COMPARISON OF THE PERFORMANCE OF CERTAIN FUNDAMENTAL MOTOR SKILLS BETWEEN AMERICAN NEGRO AND WHITE JUNIOR HIGH SCHOOL GIRLS

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by

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TABLE OF CONTENTS

CHAPTER PAGE

CHAPTER PAGE

LIST OF TABLES

CHAPTER I

THE PROBLEM, DEFINITIONS OF TERMS USED, LIMITATIONS, AND PROCEDURE

Observations of the Negro and white girls in physical education classes at Horace Mann Junior High School have seemed to indicate the Negro girls were able to surpass white girls in some basic skills. Previous studies have been concerned with racial differences affecting the athletic performance of male subjects; related studies of the racial differences affecting the athletic performance of female subjects were not found. This study was conducted to determine whether or not Negro girls surpassed white girls in the performance of certain fundamental motor skills at the junior high school level.

I. THE PROBLEM

Statement of the problem. The purpose of this study was to determine whether or not Negro girls surpass white girls in the performance of certain fundamental motor skills at the junior high school level.

Among the questions to be answered were the following: Do Negro girls run faster than white girls for short distances? Do Negro girls jump farther than white girls? Do

Negro girls run faster than white girls for long distances? Do Negro girls throw farther than white girls?

Hypotheses. The major hypothesis for this study was that at the junior high school level, Negro girls do not surpass white girls in the performance of certain fundamental motor skills.

Minor hypotheses were as follows: In junior high school, Negro girls run no faster than white girls for short or long distances. Negro girls do not throw farther than white girls. Negro girls do not jump farther than white girls.

II. DEFINITIONS OF TERMS USED

Junior high school. Junior high school girls are those girls enrolled in the seventh, eighth, and ninth grades.

Fundamental motor skills. Fundamental motor skills are those skills or abilities which are basic to performance in various sports.

Track events. Track events are those events which primarily involve running.

Field events. Field events are those events which have to do with throwing and jumping.

III. LIMITATIONS

Track and field events include running, jumping, and throwing. There are many events included in the track and field program for girls. The track events selected for use in this study were the fifty-yard dash and the 600-yard run-walk. The field events selected were the standing broad jump, the running broad jump, and the softball throw for distance.

Catching, climbing, and kicking are also considered as fundamental skills. These skills are not included in the track and field program; therefore, these skills were not considered in this study.

No attempt was made to determine any physiological or psychological factors which may have influenced the performance of the subjects.

IV. PROCEDURE

Subjects. The subjects for this study were selected at random from the girls' physical education classes at Horace Mann Junior High School, Wichita, Kansas.

The girls were grouped according to race and grade level. There were two groups for each grade; each group consisted of twenty-five Negro girls and twenty-five white girls. One hundred fifty girls were used in the study.

Method of procedure. The experimental method was used to conduct the study. The same tests were given to each group.

Two trials were allowed for the fifty-yard dash with ample time for rest allowed between trials. The scores were reported to the nearest tenth of a second. The better of the two scores was recorded for the study.

Two trials were allowed for the 600-yard run-walk. The two trials were not administered on the same day. The better of the two scores was recorded to the nearest second.

Three trials were allowed for the standing broad jump. The trials were consecutive, and the best score was recorded to the nearest inch./

Three trials were allowed for the softball throw for distance. The throws were consecutive; the best score was recorded to the nearest foot.

Three trials were allowed for the running broad jump. One trial was given in turn to each girl in class, then the order was repeated for the second and third trials.

Statistical procedure. The mean scores and standard deviations of each test were found for each group of subjects. Each Negro group was then compared with the white group of the same grade level on each test given. The mean difference and the standard error of mean difference were found for each

grade group on each test. The t test was administered to determine whether or not the differences obtained were of statistical significance.

CHAPTER II

REVIEW OF THE LITERATURE

The significant differences between the athletic abilities of boys and girls up to age twelve are few. Todd reports that elementary school children of both sexes are nearly equal in strength, speed, reaction time, and gross and fine coordination.[1] The picture changes at the junior high school level.

The junior high school age child. At the junior high school level, many individual differences may be apparent. No two individuals are alike at this age. Within the same individual, the rates of maturing in height, weight, skeletal age, and mental and motor abilities are not the same. Even the physical abilities of the child do not mature together. "The junior high school ages include periods of greatest inter-individual variability," states Espenschade.[2]

Age, height, and weight are known to affect the performance of physical skills. Cearley studied the contributions

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[1]Frances Todd, "Is the Sports Program Designed to Meet the Needs of Girls?" The Bulletin of the National Association of Secondary-School Principals, 44:134, May, 1960.

[2]Anna Espenschade, "The Junior High School Student and Research," Journal of Health, Physical Education, and Recreation, 30:22, February, 1959.

of age, height, and weight in the prediction of athletic ability. He concluded that, for girls, age made the greatest contribution at 13.5 years, height made the greatest contribution at 51 inches, and weight made the greatest contribution at 55 pounds.[3] This supported the study of Johnson, Brouha, and Gallagher. They found that a girl's athletic ability reaches a maximum at the age of thirteen or fourteen years.[4]

Gross and Casciani studied the value of age, height, and weight as classification factors for the AAHPER Youth Fitness Tests. Their findings do not pertain to the area of sports participation. The findings for junior high school girls were as follows:

> The highest r between age, height, or weight and any of the seven fitness tests was .19 between age and softball throw. The highest r was .40 between height and weight. The highest R was .24 between the combination of factors of age, height, and weight, and the standing broad jump. Since the highest R was only .24 and the lowest of the seven R's was .14, the factors of age, height, and weight have negligible value for classification purposes in the seven youth fitness tests; i. e., this group may be considered homogeneous.[5]

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[3]Jess E. Cearley, "Linearity of Contributions of Ages, Heights, and Weights to Prediction of Track and Field Performance," Research Quarterly, 28:220-221, October, 1957.

