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Student: Wayne A. Sojkowski

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Date

Robert S. Batchelder
Seminar Paper Advisor

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Date

James W. Emerson
Dean, Graduate College

A COMPARATIVE STUDY BETWEEN BLACK AND NON-BLACK STUDENTS RELATIVE TO LEG STRENGTH

A Seminar Paper

Presented to

the School of Graduate Study

University of Wisconsin - LaCrosse

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Master of Science in Physical Education

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by

Wayne A. Sojkowski

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ABSTRACT

This study was conducted between Black and Non-Black students relative to leg strength. Physical education classes from Rufus King and James Madison Senior High plus Francis Parkman and G. A. Fritsche Junior High supplied the subjects for the testing. The students involved totalled 316 in number and they represented three grade levels; seventh grade, ninth grade, and the eleventh grade. The first two grade levels came from the junior high schools and the eleventh grade level came from the senior high schools.

A battery of three leg strength tests were used; the leg dynamometer, the Sargent's Jump, and the standing long jump. Each student was given three chances at each test, except the leg dynamometer, where only one trial was given. Only the highest score recorded was used in the analysis of data.

The analysis of variance was used with the Black students receiving statistically significant higher scores at the .05% level of confidence on the standing long jump, and the Sargent's Jump and at the eleventh grade level on the leg dynamometer. Non-Black students achieved scores at the .05 level of confidence on the leg dynamometer test for seventh and ninth grade.

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CHAPTER I

INTRODUCTION

It was just twenty-eight years ago when there were no Black Americans on any of the professional baseball, basketball, or football team rosters, though, on some rare occasions in the past these sports have used Black players. The number of Black players today in professional sports shows there are approximately 150 Black out of 600 players in major league baseball, 330 out of 1,040 in football and 153 out of 280 in basketball. The percentage of these players making their all-star teams is even more astonishing. The professional leagues during the 1972-73 season saw the Black on all-star teams with nearly 50% in baseball, 50% in football, and 60% in basketball. Another facet of sport is track and field. The American Black athletes accounted for all eight Olympic records set by the United States track team at Mexico City in 1968.[22]

It is certainly clear that the Black athletes are represented in percentages well above their population proportion of approximately 12%. These significant statistics are probably partially due to environmental reasons of social opportunity and economic limitation. The American Black community is contributing more than its share of participants to the field of sport.

There has been much controversy about the superiority of the American Black in sports. Many authors claim that the Black is superior because of various physical characteristics which enable him to excel over the Non-Black. Many of these theories

have been disproved, but on the other hand, many studies have been done showing a definite anatomical advantage for the American Black in sports.

Statement of the Problem.

It was the purpose of this study to compare leg strength relative to a battery of three tests of male Non-Black students to Black students at the seventh, ninth, and eleventh grade levels.

Importance of the Study

A few studies concerned with ethnic comparisons describe the performance achievement of Caucasians, Europeans, Negroes and Japanese subjects. These studies have dealt with anything from the physical (physical fitness, reaction time, swimming buoyancy, etc.). The age groups have varied from the infant to the elderly.

To date no studies have been published to the author's knowledge of a comparison of leg strength between Black and Non-Black students in relation to a battery of three tests on three different grade levels. In addition, no studies have been published to the author's knowledge in which ethnic groups have been compared in the Milwaukee Public School system.

Need for the Study

When a comparative study of ethnic groups has been done, it has usually been in the line of a battery of tests. Therefore, since there is a general lack of research in this area, this study could be of interest to physical educators concerned about leg strength differences of Black students when compared to the other students. This study could be of special benefit to the

coach in basketball and track where leg strength plays a dominant role in success or failure of the individual athlete.

Delimitations of the Study

The junior and senior high schools selected for this study had to have a 95% or greater of the population (ethnic group) in order to qualify for the random sampling.

All classes selected where randomly picked, therefore, eliminating individual random sampling.

The standing long jump is part of the physical education curriculum taught in the Milwaukee Public School system, therefore, the administration of this test will be by each physical education specialist in each school being tested.

Only schools with physical education specialists were chosen for this study.

Limitations of the Study

Classification of leg strength was made on the basis of three tests; the standing long jump, leg dynamometer and the Sargent's vertical jump.

The time involved in traveling from my school to the four schools involved in the testing was limited because the testing occurred during the school day. A screening process eliminated some students who had a foot or leg problem and therefore, could not perform to their maximum effort.

The author had no control over the subjects before the tests were given for leg strength.

Since a sample of 50 students from each class was needed, some students were randomly selected from the next class on the same grade level.

Definitions of Terms

Black Student. Subject whose parents are of Black origin.

