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EDUCATION PROGRAM AT A FOREIGN UNIVERSITY.

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Education, physical

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A DESCRIPTION AND ANALYSIS OF A PHYSICAL EDUCATION  
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By

Dave M. Adkins

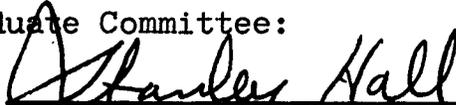
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in partial fulfillment of the requirements  
for the degree Doctor of Arts

August, 1975

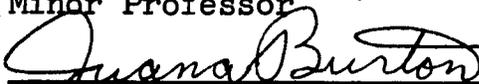
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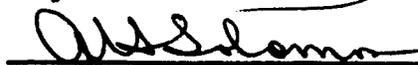
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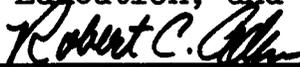
  
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## ABSTRACT

### A DESCRIPTION AND ANALYSIS OF A PHYSICAL EDUCATION PROGRAM AT A FOREIGN UNIVERSITY

by Dave M. Adkins

The purpose of the study was to describe and analyze the physical education program at a foreign university by ascertaining the level of physical fitness among male physical education majors. This was accomplished by comparing the level of physical fitness of the male physical education majors with a group of American college athletes. Comparisons were also made with existing American College Norms for men.

The subjects were sixty-two male college students. Thirty-one of the subjects were male physical education majors at the school of physical education at the University of Lourenco Marques in Mozambique. These physical education majors were referred to as Group B. Group A was composed of thirty-one American college athletes who were students at a liberal arts college in the United States. The age, height, and weight of each subject was recorded. In addition, the six item American Alliance of Health, Physical Education, and Recreation Youth Fitness Test was administered to both test groups. The six test items

Dave M. Adkins

included the standing broad jump, the shuttle-run, the 600-yard run-walk, the 50-yard dash, pull-ups, and sit-ups. Comparisons on each of the test items were made between Group A and Group B using the  $t$  test. Also, comparisons were made among Group A and Group B with established College Norms. The Median Test was employed in making this comparison. The .05 level of confidence was established as the criterion for the data measured.

Major findings of the present study included the following:

(1) The two test groups exceeded the College Norms on the test items at a level of statistical significance.

(2) In comparing height and weight, Group A (American athletes) was taller and heavier than Group B (African physical education majors) at a level of statistical significance. There was no significant differences in comparing the age of the subjects in Group A with Group B.

(3) Group A exceeded Group B at a statistically significant level in the performance of the standing broad jump, the shuttle-run, the 50-yard dash, and sit-ups. Group B showed superiority over Group A in performing the 600-yard run-walk and in pull-ups at a level of statistical significance.

## ACKNOWLEDGEMENTS

This writer wishes to recognize and express appreciation to the following people for their contributions to this project:

Mrs. A. T. Adkins, the writer's mother.

Dr. Stanley Hall, major advisor, and other graduate committee members: Dr. Aden, Dr. Burton, Dr. Kerr, and Dr. Solomon.

Ms. Geneva Alofs, dissertation typist.

Dr. Delmar De Boer, Mathematics Department, University of Tennessee at Nashville.

James McDonald, director of Computer Services, Grinnell College.

Carlos Abreu, chairman of the school of physical education, University of Lourenco Marques, Lourenco Marques, Mozambique.

Ron Mitchell, Maurice Hunt, Edd Bowers, athletic staff, Grinnell College.

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## CHAPTER 1

### INTRODUCTION

In physical education one vital function of testing is to identify existing levels of physical fitness. Only after the present level of physical fitness is determined can an ongoing physical education program be described and be analyzed in terms of that program's association with the physical fitness objective in physical education. If the results of the testing seem to indicate that a substantial number of students are weak in one of the vital aspects of physical fitness, description and analysis of the program could lead to an attempt to correct this deficiency.