[4]R. E. Johnson, L. Brouha, and J. R. Gallagher, "Evaluation of Physical Fitness by the Step Test," Yale Journal of Biology and Medicine, 15:781, 1943, cited by Laurence Morehouse and Augustus Miller, Physiology of Exercise (St. Louis: The C. V. Mosby Company, 1959), p. 274.

[5]Elmer A. Gross and Jerome A. Casciani, "The Value of Age, Height, and Weight as a Classification Device for Secondary School Students in the Seven AAHPER Youth Fitness Tests," Research Quarterly, 33:54, March, 1962.

Racial differences. Not only do individual differences occur, but there are also racial differences. Some of these differences may possibly affect athletic performance. Espenschade studied racial differences of fourth grade children taking the Kraus-Weber test. It was found that ". . . more Negro boys and both Negro and white girls pass the K-W test than do white boys."[6]

Hutinger studied the differences in speed between Negro and white children at the fourth, fifth, and sixth grade levels. He found that, for the 35-yard dash, Negro boys were faster at the fourth and fifth grade levels. The Negro girls had faster times at all three grade levels.[7]

Himebaugh found that Negro boys were superior to white boys in events of speed and strength at ages twelve, thirteen, fourteen, and fifteen.[8]

Racial differences, using the anthropometric measurements of Negro and white male college students, were studied

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[6]Anna Espenschade, "Fitness of Fourth Grade Children," Research Quarterly, 29:278, October, 1958.

[7]Paul W. Hutinger, "Differences in Speed Between American Negro and White Children in Performance of the 35-Yard Dash," Research Quarterly, 30:367, October, 1959.

[8]William K. Himebaugh, "A Study of the Differences in Speed and Strength Between Negro and Caucasian Boys Ages Twelve Through Fifteen at Central Junior High School, Wichita, Kansas" (unpublished research problem, Kansas State Teachers College, Emporia, Kansas, 1962), p. 17.

by Metheny. The findings were similar to those of earlier investigators. The racial differences reported by Metheny were as follows:

> The Negro was found to exceed the white in weight, arm length, forearm length, hand length, elbow width, leg length, lower leg length, foot length, and width, knee width, shoulder breadth, chest depth, and width, neck girth, and limb girths, all relative to stature; while the white exceeded the Negro in sitting height, total fat, hip width, and ilium width.[9]

Racial differences related to athletic performance. Metheny related the anthropometric differences between the Negro and the white male college student to athletic ability. In part, these relationships were listed as follows:

> The Negro has a longer forearm and hand than does the white. This would be advantageous in throwing events. Provided he has the muscular strength to move it, this longer lever can develop greater velocity at the end than can a shorter lever . . . . In jumping, the longer, heavier arm can develop momentum, and this momentum when transmitted to the body as a whole, should increase the height of the jump.
>
> The Negro has a longer leg, of which the upper segment is shorter and the lower proportionately longer. The longer total leg obviously permits a longer stride in running, while the shorter upper leg produces less reaction in the hip in the forward stride. This advantage may be offset by the greater weight of the leg and the bigger foot, which require a greater expenditure of energy

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[9]Eleanor Metheny, "Some Differences in Bodily Proportions Between American Negro and White Male College Students as Related to Athletic Performance," Research Quarterly, 10:50-51, December, 1939.

to move them through space--but again, he has larger muscles to move the greater weight.

In jumping, the longer leg is evidently an advantage, since he is 'split higher up' and so could raise his leg higher. Again applying the principle of the lever, the longer lower leg can develop velocity at the end, and serves also as a longer lever with which to push off the ground, thus increasing the distance over which the force can be applied.

In chest construction, the Negro is definitely handicapped. His chest is shallower, and the slant of the ribs is such that he has a smaller excursion of the chest wall in deep breathing. This, coupled with his markedly lower breathing capacity (15 to 20 per cent less than the white has been reported by several investigators), is a handicap in events of long duration, such as distance running. It is probably of minor importance in the shorter runs.[10]

The following explanation of racial differences related to athletic performance was given by Lewis:

The explanation of the proficiency of Negro athletes, particularly in running and jumping events, has been sought in some characteristic of the anatomy of the lower limbs. The slimness of the legs, the greater length of the legs in proportion to the body length, and the projection of the calcaneous have been suggested . . . . a proportionately longer thigh is conducive to fast running, and a proportionally shorter thigh is better for jumping.[11]

Morehouse and Miller pointed out that Negroes reach a greater blood lactate concentration in maximal work. The slightly lower maximum oxygen consumption causes them to

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[10]Ibid., pp. 51-52.

[11]Julian H. Lewis, The Biology of the Negro (Chicago: The University of Chicago Press, 1942), p. 73.

breathe more rapidly. Greater motivation is indicated by the higher blood lactate.[12]

Structural differences that affect performance. The performance of physical activity is affected by the structure of the joints, the variations in the position of the muscular attachments, as well as by the lengths of the levers. The anatomical structure may be an advantage for strength but a disadvantage for speed. Large joints are strong, but they also limit motion. Morehouse and Miller noted that long distance runners are observed to have flat longitudinal arches, while sprinters have smaller feet and higher arches.[13]

According to Lewis, ". . . the joints of the Negro allow greater freedom of movement, those of whites permit greater stability of posture."[14] This may possibly affect the amount of muscular energy required to move the joint.

Other factors that affect performance. Body shape and structure are not the only factors that cause an individual to perform with a high degree of skill. Metheny mentioned the physiological factors--reaction time and muscle viscosity

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[12]Laurence Morehouse and Augustus Miller, Physiology of Exercise (St. Louis: The C. V. Mosby Company, 1959), p. 282.

[13]Ibid., p. 280.

[14]Lewis, loc. cit.