Leg Dynamometer. A device used to measure isometric strength of a large number of muscles in the leg. It registers 0 to 2000 pounds of pull in gradations of 5 pounds. A belt is inserted around the waist, which is connected to the strength meter. The starting position is with the back straight and lower and upper leg in a 120 degree angle.

Non-Black Student. Subject whose parents are of another origin other than Black.

Power. This can be identified as the ability to release maximum force in the fastest possible time, which is usually measured in seconds. This is exemplified in the vertical jump, the long jump and other movements against a resistance in a minimum of time.

Sargent's Vertical Jump Test. Measures the power of the legs in jumping vertically upward.

Standing Long Jump Test. This test measures the athletic power of the legs in jumping forward from a standing start.

Hypothesis of the Study

There will be a statistically significant difference in leg strength between the Black and other students at the seventh, ninth, and eleventh grade levels in the Milwaukee Public Schools. The

results will show the Black students achieving the higher scores at the 5% level of confidence on the leg dynamometer, standing long jump, and the Sargent's vertical.

CHAPTER II

REVIEW OF RELATED LITERATURE

Historical Background

It has been through the realm of sports that many minority groups have made great strides and could compete on more favorable terms than in most other sectors of U. S. society. Jackie Robinson helped clear one of the last major obstacles in sports and it was through his successful efforts in baseball that other sports like golf and tennis received at least token integration. It has been through sports that many Blacks have found their fastest avenues to success.[21]

The dominance of Black athletes has become so profound that over half of professional basketball players are Black; over a third of professional football players are Black; and over a quarter of the professional baseball players are Black. Even the colleges in the deep South are realizing that it is difficult to compete for top national ranking without recruiting Black athletes.

Anatomical Comparisons and Inferences

Ever since man has noticed a difference between other males; there have been generalities formed and conclusions drawn. Many of these so-called conclusions have turned out to be myths, but others have proven to be true. Part of the myth surrounding the superiority of Black high jumpers and long jumpers had to do with his projecting heel. It was said that because of this anatomical feature, the

Black had a decided advantage. Schultz[11] pointed out that this assumption was incorrect. He stated that the projection of the heel is due only to a fat pad and therefore, would have no mechanical advantage.

Cobb brings out another myth surrounding the success of American Black sprinters and broad jumpers. This concept was that the Black has a stronger tendon of Achilles than those of their Non-Black competitors.[12]

An analysis of body limbs and their dimensions between Black and Non-Black groups have been taken and published since the turn of the twentieth century. One of the earliest and most thorough studies was by Metheny,[26] who found that the Black exceeded the Non-Black in weight, arm length, forearm length, hand length, elbow width, lower leg length, foot length and width, knee width, shoulder breadth, chest depth and width, neck girth, and limb girths; while the Non-Black exceeded the Black in sitting height, total fat, hip width and ilium width.

Prampers and Cerretti[29] also concluded from their findings among African natives, that the body fat percentage is significantly lower, particularly among children.

The Black was shown to have less fat, but is still heavier. McCloy and Young[25] stated that this extra weight could be a disadvantage in jumping events but it could be overcome if the Black had greater muscular strength in relation to his greater weight. Since muscle girths are a positive indication of the strength of a muscle, the Black has the greater muscular development.

Regarding the standards on skeletal proportions, Todd and Lindola[21] found the average male Non-Black lower limb forms 50.9% of the total height, the limb being measured from the pubic symphysis (mid-point on the front of the pelvic brim). The average male Black limb forms 52.5% of the standing height.

Metheny[26] goes further in stating that in applying the principle of the lever, the larger lower leg can develop greater 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.

Going one step further, Cureton[13] referred to the "grasshopper" tyre as those people with relatively long legs. He said this type usually make good jumpers, runners, vaulters and agile athletes.

Another basic anatomical difference was found by Williams et all,[36] in 1930, when he studied the proportions of the calf muscle in dissection of 73 male Non-Black and 59 male Black cadavers at Washington and St. Louis Universities.

> The tendonous part of either of the two bellies of the gastrocnemius muscle forms a greater proportion of the total length of the muscle in American Blacks than in Non-Blacks. Conversely, the muscle bellies of Blacks are, in proportion to the total muscle length, shorter than in Non-Blacks.

This is probably the reason why the Black calf appears slimmer in comparison to the bulkier appearance of the calf in the Non Black. This was found to be true in the racial difference regarding tendon to muscle, irregardless, if the stature be short, medium or tall.

Larson[24] concludes, that it is not the instrumental strength which is desired as an index of motor ability, but whether or not there is sufficient strength to effectively control body weight. Effective control of body weight is fundamental in good large muscle performance.

