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A Comparative Study of the Physical Fitness of Nigerian Elementary School Children of Different Socioeconomic Status

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A COMPARATIVE STUDY OF THE PHYSICAL FITNESS OF
NIGERIAN ELEMENTARY SCHOOL CHILDREN OF
DIFFERENT SOCIOECONOMIC STATUS

by

Adeline Omokhogie Oseni

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Master of Arts

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August 1976

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Adeline Omokhogie Oseni

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CHAPTER I

INTRODUCTION

Socioeconomic status or social class can be determined by all or a combination of factors such as annual income, educational background, type of house, dwelling area, and occupation of the individual or family. Ponthieux and Barker,¹ in their study investigating the relationship between socioeconomic status and physical fitness of elementary school children, used four rating scales to classify the subjects. The socioeconomic factors involved were "occupation of the parents, the type of house in which they lived, and the dwelling areas in the community."

In Nigeria, little research has been done with regard to social class, and there is no classification index for socioeconomic status. However, class consciousness exists in the Nigerian society and the following criteria could be accepted as the basis for socioeconomic classification in Nigeria: (1) income, (2) occupation, (3) occupational status, and (4) educational qualification. In some communities, educational qualification is very significant. In others, status in employment and type of occupation are highly rated, especially

¹Ponthieux, N. A., and Barker, D. G., "Relationship Between Socio-economic Status and Physical Fitness Measures." Research Quarterly, XXXVI (December 1965), 465.

when the position carries administrative powers, as in the case of a permanent secretary. However, educational background and occupational status usually determine the salary levels of Nigerian workers. For example, the messenger, clerk, typist, cleaner, washerman, steward, and cook earn much less than the maintenance officer, the senior assistant registrar, and permanent secretary (see Appendix A). There exists a great social and economic gap between the first group and the second. It is justifiable to classify the first category of workers as being of low socioeconomic status and the latter as upper socioeconomic status.

It is sufficient, therefore, to classify families into socioeconomic levels according to the occupational status and annual income of the breadwinner of the family.

The income of the family head determines the type of house and the dwelling area in which the family lives, and also determines what material comfort the family can afford and the privileges the children enjoy. One of these privileges is the opportunity to attend a private school.

In Nigeria, there are two types of elementary school: the private primary school and the free primary school (see Appendix B). The fees charged by the proprietors of the private primary schools are such that only families with substantial annual income can afford to send their children to these schools. The majority of Nigerian children attend the free primary schools, which are government owned.

The private schools are owned by individuals, religious bodies, community organizations, or higher institutions of learning. These schools are normally well staffed, with the population of each class usually between twenty-five and thirty and rarely exceeding thirty-five. These are schools where children begin at the age of 4 years, spend two years in the kindergarten section, and then move on to the elementary section. The academic achievement of children in these schools is relatively high, and at age 10 or 11 most of the children pass the entrance examination for admission into the secondary school (junior high school).

The children in the free primary schools begin school at about age 6 and literally struggle through the six years of elementary school, and many never make it to the secondary school. The facilities in the free primary schools are grossly inadequate, and--unlike the private schools--the classes are usually overcrowded, the teachers are less qualified, and the general atmosphere is less conducive to effective learning.

The child attending the private school usually rides to and from school, while his counterpart in the free primary school walks (see Appendix B). As a result of a more affluent home life, the child of the upper socioeconomic status lives a more comfortable life and does very few household chores. On the other hand, the child of low socioeconomic status does a lot of housework: helps to cook, cleans the

house, fetches water, and runs errands. There exists also a great difference in their general living conditions with regard to feeding habits, nutrition, sleeping accommodations, and general home environment.

Does this disparity in the modes of life of the children of upper socioeconomic status and of lower socioeconomic status also exist in their physical fitness? If so, in which components of physical fitness do the differences exist?

Statement of the Problem

The problem of this study was to determine whether the disparity in the modes of life of the children of upper socioeconomic status and low socioeconomic status also exists in their physical fitness.

Purpose of the Study

The purpose of this study was to compare the physical fitness of children from an upper socioeconomic level with that of children from a low socioeconomic level, in order to determine the effect of socioeconomic status upon the physical fitness levels of school children in Nigeria.

Definition of Terms

Physical fitness.--Physical fitness is "the condition of the body necessary for a person to carry out his daily

task without undue fatigue," as defined by Schurr.¹ Cassady, Mapes, and Alley² also define physical fitness as "the ability of the body to accommodate efficiently and effectively a variety of vigorous physical tasks." For the purpose of this study, the condition and ability of the body involve strength, speed, agility, coordination, and cardio-respiratory endurance.

Private schools.--Primary schools in Nigeria where the minimum fee charged per child is 150 naira (N150, Nigerian currency; \$240, U.S. dollars) per annum.

Free primary schools.--Elementary schools in Nigeria where no tuition fee is charged.

Elementary schools.--Synonymous with primary schools.

Socioeconomic status.--Social and economic living standards which involve housing, dwelling area, nutrition, clothing, and schooling.

Upper socioeconomic status.--Refers to families in Nigeria whose annual income is 5,400 naira (N5,400, Nigerian currency; \$8,600, U.S. dollars) or above.

Low socioeconomic status.--Refers to families in Nigeria whose annual income is 1,400 naira (N1,400, Nigerian currency; \$2,200, U.S. dollars) or less.

¹Schurr, Evelyn L., Movement Experiences for Children. New York: Appleton-Century Crofts, 1975. P. 7.

²Cassady, Donald R., Mapes, Donald F., and Alley, Louis E., Handbook of Physical Fitness Activities. New York: Macmillan Co., 1965. P. 8.

Delimitations

This study was delimited to children (1) in the primary schools; (2) between the ages of 108 and 131 months, inclusive; (3) who were normal and had no serious medical problems; (4) who were permitted by their parents to participate in this study; and (5) whose parents were both Nigerians (this was necessary to eliminate influence, by race).

Height and weight were not considered, as these do not affect significantly the analysis of group physical fitness achievements.¹

Significance of the Study

Few investigations into the effects of socioeconomic status on physical performance of school children have been reported. In Nigeria, very little research has been done in the field of physical education in general. It is hoped, therefore, that the findings of this study will lead to further research in physical education, particularly in the area of the physical fitness of children.

¹Espenschade, Ann S., "Re-Study of Relationship Between Physical Performance of School Children and Age, Height and Weight." Research Quarterly, XXXIV (May 1963), 152.

CHAPTER II

REVIEW OF LITERATURE

This chapter is devoted to reviewing literary opinions and studies related to physical fitness of children, socioeconomic factors, and their interrelation and relationship with other aspects of development. A brief summary of the findings is included at the end of the chapter.

According to Breckenridge and Vincent,¹ socioeconomic status "determines the paucity and abundance of those conditions conducive to healthy living," thus material well-being has a positive effect upon physical development.

Socioeconomic factors such as poor homes, hunger, inadequate clothing, and other evidence of inferior status also affect the emotional and social development of children.²

Schurr³ states that areas of physical fitness which should be of greatest concern to the elementary school teacher include health, posture, nutritional status, and components of physical fitness.

¹Breckenridge, Marian E., and Vincent, Lee E., Child Psychology. Philadelphia: W. B. Saunders Co., 1965. Pp. 171-2.

²loc. cit., p. 173.

³Schurr, Evelyn L., Movement Experiences for Children. New York: Appleton-Century Crofts, 1975. P. 180.

Physical fitness components such as strength, muscular endurance, speed, agility, power, coordination, and cardio-respiratory endurance are specific, and they contribute immensely to the total fitness of the individual. The most fit person attains a high degree in most of the components.¹

After discussing various opinions on the definition of physical fitness, Mathews² described the term as being "somewhat exact in meaning, indicating to us specific components we might measure to reflect a person's fitness status." He went on to explain that the components of physical fitness include muscular strength, muscular endurance, muscular flexibility, speed, agility, cardio-respiratory or -vascular fitness, and neuromuscular coordination.

Various tests have been developed for the measurement of physical fitness components. Among these are the American Association for Health, Physical Education, and Recreation (AAHPER) Youth Fitness Test, the Kraus-Weber Strength Test, and the Indiana Motor Fitness Test.³

Explaining the effects of socioeconomic status, a study by Hollingshead⁴ illustrated the fact that the children of

¹loc. cit., p. 208.

²Mathews, Donald K., Measurement in Physical Education. Philadelphia: W. B. Saunders Co., 1968. P. 5.

³loc. cit., pp. 97-112.

⁴Hollingshead, A. B., Elmtown's Youth. New York: John Wiley, Inc., 1949. Pp. 193-202.

upper-class parents had the highest percentage of participation in school activities. Participation in games showed the greatest disparity, with the upper class registering 94-percent participation and the low class registering none at all. Pressey, Robinson, and Horrocks¹ referred to a study by Greene, which found significant correlations, both physically and mentally, between persons from identical environment. This indicated that socioeconomic status had a positive correlation with mental abilities.

Rowland² reported a significant relationship between socioeconomic status and the science achievement of elementary school children. Given equal intelligence and science background, the children of upper socioeconomic status exhibited greater achievement than those of low socioeconomic status.

Thomas,³ in a study of the relationship between physical fitness and selected aspects of intelligence, academic

¹Pressey, S. L., Robinson, F. P., and Horrocks, J. E., Psychology in Education. New York: Harper and Row, 1959, p. 63 citing Greene, E. B., Measurement of Human Behavior. New York: Odyssey, 1952.

²Rowland, George Williams, "The Relationship Between Physical Fitness and Elementary School Science Achievement." Unpublished doctor's dissertation, University of Missouri, Columbia, Missouri, 1965. Abstract.

³Thomas, Peggy S., "The Relationship of Physical Fitness and Selected Intellectual and Academic Performances, Co-curricular Participation and Socio-Economic Status." Unpublished doctor's dissertation, University of Utah, Salt Lake City, Utah, 1968. Abstract.

performance, and socioeconomic status, found: (1) a low correlation ($r = .37$) between physical fitness and grade point average; (2) a low correlation ($r = .34$) between physical fitness and intelligence quotient; and (3) a negative correlation ($r = -.20$) between physical fitness and socioeconomic status.

