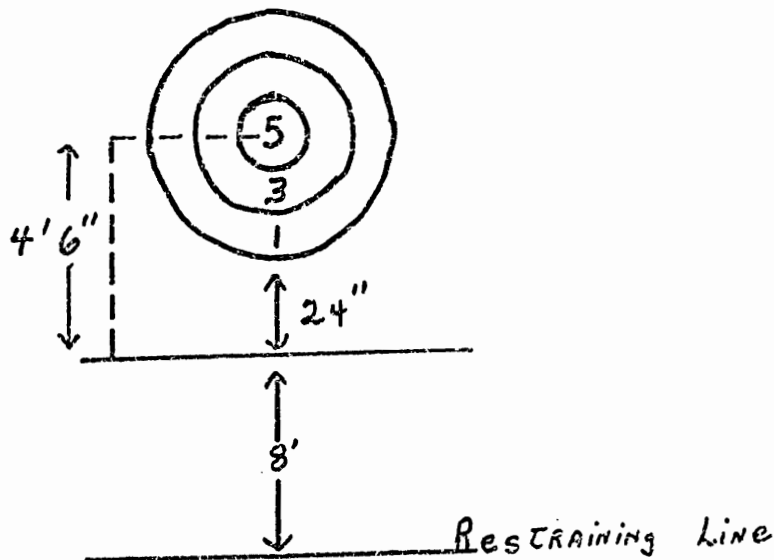
- Rules:
1. The ball must not hit in the two-foot area.
 2. The ball must hit in the correct area to count as a good throw.
 3. There is not a penalty for traveling.
 4. The subject must remain behind the restraining line at all times.

Scoring: The number of passes completed in the proper area, during thirty seconds, is the score for each trial. The sum of three trials is the recorded score.

Wall Pass Test

Equipment: basketballs and a stopwatch

Markings: Three concentric circles are marked on an unobstructed wall. The radii of the circles are ten, twenty, and thirty inches. A restraining line is marked parallel to and eight feet from the wall.



Description: The subject stands behind the restraining line, holding a basketball. On the signal, the subject passes the ball toward the target. The ball is recovered on the rebound and the pass is repeated as many times as possible during thirty seconds.

- Rules:
1. The subject must remain behind the restraining line at all times.
 2. A pass that is completed after the signal to stop is not counted.
 3. Passes that hit outside of the target do not score points.

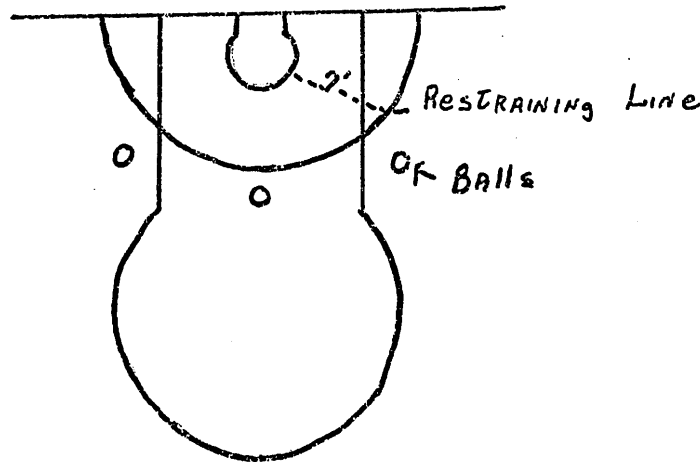
4. The test is scored according to where the ball hits the target on a five, three, and one basis and the number of hits made against the wall.

Scoring: The recorded score is the sum of three trials and the number of completed passes.

Thirty-Second Shooting

Equipment: basketball, official goal, and stopwatch

Markings: A seven foot semi-circular restraining line is marked on the floor.



Description: The subject stands anywhere behind the restraining line with the ball in her hands. On the signal, she begins shooting and continues until the signal to stop. The object is to make as many baskets as possible within the thirty-second limit. Six trials are allowed.

Rules: 1. The subject must remain behind the restraining line when shooting.

2. If the ball has left the subject's hands when the signal to stop is given, the goal counts if it is made.

3. One point is scored when the ball hits the rim.

4. Two points are scored when a basket is made.

Scoring: The score is the number of points made during the thirty

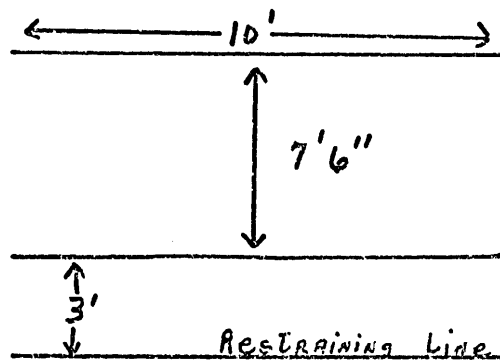
seconds. The sum of the best three trials is recorded as the score.