"Basic characteristics, sometimes can be hard to define within and ethnic group," Cobb reported in 1934, on the basic anatomical differences between the Black and the Non-Black. Cobb[12] further reveals in 1936, that there are no physical characteristics related to sports, which all the Black stars of the 1920's and 1930's have in common, which would definitely identify them as Blacks.

Published Material

The writer found no material that related directly to a battery of three leg strength tests, namely, the Sargent's Jump, the standing long jump, and use of the leg dynomometer.

Related Studies

Comparisons between ethnic groups have been occurring since the turn of the century. These studies have dealt with the physical to the abstract. The age groups have also varied. There have been few tests relating directly to leg strength for seventh, ninth, and eleventh grade males, and none at all dealing with a battery of three leg strength tests.

Ponthieux and Barker,[27] in 1965, studied some 633 children and ethnically compared them on the AAHPER. The results showed that the

Black fifth and sixth grade boys performed beyond the 0.01 level of confidence in the standing long jump. The same level of confidence was also proven in the 50 yard dash.

In another running event, Hutinger,[20] in 1959, used the 35 yard dash for 402 Black children and 390 Non-Black children in the fourth, fifth, and sixth grades. The Black boys in the fourth and fifth were superior to a confidence level of 0.01%.

A battery of fitness tests was also used in 1970, by Lipe,[39] in her investigation of aspiration and motor performance levels of Black and other sixth grade students. In the side step and broad jump tasks, the Black males had a significantly higher position level of aspiration.

The performances of four matched groups were compared on a seven item physical performance test. Stone,[41] in 1965, divided the four groups in upper-middle class and lower-middle class Non-Blacks. The subjects were boys ten through twelve years old. They were matched in age and physique according to Wetzel Grid and socio-economic status. The average performance of the Black boys, reliably exceeded that of the other boys, in all items, including the standing long jump, but excluding the pull-ups and 600 yard run walk.

In 1966, Martin[40] turned out a study, concerning selected anthropometric, strength and power characteristics of Non-Black and Black boys from grade 10. Vertical jump and isometric knee extension strength were tested. The groups did not differ in age, height, and weight. The Black group had significantly greater

(0.01 level of confidence) lower leg, thigh, total leg and foot length, standing-reach height, and vertical jump performances. The two highest correlations were 0.28 for knee extension strength and lower leg length with vertical jump.

Laeding[38] studied the assessment of the differences in power, agility, and strength, and reaction time of Black and other male subjects at the tenth grade level. The only difference at the 0.05% level was in favor of the Blacks on the vertical jump.

Previous Studies

Most of the studies that were found in doing a comparison between Blacks and Non-Blacks, concerned themselves mainly with the vertical jump or Sargent's Jump.

Most of the studies that were found on ethnic comparisons of Black and other students, concerned themselves mainly with a battery of skill tests or some form of physical fitness test. This writer found no previous studies that dealt specifically with ethnic comparisons dealing solely on leg strength. No previous studies were found in relation to use of the leg dynamometer and the standing long jump. However, Herzstein[37] in 1962, did a comparative study on the jumping of American Black male college students with other American college students as measured by the Sargent Vertical Jump Test. The results showed the mean of the Black students was found to be significantly higher than the mean of other students on the test.

CHAPTER III

PROCEDURE

Statistical Method of Handling Data

The statistical methods used in this experiment were the finding of the mean and standard deviation for each student group at each grade level for three leg strength tests. An analysis of variance was used for each test. The Sheffe test was used next for comparison between pairs. The last test used was the correlation matrix to see if there was a relationship between age and the leg dynamometer, standing long jump, and the Sargent's Jump.

Selection of the Subjects

The subjects for this study were obtained from the two junior high schools and two senior high schools that were selected by Dr. D. Rowe, Director of the Division of Planning and Long-Range Development, and Mr. W. Johnson, physical education supervisor. (Letters in Appendix A). The schools were picked on a stratified random basis. The author's request to do the study was presented to the schools that met the 95% ethnic population. Participation of each school was voluntary. The four schools that were selected on a stratified random sampling and gave their permission for this study were James Madison Senior High School and G. A. Fritsche Junior High School for the Non-Black sampling and Rufus King High School and Francis Parkman Junior High for the Black sampling.

The classes of students were also selected by Mr. W. Johnson and this also was done by random selection. A class number of fifty was used, but in some instances students had to be randomly selected from the next class and same grade level to meet the required number. Each student that participated was in a gym uniform, so that in no way was any student hindered in his movements while taking the tests. A screening process eliminated some students who had a foot or leg problem and therefore, could not perform to their maximum efficiency.

Selection of Tests

Leg Dynamometer. The leg dynamometer used in this experiment was borrowed form the LaCrosse State University human performance laboratory. It is a PC 5039 heavy duty model with a dial of seven inches in diameter. It registers 0 to 2000 pounds of pull in gradations of 5 pounds. A platform covered with corrugated rubber was used to stand on for the test. An adjustable chain was used to connect the belt to the platform. The starting position had the subject with his back straight and the lower and upper leg bent at a 120 degree angle.