In a more direct study of the relationship between socioeconomic status and physical fitness of elementary school children, Ponthieux and Barker¹ tested children between the ages of 10 and 12 years, using the AAHPER Youth Fitness Test.

This 1963 comparison of the physical fitness of children of upper socioeconomic status with children of low socioeconomic status showed neither group superior to the other in all seven components tested. The results were as follows:

Girls

1. Girls of upper socioeconomic status did better than girls of low socioeconomic status in pull-ups, sit-ups, and standing broad jump.
2. Girls of low socioeconomic status did better than girls of upper socioeconomic status in 50-yard dash, softball throw, and 600-yard run-walk.
3. There was no significant difference between the performances of both groups in the shuttle run.

¹Ponthieux, N. A., and Barker, D. G., "Relationship Between Socio-economic Status and Physical Fitness Measures." Research Quarterly, XXXVI (December 1965), 464-7.

Boys

1. Boys of upper socioeconomic status did better than boys of low socioeconomic status in sit-ups and shuttle run.
2. Boys of low socioeconomic status did better than boys of upper socioeconomic status in 50-yard dash and softball throw.
3. No significant differences were found between the performances of both groups in standing broad jump and 600-yard run-walk.

Thus, the upper-status boys and girls were superior to the low-status boys and girls in the strength of arm and shoulder muscles and in the strength of abdominal muscles, while the low-status children were better in speed and coordination. The upper-status girls had better leg explosive strength, while the low-status girls showed better cardio-respiratory endurance.

Todd¹ also found no superiority of one group over the other in all components tested. The children of low socioeconomic status appeared to be more physically fit than the upper socioeconomic children. The difference, however, was not statistically significant. Ponthieux and Barker² compared the physical fitness of Negro and white children in

¹Todd, William Charles, "Strength and Physical Fitness of Disadvantaged and Non-disadvantaged Elementary School Boys." Unpublished doctor's dissertation, University of Alabama, University, Alabama, 1969. Abstract.

²Ponthieux, N. A., and Barker, D. G., "Relationship Between Race and Physical Fitness." Research Quarterly, XXXVI (December 1965), 468-72.

fifth and sixth grades and found that the Negro girls performed better than the white girls in the shuttle run (agility), 50-yard dash (speed), and softball throw (coordination). The Negro boys were better in standing broad jump (leg explosive strength), 50-yard dash (speed), softball throw (coordination), and pull-ups (arm and shoulder strength). The only test in which the white boys and girls both excelled was the sit-ups (abdominal strength). The white girls did better than the Negro girls in the pull-ups (arm and shoulder strength).

Summary of Related Literature

The limited quantity of literature available regarding the effect of socioeconomic status on physical fitness of children indicates a dearth of research in this field. The effects of socioeconomic factors on intelligence, social fitness, and psychological adjustment seem to have received more attention.

The literature reviewed in this chapter shows a consensus of opinion that socioeconomic status has some positive effect on child development. In the area of physical fitness and motor ability, however, it does not appear that socioeconomic status has much effect on the components of the physical fitness status of the child. Race was found to have a positive correlation with physical fitness.

CHAPTER III

DESIGN AND METHODOLOGY

This chapter contains four sections: (1) the general procedures adopted to collect the data; (2) description of the subjects; (3) instrumentation and the method of administering the test; and (4) an explanation of the data analysis.

General Procedures

This study was designed to compare the physical fitness of Nigerian school children from two socioeconomic levels. Six schools were randomly selected from the Ibadan Northwest area. There were three free primary schools and three private primary schools. Questionnaires were sent through the children in classes 4 and 5 to their parents, and through these the subjects were selected and grouped into low socioeconomic status and upper socioeconomic status. The American Association for Health, Physical Education, and Recreation (AAHPER) Youth Fitness Test was used to test the children for physical fitness, in the seven components of physical fitness as explained in the section dealing with instrumentation.

Tests were administered only between 8:00 a.m. and 10:00 a.m., in order to avoid the possible unfavorable effect

of the heat of the day. This procedure was adopted each day until the complete battery of tests had been administered to all the subjects. Any subject who did not complete all seven tests was automatically excluded from the study. Previous scores recorded for the subject were deleted from the record sheet. On the average, only about 26 subjects could be tested daily. The sequence of testing was the same in all six schools. All linear scores were collected on the metric system of measurement.

Schedule

Tests were administered in the following groupings:

(1) first day--standing broad jump, shuttle run; (2) second day--50-yard dash, cricketball throw; (3) third day--sit-ups, pull-ups, flexed arm hang; and (4) fourth day--600-yard run-walk. The groups in each school were tested as follows:

Day 1: Group A-- (i) Standing broad jump
(ii) Shuttle run

Group B-- (i) Standing broad jump
(ii) Shuttle run

Day 2: Group A-- (i) 50-yard dash
(ii) Cricketball throw

Group B-- (i) 50-yard dash
(ii) Cricketball throw

Day 3: Group A-- (i) Sit-ups
(ii) Pull-ups

Group B-- (i) Sit-ups
(ii) Pull-ups

Day 4: Group A--600-yard run-walk
Group B--600-yard run-walk

Subjects

Two hundred and sixty-four subjects completed the battery of tests. Only the scores of subjects who completed all seven tests were recorded for analysis. Any child who did not participate in any one test item was eliminated from the study. Two hundred and eighty-five children were initially selected for participation, but 15 dropped out due to absences from school.

The subjects who participated in this study were elementary school children in classes 4 and 5 and between the ages of 108 and 131 months, i.e., 9 and 10 years old, and who were in good health as could be observed by the investigator. Table 1 shows the distribution of subjects by sex, type of school, and socioeconomic status.

TABLE 1.--Distribution of Subjects

Type of School	No.	Sex	Socioeconomic Status
Free primary	60	Male	Low
Free primary	66	Female	Low
Private primary	64	Male	High
Private primary	74	Female	High
Total	264		

Method of selection

A letter of explanation (Appendix C), telling the parents all about the study, and a questionnaire (Appendix D)

were sent through each child in classes 4 and 5 to his or her parents. The questionnaire was completed and returned to the investigator through the respective class teachers. Each questionnaire was studied, and the acceptability of each child to participate in this study was based on the following criteria:

1. Age--108 to 131 months old
2. Parent's annual income--N1,400 or less, and N5,400 or more. (This information was deduced from the occupation and the occupational status of the parents--see Appendix A.)
3. Nationality--both parents were Nigerian.
4. Health--no severe health problem or physical deformity
5. Parent's approval for child to participate

Information regarding the nationality of the parents was obtained directly from the children.

Instrumentation

The purpose of this study was to compare the physical fitness of children of low socioeconomic and upper socioeconomic status. Physical fitness was defined as muscular conditions such as strength, speed, agility, coordination, and cardio-respiratory endurance. The AAHPER Youth Fitness Test was selected as the test battery to be used for comparison. The sit-up test was modified from straight-legs sit-up to bent-knee sit-up in order to test the abdominal muscles exclusively, and to minimize the action of the

iliopsoas muscle.¹

Stein,² in his study of the reliability of the AAHPER Youth Fitness Test, found all seven items highly reliable. In all cases, the reliability coefficients were significant beyond .001.

The seven test items are: (1) pull-ups (for boys), flexed arm hang (for girls); (2) sit-ups; (3) 40-yard shuttle run; (4) 50-yard dash; (5) standing broad jump; (6) cricket-ball throw; and (7) 600-yard run-walk. Table 2 shows which components of physical fitness are tested by each of the test items mentioned above. The full text of the AAHPER

TABLE 2.--Test Items and Physical Fitness Components Tested

Test Item	Physical Fitness Components
1. (a) Pull-ups (boys) (b) Flexed arm hang (girls)	Arm and shoulder strength
2. Sit-ups	Abdominal strength
3. Standing broad jump	Leg explosive strength
4. Shuttle run	Agility
5. 50-yard dash	Speed
6. Softball throw	Coordination
7. 600-yard run-walk	Cardio-respiratory endurance

¹Mathews, Donald K., Measurement in Physical Education. Philadelphia: W. B. Saunders Co., 1968. P. 110.

²Stein, Julian U., "The Reliability of the Youth Fitness Test." Research Quarterly, XXXVII (October 1966), 328.

Youth Fitness Test, as authored by Hunsicker and Reiff¹ in their 1965 survey and comparison of youth fitness, is presented in Appendix E.

The test battery administered in the present study was as follows:

Test item 1a--pull-ups (boys)

Equipment.--A metal bar approximately 1-1/2 inches in diameter was used.

Description.--The bar was high enough so that the subject could hang with his arms and legs fully extended and his feet free of the floor. An overhand grasp (palms away from face) was used. After assuming the hanging position (as in Figure 1), the pupil raised his body by his arms until his chin was placed over the bar (as shown in Figure 2) and then lowered his body to a full hang as in the starting position. The exercise was repeated as many times as possible.

Rules.--(1) Only one trial was allowed except when it was obvious that the subject had not had a fair chance.

(2) The body was not allowed to swing during the execution of the movement. (The pull must in no way be a snap movement.) Any swinging action was checked by holding an extended arm across the front of the thighs.

¹Hunsicker, Paul A., and Reiff, Guy G., "A Survey and Comparison of Youth Fitness, 1958-1965." Cooperative research project, No. 2418, University of Michigan, Ann Arbor, Michigan, 1965.