This study was conducted in an effort to describe and analyze the physical education program at a foreign university. This was accomplished by determining the existing level of physical fitness among male physical education majors, as physical fitness was one of the stated objectives of the physical education program at that university. Although the foreign university under study offers a varied undergraduate academic program and also graduate professional degrees, the physical education program is in a fledgling state of development. No previous attempts had been made to describe and analyze

the physical education program in terms of the program's association with physical fitness. This would seem to have indicated that the program was in definite need of examination at the time the present study was conducted.

Classical studies in physical education use the medium of comparison to describe and to analyze physical education programs and to evaluate differences among test groups. Ikeda<sup>1</sup> used this technique in his study. He compared the physical fitness among children in Iowa, U.S.A., and in Japan. The present study used the medium of comparison in an attempt to describe and to analyze a phase of an ongoing physical education program. For the purpose of description and analysis two test groups were used. These two test groups included male physical education majors at the University of Lourenco Marques in Mozambique and male athletes at a liberal arts college in the United States. Further comparison among groups included the use of physical fitness Norms established by the American Alliance for Health, Physical Education, and Recreation in evaluating the physical fitness of college men in the United States.

Although the focus of the study was concerned with describing and statistically analyzing a phase of the physical education program at a foreign university by

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<sup>1</sup>Namiko Ikeda, "A Comparison of Physical Fitness of Children in Iowa, U.S.A., and Tokyo, Japan," Research Quarterly, XXXIII, (December, 1962), 541.

ascertaining the existing level of physical fitness among male physical education majors, factors other than physical fitness were cited. The description and analysis of the foreign physical education program crossed cultural barriers and implications from physical, social, economic, political, and geographical differences were cited.

#### STATEMENT OF THE PROBLEM

The purpose of the study was to describe and to analyze statistically a phase of the physical education program at a foreign university by ascertaining the existing level of physical fitness among male physical education majors. Physical fitness was one of the stated aims of the program under study and also is one of the four classical objectives of physical education, as stated by Bucher.<sup>2</sup>

##### Subproblem 1

What was the existing level of physical fitness among male physical education majors at the foreign university?

##### Subproblem 2

What was the existing level of physical fitness among university men participating in the athletic

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<sup>2</sup>Charles A. Bucher, Administration of Health and Physical Education Programs (St. Louis: C. V. Mosby Co., 1971), 38-45.

program at a private liberal arts college in the United States?

Subproblem 3

How did these two groups compare?

Subproblem 4

How did these two groups compare with Norms for college men in the United States as determined by American Alliance for Health, Physical Education, and Recreation testing?

SIGNIFICANCE OF THE STUDY

The physical educator should be concerned with understanding the needs of each individual student and attempting to meet those needs. Each student is different with different capabilities and each student can be viewed as a unique problem. The function of the physical educator is to make himself aware of the specific individual differences among the students through program description and analysis. He should then be prepared to adapt the ongoing program to meet each student's personal needs.

If the physical educator is to determine whether or not the physical education program is meeting each student's needs, thorough examination of the program must be attempted. By describing and analyzing different aspects of the program the needs of the student may better be

determined. A testing program for the purpose of program analysis may be justified in terms of determining student needs and thereby possibly contribute to the student's individual growth and development, as stated by Clarke.<sup>3</sup>

A physical education program which does not meet the needs of the individual students in term of program objectives should be restructured until testing procedures indicate that the stated objectives are being realized. Different schools of thought exist as to what objectives of physical education programs should be emphasized. Programs thus vary in stated objectives. Emphasis, however, is generally placed on the following objectives: physical fitness, gymnastics, individual and team games, sports, rhythmic, and recreation.