Averts and Hathaway[16] in 1938 commented on the leg dynamometer that the use of the new belt technique had increased the efficiency of physical fitness testing very materially. They further noted that the more accurately they could measure what improvements had taken place, the greater would be the respect for their work, and public confidence in and support of it.

The new belt technique was also proven by Hubbard and Mathews[19] in 1953 who found that their experimental results suggested that leg lifts as measured without the belt, may contain factors other than ability to lift with the legs.

The dynamometer test was the only test that dealt solely with the legs if administered properly. It is a stationary test where the only movement involved is that of the legs. The arms do not enter in as a factor as they do in Sargent's vertical jump or their swinging motion in the standing long jump.

The Standing Long Jump. Each subject was given three trials in succession on the standing long jump with the best effort being recorded. A standardized rubber mat measured off in inches was used for this test. Preparatory to jumping, the students swung the arms backward and bent at the knees. The jump was accomplished by simultaneously extending the knees and swinging forward the arms. Scoring was recorded to the nearest inch with the body part closest to the starting line.

Since in jumping the arms are used, it would seem probably that this body segment in addition to the leap might well increase the length of the jump. McCloy and Young[3] have indicated from their text that arm swing is an important factor in jumping.

Sargent's Jump Test. This vertical jump test was selected because it involves primarily the power and explosiveness of the leg muscles. Strength is a primary source of force and it is the leg extensors in the vertical jump that are involved in the movement.

A formula was developed for the vertical power jump by Gray, Start, and Glencross.[17] They maintained that the jump was based on a physical science definition of power, and results were expressed in foot pounds of work done per second by the legs. This work was done by moving the body from a crouch position to the peak of the jump.

Van Dalen[33] in 1940 stated that the Sargent's Jump when standardized, practiced and correctly administered is undoubtedly a valuable test for predicting the ability to develop power for the legs.

Administration of Tests

In all but two cases, all three tests were administered in one physical education class lasting exactly 58 minutes. After all students dressed for activity, they were seated and the author explained briefly what he was testing and how to perform each test. The class was then divided into three groups with each student given his own score card (Sample in Appendix B) at the first testing station. When students of one group were finished with one test, they rotated to the next station. Each student was given three trials on the standing long jump and Sargent's vertical jump with the best effort counting. Students were given only one trial on the leg dynamometer test. Students weren't encouraged vocally by their instructors, but were corrected if they performed one of the tests incorrectly.

The author administered all testing on the leg dynamometer. The Sargent's jump was taken care of exclusively by Mr. W. Johnson,

physical education supervisor for the Milwaukee Public School system. The last test was the standing long jump, and it was scored by the physical education instructor of that particular class. Even though the administrators of the standing long jump may have varied; the same mat, procedure, and scoring were uniform in all four classes.

CHAPTER IV

ANALYSIS OF DATA

This study was conducted in order to compare the scores on three leg strength tests; leg dynamometer, standing long jump, and Sargent's jump. Black and Non-Black students in the seventh, ninth, and eleventh grades from the Milwaukee Public School system were the subjects for this experiment. The number for the six groups varied from 50 to 58.

All data recorded during this investigation was treated statistically, in order to find out if there was a significant difference between Black and other students relative to leg strength. All computer processing was done at a computer center in Mitchell Hall at the University-La Crosse, LaCrosse, Wisconsin. The complete program of data is outlined in raw scores and graphs. (Appendix C). The five percent level of confidence was chosen for acceptance or rejection of the hypothesis.

Interpretation of Data

"Grades" Program. Each subject was given three chances at each test, except the leg dynamometer, where only one trial was given. The best score was recorded on each test and used for computing. A "Grades" program was run at the computer center in Mitchell Hall. The results were a mean score and standard deviation for each test and grade level.

Also included with these scores, are the number, median, low score, high score, and standard error of the mean.