--and psychological factors which should not be overlooked.[15]

In the performance of certain track events, starting time is an essential characteristic. Reaction time and reflex time are determining factors in starting time. Lautenbach and Tuttle have found that: "There is a high degree of relationship between reflex time and speed in sprinting. The coefficient of correlation is .815."[16] Westerlund and Tuttle found ". . . a high degree of relationship between speed in running 75 yards and reaction time. The coefficient of correlation is .863."[17]

Patellar reflex time was studied by Brown. He found that the Negro had a faster reflex.[18]

Negro performance in the Olympics. The performance of Negroes at the 1952 Olympics was studied by Johl and others. They found that the Negro had special aptitude for the sprints, for hurdling, and for jumping.[19]

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[15]Metheny, op. cit., p. 52.

[16]Ruth Lautenbach and W. W. Tuttle, "The Relationship Between Reflex Time and Running Events in Track," Research Quarterly, 3:142, October, 1932.

[17]J. H. Westerlund and W. W. Tuttle, "The Relationship Between Running Events in Track and Reaction Time," Research Quarterly, 2:100, October, 1931.

[18]R. L. Brown, "A Comparison of the Patellar Tendon Reflex Time of Whites and Negroes," Research Quarterly, 6:126, May, 1935.

[19]E. Johl, et al., "Research on Olympic Athletes," Journal of Health, Physical Education, and Recreation, 27:61, September, 1956.

Summary. The literature tends to indicate that the Negro has an advantage in some athletic events. Studies have shown that the Negro has a special aptitude in these events which involve running for short distances, throwing, and jumping. The literature indicated that this was true, on the average, for adult male subjects. The Negro children studied at the elementary school level were able to run faster than white children for short distances; the throwing and jumping events were not tested.

The relationship of racial differences to the motor performance of junior high school girls was not indicated in the literature.

CHAPTER III

PROCEDURES

I. SUBJECTS

The subjects used for the study were selected from girls' physical education classes at Horace Mann Junior High School, Wichita, Kansas.

Method of selecting the subjects. Each white and Negro enrolled in physical education was assigned a number according to grade level. The numbers of the seventh grade white girls were placed in a basket and mixed thoroughly. A number was drawn, recorded, and replaced in the basket. This procedure was followed until twenty-five different numbers had been recorded. If a recorded number was drawn, it was disregarded and returned to the basket. By using this method the chance of any number being drawn remained constant. The same procedure was followed for the selection of the twenty-five Negro girls from the seventh grade. The white and Negro girls from the eighth and ninth grades were selected in the same manner. A total of seventy-five white and seventy-five Negro girls were used in the study. The total number of subjects used was one hundred fifty girls.

Method of grouping the subjects. The subjects were grouped as the numbers were drawn. Each grade consisted of

two groups, twenty-five white girls and twenty-five Negro girls.

The subjects were not grouped according to height, weight, or age as all tests used with the exception of the running broad jump were a part of the American Association for Health, Physical Education, and Recreation Youth Fitness Tests.[20] According to Gross and Casciani, the factors of age, height, and weight are of little value in classifying students for the Youth Fitness Tests.[21]

Although age was not used in classifying the students, the average age for each grade group of Negro and white girls was computed. At the seventh and eighth grade levels, the average ages for the Negro groups were found to be the same as for the white groups. The average age for each seventh grade group was 160.3 months; the average age for each eighth grade group was 170 months. The ninth grade Negro group had an average age of 180.5 months. The average age for the ninth grade white group was 180 months.

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[20]American Association for Health, Physical Education, and Recreation, Youth Fitness Project, AAHPER Youth Fitness Test Manual (Washington: American Association for Health, Physical Education, and Recreation, 1958), 55 pp.

[21]Gross and Casciani, loc. cit.

II. SELECTION OF TESTS

Running, jumping, and throwing are fundamental skills needed for nearly every sport. The tests selected for use in the study were taken from the track and field program for girls. "Track and field skills include running, jumping, and throwing," states McCloy.[22]

The reliability and objectivity are high for tests involving running, jumping, and throwing according to Larson and Yocom.[23] The 600 yard run-walk was a part of the Youth Fitness Tests and Has been considered a reliable measure of the individual's ability to endure the event by Willgoose, Askew, and Askew.[24]

Description of tests used. The tests used in the study were the standing broad jump, the running broad jump, the softball throw for distance, the fifty yard dash, and the 600 yard run-walk.

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[22]Charles H. McCloy, Tests and Measurements in Health and Physical Education (New York: F. S. Crofts and Co., 1946), p. 103.

[23]Leonard Larson and Rachael Yocom, Measurement and Evaluation in Physical, Health, and Recreation Education (St. Louis: The C. V. Mosby Company, 1951), p. 191.

[24]Carl E. Willgoose, Nathaniel Askew, and Mildred Askew, "Reliability of the 600-Yard Run-Walk Test at the Junior High School Level," Research Quarterly, 32:265, May, 1961.

The standing broad jump involved leg strength, muscular power, and coordination of arms and legs. The subject stood on the take-off board with the feet slightly apart. The toes could be curled over the edge of the board so long as they did not touch the ground in front of the board.

The running broad jump involved leg strength, muscular power, and coordination of arms and legs. The subject stood an undetermined distance from the take-off board as the approach was unlimited. The subject ran to the take-off board and jumped by pushing off the take-off board with one foot. No part of the foot was allowed to touch the ground in front of the take-off board in the process of jumping.

The softball throw for distance involved arm strength and coordination. The subject stood behind the starting line. The ball was thrown with an overhand throw as far as possible onto the field. The throw could be made from a stand or run so long as the subject did not step over the starting line in the process of throwing.

The fifty yard dash involved speed and reaction time. The student took her position behind the starting line. With the starter's command "Go!", the student ran as fast as she could to the finish line.