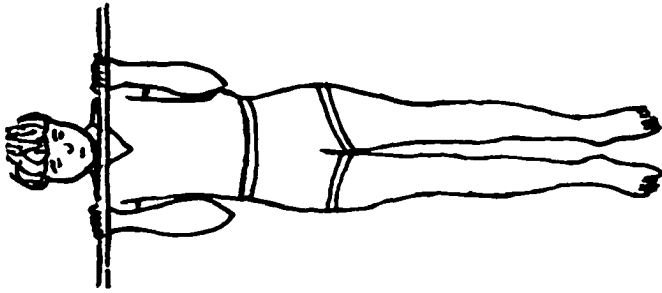


Fig. 2.--Pull-up position for pull-up test.

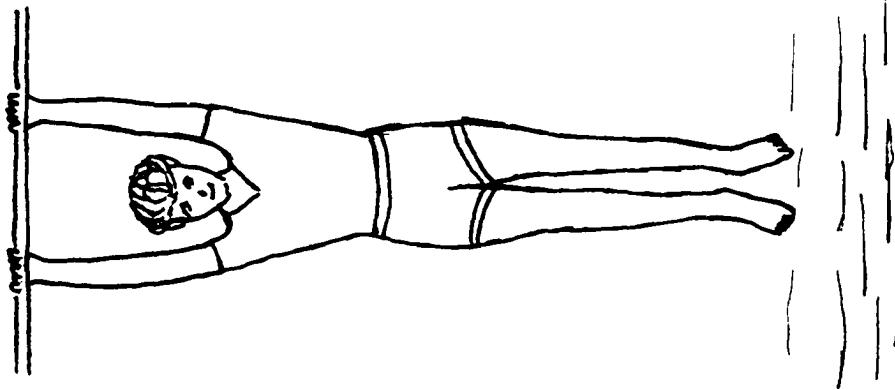


Fig. 1.--Starting position for pull-up test.

(3) Raising of the knees and kicking of the legs was not permitted.

Scoring.--The number of completed pull-ups was recorded to the nearest whole number.

Test item 1b--flexed
arm hang (girls)

Equipment.--A horizontal bar approximately 1-1/2 inches in diameter was used. A stopwatch was also used.

Description.--The height of the bar was approximately equal to the subject's standing height. When this was not possible, the subject was raised up to grasp the bar. An overhand grasp (palms away from face) was used (Figure 3). With the assistance of two spotters, one in front and one in back of the subject, the subject raised her body off the floor to a position where the chin was above the bar; the elbows were flexed and the chest was close to the bar (Figure 4). The subject held this hanging position for as long as possible, without support.

Rules.--(1) The stopwatch was started as soon as the subject took the hanging position without support.

(2) The watch was stopped when (a) the subject's chin touched the bar, (b) the subject's head tilted backwards to keep her chin above the bar, or (c) the subject's chin fell below the level of the bar.

Scoring.--The length of time the subject held the hanging position was recorded to the nearest second.

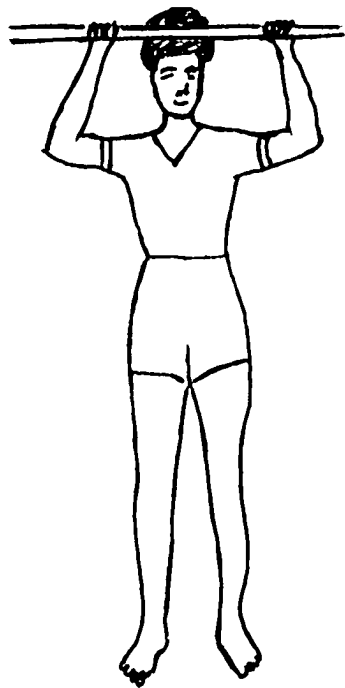


Fig. 3.--Starting position for flexed arm hang.

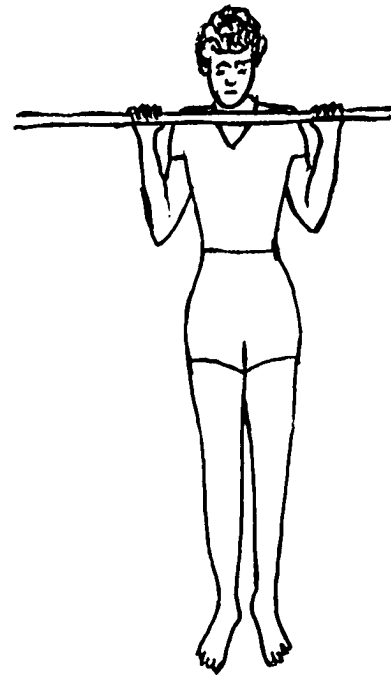


Fig. 4.--Hanging position for flexed arm hang.

Test item 2--sit-ups
(boys and girls)

Equipment.--An agility mat was used.

Description.--The subject assumed a back-lying position with knees bent at approximately 90 degrees, as shown in Figure 5. The hands were placed on the back of the neck, with the fingers interlaced and elbows retracted. A partner held the feet down, the feet being in contact with the mat or floor at all times.

The subject sat up (Figure 6), turning the trunk to the left and touching the right elbow to the left knee; returned to starting position; then sat up again, turning the trunk to the right and touching the left elbow to the right knee. The exercise was repeated, alternating sides, as many times as the subject was able to do it.

Rules.--(1) The fingers had to remain in contact behind the neck throughout the exercise.

(2) The knees had to be bent and the feet in contact with the mat throughout the exercise.

(3) When returning to starting position, the subject had to have elbows flat on the mat before sitting up again. —

Scoring.--One point was given for each complete movement of touching elbow to knee. No score was being counted when the fingertips did not maintain contact behind the head, when feet came off the mat, or when the subject pushed up off the floor from an elbow. The maximum limit in terms of

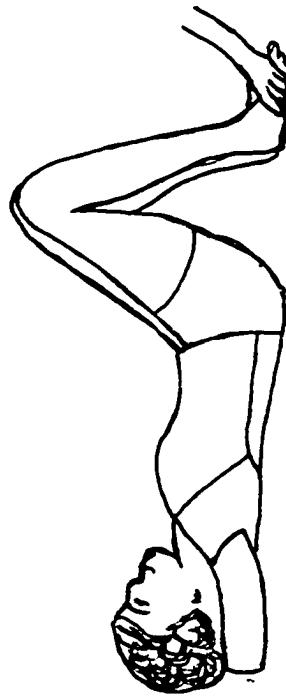


Fig. 5.--Back-lying position for sit-up test.

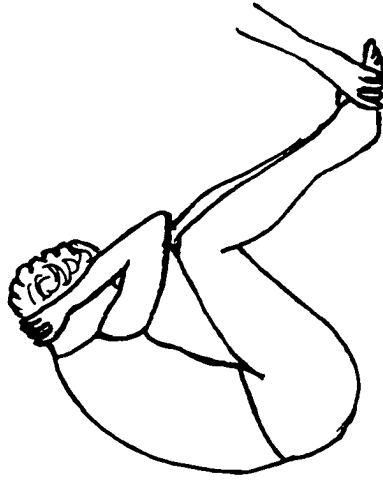


Fig. 6.--Sit-up position for sit-up test.

number of sit-ups was 50 for girls, 100 for boys.

Test item 3--shuttle run
(boys and girls)

Equipment.--Four blocks of wood (2" x 2" x 4") and two stopwatches were used. Subjects ran barefooted.

Description.--Two parallel lines were marked on the floor, 30 feet apart. The blocks of wood were placed behind one of the lines. Two subjects ran together, starting from behind the other line (Figure 7). On the signal "Ready? Go!" the subjects ran to the blocks, picked up one end, ran back to the starting line, and placed the block behind the line; they then ran back and picked up another block and carried it back across the starting line. To eliminate the necessity of returning the blocks after each race, the races were started alternately, first from behind one line and then from behind the other.

Rules.--Two trials were allowed, with some rest between.

Scoring.--The better of the two trials was recorded to the nearest tenth of a second.

Test item 4--standing broad
jump (boys and girls)

Equipment.--Outdoor jumping space and a tape measure were used.

Description.--The subject stood with the feet a few inches apart and the toes just behind the take-off line.

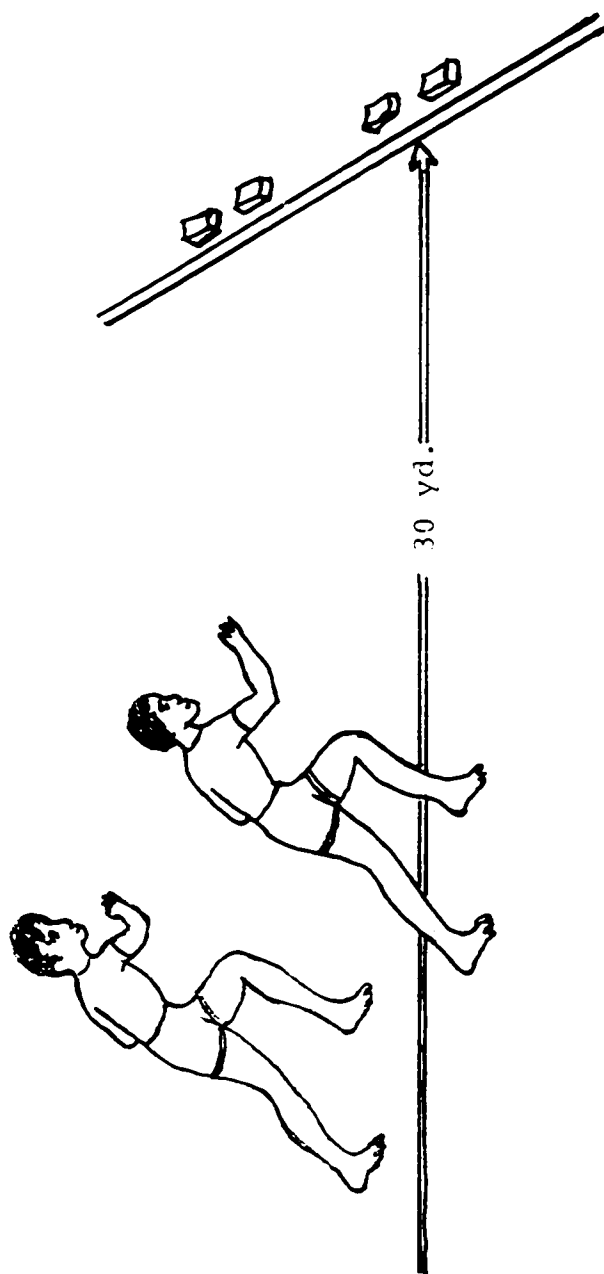


Fig. 7.--Shuttle run

Preparatory to jumping, the subject swung the arms backward and bent the knees. The jump was accomplished by simultaneously extending the knees and swinging the arms forward (see Figure 8).