Volleyball

Repeated Wall Volleys

Equipment: volleyballs, a stopwatch, and wall space at least ten feet long and fifteen feet high.

Markings: A ten-foot line is marked on the wall, seven and one-half feet from the floor. A restraining line, three feet from the wall and ten feet long, is marked directly opposite the wall marking.



Description: The subject stands behind the restraining line and tosses the ball towards the wall, using an underhand throw, on the signal, "Go." As the ball rebounds, the subject volleys it repeatedly against the wall and above the seven and one-half foot line as many times as possible during thirty seconds. The subject may start over as many times as needed or desired. If the ball gets away, it must be retrieved and started over with an underhand throw. Three trials of thirty-seconds each are allowed.

Rules:

1. The ball must not be lifted, caught, or pushed.
2. The underhand toss does not count as a volley.
3. The volley must be above the seven and one-half foot line and the

subject must be behind the restraining line.

4. The subject may not set the ball up to herself.

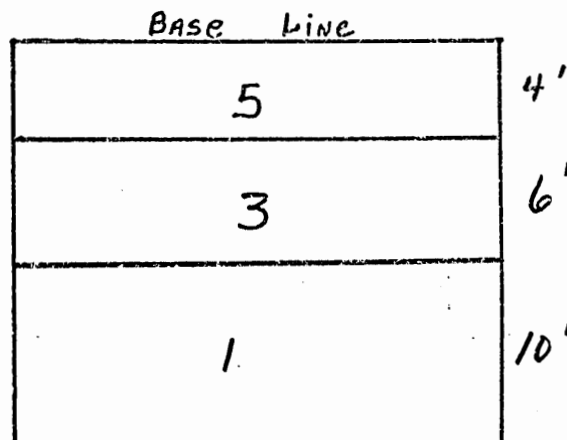
5. The volley will not be counted if the subject commits any of the above fouls.

Scoring: The score is the number of times the ball is volleyed correctly against the wall. The recorded score is the best of three trials.

Serve Test

Equipment: regulation court, net, and volleyballs

Markings: The court is divided into three sections. The area one includes the first ten feet from the center line. Area two is the middle six feet of the court; while, the back four feet is the third area.



Description: The subject stands in the serving area opposite the target. She is allowed twenty trials to serve the ball into the court.

Rules: 1. Any kind of serve is allowed.

2. Let serves are re-served.

3. Serves, which hit outside the court, are counted as trials but these serves do not score points.

4. Point values are five, three, and one, with the highest value awarded for serves which hit in area three.

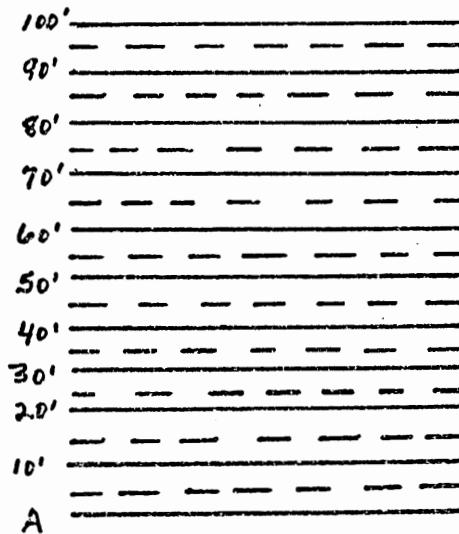
Scoring: The sum of the twenty trials is the final score.

Softball

Overhand Distance Throw

Equipment: softballs, wooden stakes, and a tape measure

Markings: An unobstructed area is marked in five-yard intervals.



Description: The subject stands behind the restraining line. Using an overhand throw, the subject throws the softball as far as she can. The place where the ball first hits the ground is marked with a stake. If the second or third throws are better, the stake is moved to the place marking the longest throw. Three trials are allowed.

Rules: 1. Only an overhand throw is allowed.