The statistics of the tests show that the Black students were superior in the Sargent's jump (Mean 16.3 to 14.3519) and the standing long jump (Mean 67.52 to 65.0741) at the seventh grade level, while the other students performed better on the leg dynamometer (Mean 308.648 to 294.92). (Table 1)

Table 1

7th Grade

	L. D.	L. D.	S. J.	S. J.	S. L. J.	S. L. J.
Number & Class	54 N-B	50 Black	54 N-B	50 Black	54 N-B	50 Black
Mean	308.648	294.92	14.3519	16.3	65.0741	67.52
Median	290	270	16	16	64	68
Standard Deviation	124.557	151.564	2.43552	2.65518	6.92246	8.48349
Standard Error of the Mean	16.9501	21.4344	.331432	.375499	.942027	1.19975
Low Score	140	45	9	11	47	51
High Score	632	760	15	23	78	84

L. D. Leg dynamometer

S. J. Sargent's jump

S. L. J. Standing long jump

N-B. Non-Black

The ninth grade level comparisons, again show the Black students better in the Sargent's jump (Mean 20.1724 to 17) and standing long jump (Mean 80 to 76.1569). Once again the Non-Black students were better on the leg dynamometer (Mean 572.765 to 502.483). The leg dynamometer test at the ninth grade level also represented the biggest difference for the Non-Black students, as they were 12.41 percent better than the Black students. (Table 2).

Table 2

9th Grade

	L. D.	L. D.	S. J.	S. J.	S. L. J.	S. L. J.
Number & Class	51 N-B	58 Black	51 N-B	58 Black	51 N-B	58 Black
Mean	572.765	502.483	17	20.1724	76.1569	80
Median	541	468	17	20	77	81
Low Score	203	150	10	14	55	58
High Score	1185	1070	24	25	94	100
Standard Deviation	204.388	190.572	3.09965	3.03507	8.20658	8.18957
Standard Error of the Mean	28.62	25.0233	.434038	.398524	1.14915	1.07534

The scores at the eleventh and final grade level, show the Black students achieving a "clean sweep," in all three tests. The score on the Sargent's jump was (Mean 22.78 to 20.2075). Performing on the standing long jump, the Black students scores were (Mean 91 to 86). The final test and probably the most surprising one, was the leg dynamometer. The Non-Black students had achieved high scores at the seventh and ninth grade levels on this test, but the Black students, at the eleventh grade showed the greatest percentage in difference with a score of (Mean 644.98 to 506). (Table 3).

Table 3

11th Grade

	L. D.	L. D.	S. J.	S. J.	S. L. J.	S. L. J.
Number & Class	53 N-B	50 Black	53 N-B	50 Black	53 N-B	50 Black
Mean	506	644.98	20.2075	22.78	84.4528	90.98
Median	535	608	20	23	86	91
Low Score	175	160	16	18	67	57
High Score	915	1055	28	28	103	104
Standard Deviation	147.701	227.834	2.47522	7.36042	7.84175	8.4652
Standard Error of the Mean	20.2883	32.2206	.339998	.333814	1.07715	1.19716

ANALYSIS OF VARIANCE AND A SHEFFE TEST

The application of the analysis of variance technique was now used. The results showed a F-ratio of 31.9331 for the leg dynamometer, 77.4111 for the standing long jump, and 67.8765 for the Sargent's jump. All three F-ratios were found to be statistically significant at the .05 level of confidence, when compared to a table value of 2.24, needed for a significance, with 5 and 310 degrees of freedom. (Table 4).

Table 4

Analysis of Variance on Leg Dynamometer

Source of variation	Sum of squares	df	Mean square	F
Between subjects	5137580	5	102.7520	31.9331
Error	9974930	310	32177.2	
Total	15112500	315		

Analysis of Variance on Standing Long Jump

Source of variation	Sum of squares	df	Mean square	F
Between subjects	25411.7	5	5082.35	77.4111
Error	20352.7	310	65.654	
Total	45764.5	315		

Analysis of Variance on Sargent's Jump

Source of variation	Sum of squares	df	Mean square	F
Between subjects	2518.37	5	503.675	67.8765
Error	2300.37	310	7.42056	
Total	4818.75	315		

Sheffe Test. Since all three tests showed a significance at the .05% level, a Sheffe test was used to see the comparison between each pair, on all three leg strength tests. In order to reject the hypothesis of no difference between any two groups, a score of 11.25 was needed. The number of pairs for each leg strength test was 15. The Sheffe test on the leg dynamometer showed a statistically significant difference in eleven out of fifteen pairs. (Table 5). The second Sheffe test, on the standing long jump had a statistically significant difference in twelve out of fifteen pairs. (Table 6). The last Sheffe test, using the Sargent's jump had a statistically significant difference in thirteen out of fifteen pairs. (Table 7).

Table 5

Scheffe Test on Leg Dynamometer at 7th Grade

	7th N-B	7th Black	9th N-B	9th Black	11th N-B	11th Black
7th N-B		.152054	* 56.8616	* 32.6527	* 32.3758	* 91.268
7th Black			* 60.5725	* 35.9522	* 35.625	* 95.2087
9th N-B				4.16593	3.6005	4.0919
9th Black					.010646	* 16.9448
11th N-B						* 15.4442
11th N-B						

* Significant at .05% level of confidence

Table 6

Scheffe Test on Standing Long Jump at 9th Grade

	7th N-B	7th Black	9th N-B	9th Black	11th N-B	11th Black
7th N-B		2.36564	49.0697 *	94.8907 *	152.994 *	265.379 *
7th Black			28.6862 *	63.7004 *	112.358 *	209.573 *
9th N-B				6.10481	27.2445 *	84.4958 *
9th Black					8.36348	49.308 *
11th N-B						16.6955 *
11th Black						

* Significant at .05% level of confidence.