Rules.--(1) Three trials were allowed.

(2) Measurement was taken from the take-off line to the heel or other part of the body that touched the floor nearest to the take-off line.

Scoring.--The best of the three trials was recorded in centimeters.

Test item 5--50-yard dash
(boys and girls)

Equipment.--Two stopwatches and a straight distance of 50 yards were used.

Description.--Two subjects ran at the same time. They both stood behind the starting line. The starter, a teacher, gave the commands "Are you ready?" and "Go!" The latter was accompanied by a downward sweep of the starter's arm, to give the timer (the investigator) a visual signal.

Rules.--The score was the time that elapsed between the starter's signal and the instant the subject crossed the finish line.

Scoring.--The time was recorded in seconds, to the nearest tenth of a second.

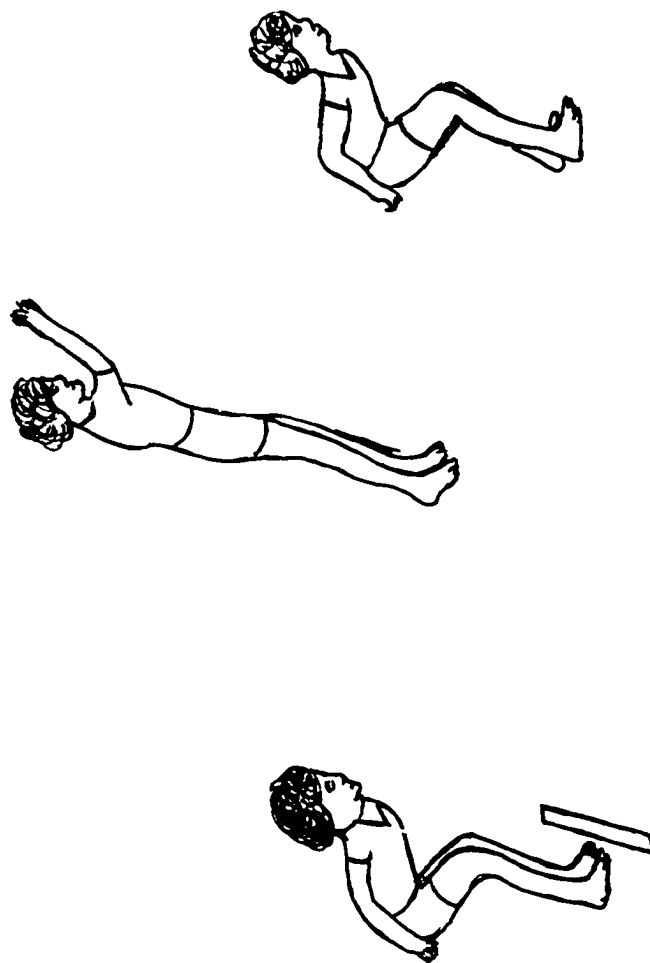


Fig. 8.--Standing broad jump

Test item 6--cricketball
throw (boys and girls)

Equipment.--A cricketball (10-inch circumference), three wooden stakes, and a tape measure were used.

Description.--Each subject threw the ball from behind a restraining line, while remaining within two parallel lines, using an overarm throw (see Figure 9). The point of landing was marked with one of the small stakes. The second and third throws were also marked. After three throws, the furthest throw was measured.

Rules.--(1) Only an overhand throw was allowed.

(2) Three throws were allowed.

(3) The distance recorded was the distance from the point of landing to the nearest point on the restraining line.

Scoring.--The best of the three trials was recorded to the nearest tenth of a meter.

Test item 7--600-yard run-walk
(boys and girls)

Equipment.--Two stopwatches and an area marked off for 600 yards (Figure 10) were needed.

Description.--Subjects used a standing start. At the signal "Ready? Go!" the subjects started running the 600-yard distance. The subjects were paired off before the start of the event. The stopwatches were started at the word "Go!"

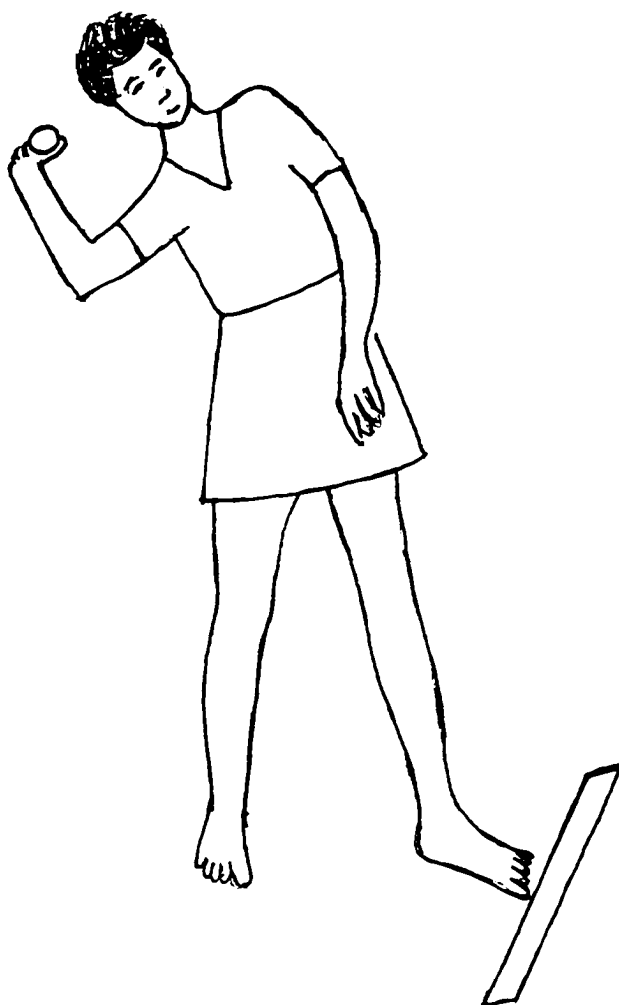


Fig. 9.--Overarm throw

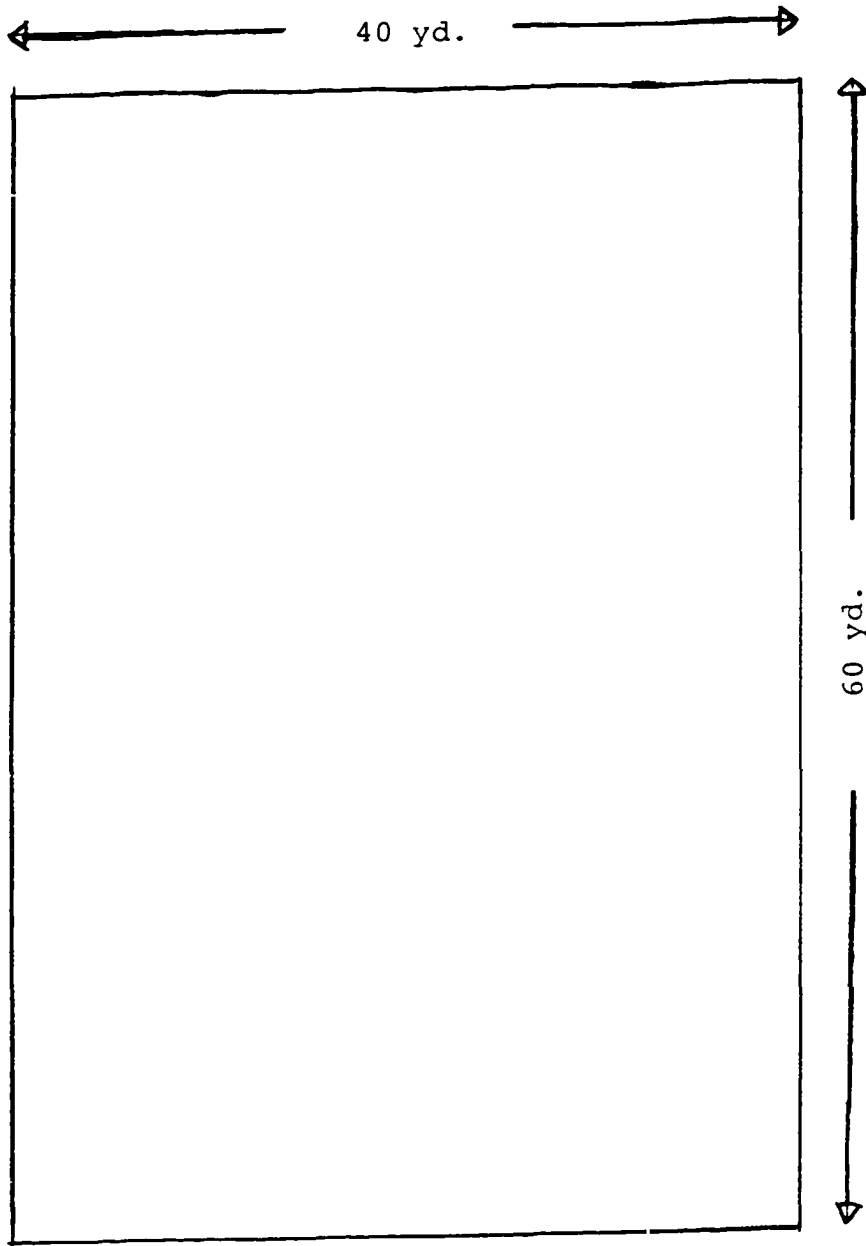


Fig. 10.--Open area for 600-yard run-walk

and were stopped when the subjects crossed the finish line.