No matter what the stated objectives of a program might be, it would seem that physical fitness should be included in every effective physical education program. Physical fitness enables an individual to perform his occupational tasks, to face emergencies, to maintain sound health, to enjoy life to its fullest, and in general to

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<sup>3</sup>H. Harrison Clarke, Application of Measurement to Health and Physical Education (New Jersey: Prentice-Hall, Inc., 1961), 16.

be an effective person and citizen. The late President Kennedy<sup>4</sup> comments on the individual and civic values of physical fitness in the following:

For Physical Fitness is not only one of the most important keys to a healthy body, it is the basis of dynamic and creative intellectual activity. The relationship of the body and the activities of the mind is subtle and complex. Much is not yet understood, but we do know what the Greeks knew: that intelligence and skill can only function at the peak of their capacity when the body is healthy and strong; that hardy spirits and tough minds usually inhabit sound bodies.

In the seventies, especially, demands on college students the world over are greater than ever. College students must be able to cope with the pressures and demands of campus life and also be prepared for the demands of the future. The American Alliance for Health, Physical Education, and Recreation<sup>5</sup> comments on the college student and fitness as follows:

. . . For such tasks as the college student faces today, there is no substitute for a personal fitness and a competence which will see him through. At every state from freshman year through post-graduate study, success - full success - depends upon the way the student uses his personal resources, the way he develops his talents. It becomes clearly a personal responsibility to maintain a type of life which enables him to rise to the heights which will be required of him. . . .

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<sup>4</sup>Seaton, Clayton, Leibe, Messersmith, Physical Education Handbook (New Jersey: Prentice-Hall, 1969), 33, citing John F. Kennedy.

<sup>5</sup>American Alliance for Health, Physical Education, and Recreation Test Manual (Washington: AAHPER Publications, 1975), 2.

Studies indicate that there is some disagreement as to just how effective various physical education programs are in accomplishing the physical fitness objective. It is possible that a voluntary, recreationally oriented physical education program could also accomplish high standards of physical fitness. In order to insure, however, that the physical fitness objective is being realized, periodic testing must be conducted to describe and to analyze that phase of the program. Since personal fitness is necessary for meeting daily life needs, it would seem that it is imperative that physical fitness be emphasized in any meaningful description and analyzation of a physical education program.

#### DEFINITIONS

In this study, the following definitions were used:

1. Test Group A was composed of American male athletes who were participating in basketball or wrestling during the fall semester of the 1974-75 academic year.
2. Test Group B consisted of the entire population of male physical education majors enrolled for study during the fall semester of the 1973-74 academic year.

3. Isometric contractions, as defined by Johnson and Nelson,<sup>6</sup> are specialized exercises used to build strength and endurance. The isometric muscular contraction is performed by exerting force against an immovable object for a brief period of time. No movement of the body joints is involved.

4. Isotonic contractions, or weight training, as described by Johnson and Nelson,<sup>7</sup> involves the exertion of muscular force against an object with movement of the object as the objective. The contraction takes place over a range of movement.

5. A physical education program, as defined by Seaton, Clayton, Leibee, and Messersmith,<sup>8</sup> is concerned with the teaching of skills, knowledge, and attitudes in activities concerned primarily with body movement. The program, which may be voluntary or required, has physical fitness as one of its basic objectives.

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<sup>6</sup>Barry L. Johnson and Jack K. Nelson, Practical Measurements for Evaluation in Physical Education (Minneapolis: The Burgess Publishing Company, 1961), 241.

<sup>7</sup>Johnson and Nelson, Practical Measurements for Evaluation in Physical Education.

<sup>8</sup>Seaton, Clayton, Leibee, and Messersmith, Physical Education Handbook.

6. The American Alliance for Health, Physical Education, and Recreation<sup>9</sup> is an arm of the National Education Association and is the official body concerned with health education, safety, driver education, physical education, athletics, recreation, and outdoor education. Recommendations from the American Alliance for Health, Physical Education, and Recreation provide guidelines for secondary school and college programs in these areas.