Table 7

Scheffe Test on Sargent's Jump at 11th Grade

	7th N-B	7th Black	9th N-B	9th Black	11th N-B	11th Black
7th N-B		13.2775 *	24.786 *	127.67 *	123.592 *	248.515 *
7th Black			1.66717	54.2623 *	52.9398 *	141.466 *
9th N-B				36.8054 *	36.0338 *	113.668 *
9th Black					.11459763	24.6047 *
11th N-B						22.9447 *
11th Black						

* Significant at .05% level of confidence

Correlation Matrix. A correlation matrix was the last program used as the author wanted to see if there was a relationship between age and the standing long jump; age and the Sargent's jump; and age and the use of the leg dynamometer. The significant correlation is .26. The Black students showed a significant correlation at a .05 percent level of confidence at the ninth grade level on the leg dynamaometer. They also had a significant correlation at the .05 level of significance at the eleventh grade, on all three leg strength tests. (Table 8).

A second chart was used to show the range and number of students involved at each grade level and for every grade (Table 9).

Table 8

Correlation Matrix Using Age

7th Grade

Non-Black			Black		
LD	SLJ	SJ	LD	SLJ	SJ
.113142	.00183547	-.118786	.0859382	.145873	-.013227

9th Grade

Non-Black			Black		
LD	SLJ	SJ	LD	SLJ	SJ
.191612	.177125	.168777	.283801*	.209377	.237074

11th Grade

Non-Black			Black		
LD	SLJ	SJ	LD	SLJ	SJ
.0163747	.0112809	-.126007	.402302*	.336302*	.402164*

LD-Leg Dynamometer SLJ-Standing Long Jump SJ-Sargent's Jump
*Significant at .05% level of confidence (.26)

Table 9

			7th			
Age	12	13	14	15	N	Mean
Non-Black	26	23	4	1	54	12.63
Black	18	27	5		50	12.64
			9th			
Age	13	14	15	16	N	
Non-Black	1	28	19	3	51	14.53
Black		25	27	6	58	14.67
			11th			
Age	15	16	17	18	N	
Non-Black	1	44	8		53	16.13
Black	1	29	18	2	50	16.42

Summary of Statistical Analysis. The purpose of this study was to determine whether Black or Non-Black students were statistically significant in their scores and where they differed. Black students were statistically better in all scores at all grade levels, except the leg dynamometer at the seventh and ninth grade levels.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study was concerned with Black and Non-Black students being compared on leg strength. The comparisons involved three tests; leg dynamometer, Sargent's jump, and standing long jump. The students involved totalled 316 in number and they represented the seventh, ninth, and eleventh grade levels. All subjects were taken from the Milwaukee Public School system. The four schools selected were Rufus King and James Madison Senior Highs; plus Francis Parkman and G. A. Fritsche Junior Highs.

Each student was given three chances at each test, except the leg dynamometer, where only one trial was given. Only the highest score recorded was used for the testing.

Seventh grade Black students were superior in the Sargent's Jump (Mean 16.3 to 14.3519) and the standing long jump (Mean 67.52 to 65.0741) while the other students performed better on the leg dynamometer (Mean 308.648 to 294.92). The ninth grade level comparisons, again, show the Black students better in the Sargent's jump (Mean 20.1724 to 17).and standing long jump (Mean 80 to 76.1569). Non-Black students were better on the leg dynamometer once again (Mean 572.765 to 502.483).

The final grade level, the eleventh grade, shows the Black students achieving higher scores in all three leg strength tests.

The Sargent's jump score was (Mean 22.78 to 20.2075); the standing long jump (Mean 91 to 80); and the leg dynamometer (Mean 644.98 to 506).

Conclusions.

From the results of this comparative study, the following conclusions were made:

1. Black students at seventh, ninth, and eleventh grade levels in the Milwaukee Public School System achieved higher scores in the standing long jump than did Non-Black students.
2. Black students at the seventh, ninth, and eleventh grade levels in the Milwaukee Public School System achieved higher scores in the Sargent's jump than did Non-Black students.
3. Non-Black students scores higher on the leg dynamometer at seventh and ninth grade levels in the Milwaukee Public School System than did Black students.
4. Black students at the eleventh grade level in the Milwaukee Public School System achieved a higher score on the leg dynamometer.