Rules.--Walking was permitted, but the subject was instructed to cover the distance in the shortest possible time.

Scoring.--The score was recorded in minutes and seconds (and converted to seconds for analysis).

Method of Instruction

Each test item was explained, verbally, to the subjects at the start of each test session. When possible, verbal instructions were accompanied by demonstration for clarification. The investigator made comments only to correct a subject when any rule was being violated. No words of encouragement or discouragement were used.

Statistical Analysis of Data

The data were analyzed at the computer center of Western Michigan University. The raw scores in each test item were coded by sex and socioeconomic status to enable the investigator to separate the data for the purpose of comparison.

The t test for independent samples was utilized to test for the presence of significant differences in the mean scores of the low and upper socioeconomic status in each of the seven test items. The null hypothesis that the group means are equal was evaluated at the .05 level of confidence.

The F value was computed for the scores where a

significant difference was established by the t test. This was used to establish the homogeneity of variance of the two samples. The null hypothesis that the variances of the two groups were equal was evaluated at the .02 level of significance.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

The main purpose of this study was to determine whether any significant differences existed between the physical fitness levels of Nigerian children of low socioeconomic status and upper socioeconomic status. Specifically, the investigation compared the performance of low and upper socioeconomic status children in the following test items: (1) pull-ups (boys), flexed arm hang (girls); (2) sit-ups; (3) shuttle run; (4) 50-yard dash; (5) standing broad jump; (6) cricket-ball throw; and (7) 600-yard run-walk.

The data collected in this study were analyzed and comparisons made by use of the t test for independent samples. The homogeneity of the samples was tested by the F test.

The results of these analyses are presented below with tables and discussions.

Analysis of Scores in Pull-Up Test Item

To compare the mean scores of the low and upper socioeconomic groups of male subjects for the pull-up test item, the t test for independent samples was used. Table 3 presents the groups, the means, difference between the means, standard deviation, and the t value.

TABLE 3.--Comparison of Pull-Up Means of Low Socioeconomic and Upper Socioeconomic Male Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	1.283	.483	1.668	1.555
Upper SES	1.766		1.779	

The mean scores for the pull-up test item were 1.283 (low socioeconomic group) and 1.766 (upper socioeconomic group). The difference of .483 pull-ups was not significant at the .05 level of confidence.

With 122 degrees of freedom, a t value greater than 1.96 was necessary to reject the null hypothesis. The obtained t value was 1.555. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

Analysis of Scores in Flexed Arm Hang Test Item

To compare the mean scores of the low and upper socioeconomic groups of female subjects for the flexed arm hang test item, the t test for independent samples was used. Table 4 presents the groups, the means, difference between the means, standard deviation, and the t value.

The mean scores for the flexed arm hang test item were 6.673 seconds (low socioeconomic group) and 6.131 seconds (upper socioeconomic group). The difference of .542 seconds was not significant at the .05 level of confidence.

TABLE 4.--Comparison of Flexed Arm Hang Means of Low Socio-economic and Upper Socioeconomic Female Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	6.673		7.21	
		.542		.465
Upper SES	6.131		6.67	

With 138 degrees of freedom, a t value greater than 1.96 was required to reject the null hypothesis. The obtained t value was .465. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

Analysis of Scores in Sit-Up Test Item

Male groups

To compare the mean scores of the low and upper socioeconomic groups of male subjects for the sit-up test item, the t test for independent samples was used. Table 5 presents the groups, the means, difference between the means, standard deviation, and the t value.

TABLE 5.--Comparison of Sit-Up Means of Low Socioeconomic and Upper Socioeconomic Male Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	36.62		24.77	
		3.39		.99
Upper SES	33.23		15.00	

The mean scores for the sit-up test item were 36.62 sit-ups (low socioeconomic group) and 33.23 sit-ups (upper socioeconomic group). The difference of 3.39 was not significant at the .05 level of confidence.

With 122 degrees of freedom, a t value greater than 1.96 was required to reject the null hypothesis. The obtained t value was .99. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

Female groups

To compare the mean scores of the low and upper socioeconomic groups of female subjects for the sit-up test item, the t test for independent samples was used. Table 6 presents the groups, the means, difference between the means, standard deviation, and the t value.

TABLE 6.--Comparison of Sit-Up Means of Low Socioeconomic and Upper Socioeconomic Female Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	25.64	2.64	13.98	1.157
Upper SES	28.28		13.09	

The mean scores for the sit-up test item were 25.64 sit-ups (low socioeconomic group) and 28.28 sit-ups (upper socioeconomic group). The difference of 2.64 was not significant at the .05 level of confidence.

With 138 degrees of freedom, a t value greater than 1.97 was required to reject the null hypothesis. The obtained t value was 1.157. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

Analysis of Scores in Shuttle Run Test Item

Male groups

To compare the mean scores of the low and upper socioeconomic groups of male subjects for the shuttle run test item, the t test for independent samples was used. Table 7 presents the groups, the means, difference between the means, standard deviation, and the t value.

TABLE 7.--Comparison of Shuttle Run Means of Low Socioeconomic and Upper Socioeconomic Male Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	11.57	0.30	0.643	2.857 ^a
Upper SES	11.27		0.500	

^aSignificant at the .01 level.

The mean scores for the shuttle run test item were 11.57 seconds (low socioeconomic group) and 11.27 seconds (upper socioeconomic group). The difference of .30 was significant at the .01 level of confidence.

With 122 degrees of freedom, a t value greater than

2.61 was required to reject the null hypothesis. The obtained t value was 2.857. Therefore, the null hypothesis that the means of the two groups were equal was rejected.

Table 8 shows the variances, the degrees of freedom, and the F value obtained for the shuttle run test item using male subjects. The assumption of homogeneity of variance was tested, using the F statistic. The null hypothesis that the variances of the two groups were equal was tested. The variance of the low socioeconomic group was .4096, while the variance of the upper socioeconomic group was .2500. With 59 and 63 degrees of freedom, an F value greater than 1.87 was necessary to reject the null hypothesis. The obtained F value was 1.65. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

TABLE 8.--Analysis of Variance in Shuttle Run Test Item (Male Groups)

Group	Variance	df	F
Low SES	.4096	59	1.653 ^a
Upper SES	.2500	63	

^aSignificant at the .02 level.

Female groups

To compare the mean scores of the low and upper socioeconomic groups of female subjects for the shuttle run test

item, the t test for independent samples was used. Table 9 presents the groups, the means, difference between the means, standard deviation, and the t value.

TABLE 9.--Comparison of Shuttle Run Means of Low Socioeconomic and Upper Socioeconomic Female Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	12.20	0.58	0.942	4.263 ^a
Upper SES	11.62		0.631	

^aSignificant at the .01 level.

The mean scores for the shuttle run test item were 12.20 seconds (low socioeconomic group) and 11.62 seconds (upper socioeconomic group). The difference of .58 was significant at the .01 level of confidence.

With 138 degrees of freedom, a t value greater than 2.61 was required to reject the null hypothesis. The obtained t value was 4.263. Therefore, the null hypothesis that the means of the two groups were equal was rejected.

Table 10 shows the variances, the degrees of freedom, and the F value obtained for the shuttle run test item using female subjects. The assumption of homogeneity of variance was tested, using the F statistic. The null hypothesis that the variances of the two groups were equal was tested. The variance of the low socioeconomic group was .884, while the variance of the upper socioeconomic group was .397. With 65 and 73 degrees of freedom, an F value greater than 1.82 was

necessary to reject the null hypothesis. The obtained F value was 2.226. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was rejected. The difference observed between the variances, however, should not drastically affect the difference found between the means in this test item.

TABLE 10.--Analysis of Variance in Shuttle Run Test Item
(Female Groups)

Group	Variance	df	F
Low SES	.884	65	2.226 ^a
Upper SES	.397	73	

^aSignificant at the .02 level.

Analysis of Scores in 50-Yard Dash Test Item

Male groups

To compare the mean scores of the low and upper socioeconomic groups of male subjects for the 50-yard dash test item, the t test for independent samples was used. Table 11 presents the groups, the means, difference between the means, standard deviation, and the t value.

The mean scores for the 50-yard dash test item were 8.37 seconds (low socioeconomic group) and 8.34 seconds (upper socioeconomic group). The difference of .03 was not significant at the .05 level of confidence.

TABLE 11.--Comparison of 50-Yard Dash Means of Low Socioeconomic and Upper Socioeconomic Male Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	8.368	0.31	0.490	0.316
Upper SES	8.337		0.584	

With 122 degrees of freedom, a t value greater than 1.97 was necessary to reject the null hypothesis. The obtained t value was 0.31. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

Female groups

To compare the mean scores of the low and upper socioeconomic groups of female subjects for the 50-yard dash test item, the t test for independent samples was used. Table 12 presents the groups, the means, difference between the means, standard deviation, and the t value.

TABLE 12.--Comparison of 50-Yard Dash Means of Low Socioeconomic and Upper Socioeconomic Female Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	8.73	0.01	0.493	0.139
Upper SES	8.72		0.591	

The mean scores for the 50-yard dash test item were 8.73 seconds (low socioeconomic group) and 8.72 seconds

(upper socioeconomic group). The difference of .01 was not significant.

With 138 degrees of freedom, a t value greater than 1.97 was necessary to reject the null hypothesis. The obtained t value was 0.139. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

Analysis of Scores in Standing Broad Jump Test Item

Male groups

To compare the mean scores of the low and upper socioeconomic groups of male subjects for the standing broad jump test item, the t test for independent samples was used. Table 13 presents the groups, the means, difference between the means, standard deviation, and the t value.

TABLE 13.--Comparison of Standing Broad Jump Means of Low Socioeconomic and Upper Socioeconomic Male Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	140.8	12.5	15.36	4.026 ^a
Upper SES	153.3		18.81	

^aSignificant at the .01 level.