2. The subject must stay between the restraining lines.

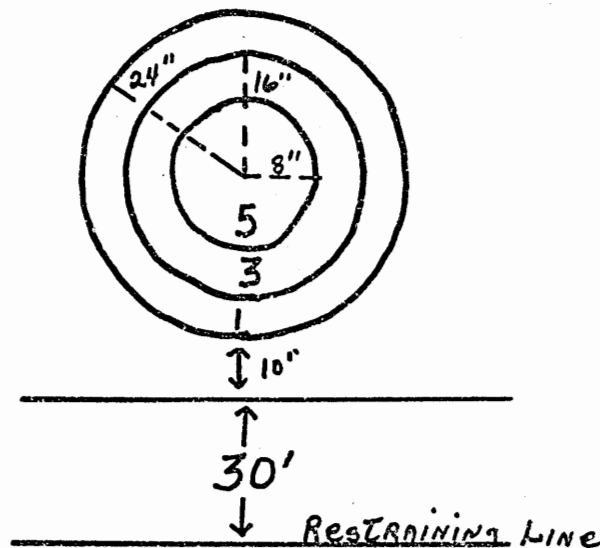
Scoring: The final score is the best of the trials, to the nearest five feet.

Underhand Accuracy Throw

Equipment: several softballs and an unobstructed wall

Markings: A circular target, forty-eight inches in diameter, is marked

on the wall. The target contains three concentric circles with radii of eight inches, sixteen inches, and twenty-four inches. A thirty-foot restraining line is marked parallel to the wall.



Description: The subject stands behind the restraining line and throws the ball toward the target, using an underhand throw. Three trials of ten throws each are allowed. Point values for the circles are five, three, and one, with the inside circle obtaining the highest score.

Rules: 1. The subject must remain behind the restraining line at all times.

2. The throw does not count if the subject steps on or over the restraining line.

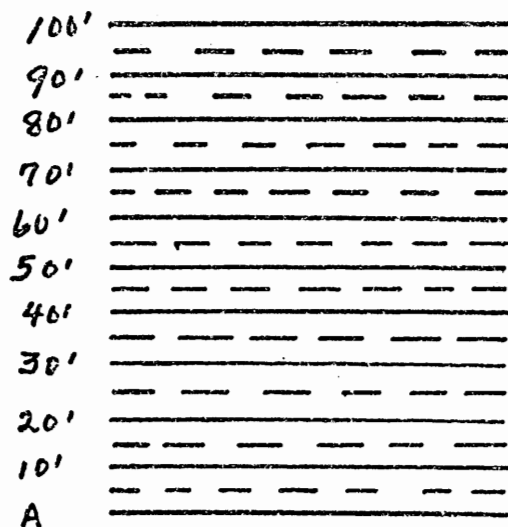
3. Throws that hit a line score the highest point value.

Scoring: The sum of the trials is the final score.

Batting Tee Test

Equipment: softball bats, softballs, batting tee, tape measure, and an unobstructed area.

Markings: Lines are marked five yards apart and parallel to the batting tee.



Description: The batting tee is placed on homeplate. The subject adjusts the tee to the desired height. The subject hits the ball as far as possible. Five trials are allowed without a rest period.

Rules: 1. At least three practice hits should be allowed.

2. The subject may change bats at any time.

3. A trial is counted as no score if the subject swings and misses the ball.

Scoring: Each trial is measured to the nearest yard. The recorded score is the sum of the five trials.

PHYSICAL CONDITIONING UNIT

I. Objectives

- A. To develop positive attitudes toward the needs of the body in regards to physical conditioning.
- B. To develop positive attitudes as to how exercise assists in the development and maintenance of a healthy body.
- C. To provide a program that will assist in improving the level of physical fitness attainable for each student.
- D. To create an interest in maintaining a high level of fitness, not only during the present time but in the future.
- E. To develop the habit of maintaining the correct body alignment at all times.

II. Exercises for warming-up

III. Exercises for developing fitness areas

- A. Endurance
- B. Agility
- C. Strength
- D. Flexibility
- E. Coordination

IV. Evaluation

BASKETBALL INSTRUCTIONAL UNIT

I. Objectives

- A. To develop positive attitudes toward the needs of the body for physical activity.
- B. To create an interest in basketball, which can provide enjoyment at the present time and in the future as either a participant or spectator.
- C. To assist in developing an understanding and appreciation for basketball through learning the rules of the game and participating in the game.
- D. To learn the fundamental skills that are required when playing basketball.
- E. To learn basic offensive and defensive tactics that are used in basketball.