The 600 yard run-walk involved endurance. The subject took a position behind the starting line. On the signal,

"Go!", the subject started running. If the performer became tired, she was allowed to walk. The object was to cover the distance as quickly as possible.

III. ADMINISTRATION OF TESTS

The subjects were informed that they were a part of an experiment. They were not told that the Negro girls were being compared with the white girls; instead, they were urged to make better scores than the girls from the other grades. All subjects were encouraged to do their best on all of the tests.

All testing was done during the subjects' regular physical education classes. The ninth grade girls had more practice than the others as they had physical education class five days a week. The seventh and eighth grade students had only three days of physical education each week. The students were allowed to practice all events included in the track and field unit; this included the items used for testing in this study.

The subjects took the tests with their grade group. When a physical education class consisted of all three grades, the testing was done with one grade at a time. The others involved in the experiment participated in regular class activity until their turn to be tested. When a given group had completed the tests to be given during that period, that

group returned to the regular class. The method used enabled the subjects to keep up with the rest of the class without taking too much time out for testing.

The standing broad jump. The standing broad jump test was administered out-of-doors in a regular jumping pit. An elevated take-off board was used so that the performer could curl her toes over the edge of the board if she so desired. All subjects were allowed three trials in succession. The distance of the jump was measured from the nearest break in the sand to the front edge of the take-off board. Touching the sand in front of the board or lifting either foot from the board before jumping constituted a foul and counted as a trial. The distance of each jump was measured, recorded, and the sand in the pit raked before the next jump was allowed. The best of the three trials was recorded to the nearest inch for use in this study.

The running broad jump. The running broad jump test was administered out-of-doors in a jumping pit. A take-off board four feet long and eight inches wide was sunk flush with the ground. An unlimited approach was allowed. The take-off was from one foot. Stepping over the front edge of the board on the jump constituted a foul and counted as a trial. The distance of the jump was measured from the nearest break in the sand to the front edge of the take-off

board. Each jump was measured and recorded and the sand leveled before the succeeding jump was allowed. Three trials were allowed for each subject. Each girl was allowed one trial before the first person in line had attempted her second trial. This procedure was followed for the third trial. The best of the three scores was recorded to the nearest inch for use in the study.

The softball throw for distance. The softball throw for distance was tested out-of-doors on the playground. A starting line ten feet long and two inches wide was marked on one end of the field. Parallel lines were drawn every ten feet for one hundred twenty feet. The subject stood behind the starting line and threw the softball three times, using an overhand throw. Student assistants marked the spot, with a small stake, where each throw landed. The longest throw was measured to the nearest foot, and that number was recorded for the study.

The fifty yard dash. The fifty yard dash was run on a sidewalk that was level and free from cracks. The girls were asked to choose a partner and encouraged to select someone who would give them a good race. The partners were timed simultaneously with two stopwatches.

A student was selected from each class to act as the starter. On both trials, the same student started all

subjects in that class with the signal, "On your mark, Get set, Go!"

Two trials were allowed with ample time for rest between trials. The better of the two scores was recorded to the nearest one-tenth of a second for use in the study.

The 600 yard run-walk. The 600 yard run-walk test was administered out-of-doors on the sidewalk which encompasses the school ground. All subjects in a group meeting at the same time were timed simultaneously. As the event was long, the finish was so widespread that timing several subjects at once was not difficult.

The subjects took a position behind the starting line. On the signal, "Go", the subjects began the test. As each girl crossed the finish line, her time was called aloud. Student assistants were assigned for each subject. It was the duty of the assistant to remember the time given for her subject until all girls completed the event. The time was recorded for each subject when all performers had crossed the finish line. A second trial was administered in the same manner one week later. The better of the two scores was recorded to the nearest second for use in the study.

Equipment used in the study. The equipment necessary to conduct the experiment consisted of two jumping pits, two

take-off boards--one elevated, one flat--a steel tape measure, two stopwatches, three softballs, a rake, and short stakes for marking the distance of the softball throws. A playground area was used for the softball throw; sidewalks were used for testing the running events.

Testing procedures. All phases of the testing program were administered by the experimenter. Instructions, measuring of jumps and throws, timing for running events, and the recording of scores were included. Student assistants aided in the marking of the softball throws, starting of the fifty yard dash, and remembering times made on the 600 yard run-walk.

The testing schedule was as follows:

I. Monday and Tuesday
   A. Standing broad jump
   B. Running broad jump
II. Wednesday and Thursday
   A. Softball throw for distance
   B. Fifty yard dash
III. Friday
   A. 600 yard run-walk

The second week was used to complete any test not completed during the first session. The second trial for the 600 yard run-walk was given on Friday of the second week.

Any girl who was absent or ill during the regular testing session was allowed to take the tests at a later time.

The scores for each subject on all five tests are shown in the Appendix.

IV. SUMMARY

One hundred fifty girls were selected at random from the girls' physical education classes at Horace Mann Junior High School. This group consisted of an equal number of Negro and white girls.

The twenty-five Negro and twenty-five white girls from each grade were given five tests involving running, jumping, and throwing. The testing followed a unit on track and field events.

The subjects were tested in their grade groups. All tests were administered by the experimenter.

Three trials were allowed for the standing broad jump, the running broad jump, and the softball throw for distance. The best of the three scores made on each test was recorded for use in the experiment. Two trials were allowed for the fifty yard dash and the 600 yard run-walk. The better of the two scores on each test was recorded for use in the study.

CHAPTER IV

RESULTS

I. ANALYSIS OF DATA

The scores of the Negro and white girls for each grade level were tabulated to find the mean score and the standard deviation for each group on each test. The mean scores and standard deviations for all groups on all tests are shown in Table I. The Negro groups were able to jump and throw farther than the white groups; consequently, the mean scores for the Negro groups were higher, at all grade levels, than those for the white groups on the tests involving throwing and jumping. The Negro groups had faster times on the running tests; therefore, the mean scores for the Negro groups, at the three grade levels, were lower than those of the white groups on the running tests.