The mean scores for the standing broad jump test item were 140.8 centimeters (low socioeconomic group) and 153.3 centimeters (upper socioeconomic group). The difference of

12.5 centimeters was significant at the .01 level of confidence.

With 122 degrees of freedom, a t value greater than 2.61 was necessary to reject the null hypothesis. The obtained t value was 4.026. Therefore, the null hypothesis that the means of the two groups were equal was rejected.

Table 14 shows the variances, the degrees of freedom, and the F value obtained for the standing broad jump test item using male subjects. The assumption of homogeneity of variance was tested, using the F statistic. The null hypothesis that the variances of the two groups were equal was tested. The variance of the low socioeconomic group was 235.930, while the variance of the upper socioeconomic group was 353.816. With 59 and 63 degrees of freedom, an F value greater than 1.87 was necessary to reject the null hypothesis. The obtained F value was 1.499. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

TABLE 14.--Analysis of Variance in Standing Broad Jump Test Item (Male Groups)

Group	Variance	df	F
Low SES	235.930	59	1.499 ^a
Upper SES	353.816	63	

^aSignificant at the .02 level.

Female groups

To compare the mean scores of the low and upper socioeconomic groups of female subjects for the standing broad jump test item, the t test for independent samples was used. Table 15 presents the groups, the means, difference between the means, standard deviation, and the t value.

TABLE 15.--Comparison of Standing Broad Jump Means of Low Socioeconomic and Upper Socioeconomic Female Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	135.5	7.3	17.69	2.403 ^a
Upper SES	142.8		18.35	

^aSignificant at the .05 level.

The mean scores for the standing broad jump test item were 135.5 centimeters (low socioeconomic group) and 142.8 centimeters (upper socioeconomic group). The difference of 7.3 centimeters was significant at the .05 level of confidence.

With 138 degrees of freedom, a t value greater than 1.97 was necessary to reject the null hypothesis. The obtained t value was 2.403. Therefore, the null hypothesis that the means of the two groups were equal was rejected.

Table 16 shows the variances, the degrees of freedom, and the F value obtained for the standing broad jump test item using female subjects. The assumption of homogeneity of

TABLE 16.--Analysis of Variance in Standing Broad Jump Test Item (Female Groups)

Group	Variance	df	F
Low SES	312.98	65	1.076 ^a
Upper SES	336.72	73	

^aSignificant at the .02 level.

variance was tested, using the F statistic. The null hypothesis that the variances of the two groups were equal was tested. The variance of the low socioeconomic group was 312.93, while the variance of the upper socioeconomic group was 336.72. With 65 and 73 degrees of freedom, an F value greater than 1.76 was necessary to reject the null hypothesis. The obtained F value was 1.076. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

Analysis of Scores in Cricketball Throw Test Item

Male groups

To compare the mean scores of the low and upper socioeconomic groups of male subjects for the cricketball throw test item, the t test for independent samples was used. Table 17 presents the groups, the means, difference between the means, standard deviation, and the t value.

The mean scores for the cricketball throw test item were 23.82 meters (low socioeconomic group) and 22.45 meters

(upper socioeconomic group). The difference of .37 was not significant at the .05 level of confidence.

TABLE 17.--Comparison of Cricketball Throw Means of Low Socioeconomic and Upper Socioeconomic Male Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	23.82	0.37	4.36	1.58
Upper SES	22.45		5.30	

With 122 degrees of freedom, a t value greater than 1.97 was necessary to reject the null hypothesis. The obtained t value was 1.58. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

Female groups

To compare the mean scores of the low and upper socioeconomic groups of female subjects for the cricketball throw test item, the t test for independent samples was used. Table 18 presents the groups, the means, difference between the means, standard deviation, and the t value.

The mean scores for the cricketball throw test item were 15.87 meters (low socioeconomic group) and 18.82 meters (upper socioeconomic group). The difference of 2.95 meters was significant at the .01 level of confidence.

With 138 degrees of freedom, a t value greater than 2.61 was necessary to reject the null hypothesis. The

obtained t value was 3.385. Therefore, the null hypothesis that the means of the two groups were equal was rejected.

TABLE 18.--Comparison of Cricketball Throw Means of Low Socioeconomic and Upper Socioeconomic Female Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	15.87	2.95	3.795	3.385 ^a
Upper SES	18.82		3.363	

^aSignificant at the .01 level.

Table 19 shows the variances, the degrees of freedom, and the F value obtained for the cricketball throw test item using female subjects. The assumption of homogeneity of variance was tested, using the F statistic. The null hypothesis that the variances of the two groups were equal was tested. The variance of the low socioeconomic group was 14.402, while the variance of the upper socioeconomic group was 11.309. With 65 and 73 degrees of freedom, an F value greater than 1.82 was necessary to reject the null hypothesis.

TABLE 19.--Analysis of Variance in Cricketball Throw Test Item (Female Groups)

Group	Variance	df	F
Low SES	14.402	65	1.273 ^a
Upper SES	11.309	73	

^aSignificant at the .02 level.

The obtained F value was 1.273. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

Analysis of Scores in 600-Yard Run-Walk Test Item

Male groups

To compare the mean scores of the low and upper socioeconomic groups of male subjects for the 600-yard run-walk test item, the t test for independent samples was used. Table 20 presents the groups, the means, difference between the means, standard deviation, and the t value.

TABLE 20.--Comparison of 600-Yard Run-Walk Means of Low Socioeconomic and Upper Socioeconomic Male Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	147.9	11.4	11.56	4.674 ^a
Upper SES	159.3		15.18	

^aSignificant at the .01 level.

The mean scores for the 600-yard run-walk test item were 147.9 seconds (low socioeconomic group) and 159.3 seconds (upper socioeconomic group). The difference of 11.4 seconds was significant at the .01 level of confidence.

With 122 degrees of freedom, a t value greater than 2.61 was necessary to reject the null hypothesis. The obtained t value was 4.674. Therefore, the null hypothesis

that the means of the two groups were equal was rejected.

Table 21 shows the variances, the degrees of freedom, and the F value obtained for the 600-yard run-walk test item using male subjects. The assumption of homogeneity of variance was tested, using the F statistic. The null hypothesis that the variances of the two groups were equal was tested. The variance of the low socioeconomic group was 133.633, while the variance of the upper socioeconomic group was 230.432. With 59 and 63 degrees of freedom, an F value greater than 1.76 was necessary to reject the null hypothesis. The obtained F value was 1.72. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was tenable.

TABLE 21.--Analysis of Variance in 600-Yard Run-Walk Test Item (Male Groups)

Group	Variance	df	F
Low SES	133.633	59	1.72
Upper SES	230.432	63	

Female groups

To compare the mean scores of the low and upper socioeconomic groups of female subjects for the 600-yard run-walk test item, the t test for independent samples was used. Table 22 presents the groups, the means, difference between the means, standard deviation, and the t value.

TABLE 22.--Comparison of 600-Yard Run-Walk Means of Low Socioeconomic and Upper Socioeconomic Female Nigerian Children

Group	\bar{X}	Difference	SD	t
Low SES	158.1	23.9	13.56	7.879 ^a
Upper SES	182.0		21.11	

^aSignificant at the .01 level.

The mean scores for the 600-yard run-walk test item were 158.1 seconds (low socioeconomic group) and 182.0 seconds (upper socioeconomic group). The difference of 23.9 seconds was significant at the .01 level of confidence.

With 138 degrees of freedom, a t value greater than 2.61 was necessary to reject the null hypothesis. The obtained t value was 7.879. Therefore, the null hypothesis that the means of the two groups were equal was rejected.

Table 23 shows the variances, the degrees of freedom, and the F value obtained for the 600-yard run-walk test item using female subjects. The assumption of homogeneity of

TABLE 23.--Analysis of Variance in 600-Yard Run-Walk Test Item (Female Groups)

Group	Variance	df	F
Low SES	183.873	65	2.423 ^a
Upper SES	445.632	73	

^aSignificant at the .02 level.

variance was tested, using the F statistic. The null hypothesis that the variances of the two groups were equal was tested. The variance for the low socioeconomic group was 183.873, while the variance of the upper socioeconomic group was 445.632. With 65 and 73 degrees of freedom, an F value greater than 1.76 was necessary to reject the null hypothesis. The obtained F value was 2.423. Therefore, the null hypothesis that there was no significant difference between the means of the two groups was rejected. The difference observed between the variances, however, should not drastically affect the difference found between the means in this test item.

Summary

Summaries of the results are presented in Tables 24 and 25. For the males, significant differences existed between the means of the two socioeconomic groups (low and upper) in the following test items: (1) shuttle run, (2) standing broad jump, and (3) 600-yard run-walk (see Table 24).

For the females, the differences occurred in (1) shuttle run, (2) standing broad jump, (3) cricketball throw, and (4) 600-yard run-walk (see Table 25).

TABLE 24.--Summary of Analyses of Data in all Seven Test Items (Male Groups)

Test Item	Low SES		Upper SES		Mean Difference	\bar{t}
	\bar{X}	SD	\bar{X}	SD		
Pull-ups	1.28	1.668	1.77	1.779	0.49	1.555
Sit-ups	36.62	24.770	33.23	15.000	3.39	2.857 ^a
Shuttle run	11.57	0.643	11.27	0.500	0.30	0.926
50-yard dash	8.37	0.490	8.34	0.584	0.03	0.316
Standing broad jump	140.80	15.360	153.30	18.81	12.50	4.026 ^a
Cricketball throw	23.82	4.356	22.45	5.296	1.37	1.576
600-yard run-walk	147.90	11.560	159.30	15.180	11.40	4.674 ^a

^aSignificant at the .01 level.

