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Date April 28, 1992

COMPARISON OF ANAEROBIC POWER BETWEEN
BLACK AND WHITE SIXTH GRADE STUDENTS

A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville

William R. Powell

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DEDICATION

To my mom without whose love, support and encouragement, this project would have never been completed.

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ABSTRACT

This research attempted to determine if a difference in anaerobic power exists between black and white males and females between the ages of eleven and thirteen. To make this determination, fifty-seven black males and fifty-six white males were randomly chosen from one predominantly black school and one predominantly white school. The black males tested significantly better in the fifty yard dash ($P=.032$) and the standing long jump ($P=.012$). However, when cross-referenced for body fat percentage, no significant difference was found. In the female portion of the study, fifty-three black students and fifty-three white students were randomly chosen from the same schools. The black females fared significantly better in the fifty yard dash ($P=.000$) and the standing long jump ($P=.000$) despite having significantly more body fat.

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CHAPTER I

INTRODUCTION

Anyone who has watched sporting events with any regularity over the past several years has probably noticed that certain races of people do particularly well in selected sports. Caucasians have dominated the amateur swimming scene in much the same fashion as blacks have dominated the sprinting events in track and field. Asians have done likewise in the gymnastics area. In the United States, we have seen this issue take on an even sharper contrast within college and professional sports. Black Americans dominate basketball, the "skill" positions in football, and make up a substantial percentage of rosters in major league baseball, while comprising a minority of our total population. Whites, on the other hand, dominate tennis, golf and ice hockey.

While many researchers have attempted to explain these phenomena, or differences, they have been unable to do so because of the complexity which is integral to sport performance. Factors dealing with anthropology, physiology and biomechanics, as well as the many social aspects, must be taken into account. Social scientists (10, 25, 28) have hypothesized that differences in performance are the result of socio-economic manifestations, discrimination, or political environments in which athletes develop. This is in contrast

to the long standing physiological or psychological reasons given by scientists for observed differences.

In any review of this literature, one must take into account the mindset of the researchers involved. Frequently, the topic of race generates literature which has been permeated by either an unconscious racist attitude or overt racism (2, 38, 39). In fact, it would be difficult to perform a study which would be more controversial than one which tries to explain observations on the basis of race. Such is the case for the observed differences in athletic performance mentioned earlier. Due to the explosive nature of many of the movements in basketball and track and field, researchers have focused on possible differences in anaerobic power between blacks and whites as an explanation for these differences in performance. Most studies probing the differences in anaerobic power between blacks and whites were performed many years ago. Accordingly, none of these studies controlled for differences in body fat, which could affect the interpretation of the results of anaerobic power tests. The fifty yard dash and the standing long jump (SLJ) are power events in which the body must be projected through space. Although absolute body size is less important, relative fatness is a significant factor because it is dead weight which exerts a negative influence on performance. Since none of the earlier studies used body fat percentage as a cross reference, any difference in performance could be the result

of body fatness. The measured difference in anaerobic power between children is significant because it reflects differences without respect to training and the effects of adolescence. Consequently, any observed differences could be considered genetic in nature. These factors underline the need for further research into this area.

Purpose

The primary purpose of this study was to determine if a difference existed between black and white sixth grade students in anaerobic power as measured by the fifty yard dash and the standing long jump. Another purpose was to determine if any differences in anaerobic power were affected by differences in body fat.

Hypotheses

The following hypotheses were tested in this study: (1) the mean score for black sixth grade students, male and female, will be significantly better in the fifty yard dash and in the SLJ, (2) any measured difference in anaerobic power will be constant across each body fat grouping, and (3) the upper 5% of black students will run a significantly faster time and jump a significantly greater distance than their white counterparts' top 5%.

Definitions

1. AAPHERD - American Alliance for Health,
Physical Education, Recreation and
Dance.
2. Anaerobic- without oxygen.
3. Biomechanics- the structure or arrangement of
body parts.
4. Elite- for the purposes of this study, the
top five performers in each category.
5. Lange Skinfold Calipers- a commonly used instrument
to measure skinfold thicknesses on the
body.
6. Lean Body Mass (LBM)- the body weight minus the weight
of the body fat.
7. Quadriceps- the large muscle group at the front of
the thigh that is responsible for
extending the knee joint.
8. Static Stretching- a muscle lengthening procedure in
which a muscle is extended and held in
that position for ten to thirty seconds
in contrast to dynamic stretching which
involves constant motion.