7. The American Alliance for Health, Physical Education, and Recreation Youth Fitness Test,<sup>10</sup> which was created to measure the fitness of American youth during the Eisenhower administration, consists of six test items. These items may be administered either indoors or outdoors. Ponthieux and Barker<sup>11</sup> reported that each of the six items of the American Alliance for Health, Physical Education, and Recreation Youth Fitness Test was considered a valid measure of an important component of physical fitness. The test items measure strength, endurance, cardiovascular capacity, speed, agility, power, flexibility, and

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<sup>9</sup>American Association of Health, Physical Education, and Recreation Test Manual (Washington: AAHPER Publications, 1961), 3.

<sup>10</sup>American Alliance for Health, Physical Education, and Recreation Test Manual (Washington: AAHPER Publications, 1975), 15-22.

<sup>11</sup>N. A. Ponthieux and D. G. Barker, "An Analysis of the AAHPER Youth Fitness Test," Research Quarterly, (December, 1963), 525.

coordination. The six test items include the following:

- a. the standing broad jump
- b. the shuttle-run
- c. the 600-yard run-walk
- d. the 50-yard dash
- e. the pull-ups
- f. the sit-ups

Safrit<sup>12</sup> reported the test as being reliable and an accepted instrument to use in physical fitness testing.

8. College Norms<sup>13</sup> of the American Alliance for Health, Physical Education, and Recreation Youth Fitness Test are derived from the test results of 2,200 college men who participated in the six item American Alliance for Health, Physical Education, and Recreation Youth Fitness Test. The 50th percentile on each of the test items represents national average performance.

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<sup>12</sup>M. J. Safrit, Evaluation in Physical Education (Englewood Cliffs: Prentice-Hall, 1973), 227.  
Reliability Coefficients: (1) Standing Broad Jump .94, (2) Shuttle-Run .75, (3) 600-yard Run-Walk .80, (4) 50-yard Dash .95, (5) Pull-ups .89, (6) Sit-ups .75.

<sup>13</sup>American Alliance for Health, Physical Education, and Recreation Test Manual, 60.

## HYPOTHESES

For the purpose of this study, the following Null Hypotheses were tested:

HO<sub>1</sub>: There will be no significant differences in comparing the two test groups in age, height, and weight.

HO<sub>2</sub>: There will be no significant differences in comparing the two test groups in the performance of each of the six test items.

HO<sub>3</sub>: There will be no significant differences in comparing the two test groups with the established College Norms as computed from the medians of the six test items.

## CHAPTER 2

### REVIEW OF THE LITERATURE

In order to gain further insight into the problem of describing and analyzing an ongoing physical education program in terms of existing levels of physical fitness, the work of several researchers was surveyed. Literature was found concerning the problem of how different programs of physical education may be associated with changes in physical fitness levels of the participating students. Different facets of this problem were scrutinized by several investigators. No studies, however, which dealt specifically with a description and analysis of the physical education program for male majors at the University of Lourenco Marques in Mozambique, were reported.

The following studies are concerned with the problem of describing and analyzing an ongoing physical education program in terms of how a specific college level, men's physical education program is associated with physical fitness. Literature pertaining to this issue was arranged to deal with the following topics related to the problem

of program description and analysis: (1) aims and objectives in physical education, (2) defining physical fitness, (3) the effect of physical education programs on physical fitness, and (4) other influences on physical fitness.

### Aims and Objectives in Physical Education

To describe and analyze a physical education program, a discussion of program aims and objectives is vital. Aims and objectives serve as criteria for program description and analysis. Burton and Brueckner<sup>1</sup> mention that without stated criteria, no basis for describing and analyzing a program would exist.

Although the terms "aims" and "objectives" are frequently used interchangeably, Daughtrey and Woods<sup>2</sup> emphasize that a differentiation between the terms should be attempted prior to the use of these terms in establishing goals. These writers state that the term "aim" is used for a general category under which several objectives might appear, while "objectives" are practical, more attainable major points of emphasis toward the realization of the aims.

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<sup>1</sup>William H. Burton and Leo J. Brueckner, Supervision: A Social Process (New York: Appleton-Century-Crofts, Inc., 1966), 275.