TABLE 25.--Summary of Analyses of Data in all Seven Test Items (Female Groups)

Test Item	Low SES		Upper SES		Mean Difference	<u>t</u>
	\bar{X}	SD	\bar{X}	SD		
Flexed arm hang	6.67	7.121	6.13	6.668	0.54	0.464
Sit-ups	25.64	13.980	28.28	13.090	2.64	1.157
Shuttle run	12.20	0.942	11.62	0.631	0.58	4.263 ^a
50-yard dash	8.73	0.493	8.72	0.591	0.01	0.139
Standing broad jump	135.50	17.690	142.80	18.350	7.30	2.403 ^b
Cricketball throw	15.87	3.795	18.82	3.363	2.95	3.385 ^a
600-yard run-walk	158.10	13.560	182.00	21.110	23.90	7.879 ^a

^aSignificant at the .01 level. ^bSignificant at the .05 level.

CHAPTER V

DISCUSSION OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER RESEARCH

In this chapter, the study is discussed in three sections: (1) findings, (2) conclusions, and (3) recommendations for further research.

Discussion of Findings

The results of this study were so varied that no conclusion was reached as to which group was superior to the other in physical fitness. It is important to note, however, that there were significant differences between the two socioeconomic groups in some of the test items, and that the upper socioeconomic males and females did much better in most of these items than did the low socioeconomic males and females. The low socioeconomic status group did much better than the upper socioeconomic status group in the 600-yard run-walk. This was the only test item where the low socioeconomic group, male and female, superseded the upper socioeconomic group. This result supported the general assumption that children of the upper socioeconomic status have lower cardiovascular endurance compared with the children of low socioeconomic status. It is not, however, the intention of the investigator to find reasons for the differences in the

physical fitness of the two socioeconomic groups.

The children of the upper socioeconomic status had significantly higher mean scores in the standing broad jump. This indicated that this group had better leg explosive strength. This finding supported that of Ponthieux and Barker.¹ The results also showed that the girls of upper socioeconomic status were better at the shuttle run, where the Ponthieux and Barker study found no significant difference.

Significant differences were also found in the boys' shuttle run and standing broad jump. The results favored the upper socioeconomic boys.

There were no significant differences observed in all the other test items: pull-ups, sit-ups, 50-yard dash, and cricketball throw for the boys.

For the girls, no significant differences were observed in the flexed arm hang, sit-ups, and 50-yard dash. This meant that the low socioeconomic children and the upper socioeconomic children were equally fit in the aspects of physical fitness tested by these test items. They were equally similar in arm and shoulder strength, abdominal strength, and throwing, except where the upper socioeconomic girls were better at throwing. The idea that the children

¹Ponthieux, N. A., and Barker, D. G., "Relationship Between Socio-economic Status and Physical Fitness Measures." Research Quarterly, XXXVI (December 1965), 464-7.

of a lower socioeconomic status are stronger because they are brought up in a tougher environment was thus refuted. The superiority of the upper socioeconomic status over the low socioeconomic status was probably the effect of better living conditions.

Conclusions

The conclusions reached were based on the findings of this study, and are stated below:

1. There was no significant difference between the low socioeconomic group and the upper socioeconomic group in pull-ups for boys. No significant difference was observed in the flexed arm hang for girls.
2. There were no significant differences in the sit-ups for both boys and girls.
3. A significant difference was found in the shuttle run for both boys and girls.
4. Statistical analysis of the data in the 50-yard dash showed minimal differences. The mean scores were nearly identical.
5. There was a significant difference between the two socioeconomic groups in the standing broad jump for both boys and girls.
6. In the cricketball throw, the mean score of the upper socioeconomic girls was significantly higher than that of the low socioeconomic girls. There was no significant difference, however, between the two groups of boys.
7. Both boys and girls of low socioeconomic status had much higher mean scores in the 600-yard run-walk than the boys and girls of upper socioeconomic status.

The above conclusions indicate that the boys of upper

socioeconomic status were more agile, and had better leg explosive strength than the low socioeconomic boys. There was no difference between the two groups in abdominal strength, arm and shoulder strength, speed, and coordination. The low socioeconomic boys had better cardio-respiratory endurance than the upper socioeconomic boys.

For the female groups, the low socioeconomic girls also had better cardio-respiratory endurance. However, the upper socioeconomic girls were better coordinated, more agile, and had better leg explosive strength. Arm and shoulder strength, abdominal strength, and speed were not significantly different between the two groups. A greater number of differences were observed between the female groups than between the male groups.

Recommendations for Further Research

As was stated in the summary of the review of literature, there are relatively few studies related to the physical fitness of socioeconomic groups. There is need, therefore, to have further research in this area.

In this study, socioeconomic status was based only on the income of the parents. This did not make it possible to obtain the correlations between physical fitness and various socioeconomic variables such as education and dwelling areas. The investigator, therefore, recommends the establishment of a more refined tool for measuring socioeconomic

status, such as the classification index. Research similar to the present study could be carried out with such refined measures of socioeconomic status.

Future study in this field could include tests of postural fitness and anthropometric measures.

It would also be necessary to find the causes for the differences in the various components of physical fitness so that these could be eliminated. Physical fitness is very important to the child. Further research should be done to the extent of ascertaining the physical fitness of Nigerian youths and establishing national fitness norms, as has been done in the United States of America.

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APPENDIX A

SAMPLE OF SALARY STRUCTURE IN NIGERIA
1976

SAMPLE OF SALARY STRUCTURE IN NIGERIA: 1976

<u>Post</u>	<u>Approved New Scale</u>
Professor	Grade level 16:
Librarian	N11,268 x N576
Registrar	up to N12,420
Burriar	
Chief Engineer	Grade level 15:
Director, University Health Services/Chief Medical Officer	N9,996 x N516
Director, Computing Centre	up to N11,028
Senior Deputy Registrar	
Reader	Grade level 14:
Deputy Librarian	N8,868 x N320
Deputy Registrar	up to N9,828
Deputy Director, Computing Centre	
Senior Lecturer	Grade level 13:
Senior Research Fellow	N7,764 x N320
Principal Assistant Registrar	up to N8,724
Senior Sub-Librarian	Grade level 12:
Senior Editor	N7,104 x N216
Senior Assistant Registrar	up to N7,752
Principal Pharmacist	
Senior Accountant	
Lecturer Grade I	Grade level 11:
Research Fellow Grade I	N6,444 x N180
	up to N6,984
Lecturer Grade II	Grade level 10:
Research Fellow Grade II	N5,460 x N162
Sub-Librarian Grade I	up to N6,432
Assistant Registrar	
Accountant Grade I	
Principal Executive Officer	
Assistant Lecturer	Grade level 09:
Junior Research Fellow	N4,368 x N162
Sub-Librarian Grade II	up to N5,340
Administrative Officer I	

<u>Post</u>	<u>Approved New Scale</u>
Teaching Assistant Graduate Assistant Research Assistant Assistant Librarian Administrative Officer II	Grade level 08: N3,264 x N150 up to N4,164
Chief Technical Assistant Workshop Supervisor Nursing Sister Assistant Catering Officer	Grade level 07: N2,496 x N120 up to N3,216
Assistant Executive Officer Chief Clerical Officer Secretary Grade II Assistant Technician/Technologist	Grade level 06: N1,908 x N96 up to N2,388
Senior Clerical Officer Stenographer Chief Typist Senior Laboratory Assistant/ Senior Field Staff Head Zookeeper	Grade level 05: N1,440 x N72 up to N1,800
Key punch Operator Laboratory Assistant/Field Staff Library Assistant Chief Groundsman	Grade level 04: N1,164 x N52 up to N1,416
Artisan III (Painters, Masons, Carpenters, Plumbers, Sign- writers) Cook/Steward/Baker Grade I	Grade level 03: N900 x N36 up to N1,140
Cook/Steward/Baker Grade II Caretaker Dairy Attendant Stores Attendant	Grade level 02: N804 x N30 up to N984
Cleaner Kitchen Attendant Laborer Watchman	Grade level 01: N720 x N24 up to N870

APPENDIX B

PRIVATE AND FREE PRIMARY SCHOOLS
IN NIGERIA

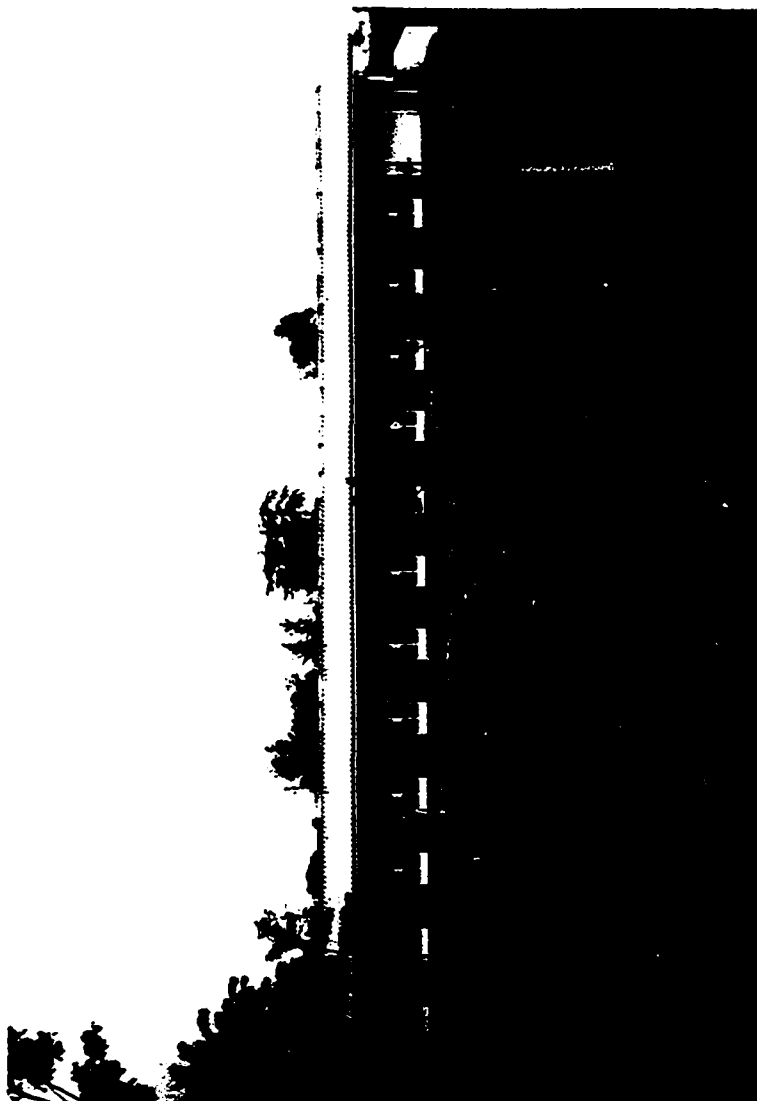


Fig. B1.--A private primary school



Fig. B2.--A free primary school



Fig. B3.--Parents waiting to take children home by car



Fig. B4.--Free primary school children walking home

APPENDIX C

INTRODUCTORY LETTER TO PARENTS

1

Sports Centre
University of Ibadan
9 October 1976

Dear Sir/Madam,

I intend to conduct an investigation into the physical fitness of elementary school children, and it will be greatly appreciated if you would grant permission for your child to be tested.