9. Triceps- muscle located on the back of the upper arm and whose function is to extend the arm.
10. Type I Muscle Fibers- also called slow-oxidative; contain large numbers of mitochondria, capillaries, and have a high resistance to fatigue.
11. Type II A Muscle Fibers- fast twitch muscle fibers capable of rapid contractions and also possessing endurance capabilities.
12. Type II B Muscle Fibers- fast twitch muscle fibers capable of rapid contractions but with little endurance capability.
13. Vastus Lateralis- the outside muscle of four muscles which make up the quadricep muscle group.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter will present a review of the literature on anaerobic power differences between black and white youths of varying ages. Although a majority of the research seems to indicate that blacks are more powerful, the studies are out of date. Also, none of the studies attempted to adjust for body fat percentage, nor did they compare the top performers in the group.

Although many sociologists believe any differences to be a result of societal manifestations, this review will not provide a strong basis for such observations. Differences in biomechanics and muscle fiber type argue for a genetic component in the reasons for Black success in certain sports.

Early Motor Development

A review of studies using several developmental scales seems to indicate that black children consistently demonstrate advanced motor development as compared to white children during their first two years (3, 12, 20). Bayley did a comprehensive survey across several geographic areas of the United States and found that black children

outperformed whites at every age except fifteen months. Other researchers did much smaller studies of preschool children and found their results to be inconclusive (11, 17, 31, 33). Guttenburg (13) did a study of 9 year olds and found blacks to have more movement responses than their white counterparts. Van Alstyne and Osborne (37) found that blacks two to six years in age responded better to rhythmic patterns.

Thus, the available evidence indicates advanced motor development for blacks over whites during the first three to four years of life, but data are not conclusive for preschool children after four years of age. Furthermore, interpretations of these differences vary. Many researchers believe an environmental factor is related to the differences, particularly, child rearing practices between blacks and whites (21). Others suggest that the difference in earlier years is a result of genetic differences. Bayley (3) believes that black children are more sophisticated in their motor controls due to an inherited quality. This would be consistent with other studies involving twins (23), in which the evidence seems to indicate a significant genetic component. However, the studies which incorporate both biological and cultural factors to examine the interaction of the two do not appear in the literature.

Motor Performance at School Age

Most of the available literature concerning black and white comparisons has involved children of middle school age (eight to twelve years of age). In 1965, using fifth and sixth grade students, Ponthieux and Barker (29) found that both black boys and girls were superior to their white counterparts in the fifty yard dash and the SLJ. Malina (20) found similar results in 1968 when he tested six to twelve year olds and found black children to be faster in the 35 yard dash. Hutingier (15) tested black and white fourth and fifth graders in 1959 and reported that both black boys and girls were faster in the 35 yard dash; but in the sixth grade, only the black girls were significantly faster.

One study involving 600 males and females from kindergarten to second grade was performed in the Battle Creek, Michigan public school system to determine motor performance in the 30 yard dash, standing long jump, and 40 yard agility shuttle run (26). The findings were comparable to the ones listed above. Perhaps more significantly, however, is that in the scope of studies mentioned, all seem to indicate an advantage in anaerobic power for blacks constant over all grades (K-8).

Socio-Economic Considerations

Environmental, economic and social influences have often been used to explain differences in performance between racial groups. Edwards (10) states that any differences are the results of a stratified society and that blacks are denied access to power, prestige and money and consequently are channeled towards socially acceptable occupations, such as sports and music. Whites, on the other hand, have access to a wide spectrum of occupations and services. Therefore, blacks choose from an array of pursuits that they believe to be attainable. As successful examples of black athletes have become prominent, a sub-culture has developed which places sports high on its social values.

This opinion differs somewhat with data collected by Berger and Paradis (4). Taking thirty black students and thirty white students from similar socio-economic levels, Berger and Paradis tested for differences in physical fitness. They concluded that the black seventh grade boys were faster than the whites in the fifty yard dash and SLJ despite similar socio-economic levels.

In related research, Malina and Mueller (22) studied the effects of genetics and environment on

performance of siblings. In simplest terms, what they found was a strong environmental co-variation which differed with respect to sex. In other words, one brother adept in one task may influence his younger brother; but sisters were less likely to influence one another.

Also to be considered in this section is the opportunity afforded blacks to pursue various sports. According to Phillips (28), blacks excel in sports that have outstanding coaches and facilities available within the public school system (i.e. football, basketball, baseball, etc.). In sports where the best facilities and coaches are under the umbrella of private clubs and organizations (i.e. gymnastics, tennis, and golf), blacks are found in small numbers.