II. Fundamental Skills

A. Dribble

- 1. right-handed
- 2. left-handed
- 3. alternating hands

B. Passes

- 1. chest
- 2. one-handed
- 3. overhead
- 4. underhand
- 5. bounce

C. Shots

1. two-hand set
2. one-hand push
3. underhand
4. lay-up

D. Pivoting

E. Jumping

F. Feinting

G. Dodging

III. Drills and Formations

A. Dribble

1. straight down court and back
2. around obstacles

B. Passes

1. practice each pass
 - a. zig-zag formation
 - b. single line formation with one person in front
 - c. circle formation with one person in center
2. passing, catching, and running in line formation
3. combine dribbling and passing
 - a. line formation
 - b. shuttle formation
4. use drills as relays

C. Shots

1. practice all shots at various positions on court
2. free throw shooting

3. shooting lay-ups
4. shooting games such as Twenty-One and Around the World
 - a. specified shot for entire game
 - b. specified shot from certain court position

D. Shooting, passing, and dribbling

1. four corners
2. figure eight

IV. Lead-up Games

- A. One on One Basketball
- B. One-basket Basketball
- C. End Zone Basketball
- D. Cornerball

V. Simple offensive plays

VI. Basic defensive plays

- A. Man to man
- B. Zone

VII. Actual game participation

VIII. Evaluation

- A. Skill Tests
- B. Written Tests
 1. definitions
 2. basic rules

VOLLEYBALL INSTRUCTIONAL UNIT

I. Objectives

- A. To develop an understanding of the game of volleyball by learning the rules and participating in the game.
- B. To develop an understanding of how the body benefits from physical activity.
- C. To develop positive attitudes toward the necessity of filling leisure hours with activity, either as a participant or a spectator.
- D. To develop positive attitudes toward an activity which will benefit each student during her leisure hours at the present time and may be used in the future to fulfill her personal needs for activity.
- E. To learn the fundamental skills and techniques that are required when playing volleyball.

II. Skills

A. Volley

- 1. overhead
- 2. underhand
- 3. reverse

B. Serving

- 1. underhand
 - a. closed palm
 - b. open palm

c. thumb-circle

2. sidearm

C. Net recovery

III. Drills

A. Volleys

1. circle with a purpose

2. captain circle formation

3. Zig-zag formation

4. volley by two's

B. Serving

1. against wall

2. informal serving

3. short-distance serving

C. Net recovery

1. experimentation with ball landing in net

2. toss and catch

IV. Lead-up Games

A. Volley game

B. Newcomb

C. V-B-B

D. All-Set

E. Bonus volleyball

F. Vollecom

V. Actual game participation

VI. Evaluation

A. Skill tests

B. Written test

SOFTBALL INSTRUCTIONAL UNIT

I. Objectives

- A. To develop an understanding of softball, by learning the rules and participating in the game.
- B. To develop positive attitudes toward the need of fulfilling leisure time with an activity as a participant or a spectator.
- C. To learn the fundamental skills necessary for playing softball.
- D. To learn simple offensive and defensive plays.

II. Skills

- A. Batting
- B. Catching
- C. Fielding
 - 1. ground balls
 - 2. fly balls
- D. Base running
- E. Throwing
 - 1. overhand
 - 2. underhand
 - 3. sidearm

III. Drills and Formations

- A. Batting
 - 1. use a batting tee
 - 2. practice with a student pitching

B. Catching and Throwing

1. short distance - one and one
2. zig-zag formation
3. long distances
4. circle formation
5. throws around the bases

C. Fielding

1. ground balls
2. bouncing balls
3. fly balls

IV. Lead-up Games

- A. Kick Baseball
- B. Tee Softball
- C. Four Throws
- D. Teacher Softball

V. Actual Game Participation

VI. Evaluation

- A. Skill Tests
- B. Written Test

January, 1966

M	T	W	T	F
	3	4	5	6
	10	11	12	13
	17	18	19	20
	Pre-test admini- stration of Standing Broad Jump	Pre-test admini- stration of Shuttle Run	Pre-test admini- stration of Pull-ups	School Closed Snow
	24	25	26	27
Pre-test admini- stration of Sit-ups	Pre-test admini- stration of the basketball Wall Pass	Pre-test admini- stration of the basketball 30-second shooting	Pre-test admini- stration of the basketball Edgren ball Handling	Begin Basketball Instruction
	31			

February, 1966

M	T	W	T	F
	1	2	3	4
7	8	9	10	11
14	15	16	17	18 End of Basketball Instruction
21 Post-test admini- stration of the Wall Pass	22 Post-test admini- stration of the Thirty-second Shooting	23 Post-test admini- stration of the Edgren Ball Handling	24	25
28				