<sup>2</sup>Daughtrey and J. B. Woods, Physical Education Program: Organization and Administration (Philadelphia: W. B. Saunders Co., 1971), 23.

Nixon and Jewett<sup>3</sup> emphasize that in the application of aims and objectives in an actual educational setting, ideally a physical education program in any school should be concerned with achieving the over-all aims and underlying objectives of the total educational system. Thus, the direction of the physical education program should take place within the framework of the aims and objectives of the ongoing school situation as a whole. These writers, however, state that the physical education program itself must have its own definite aims and objectives. Relative to this discussion, Seaton, Clayton, Leibee, and Messersmith<sup>4</sup> point out that the objectives of a physical education program can be classified into five categories: physical fitness, motor skills, knowledge, social objectives, and aesthetic objectives. These authors further state that there is a close association between the objectives of a program and the values attained from participation in that program. They conclude that any discussion of the aims of a physical education program should also include mention of not only objectives, but of values also.

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<sup>3</sup>J. Nixon and A. Jewett, Physical Education Curriculum (New York: The Ronald Press Co., 1964), 23.

<sup>4</sup>Seaton, Clayton, Leibee, and Messersmith, Physical Education Handbook (New Jersey: Prentice-Hall, 1969), 7.

From a similar point of view, Nixon and Jewett<sup>5</sup> further emphasize the importance of program values and state the following:

. . . the teaching of values is among the most crucial of current curriculum problems and it is therefore important to delineate the nature of a particular problem and focus on possible approaches open to teachers for guiding in the development of desired student values.

Concerning the actual preparation and selection of physical education objectives for implementation in an ongoing program, Cogan<sup>6</sup> feels that teachers frequently put far too little thought into this vital area of instruction, and he offers advice concerning the preparation of meaningful objectives. He states that an outline to follow in the construction of course objectives might be based in response to three questions:

(1) What is it we want to teach?; (2) How will we know when we have taught it?; and (3) What materials and procedures will work best to teach what we wish to teach?

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<sup>5</sup>Nixon and Jewett, Physical Education Curriculum, 136.

<sup>6</sup>Max Cogan, Curriculum Problems in Physical Education: Summary of Notes, (August, 1969) Northeast Missouri State University, Kirksville, Missouri.

Cogan<sup>7</sup> further emphasizes that meaningful objectives convey a picture to others as to what a successful learner is like. He states that in order to achieve meaningful objectives it is necessary to search for groups of words and symbols which communicate one's intent exactly as the teacher understands it--if misinterpreted, one is unsuccessful. Finally, he stresses that a meaningfully stated objective is one that is explicit and excludes the greatest number of possible alternatives to the desired goal.

Moving the focus of the discussion from the proper construction of program aims and objectives to the identification, selection, and explanation of these objectives, Nixon and Jewett<sup>8</sup> stress that curriculum objectives must be directed toward the fulfillment of basic human needs

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<sup>7</sup>Cogan, Curriculum Problems in Physical Education: Summary of Notes.

<sup>8</sup>Nixon and Jewett, Physical Education Curriculum, 23.

in terms of societal contest. This point is emphasized in the following:

Sound educational objectives lead to the satisfaction of basic human needs. Universal needs have been variously classified, but Murphy has synthesized the list to four main categories of inborn needs. These inborn needs include the following:

1. Visceral needs - related to the vital organs
2. Activity needs - these include the needs to explore, manipulate and keep going
3. Sensory needs - these include needs for color, tone, rhythm and the need to orient ourselves to the environment; the need to escape confusion; the urge to perceptual clarity
4. Avoidance needs- the need to avoid or escape attack, injury, threat, shock, or unbearable disturbance, as exemplified by fear, disgust, rage, and many other 'emergency responses.'

Agreeing with Nixon and Jewett on the matter of judiciously determining the objectives of a physical education program but focusing on the matter of social circumstances and democratic ideals, Crowell and Schwehn<sup>9</sup> speak to the importance of directing the program toward the value of "effective participation in the activities of our democratic society."