Within these sports in which blacks are afforded an equal opportunity, blacks have been found to dominate the positions requiring speed and jumping ability. Schneider and Eitzen (34) found that despite NFL changes in strategy and rules over a twenty-five year period, blacks continued to be the victim of "stacking": playing players in certain positions because they believe blacks react quicker or to be more "instinctive"; whereas, whites are placed in positions which require leadership ability (i.e. quarterback).

Carlston (6) extends this argument further by

observing that blacks are more likely to hone skills within a very competitive environment (i.e. inner city basketball) while whites, on the other hand, often practice alone in a less competitive situation. While this argument has some merit, it does not account for blacks' superiority in the sprints or the long jump, for example, in which the environment remains stable for all competitors.

Differences in Performance

Any review of performances in professional or world class circles is certain to be characterized by the fact that blacks have dominated football, baseball, and basketball.

In basketball, blacks constitute 71.5% of professional rosters (19). When broken down into individual performance categories, researchers found the difference even more staggering. As Johnson and Marple (16) discovered, blacks comprised the top 8 scorers and, in general, averaged more points per game than their white counterparts. Scully, Eitzen and Yetma (36), using other indicators found blacks to be significantly superior as well.

In boxing, one would have to go back to the Rocky Marciano and Jack Dempsey era before locating successful

white heavyweights.

Major league baseball rosters are comprised of 21% black athletes. Again, an observation of individual performance indicators by various researchers (i.e. mean lifetime batting avg.) seems to indicate that blacks have experienced greater success than their white counterparts (19).

In track and field there have been only two white male champions in the Olympics 100 meter dash since the 1960 Rome Olympics (32). In women's competition, there have been only three. In the long jump there have been only two non-black champions since Rome, but the whites have dominated in the high jump. It must be mentioned that these feats were accomplished during a period of fierce competition with two countries, U.S.S.R. and East Germany, who maintained outstanding athletic systems. They are also primarily Caucasian societies.

Some sports in which whites dominate are tennis, gymnastics, wrestling and weightlifting (18). Although these sports contain a significant power factor, it should be noted that each of these sports also requires varying degrees of technical difficulty and consequently places a premium on coaching.

Race-Linked Physical Characteristics

According to Coakley (8), sports success is directly related to physical ability. Nevertheless, he finds it difficult to accept that one or even several physical traits could affect performance of a particular group of people over a wide array of activities. One important reason is the inability to identify the concept of race. For example, with North American athletes, it is difficult to determine to what degree Afro-Americans are of pure Negroid descent.

One often researched possibility is the type of body build associated with a particular race of people. Himes (14) discovered, however, through a review of the literature that the notion of a racial "type" would be inappropriate. He found that although there is considerable variation within groups, there is also a significant overlap between races. Consequently, it would be ill-advised to compare performance based upon body shape or proportion.

Even if researchers were able to identify particular physical builds which were race-dependent, it would not take into account differences in lean body mass (LBM). According to Schutte (35) et.al., blacks' relative LBM is slightly greater than that of whites. By examining 34 black and white college students of identical

height, weight, and anthropometric dimensions, he and his colleagues concluded that blacks have relative more LBM, and therefore equations to estimate body composition should reflect as much.

Perhaps most significant in terms of race-linked physical traits would be any significant differences in terms of skeletal muscle. Ama and associates (1) did just that. They selected 23 male Africans and Caucasians. Care was taken to select individuals who were sedentary during and preceding the months of the study. By examining muscle biopsies of the vastus lateralis, the study determined that blacks had a significantly higher degree of Type II A muscle fiber, and concluded that in terms of skeletal muscle characteristics, black individuals were well endowed for sports events of short duration.

Wilmore and Costill (40) indicate that both sprinters and jumpers possess a disproportionate percentage of fast twitch (FT) muscle fibers in comparison to other athletes, as well as non-athletes. This would seem to indicate an advantage for people who are born with a favorable FT to ST muscle fiber ratio.

Biomechanically, blacks have been found to possess an advantage as well. Carter (7) determined this by studying 109 black and 84 white runners and jumpers from the Mexico Olympics. By constructing

proportionality profiles for each event and measuring the athletes, he concluded that in biomechanical terms, the differences suggest an advantage for blacks in running and jumping.