The standard deviation indicated the spread of the scores about the mean. A small standard deviation indicated that the scores were closely grouped around the mean; a large standard deviation indicated that the scores were more widely scattered.

To determine whether the differences between the mean scores of the Negro groups and the white groups were real or due to chance, the standard error of the mean difference was

TABLE I

MEAN SCORES AND STANDARD DEVIATIONS OF THE THREE GRADE GROUPS ON FIVE TRACK AND FIELD TESTS

Test	Grade	Mean		Standard Deviation	
		Negro	White	Negro	White
Standing Broad Jump[a]	7th	76.96	66.48	7.20	6.60
	8th	79.44	72.12	7.79	6.48
	9th	79.68	74.16	9.94	7.98
Running Broad Jump[a]	7th	120.60	102.40	19.80	24.20
	8th	116.60	107.60	28.28	21.09
	9th	131.41	113.20	16.88	24.55
Softball Throw[b]	7th	79.60	59.80	15.50	16.80
	8th	89.60	62.40	19.84	17.46
	9th	92.60	69.00	19.36	18.75
50 Yard Dash[c]	7th	7.75	8.72	.40	.63
	8th	7.70	8.40	.32	.68
	9th	7.66	8.36	.37	.40
600 Yard Run-Walk[c]	7th	158.00	182.00	19.20	22.60
	8th	155.00	171.00	31.33	17.48
	9th	152.00	168.00	24.74	22.25

[a]Measured in inches

[b]Measured in feet

[c]Measured in seconds

computed for each grade level on the five tests.

To determine whether or not the difference was significant, the t-test was administered. The formula suggested by Edwards was used.[25]

The t ratios necessary for significance were 2.68 for the 1 per cent level of confidence and 2.01 for the 5 per cent level of confidence.

The mean scores, the mean differences, the standard error of mean differences, and the t's for the standing broad jump test are shown in Table II. The t-test indicated that the ninth grade Negro group was significantly better than the ninth grade white group at the 5 per cent level of confidence. The seventh and eighth grade Negro groups were significantly better than the seventh and eighth grade white groups at the 1 per cent level of confidence. The most highly significant difference, t=5.26, was found at the seventh grade level.

The mean scores, mean differences, standard error of mean differences, and the t's for the running broad jump test are shown in Table III, page 28. The t-test of significance indicated no significant difference in the mean scores of the eighth grade group. The t value for the eighth

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[25] Allen L. Edwards, Statistical Analysis for Students in Psychology and Education (New York: Rinehart and Company, Inc., 1946), p. 182.

TABLE II

COMPARISON OF THE MEAN SCORES OF THE THREE GRADE GROUPS ON THE STANDING BROAD JUMP TEST

Group	Mean[a]	Mean Difference	Standard Error of Difference	t[b]
7th grade:				
Negro	76.96	10.48	1.99	5.26
White	66.48			
8th grade:				
Negro	79.44	7.32	2.07	3.54
White	72.12			
9th grade:				
Negro	79.68	5.52	2.60	2.13
White	74.16			

[a]Scores measured in inches

[b]t values necessary for significance:
5 per cent level of confidence--2.01
1 per cent level of confidence--2.68

grade group was 1.25. The differences in mean scores for the seventh and ninth grade groups were significant at the 1 per cent level of confidence. The differences found indicated that the seventh and ninth grade Negro groups were significantly better on the running broad jump test than the seventh and ninth grade white groups. The greatest t was 3.00 for the ninth grade group.

TABLE III

COMPARISON OF THE MEAN SCORES OF THE THREE GRADE GROUPS ON THE RUNNING BROAD JUMP TEST

Group	Mean[a]	Mean Difference	Standard Error of Difference	t[b]
7th grade:				
Negro	120.60	18.20	6.39	2.85
White	102.40			
8th grade:				
Negro	116.60	9.00	7.21	1.25
White	107.60			
9th grade:				
Negro	131.41	18.21	6.07	3.00
White	113.20			

[a]Scores measured in inches

[b]t values necessary for significance:
5 per cent level of confidence--2.01
1 per cent level of confidence--2.68

The mean scores, mean differences, standard error of mean differences and the t values for the softball throwing test are shown in Table IV. The t values for each grade group indicated a highly significant difference at the 1 per cent level of confidence. The t ratios indicated that the Negro groups, at all three grade levels, were significantly better than the corresponding white groups. The smallest t ratio was 4.24 for the seventh grade group, and the largest t ratio was 5.04 for the eighth grade group.

TABLE IV

COMPARISON OF THE MEAN SCORES OF THE THREE GRADE GROUPS ON THE SOFTBALL THROW TEST

Group	Mean[a]	Mean Difference	Standard Error of Difference	t[b]
7th grade:				
Negro	79.60	19.80	4.67	4.24
White	59.80			
8th grade:				
Negro	89.60	27.20	5.39	5.04
White	62.40			
9th grade:				
Negro	92.60	23.60	5.51	4.28
White	69.00			

[a]Scores measured in feet

[b]t values necessary for significance: 5 per cent level of confidence--2.01; 1 per cent level--2.68

The mean scores of the Negro groups were lower than those of the white groups on the fifty yard dash test. The mean scores, mean differences, standard error of mean differences, and the t values for the fifty yard dash test are shown in Table V. The t's computed were higher for the fifty yard dash test than for any other test given. The mean differences were highly significant, in favor of the Negro groups, at the 1 per cent level of confidence for the seventh, eighth, and ninth grade groups. The most highly significant difference found was at the seventh grade level. The t ratio for the seventh grade group was 6.41. The t value necessary for significance at the 1 per cent level of confidence was 2.68.