Although the authors--Nixon and Jewett along with Crowell and Schwehn--use different terminology in identifying physical education objectives; the description and

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<sup>9</sup>Crowell and Schwehn, Modern Principles in High School Physical Education (Allyn and Bacon, Inc., 1958), 69.

explanation of the objectives seem to parallel the objectives of physical fitness, motor skills, knowledge, social objectives, and aesthetic objectives as mentioned previously by Seaton, Clayton, Leibee, and Messersmith.<sup>10</sup> These authors conclude their discussion on objectives of physical education by emphasizing the importance of the physical fitness objectives and stating that "by its very nature physical education's chief contribution to the education of the individual is in the attainment of physical fitness."

#### Defining Physical Fitness

In the previous section, the discussion focused on physical education program aims and objectives and that these aims and objectives served as criteria for program description and analysis. It was noted that physical fitness is recognized among physical educators as one of the classical objectives of physical education. To describe and analyze a physical education program in relation to existing levels of physical fitness, it is essential to examine various definitions of physical fitness. Then an explicit definition for the purpose of this study can be attempted.

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<sup>10</sup>Seaton, Clayton, Leibee, and Messersmith, Physical Education Handbook.

Clarke<sup>11</sup> defines physical fitness as developing and maintaining a sound body with an effective functioning of the vital organs and with a capacity for physical activity. Taking a similar point of view, Hunsicker<sup>12</sup> explains physical fitness as having the available energy and the capacity to perform strenuous physical work and to recover from that exertion after exercise. Hunsicker suggests that the characteristics of physical fitness include a lower pulse rate, lower oxygen consumption during work, a faster recovery to normal heart rate and blood pressure after exertion, and an ability to endure larger amounts of physical work.

In further elaboration on this discussion dealing with different concepts of what physical fitness actually entails, Golding and Bos<sup>13</sup> state that some misunderstanding

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<sup>11</sup>H. Harrison Clarke, Application of Measurement to Health and Physical Education (New Jersey: Prentice-Hall, 1961), 16.

<sup>12</sup>Paul Hunsicker, Physical Fitness (Washington, D.C.: National Education Association Publication, 1963), 6-8.

<sup>13</sup>L. A. Golding and R. R. Bos, Scientific Foundations of Physical Fitness Programs (Minnesota: Burgess Publishing Co., 1967), 1.

still exists as to the essence of physical fitness. These authors comment as follows:

Many misconceptions exist as to the definition of physical fitness. Any youngster can put it in a simple word such as "strong, fast, or wind" and be remarkably accurate. However, it must be agreed that physical fitness is but one part of what might be called total fitness, which includes mental, emotional, and social fitness. Physical fitness refers to the physical - it may be called physical fitness, organic fitness, or physiological fitness. Physical fitness cannot be represented by any one item, rather it is made up of many items. Too often physical fitness is thought to be synonymous with strength. A strong man may not necessarily be physically fit, since strength is but one attribute of fitness. The strong man may tire easily, have high blood pressure, and be incapable of doing work for a prolonged period of time. Broad shoulders, narrow hips, and a lack of external fat may be desirable; however, this is not necessarily an indication of physical fitness.

Elaborating on the above reference to total fitness, Golding and Bos<sup>14</sup> emphasize that physical fitness is an element of total fitness and includes strength, endurance, cardiovascular capacity, agility, speed power, flexibility, and coordination. These authors feel that muscular strength, muscular endurance, and cardiovascular endurance are the "hard core" aspects of physical fitness.

From a similar position, Seaton, Clayton, Leibee, and Messersmith<sup>15</sup> state that three elements--strength, endurance, and cardiovascular capacity--are directly

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<sup>14</sup>Golding and Bos, Scientific Foundations of Physical Fitness Programs.