Although genetics appear to play a significant role in performance, Bouchard reminds us that there are two kinds of genetic effects (5). One is the kind of effect that is unaffected by lifestyle or environmental factors, an inborn ability. The other effect is one that is dependent on training. Defined as genotype-training interaction, it implies that a genetic component is responsible for an individual's response to exercise. Although Chagnon (9) has attempted to determine how sensitivity to training is affected by heredity, he has found it too difficult to draw any conclusions about sports performance and heredity.

Strength Development Considerations

Previously in this review, it was determined that black children possess superior motor ability. This would seem to indicate an enhanced motor neuron firing rate synchronization for blacks. If this is true, it

would improve an individual's potential to gain muscular strength and, consequently, anaerobic power. O'Shea (27) states that changes in the central nervous system as well as hypertrophy (an increase in muscle fiber diameter due to an increase in the number and size of myofibrils), and possibly hyperplasia (increase in the number of muscle fibers), are factors which occur in the development of strength.

CHAPTER III

METHODS AND PROCEDURES

Historically, researchers have used a variety of "field tests" to assess maximal anaerobic power (30). The Magaria Power Test, which requires a subject to run up a flight of steps, is one of the most popular. Others include the Sargent's jump-and-reach test, (a measure of vertical jump), a standing long jump, the fifty yard dash, and a type of shuttle run. Although the long jump is a good method to measure anaerobic power, it is not a reliable predictor of success in a short dash (24).

In this chapter the proposed methods and procedures of the present study will be presented in order to address the hypotheses mentioned earlier.

Purpose

The primary purpose of this study was to determine if a difference existed between black and white sixth graders in terms of anaerobic power as measured by the fifty yard dash and the standing long jump.

Description of Subjects

Two hundred and nineteen volunteers with no known health problems were used in this study.

Approximately half of the students were sixth grade physical education students from Middlesboro Middle School in Middlesboro, Kentucky. The remaining students were sixth graders who were enrolled in physical education classes at Vine Middle School in Knoxville, Tennessee. Only students aged eleven, twelve or thirteen were eligible for this study.

Stretching

All students performed several static stretches of the quadriceps, hamstrings and lower back muscle groups. These stretches were performed only after each student had jogged 400 meters on the track. (See below.)

Warm-ups

The warm-ups consisted of (a) a comfortable 400 meter jog around the track and (b) three forty-yard dashes. The stretching exercises described above were performed between these two warm-up activities.

Fifty Yard Dash

The dash was run on an asphalt track located behind each respective school, and the time was measured and recorded by a trained physical education instructor. A hand-held stopwatch was used to record the time to the nearest tenth of a second. The test was administered to two students at a time. After both students had taken a standing position behind the starting line, the starter used the commands, "Are you ready?" and "Go!" The command was accompanied by a downward sweep of the starter's arm to give a visual signal to the timer who stood at the finish line. The score was the amount of time between the starter's signal and the instant the student crossed the finish line.

Standing Long Jump

In the week preceding the test, a physical education instructor familiarized each student with the standing long jump (SLJ). Each student was instructed to keep his/her feet several inches apart and his/her toes just behind the starting line. Each student was given three attempts. The distance was measured from the takeoff line to heel or

other part of the body that touched the floor nearest the takeoff line. The best of the three trials, measured in feet and inches, was recorded. A special mat manufactured for testing the SLJ was used in the study.

Height and Weight

Each student was measured for height in shoes with no more than one inch sole thickness. The same scale was used for height and weight measurements of all students.

Skinfold Measurement

Two skinfold measurements were taken on each student. One was taken on the triceps of the right arm and the other on the back near the scapula. The triceps was taken halfway between the elbow and the acromion process of the scapula with the skinfold parallel to the longitudinal axis of the upper arm. The subscapular site (right side of the body) was 1/2 inch below the inferior angle of the scapula in line with the natural cleavage lines of the skin. The method used for measuring these skinfolds was:

- 1) Firmly grasp the skinfold between the thumb

and forefinger and lift up.

- 2) Place the contact surfaces of the caliper 1/2 inch above and below the finger.
- 3) Slowly release the grip on the calipers enabling them to exert their full tension on the skinfold.
- 4) Read skinfold measurement to the nearest 0.5 millimeter after needle stops (1 to 2 seconds after releasing grip on caliper).

These guidelines are in accordance with guidelines established by AAHPERD in the Physical Best Instructor's Guide.