Recommendations.

From the results of this study, the following recommendations were made:

1. A pre and post- test technique with some practice and coaching of skills in between testing.

2. A study should be done using other skills for comparison (arm strength or reflex action as examples).
3. A study comparing college Black students to Non-Black with the same leg strength tests should be done.
4. A study testing just the athletes of a school, whether they be Black or Non-Black with the same leg strength tests.
5. A study done, involving anthropometric measurements of the leg between Black and Non-Black students.
6. Conduct the same study, only use girls as subjects.
7. Conduct the same study and use height and weight in the analysis of data.
8. Leg strength is an important part of athletics and the daily physical education; therefore, the author feels a more extensive and expanding program of study, in regards to ethnic comparisons is needed in this area.

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APPENDIX A

milwaukee public schools

DIVISION OF PLANNING AND
LONG-RANGE DEVELOPMENT

administration building
5225 west vliet st: p.o. drawer 10k
milwaukee, wisconsin 53201
area 414:476-3670

October 7, 1971

Mr. Wayne A. Sojkowski
3108 S. 105 Street
West Allis, Wisconsin 53227

Dear Mr. Sojkowski:

Your request for participation in the Milwaukee Public Schools in your research study, which will be a Master's Thesis, has been referred to this office.

As explained in the enclosed policy and procedure statement, research activity which is initiated by individuals or outside sources is reviewed by the Central Office Staff and approved by the Division of Planning and Long-Range Development. This procedure is outlined in the enclosed statement. You may wish to note, particularly, the list of items on the fourth page of this statement which, in general, indicates the kind of information we need in order to properly evaluate your request. It is not necessary that your write-up follow this particular sequence, but it is important that we have complete information about your project.

I might introduce a suggestion that there be particular caution in making plans to test groups that are going to be identified on a racial variable. We must be careful not to create problems either on a personal or a group basis. Some people would be sensitive to data collection in a racially segregated situation. This and other questions could be discussed in this office as you may wish.

The material can be returned to this office for processing for the staff review.

Very truly yours,

G. Dwight Rowe
Executive Director
Department of Educational
Research & Program Assessment

GDR/ep

Enclosure

c.c. Mr. Willis Johnson

milwaukee public schools

Department of Educational
Research & Program Assessment
DIVISION OF PLANNING AND
LONG-RANGE DEVELOPMENT

administration building
5225 west vliet st: p.o. drawer 10k
milwaukee, wisconsin 53201
area 414:476-3670

December 3, 1971

Mr. Wayne A. Sojkowski
3108 South 105 Street
West Allis, Wisconsin 53227

Dear Mr. Sojkowski:

Your request for participation of the Milwaukee Public Schools in your research study, "A Survey of Negro and Caucasian Students in the Milwaukee Public Schools in Relation to Leg Strength," has been carefully considered by the Central Office Staff and approved by the Division of Planning and Long-Range Development.

The request will now be presented to the schools in which data are to be collected. You may recall that the schools which were to be included in the sample will be selected. Participation of each school will be voluntary. If it is inconvenient for you to do this, you might wish to have the selection done in this office with Mr. Johnson. It would be on a stratified random procedure basis. If this would be your preference, would you please ask Mr. Johnson to contact me and we will follow through on that point.

Very truly yours,

G. Dwight Rowe
Executive Director

GDR/ep

c.c. Mr. Willis Johnson

APPENDIX B

SCORE CARD

Last Name _____ First Name _____ Grade _____

Age _____

Height _____

Weight _____

Tests	1st Trial	2nd Trial	3rd Trial
Sargent's Jump			
Dynamometer			
Standing Long Jump			

APPENDIX C

7th N=54 N-B	7th N=50 Black	9th N=51 N-B	9th N=58 Black	11th N=53 N-B	11th N=50 Black
140-11	45-11	203	150	175	160
145	50	256	240	220	219
154	97	270	247	279	315
162	105	298	248	310-11	333
165-11	120	310	255	320	345
175-11	150	318	270	335	388
185	155	323	298	350-111	412
190	165	345	300	380-11	415
191	171	366	305	388	468-11
211	178	405	309	390	482
218-11	200-111	420	330	395	495
220	211	423	365	417	500
225	212	424	370	425	502
228	224-111	437	375	430	503
235	225	455	395	440	505
238	228	470	398	465	515
245	255-11	491	400	478	520
250	260	495	402	480-11	535
282	270	503-11	409	488	548
285	280-111	508	410	500	558
290-111	292	510	411	530	565
292	300	511	422	535	570
298	302	512	427	540	579
308	305	520	430-11	547	608
309	339	541	438	550-11	611
310	348	550	440	555-111	615
315	358	553	450	560	622
327	359	569	468	562	635
335	360-11	578	470	570-11	675
340-11	370	581	482	575	681
343	420	593	485	585	693
348-11	421	599	504-11	590	722
360	430	629	525	602	725
365	461	640-11	532	608	745
399	472	648	535	610	766
425	510	669	542	625	770
440-11	525	716	545	630-11	833
451	545	752	560	670	862
472	590	774	579	712-11	880
530	610	779	590	810	902
545-11	760	788	591	830	905
563		803	600	915	928
580		842	605		956
632		864	609		975
		887	615		985
		900	625		1110
		910	627		1035
		945	657		1055-11
		1185	705		
			734		
			794		
			875		
			910		
			918		
			964		
			1070		