<sup>15</sup>Seaton, Clayton, Leibee, and Messersmith, Physical Education Handbook, 35.

related to the individual's physical effectiveness. These authors cite the following definitions:

1. Muscular Strength is the maximum amount of force or strength that a muscle or muscle group can exert in a single effort . . .
2. Muscular Endurance is the ability to persist in localized muscular effort . . .
3. Cardio-Respiratory Capacity is the ability to persist in strenuous tasks. It reflects the capacity of the cardiovascular and respiratory systems to supply the working muscles with oxygen.

A similar definition of strength and endurance comes from Johnson and Nelson,<sup>16</sup> who state that strength involves muscular force exerted in one maximum effort against an immovable or movable object, while endurance is the ability to sustain that particular effort.

From the essence of the discussion on the elements of physical fitness, it has been stated that strength and endurance, in addition to cardiovascular efficiency, are vital factors in physical performance. However, an implication was made that strength and endurance may be one entity. From the definitions by Seaton, Clayton, Leibe, and Messersmith and by Johnson and Nelson; the implication that strength and endurance are one and the same would seem inaccurate and that a differentiation between these two

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<sup>16</sup>Barry L. Johnson and Jack K. Nelson, Practical Measurements for Evaluation in Physical Education (Minneapolis: The Burgess Publishing Co., 1961), 241.

elements of physical fitness should be made. Strength involves a single maximum physical effort, while endurance involves repetition of that single exertion of force. Steinhaus<sup>17</sup> agrees with the differentiation between strength and endurance but concedes that strength is possibly the major component of physical fitness. He emphasizes that strength has to be developed and maintained and that modern man has shown weakness in three muscle areas--the upper body, the abdomen, and the feet.

In addition to independent and university researchers, a viable definition of physical fitness is of major interest to military leaders. Hunsicker<sup>18</sup> reports that the armed forces take a different approach in an attempt to explain physical fitness and state that a man is physically fit if he is devoid of physical disability and free from a pathological state. Larson<sup>19</sup> emphasizes that modern aerial warfare tactics place great strain on the body and that minimum standards of fitness are inadequate for the proper performance of duty under unfavorable conditions. He advocates an intensive physical conditioning program

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<sup>17</sup>Arthur Steinhaus, How to Keep Fit and Like It (Chicago: The Dartnell Press, 1957), 1.

<sup>18</sup>Hunsicker, Physical Fitness, 4.

<sup>19</sup>Leonard A. Larson, "Some Findings Resulting from the Army Air Forces Physical Training Program," Research Quarterly, XVII, (May, 1946), 144-155.

for military personnel and a more stringent definition of the term "physically fit."

Inferences from this discussion would seem to indicate that a viable definition of physical fitness would include an emphasis on the three major components of physical fitness--strength, endurance, and cardiovascular efficiency--in that the literature lends support to emphasis in these areas. Since the present study is concerned with the improvement and development of physical fitness, the comments by Steinhaus<sup>20</sup> in reference to physical weakness in modern man are of special interest. He states that it is the task of physical educators to devise physical education programs which improve and develop physical fitness and which attempt to remedy physical weakness.

#### The Effect of Physical Education Programs on Physical Fitness

In describing and analyzing a physical education program in terms of the existing level of physical fitness among program participants, consideration must be given to the possible relationship between program methodology and outcomes. In examining programs termed effective in realizing physical fitness, inferences may possibly be drawn regarding the relationship between methodology

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<sup>20</sup>Steinhaus, How to Keep Fit and Like It.

employed in the program under study and its outcomes in terms of physical fitness.

Slusher and Lockhart<sup>21</sup> report that physical educators are in complete agreement with the testimony that exercise is a vital, contributing factor in the development of physical fitness. Using this statement on the value of exercise in regard to developing and maintaining physical fitness, the discussion in this section focuses on the effect of various physical education programs and special training methods on the vital elements of physical fitness, i.e., strength, endurance, and cardiovascular efficiency.

Researchers in physical education recognize strength and endurance as vital elements in physical performance, and isometric training and weight training are regarded as effective methods in the development of strength and endurance. Writers, however, do differ in their findings as to which method of training is superior. Some researchers recommend isometrics; some recommend weights. There are also those who favor the combined use of the two training procedures.