In measuring the subscapular skinfold on the females, it was suggested that the student wear a loose fitting T-shirt or similar garment which allowed access to the skinfold site. All measurements on the girls were taken by one female teacher, and a male measured and recorded all boys' scores. Only individuals trained in body composition testing via skinfolds were used in this study.

Procedures

This study was conducted over an approximate one week period. On the first day, one-half of the sixth graders at Vine Middle School were tested; the

remaining students were tested the following day. All students were tested in their physical education classes. Middlesboro Middle School students were tested on the third and fourth days using the same procedure as the one used at Vine Middle School. The procedure for testing is described in the next paragraph.

After a group explanation of the procedures for the fifty yard dash, the SLJ, and the skinfold measurements, all students were taken through a stretching and warm-up routine. Afterwards, they moved to the fifty yard dash area to prepare for the run. As each student completed the run, he/she moved to the SLJ area where he/she was tested. From this area, the student moved to another test area to be measured for height and weight and finally to the fourth area where the skinfold measurements were obtained. Each student was tested in each category by the same individual.

An unpaired t-test was used to determine if a significant difference existed between black and white students. When such a difference did exist, an analysis of covariance was used to determine if any measured differences were the result of body fatness.

CHAPTER IV

RESULTS AND DISCUSSION

Summary of Results

Table 1 presents data for black and white males with respect to age, height, weight, skinfold measurements, and their performances in the 50 yard dash and the standing long jump (SLJ). Table 2 presents corresponding data for black and white females. The t-test for unrelated measures showed a significant difference between the groups of males with respect to weight, 50 yard dash time, standing long jump, and skinfold measurement. The females elicited similar differences in the 50 yard dash, standing long jump, skinfolds, and height; but there was no significant difference in body weight.

Discussion of Results

The first hypothesis, which stated that there would be a significant difference between black and white students in the fifty yard dash and standing long jump was accepted. These results are consistent with previous findings by Ponthieux and Barker (29), Malina

Table 1
Mean and Standard Error
For Black and White Male Students

Category	Black	White	P Value
No. of Students	57	56	
Age (mos.)	149.8 ± 6.0	150.7 ± 5.9	P=.413
Height (in.)	58.9 ± 3.3	59.7 ± 3.3	P=.205
Weight (lbs.)	90.6 ± 13.6	102.2 ± 22.8	P=.001
50 Yd. Dash (sec.)	7.0 $\pm .6$	7.3 $\pm .6$	P=.032
SLJ*(in.)	65.7 ± 8.1	61.7 ± 8.4	P=.012
Skinfold (mm.)	15.8 ± 4.6	19.0 ± 5.8	P=.001

*SLJ = Standing Long Jump

Table 2
Mean and Standard Error
For Black and White Female Students

Category	Black	White	P Value
No. of Students	53	53	
Age (mos.)	148.8 ± 6.5	147.2 ± 5.2	P=.168
Height (in.)	61.3 ± 3.3	59.5 ± 3.1	P=.006
Weight (lbs.)	112.2 ±17.4	110.2 ± 24.0	P=.625
50 Yd. Dash (sec.)	7.4 ± .5	8.0 ± .4	P=.000
SLJ*(in.)	59.9 ± 7.2	53.8 ± 7.1	P=.000
Skinfold (mm.)	28.4 ± 9.4	23.5 ± 8.7	P=.007

*SLJ=Standing Long Jump

(20), and Berger (4). (See Tables 1 and 2.) Since the white males were significantly slower, jumped shorter distances, and were fatter than the black males, an analysis of co-variance was performed to control for differences in skinfold thickness. The differences in performance of the 50 yard dash disappeared ($P=.263$), and the SLJ differences also disappeared ($P=.075$) suggesting that the black males' superiority in anaerobic power (as measured by 50 yard dash and SLJ) was the result of less body fatness. Interestingly, the black males had a significantly lower skinfold measurement and ran faster; but the black females had a significantly higher skinfold measurement and ran faster as well.

The second hypothesis stated that any differences in power between body fat groups would be constant. This was not always found to be true. (See Table 3.) The black males did not fare significantly better in any body fat group with respect to the standing long jump or the 50 yard dash. The overall significant difference between white and black males could be attributed to the higher number of black males in the lower body fat group. There was a significant difference between the male <14 groups and the male 20+ groups in both the SLJ and the 50 yard dash.

The results of the female tests were somewhat different than those of the males. Although the black

females had more subjects in the 30+ group and less in the 20+ group, the black females ran significantly faster in every group and jumped significantly farther in every group but the <20 group.