Table VI shows the mean scores, mean differences, standard error of mean differences, and the t values found for the three grade groups on the 600 yard run-walk test. The t-test indicated a significant difference, in favor of Negroes, at the 5 per cent level of confidence for the eighth and ninth grade groups. The difference found for the seventh grade group was significant at the 1 per cent level of confidence. This difference was in favor of the Negro girls from the seventh grade. The t value found for the seventh grade group was 3.98.

TABLE V

COMPARISON OF THE MEAN SCORES OF THE THREE GRADE GROUPS ON THE FIFTY YARD DASH TEST

Group	Mean[a]	Mean Difference	Standard error of difference	t[b]
7th grade:				
Negro	7.75	.97	.1514	6.41
White	8.72			
8th grade:				
Negro	7.70	.70	.1520	4.60
White	8.40			
9th grade:				
Negro	7.66	.70	.1109	6.31
White	8.36			

[a]Measured in seconds

[b]t values necessary for significance:
5 per cent level of confidence--2.01
1 per cent level of confidence--2.68

TABLE VI

COMPARISON OF THE MEAN SCORES OF THE THREE GRADE GROUPS ON THE 600 YARD RUN-WALK TEST

Group	Mean[a]	Mean Difference	Standard Error of Difference	t[b]
7th grade:				
Negro	158	24	6.02	3.98
White	182			
8th grade:				
Negro	155	16	7.32	2.18
White	171			
9th grade:				
Negro	152	16	6.79	2.35
White	168			

[a]Measured in seconds

[b]t values necessary for significance:
5 per cent level of confidence--2.01
1 per cent level of confidence--2.68

II. COMPARISON WITH OTHER STUDIES

The findings of this study tended to agree with those of similar studies; the Negro is more adept than the white in those events which involve running, jumping, and throwing.

Paul Hutinger found the Negro girls at the fourth, fifth, and sixth grade levels to have faster times on the 35-yard dash.[26]

Eleanor Metheny indicated the differences in body structure that possibly influenced performance of motor skills. On the college level, the Negro male was found to have an advantage over the white male in throwing, jumping, and running short distances.[27]

III. SUMMARY

In comparison by grade level, the t-test of significance indicated a significant difference at the 1 per cent level of confidence in the mean scores of the seventh grade groups on all tests. All significant differences found were in favor of the Negro group.

The t-test indicated a significant difference at the 1 per cent level of confidence in the mean scores of the eighth grade group on the standing broad jump, the softball

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[26] Hutinger, loc. cit.

[27] Metheny, op. cit., pp. 51-52.

throw for distance, and the fifty yard dash. At the 5 per cent level of confidence, a significant difference in mean scores was found for the 600 yard run-walk test. On all tests, the significant differences were in favor of the Negro group. The t value of 1.25 for the running broad jump test indicated no significant difference in the mean scores of the eighth grade group on that test.

The t-test indicated a significant difference, in favor of Negroes, in the mean scores of the ninth grade group at the 5 per cent level for the standing broad jump and the 600 yard run-walk. Differences at the 1 per cent level were found, in favor of Negroes, for the running broad jump, the softball throw for distance, and the fifty yard dash.

CHAPTER V

SUMMARY AND CONCLUSIONS

I. SUMMARY

Statement of purpose. The purpose of the study was to determine whether or not Negro girls surpass white girls in the performance of certain fundamental motor skills at the junior high school level.

Procedures followed. One hundred fifty girls from Horace Mann Junior High School, Wichita, Kansas were selected to take part in the experiment. One-half of the group were Negro girls and the other half were white girls. There were fifty girls from each grade level.

The subjects were given five track and field tests following a two-week unit on track and field in their regular physical education classes. Three trials were allowed for the standing broad jump test, the running broad jump test, and the softball throw for distance test. The best of the three trials on each test was used in the study. Two trials were allowed for the fifty yard dash test and the 600 yard run-walk test. The better of the two trials on each test was used in the study.

The mean score and standard deviation were computed for each group on each test. Each Negro group was then

compared with the white group of the same grade level. The standard error of mean difference and the t ratio were computed for each grade group of Negro and white students.

Results. The t-test of significant difference in the mean scores of independent groups indicated a significant difference in the mean scores of the three grade groups on the standing broad jump test. The difference was significant for the seventh and eighth grade groups at the 1 per cent level of confidence. At the ninth grade level, the difference was significant at the 5 per cent level of confidence. The differences were in favor of the Negro groups at all three grade levels.

The t ratios for the running broad jump test indicated that a significant difference existed for the seventh and ninth grade groups at the 1 per cent level of confidence. The difference was not significant for the eighth grade group.

At the 1 per cent level of confidence, a highly significant difference was found for all three grade levels on the softball throwing test. Once again, the difference favored the Negro group in each grade. The greatest t was 5.04 for the eighth grade group.

The t-test indicated a highly significant difference in the mean scores of the three grade groups on the fifty yard dash test. The difference was significant at the

1 per cent level of confidence for all three grade levels, and the difference favored the Negro group in each grade. The greatest t was 6.41 for the seventh grade group.

For the 600 yard run-walk test, the t ratio indicated a significant difference in the mean scores at all three grade levels. The difference was significant at the 1 per cent level of confidence for the seventh grade group. At the 5 per cent level, the difference was significant for the eighth and ninth grade groups. The differences found were in favor of the Negro groups at all three grade levels.

Discussion. The experimenter felt that the running broad jump involved more than the ability to jump. Many girls had difficulty mastering the approach. The running approach added very little to the jump as many girls hesitated or changed their stride before reaching the take-off board. The results of the test were included in the study as the event seemed to be an indication of the individual's ability to master a skill in a short period of time.

II. CONCLUSIONS

The findings of this study failed to support the hypothesis that Negro girls do not surpass white girls in the performance of certain fundamental motor skills at the junior high school level.