The battery of tests which will be administered to the children are:

- Pull-ups
- Sit-ups
- Standing broad jump
- 40-yard shuttle run
- 50-yard dash
- Cricketball throw
- 600-yard run-walk

These tests constitute the Youth Fitness Test designed by the American Association for Health, Physical Education, and Recreation (AAHPER) in 1957. These tests have been used in the United States of America and in many other countries, and have been found suitable. The whole test will be spread over four days, utilizing only one class period each day; therefore, normal class work will hardly be interrupted.

This research does not entail the analysis of the individual child's performance, but involves comparison of the physical fitness level of groups of children.

Please fill and return the attached form through your child to school if you approve of your child's participation in the test.

The results of my findings will be made available to the school. Thank you for your cooperation.

Yours faithfully,

Adeline O. Oseni
University Coach

APPENDIX D

QUESTIONNAIRE TO FACILITATE GROUPING OF CHILDREN

(1) Name of child _____

(2) Date of birth _____

(3) Father's occupation _____

(4) Father's official status (e.g., Senior
Lecturer, Executive Officer, Head Messenger)

(5) My child is permitted to participate in the
test.

Father's/Mother's Signature

APPENDIX E

AMERICAN ASSOCIATION FOR HEALTH, PHYSICAL
EDUCATION, AND RECREATION (AAHPER)
YOUTH FITNESS TEST

THE AMERICAN ASSOCIATION FOR HEALTH, PHYSICAL
EDUCATION, AND RECREATION (AAHPER) YOUTH
FITNESS TEST¹

Pull-up (boys)

Equipment. A metal or wooden bar approximately 1-1/2 inches in diameter is preferred. A doorway gym bar can be used and, if no regular equipment is available, a piece of pipe or even the rungs of a ladder can serve the purpose.

Description. The bar should be high enough so that the pupil can hang with his arms and legs fully extended and his feet free of the floor. Use the overhand grasp (palms away from face). After assuming the hanging position, the pupil raises his body by his arms until his chin can be placed over the bar and then lowers his body to a full hang as in the starting position. The exercise is repeated as many times as possible.

Rules. (1) Allow one trial unless it is obvious that the pupil had not had a fair chance.

(2) The body must not swing during the execution of the movement. The pull must in no way be a snap movement. If the pupil starts swinging, check this by holding your

¹Hunsicker, Paul A., and Reiff, Guy G., "A Survey and Comparison of Youth Fitness, 1958-1965." Cooperative research project, No. 2418, University of Michigan, Ann Arbor, Michigan, 1965.

extended arm across the front of the thighs.

(3) The knees must not be raised and kicking of the legs is not permitted.

Scoring. Record the number of completed pull-ups to the nearest whole number.

Flexed arm hang (girls)

Equipment. A horizontal bar approximately 1-1/2 inches in diameter is preferred. A doorway gym bar can be used and, if no regular equipment is available, a piece of pipe can also serve the purpose. A stop watch is needed.

Description. Adjust the height of the bar so it is approximately equal to the subject's standing height. Use an overhand grasp (palms away from face). With the assistance of two spotters, one in front and one in back of subject, the subject raises her body off the floor to a position where the chin is above the bar, the elbows are flexed, and the chest is close to the bar. The subject holds this position against a time criterion as long as possible.

Rules. (1) The stop watch is started as soon as the subject takes the starting position.

(2) The watch is stopped when: (a) subject's chin touches the bar, (b) subject's head tilts backwards to keep chin above the bar, (c) subject's chin falls below the level of the bar.

Scoring. Record in seconds to the nearest second the

length of time the subject holds the starting position.

Sit-up (boys and girls)

Equipment. Mat or floor.

Description. The pupil lies on his back, either on the floor or on a mat, with legs extended and feet about 2 feet apart. His hands are placed on the back of the neck with the fingers interlaced. Elbows are retracted. A partner holds the ankles down, the heels being in contact with the mat or floor at all times.

The pupil sits up, turning the trunk to the left and touching the right elbow to the left knee, returns to starting position, then sits up turning the trunk to the right and touching the left elbow to the right knee. The exercise is repeated, alternating sides.

Rules. (1) The fingers must remain in contact behind the neck throughout the exercise.

(2) The knees must be on the floor during the sit-up, but may be slightly bent when touching elbow to knee.

(3) The back should be rounded and the head and elbows brought forward when sitting up as a "curl" up.

(4) When returning to starting position, elbows must be flat on the mat before sitting up again.

Scoring. One point is given for each complete movement of touching elbow to knee. No score should be counted if the fingertips do not maintain contact behind the head, if

knees are bent when the pupil lies on his back or when he begins to sit up, or if the pupil pushes up off the floor from an elbow. The maximum limit in terms of number of sit-ups shall be: 50 sit-ups for girls, 100 sit-ups for boys.

Shuttle run (boys and girls)

Equipment. Two blocks of wood, 2 in. x 2 in. x 4 in., and stop watch. Pupils should wear sneakers or run barefooted.

Description. Two parallel lines are marked on the floor 30 feet apart. The width of a regulation volleyball court serves as a suitable area. Place the blocks of wood behind one of the lines. The pupil starts from behind the other line. On the signal "Ready? Go!" the pupil runs to the blocks, picks one up, runs back to the starting line, and places the block behind the line; he then runs back and picks up the second block which he carries back across the starting line. If the scorer has two stopwatches or one with a split-second timer, it is preferable to have two people running at the same time. To eliminate the necessity of returning the blocks after each race, start the races alternately, first from behind one line and then from behind the other.

Rules. Allow two trials with some rest between.

Scoring. Record the better of the two trials to the nearest tenth of a second.

Standing broad jump
(boys and girls)

Equipment. Mat, floor, or outdoor jumping pit, and tape measure.

Description. Pupil stands with the feet several inches apart and the toes just behind the take-off line. Preparatory to jumping, the pupil swings the arms backward and bends the knees. The jump is accomplished by simultaneously extending the knees and swinging forward the arms.

Rules. (1) Allow three trials.

(2) Measure from the take-off line to the heel or other part of the body that touches the floor nearest to the take-off line.

(3) When the test is given indoors, it is convenient to tape the tape measure to the floor at right angles to the take-off line and have the pupils jump along the tape. The scorer stands to the side and observes the mark to the nearest inch.

Scoring. Record the best of the three trials in feet and inches to the nearest inch.

50-yard dash (boys and girls)

Equipment. Two stopwatches or one with a split-second timer.

Description. It is preferable to administer this test to two pupils at a time. Have both take positions behind

the starting line. The starter will use the commands "Are you ready?" and "Go!" The latter will be accompanied by a downward sweep of the starter's arm to give the timer a visual signal.

Rules. The score is the amount of time between the starter's signal and the instant the pupil crosses the finish line.

Scoring. Record in seconds to the nearest tenth of a second.

Softball throw for distance
(boys and girls)

Equipment. Softball (12-inch), small metal or wooden stakes, and tape measure.

Description. A football field marked in conventional fashion (5-yard intervals) makes an ideal area for this test. If this is not available, it is suggested that lines be drawn parallel to the restraining line, 5 yards apart. The pupil throws the ball while remaining within two parallel lines, 6 feet apart. Mark the point of landing with one of the small stakes. If his second or third throw is farther, move the stake accordingly so that, after three throws, the stake is at the point of the pupil's best throw. It was found expedient to have the pupil jog out to his stake and stand there; and then, after five pupils have completed their throws, the measurements were taken. By having the pupil at

his particular stake, there is little danger of recording the wrong score.

Rules. (1) Only an overhand throw may be used.

(2) Three throws are allowed.

(3) The distance recorded is the distance from the point of landing to the nearest point on the restraining line.

Scoring. Record the best of the three trials to the nearest foot.

600-yard run-walk
(boys and girls)

Equipment. Track or area marked off for 600 yards, and a stop watch.

Description. Pupil uses a standing start. At the signal "Ready? Go!" the subject starts running the 600-yard distance. The running may be interspersed with walking if the subject tires. It is possible to have a dozen subjects run at one time by having the pupils pair off before the start of the event. Then each pupil listens for and remembers his partner's time as the latter crosses the finish. The timer merely calls out the times as the pupils cross the finish.

Rules. Walking is permitted, but the object is to cover the distance in the shortest time possible.

Scoring. Record in minutes and seconds.

APPENDIX F

TEST ITEM SCORE SHEET

SCORE SHEET

NAME OF SCHOOL _____ TYPE _____ SEX OF CHILDREN _____

Name of Subject	Pull-Up	Sit-Up	Shuttle Run	Standing Broad Jump	50-Yard Dash	Cricketball Throw	600-Yard Run-Walk
	Scores in Numbers	Scores in Numbers	Scores in Seconds	Scores in Centimeters	Scores in Seconds	Scores in Meters	Scores in Seconds