The third hypothesis stated that the top five of both black male and female groups would fare significantly better than their white counterparts. This was accepted in every category but the males' SLJ. (See Table 4.)

Table 3
Comparison of Selected Groups

Subject	Sknfld. (mm.)	No.	SLJ (mean)	P.Value	50 Yd. (mean)	P.Value
Bl.Males	<14	23	66.52	.413	7.01	.701
Wh.Males	<14	9	64.11		7.10	
Bl.Males	14-19	24	66.29	.197	7.04	.626
Wh.Males	14-19	25	62.96		7.12	
Bl.Males	20	10	63.10	.206	7.17	.081
Wh.Males	20+	21	59.00		7.64	
Bl.Females	<20	9	61.55	.063	7.21	.002
Wh.Females	<20	20	56.15		7.86	
Bl.Females	20-29	24	59.16	.001	7.24	.000
Wh.Females	20-29	22	52.04		8.10	
Bl.Females	30+	20	60.15	.032	7.58	.001
Wh.Females	30+	11	53.63		8.11	

SLJ=Standing Long Jump

Table 4
Comparison of Top Athletes

Subject	No.	50Yd.Dash	P.Value	SLJ	P.Value
Bl.Males	Top 5	6.18	.007	78.4	.063
Wh.Males	Top 5	6.34		75.2	
Bl.Females	Top 5	6.44	.001	73.0	.000
Wh.Females	Top 5	7.32		64.8	

SLJ=Standing Long Jump

Conclusions

Within the limitations of this study, it can be concluded that:

- 1) When controlled for body fatness, black males between the ages of 11 and 13 did not jump farther (as measured by the SLJ) nor run faster (as measured by the 50 yard dash) than white males of the same age;
- 2) Black females between the ages of 11 and 13 were significantly taller, faster, jumped farther, and had more body fat than white females of the same age;

- 3) Black females between the ages of 11 and 13 ran faster and jumped farther regardless of body fat than did white females of the same age;
- 4) Elite black males between the ages of 11 and 13 ran faster than white males of the same age; and
- 5) Elite black females between the ages of 11 and 13 ran faster and jumped farther than white females of the same age group.

Recommendations

Based on the design and results of this study, this author recommends that further research be initiated to determine if a difference in anaerobic power exists between black and white females when controlled for the onset of puberty. Since the black girls were taller, heavier, and more powerful, any differences in their performance with respect to whites could have been the result of puberty.

Another recommendation would be to test a larger population to determine if the results of this study as it pertains to elite athletes remains the same.

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APPENDIX

CONSENT FORM

PURPOSE OF STUDY

The purpose of this study is to determine if there is a difference in the anaerobic power of sixth grade black and white students.

DESCRIPTION OF THE STUDY

This study will take approximately one class period to complete. During your physical education class, you will receive a five to ten minute stretching and warm-up routine after which you will be instructed on running the fifty yard dash. After running the fifty yard dash, you will be given three opportunities to perform the standing long jump. From there, you will be measured for height, weight and skinfold measurements. One skinfold measurement will be from your triceps (back of upper arm), and the other will be from your back.

POTENTIAL RISKS AND DISCOMFORTS

Although falls and pulled muscles are a remote possibility, few if any injuries are expected in a study of this nature.

I have read the statement above and understand my role in this experiment and the risks involved. In addition, I am aware that:

- 1) My name, times and measurements will remain confidential.
- 2) I am entitled to ask any further questions concerning the procedures.
- 3) I may discontinue my participation at any time without penalty or prejudice toward me.

PARENTAL CONSENT. Return this form only if you do not consent to your child's participation in the study.

Date: _____ Signature _____

Date: _____ Signature _____

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VITA

William R. Powell was born in Middlesboro, Kentucky on September 16, 1957. He attended elementary schools in Middlesboro and graduated from Middlesboro High School in May, 1975. In September, 1975, he enrolled at Morehead State University in Morehead, Kentucky. The following year he studied at the University of Tennessee before completing his undergraduate work at Lincoln Memorial University where he received the degree of Bachelor of Arts in Health and Physical Education. In 1985, he enrolled in the graduate program at the University of Tennessee and worked as graduate teaching assistant in the Department of Physical Education. He received the Master of Science Degree in Human Performance and Sports Studies from the University of Tennessee, Knoxville, in May, 1992.

He is presently employed as a physical education teacher and coach in the Middlesboro Independent Schools in Middlesboro, Kentucky.