The results of the study indicated the following conclusions:

1. Negro girls surpass white girls at the junior high school level in the fundamental motor skill, running, as measured by the fifty yard dash.
2. Negro girls surpass white girls at the junior high school level in the fundamental motor skill, jumping, as measured by the standing broad jump.
3. Negro girls in the seventh and ninth grades surpass white girls in the seventh and ninth grades in the fundamental motor skill, jumping, as measured by the running broad jump.
4. Negro girls in the eighth grade do not surpass white girls in the eighth grade in the fundamental motor skill, jumping, as measured by the running broad jump.
5. Negro girls surpass white girls at the junior high school level in the fundamental motor skill, throwing, as measured by the softball throw for distance.
6. Negro girls surpass white girls in junior high school in the ability to run events of long duration as measured by the 600 yard run-walk.

The limitations of the study do not allow broad generalizations to be drawn about the performance of junior high school girls, Negro or white, in other fundamental motor areas or in sports events.

Recommendations. Further studies could be made in other fundamental motor skills and sports events at the junior and senior high school levels for girls. Studies of the structural differences between Negro and white girls could be made. The psychological factors involved in the performance of girls, the environmental factors effecting

performance, and possible motivational factors could be studied with Negro and white girls at the junior and senior high school levels.

The results of this study have shown that a difference exists between Negro and white girls at the junior high school level in the performance of the three fundamental motor skills of running, jumping, and throwing.

BIBLIOGRAPHY

BIBLIOGRAPHY

American Association for Health, Physical Education, and Recreation, Youth Fitness Project. AAHPER Youth Fitness Test Manual. Washington: American Association for Health, Physical Education, and Recreation, 1958. 55 pp.

Arkin, Herbert, and Raymond R. Colton. Tables for Statisticians. New York: Barnes and Noble, Inc., 1950. 152 pp.

Brown, R. L. "A Comparison of the Patellar Tendon Reflex Time of Whites and Negroes," Research Quarterly, 6:121-126, May, 1935.

Cearley, Jess E. "Linearity of Contributions of Ages, Heights, and Weights to Prediction of Track and Field Performance," Research Quarterly, 28:218-222, October, 1957.

Edwards, Allen L. Statistical Analysis for Students in Psychology and Education. New York: Rinehart and Company, Inc., 1946. 360 pp.

Espenschade, Anna. "Fitness of Fourth Grade Children," Research Quarterly, 29:274-278, October, 1958.

Espenschade, Anna. "The Junior High School Student and Research," Journal of Health, Physical Education, and Recreation, 30:22-23, February, 1959.

Gross, Elmer A., and Jerome A. Cascian. "The Value of Age, Height, and Weight as a Classification Device for Secondary School Students in the Seven AAHPER Youth Fitness Tests," Research Quarterly, 33:51-58, March, 1962.

Himebaugh, William K. "A Study of the Differences in Speed and Strength Between Negro and Caucasian Boys Ages Twelve through Fifteen at Central Junior High School, Wichita, Kansas." Unpublished research problem, Kansas State Teachers College, Emporia, Kansas, 1962. 20 pp.

Hutinger, Paul W. "Differences in Speed Between American Negro and White Children in Performance of the 35-Yard Dash," Research Quarterly, 30:366-368, October, 1959.

Johl, E., et al. "Research on Olympic Athletes," Journal of Health, Physical Education, and Recreation, 27:61-62, September, 1956.

Johnson, R. E., L. Brouha, and J. R. Gallagher. "Evaluation of Physical Fitness by the Step Test," Yale Journal of Biology and Medicine, 15:781, 1943. Cited by Laurence Morehouse and Augustus Miller. Physiology of Exercise. St. Louis: The C. V. Mosby Company, 1959. 349 pp.

Larson, Leonard, and Rachael Yocom. Measurement and Evaluation in Physical, Health, and Recreation Education. St. Louis: The C. V. Mosby Company, 1951. 507 pp.

Lautenbach, Ruth, and W. W. Tuttle. "The Relationship Between Reflex Time and Running Events in Track," Research Quarterly, 3:138-142, October, 1932.

Lewis, Julian H. The Biology of the Negro. Chicago: The University of Chicago Press, 1942. 433 pp.

McCloy, Charles H. Tests and Measurements in Health and Physical Education. Second edition. New York: F. S. Crofts and Company, 1946. 412 pp.

Metheny, Eleanor. "Some Differences in Bodily Proportions Between American Negro and White Male College Students as Related to Athletic Performance," Research Quarterly, 10:41-53, December, 1939.

Morehouse, Laurence, and Augustus Miller. Physiology of Exercise. St. Louis: The C. V. Mosby Company, 1959. 349 pp.

Todd, Frances. "Is the Sports Program Designed to Meet the Needs of Girls?" The Bulletin of the National Association of Secondary-School Principals, 44:133-138, May, 1960.

Westerlund, J. H., and W. W. Tuttle. "The Relationship Between Running Events in Track and Reaction Time," Research Quarterly, 2:95-100, October, 1931.

Willgoose, Carl E., Nathaniel Askew, and Mildred Askew. "Reliability of the 600-Yard Run-Walk Test at the Junior High School Level," Research Quarterly, 32:264-266, May, 1961.

APPENDIX

TABLE VII

THE STANDING BROAD JUMP SCORES OF ALL SUBJECTS[a]

Subjects	7th Grade		8th Grade		9th Grade	
	White	Negro	White	Negro	White	Negro
1	60	66	81	83	82	87
2	63	75	54	74	73	88
3	63	72	62	93	62	73
4	52	77	70	78	64	57
5	65	61	75	80	76	90
6	70	84	68	84	79	69
7	73	76	78	74	77	83
8	68	75	73	85	76	81
9	63	82	84	65	96	76
10	65	76	72	74	63	96
11	78	81	79	96	65	58
12	59	83	73	74	72	89
13	61	79	78	62	71	82
14	59	80	75	80	72	95
15	72	68	77	77	72	88
16	66	75	73	78	68	85
17	60	85	68	80	82	71
18	69	68	66	81	73	80
19	78	85	65	75	78	88
20	67	85	74	83	87	78
21	68	75	74	93	78	67
22	68	80	66	78	72	78
23	59	78	71	66	79	78
24	75	65	70	84	78	79
25	77	91	75	78	61	80

[a]The best of three trials, measured in inches.