RAW SCORES FOR STANDING LONG JUMP IN INCHES

7th		9th		11th	
N=54 N-B	N=50 Black	N=51 N-B	N=58 Black	N=53 N-B	N=50 Black
47 -1	47	47	47	47	47
48 -1	48	48	48	48	48
49	49	49	49	49	49
50	50	50	50	50	50
51	51-3	51	51	51	51
52 -2	52-1	52	52	52	52
53	53	53	53	53	53
54	54-1	54	54	54	54
55	55	55-1	55	55	55
56 -2	56-1	56	56	56	56
57	57	57	57	57	57 -1
58	58-3	58	58-1	58	58
59 -2	59-2	59	59	59	59
60 -5	60	60	60	60	60
61 -2	61	61-1	61	61	61
62 -3	62	62	62	62	62
63 -5	63	63-3	63-1	63	63
64 -5	64-4	64-1	64	64	64
65 -1	65-2	65	65	65	65
66 -3	66-4	66	66-1	66	66
67	67-2	67-1	67-2	67-1	67
68	68-4	68-1	68	68	68
69 -10	69-6	69	69-1	69	69
70	70-3	70-6	70-2	70	70
71 -1	71-1	71-2	71	71	71
72 -2	72	72-3	72-2	72-2	72
73 -2	73-1	73-1	73-4	73-2	73
74	74-3	74	74	74-2	74
75 -6	75-1	75-2	75-4	75-1	75
76	76	76-3	76	76-5	76
77	77	77-2	77-1	77-1	77 -2
78 -1	78-1	78-4	78-6	78-1	78
79	79	79-3	79	79-1	79
80	80-2	80	80-2	80-1	80 -1
81	81-3	81-1	81-5	81	81 -2
82	82	82	82-3	82-2	82 -1
83	83-1	83-7	83-1	83-2	73 -1
84	84-1	84-2	84-5	84-4	84 -1
85	85	85-1	85-3	85-1	85 -2
86	86	86	86-1	86-4	86 -2
87	87	87-3	87-5	87-3	87 -3
88	88	88-1	88	88-2	88 -1
89	89	89	89-2	89-2	89 -2
90	90	90-1	90-3	90-4	90 -3
91	91	91	91	91-4	91 -3
92	92	92	92	92	92 -2
93	93	93	93	93-3	93 -2
94	94	94-1	94	94-1	94 -3
95	95	95	95-1	95	95 -3
96	96	96	96-1	96-2	96 -2
97	97	97	97	97	97
98	98	98	98	98	98 -2
99	99	99	99	99	99 -1
100	100	100	100-1	100-1	100 -3
101	101	101	101	101	101 -5
102	102	102	102	102	102 -1
103	103	103	103	103 -1	103
104	104	104	104	104	104 -1

FOR SARGENT'S JUMP IN INCHES

RAW SCORES

N=54 N-B S. J.	N=50 Black S. J.	N S. J.	N=58 Black S. J.	N=53 N-B S. J.	N=51 Blad S. J.
9 -1	9	9	9	9	9
10	10	10	10	10	10
11 -5	11-1	11	11	11	11
12 -9	12-3	12	12	12	12
13 -4	13-6	13	13	13	13
14 -10	14-3	14	14-1	14	14
15 -7	15-4	15	15-4	15	15
16 -9	16-11	16	16-2	16-4	16
17 -5	17-6	17	17-4	17-3	17
18 -3	18-4	18	18-8	18-7	18-3
19	19-6	19	19-3	19-7	19-3
20	20-4	20	20-13	20-7	20-2
21	21-1	21	21-5	21-10	21-7
22 -1	22	22	22-2	22-8	22-5
23	23-1	23	23-5	23-3	23-9
24	24	24	24-4	24-2	24-9
25	25	25	25-7	25	25-8
26	26	26	26	26-1	26-1
27	27	27	27	27	27-2
28	28	28	28	28-1	28-1
29	29	29	29	29	29
30	30	30	30	30	30
Grade	7th	9th		11th	