March, 1966

M	T	W	T	F
	1 Pre-test administration in Volleyball Repeated Wall Volleys	2 Pre-test administration in Volleyball Serves	3 Continuation of the Pre-test administration in Volleyball Serves	4 District TSTA Meeting
7 Begin Volleyball Instruction	8	9	10 Pre-test administration of Fifty-yard Dash	11 Pre-test administration of 600-yard Run
14	15	16	17	18
21	22	23	24	25
28	29	30	31	

April, 1966

M	T	W	T	F
				1 End of Volleyball Instruction
4 Post-test admini- stration in Volleyball Repeated Wall Volleys	5 Post-test admini- stration in Volleyball Serves	6 Continuation of the Post-test admini- stration in Volleyball Serves	7	8 Easter Holiday
11 Easter Holiday	12 Easter Holiday	13 Pre-test admini- stration in Softball Overhand Throw for Distance	14 Pre-test admini- stration in Softball Underhand Throw for Accuracy	15 Continuation of the Pre-test admini- stration in Softball Underhand Throw for Accuracy
18 Pre-test admini- stration in Softball Batting for Distance	19 Begin Softball Instruction	20	21	22
25 Post-test admini- stration of Standing Broad Jump	26 Post-test admini- stration of Shuttle Run	27 Post-test admini- stration of Pull-ups	28	29

May, 1966

M		T		W		T		F	
	2	Post-test administration of Fifty-yard Dash			4		5		6
Post-test administration of Sit-Ups			10		11		12	Post-test administration of 600-yard Run	
	16	Post-test administration in Softball Underhand Accuracy Throw for Distance			18	Post-test administration of Overhand Throw for Distance (softball and fitness batteries)			20
End of Softball Instruction			17	Continuation of the post-test administration in Softball Underhand Accuracy Throw for Distance			19	Post-test administration in Softball Batting for Distance	
Final Examinations		Final Examinations		Teachers Work Day		Issued Report Cards			

EXAMPLE OF SCORE CARD FOR THE YOUTH FITNESS

TEST AND THE BASKETBALL SKILLS TESTS

F I T N E S S T E S T	Pre-Test Scores						Post-Test Scores				
	Event	1	2	3	Best		Event	1	2	3	Best
	Pull-ups						Pull-ups				
	Sit-ups						Sit-ups				
	Shuttle Run						Shuttle Run				
	Standing Bd. Jump						Standing Bd. Jump				
	50-yard Dash						50-yard Dash				
	Softball Throw						Softball Throw				
	600-yard Run						600-yard Run				
B A S K E T B A L L		1	2	3	Sum			1	2	3	Sum
	Edgren Ball Handling						Edgren Ball Handling				
	Wall Pass						Wall Pass				
	Thirty-Second Shooting						Thirty-Second Shooting				

EXAMPLE OF SCORE CARD FOR THE VOLLEYBALL
AND SOFTBALL SKILLS TESTS

		Pre-Test Scores						Post- Test Scores							
V O L L E Y B A L L	Repeated Volleys	1	2	3	Best			Repeated Volleys	1	2	3	Best			
	Serve	1	2	3	4	5	Sum	Serve	1	2	3	4	5	Sum	
S B A L L	Overhand Throw	1	2	3	Best			Overhand Throw	1	2	3	Best			
	Batting	1	2	3	4	5	Sum	Batting	1	2	3	4	5	Sum	
Under- hand Throw for Accuracy	1	2	3	4	5	Sum	Under- hand Throw for Accuracy	1	2	3	4	5	Sum		

FORMULA USED FOR STATISTICAL COMPUTATION¹

t-test for the significance of the difference between the means of independent samples

Key: N_1 = number of cases in group one

N_2 = number of cases in group two

M_1 = mean for group one

M_2 = mean for group two

X^2 = change for group one

Y^2 = change for group two

$df = N_1 + N_2 - 2$

$$t = \frac{M_1 - M_2}{\sqrt{\left(\frac{\sum X^2 + \sum Y^2}{N_1 + N_2 - 2} \right) \left(\frac{N_1 + N_2}{N_1 N_2} \right)}} \rightarrow \boxed{\text{Standard error of the difference between means}}$$

¹Robert H. Koenker, Simplified Statistics, (Bloomington, Illinois: McKnight and McKnight Publishing Company, 1961), p. 87.