TABLE VIII

THE RUNNING BROAD JUMP SCORES OF ALL SUBJECTS[a]

Subjects	7th Grade		8th Grade		9th Grade	
	White	Negro	White	Negro	White	Negro
1	134	124	132	139	139	135
2	70	128	62	90	141	162
3	95	98	72	142	87	104
4	72	90	116	143	82	123
5	81	71	102	144	92	150
6	86	132	121	126	118	112
7	146	134	139	139	132	142
8	126	136	121	134	128	151
9	75	143	129	91	140	82
10	92	120	130	91	80	114
11	125	132	138	144	83	115
12	94	124	102	81	127	109
13	80	125	95	49	89	148
14	66	136	106	139	83	161
15	95	130	95	127	132	132
16	129	113	80	112	92	150
17	94	99	104	131	118	88
18	83	134	122	101	130	118
19	119	136	86	94	139	159
20	128	154	98	138	139	120
21	136	129	89	146	133	134
22	109	138	115	118	117	148
23	82	94	76	86	125	148
24	96	96	134	156	130	141
25	135	103	120	60	63	142

[a]Best of three trials, measured in inches

TABLE IX

THE SOFTBALL THROW SCORES FOR ALL SUBJECTS[a]

Subjects	7th Grade		8th Grade		9th Grade	
	White	Negro	White	Negro	White	Negro
1	69	72	55	144	68	110
2	74	90	38	101	75	130
3	60	70	40	90	37	65
4	26	67	71	101	46	118
5	47	61	61	110	67	93
6	61	70	55	76	70	112
7	63	61	45	94	80	91
8	42	98	86	83	79	75
9	75	68	82	78	91	86
10	86	75	69	74	28	58
11	86	70	63	77	56	89
12	49	66	60	82	51	79
13	35	84	56	75	57	101
14	46	80	102	68	91	102
15	56	106	51	97	55	80
16	49	66	60	96	66	109
17	74	89	51	110	69	69
18	50	78	56	85	75	121
19	70	65	46	78	113	99
20	50	111	49	80	85	66
21	92	109	68	125	59	90
22	74	68	90	73	69	86
23	38	70	42	59	101	68
24	55	99	97	124	71	90
25	74	90	61	67	65	124

[a]Best of three trials, measured in feet

TABLE X

THE 50 YARD DASH SCORES FOR ALL SUBJECTS[a]

Subjects	7th Grade		8th Grade		9th Grade	
	White	Negro	White	Negro	White	Negro
1	8.9	7.8	7.5	7.1	7.7	7.8
2	8.4	8.0	11.2	8.0	7.9	7.2
3	8.6	7.7	8.9	7.5	8.3	7.9
4	9.4	8.1	8.1	7.5	8.7	8.1
5	8.9	8.8	8.5	8.0	8.4	7.6
6	9.0	7.7	8.6	7.1	8.1	8.0
7	7.9	8.0	8.2	7.3	8.5	7.6
8	8.0	7.9	7.7	7.5	8.5	7.9
9	9.1	7.7	8.9	8.5	7.7	8.0
10	10.0	7.4	8.9	8.4	9.0	7.3
11	7.9	7.5	7.8	7.2	8.6	8.5
12	9.1	7.7	8.0	7.7	8.1	8.0
13	9.7	7.2	8.3	8.4	8.9	7.3
14	9.7	7.4	8.1	7.5	8.5	7.3
15	8.4	7.9	7.7	7.8	8.3	7.4
16	9.1	7.8	8.7	7.9	8.4	7.2
17	8.7	7.6	8.3	7.9	8.5	8.1
18	9.3	8.1	8.6	7.6	8.7	7.6
19	7.5	7.5	8.9	7.8	7.6	7.3
20	8.4	7.0	8.5	7.1	8.1	7.9
21	8.3	7.7	8.4	7.5	7.9	7.5
22	8.5	7.3	8.5	8.2	8.4	7.4
23	8.9	8.1	8.3	8.7	7.8	7.9
24	8.2	8.5	8.3	7.3	8.1	7.9
25	8.0	7.4	8.0	7.5	9.0	7.4

[a]Better score of two trials, measured in seconds

TABLE XI

THE 600 YARD RUN-WALK SCORES FOR ALL SUBJECTS[a]

Subjects	7th Grade		8th Grade		9th Grade	
	White	Negro	White	Negro	White	Negro
1	165	165	146	145	153	162
2	220	155	221	147	179	147
3	167	181	196	131	177	156
4	223	176	159	128	180	242
5	166	208	187	126	192	128
6	177	166	192	151	143	145
7	156	156	169	123	154	140
8	166	143	157	168	190	159
9	229	148	156	228	122	182
10	182	147	180	197	168	130
11	139	168	154	140	151	155
12	197	166	154	135	158	170
13	199	138	145	177	193	132
14	216	137	173	140	167	145
15	196	183	179	171	195	135
16	162	168	171	170	191	127
17	184	177	158	146	171	133
18	190	172	193	161	178	150
19	180	134	181	144	118	133
20	168	126	168	118	156	175
21	157	134	185	120	154	164
22	151	138	174	182	161	132
23	202	165	180	247	180	132
24	174	166	148	129	156	175
25	161	161	173	162	219	150

[a]Better score of two trials, measured in seconds