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<sup>21</sup>Howard S. Slusher and Aileene S. Lockhart, Anthology of Contemporary Readings in Physical Education (Dubuque: William C. Brown Publishers, 1966), 183.

Among those finding that weight training had a significant effect on strength development was Chui,<sup>22</sup> who stated that potential athletic power increased in an experimental group training with weights. He compared the weight-trained group to another experimental group who participated in a required physical education program without the use of weights. Supporting the findings of Chui was Capen,<sup>23</sup> who compared two groups involved in different physical training methods. He reported that one of the groups trained with weights, while the other group used a program of strenuous exercises, excluding weights. He concluded in his eleven week study that weight training is more effective than general exercise in strength development, noting significant differences in muscular strength, muscular endurance, body weight, and general athletic power.

McGraw and Burnham,<sup>24</sup> who agree with the experimenters advocating weight training in developing strength as an element of physical fitness, found isotonic superior

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<sup>22</sup>Edward Chui, "The Effect of Systematic Weight Training on Athletic Power," Research Quarterly, XXI (October, 1950), 193.

<sup>23</sup>Edward K. Capen, "The Effect of Systematic Weight Training on Power, Strength, and Endurance," Research Quarterly, XXI, (May, 1950), 92.

<sup>24</sup>L. McGraw and S. Burnham, "Resistive Exercises in the Development of Muscular Strength and Endurance," Research Quarterly, XXX, (December, 1959), 387-98.

to isometrics in building endurance. Taking a different point of view and supporting isometric contractions as the superior training method in strength and endurance development was Hoffman.<sup>25</sup> This physical culturist, referring to test results involving former proteges, stated in rather lavish terms that isometrics allows an athlete to improve his performance; enables a man or woman to nearly double his or her strength; and is incomparable in building an imposing physique. Cureton<sup>26</sup> was more reserved in his analysis of isometrics. He stated that the main function of isometric training is to supplement a program of general physical conditioning. Commenting on the strength aspect of physical fitness, Healey<sup>27</sup> pointed out that isometric training and isotonic training are equally valuable in the development of strength.

Studies mentioned thus far indicate that both isometric training and isotonics are associated with significant increases in strength and endurance development. No mention was made of isometrics or isotonics

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<sup>25</sup>Bob Hoffman, "Functional Isometric Contractions," Athletic Journal, XLIII, (November, 1962), 20.

<sup>26</sup>Thomas K. Cureton, Physical Fitness and Dynamic Health (New York: The Dial Press Company, 1965), 59.

<sup>27</sup>Alfred Healey, "Two Methods of Weight Training for Children with Spastic Type of Cerebral Palsy," Research Quarterly, XXIX, (December, 1958), 389-95.

being associated with cardiovascular capacity, the other vital element of physical fitness.

In regard to the cardiovascular element of total physical fitness, Seaton, Clayton, Leibee, and Messersmith<sup>28</sup> view cardio-respiratory capacity as the ability to endure strenuous work and play without excessive or unusual body fatigue. Studies of these authors further indicate that running a prescribed distance within a certain time limit is an effective method to evaluate cardiovascular efficiency.

Cooper,<sup>29</sup> who has done extensive research with United States Air Force personnel, recommends a progressive program of running to enhance cardiovascular health. Cooper also categorizes and evaluates other forms of exercise in regard to the value of each particular activity in contributing to cardiovascular efficiency. Agreement with Cooper on the importance of vigorous physical activity in developing cardiovascular efficiency comes from Bos and Golding.<sup>30</sup> They recommend activities, such as running, swimming and cycling, to condition and develop the heart.

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<sup>28</sup>Seaton, Clayton, Leibee, and Messersmith, Physical Education Handbook.

<sup>29</sup>Kenneth H. Cooper, Aerobics, (New York: M. Evans and Co., 1968).

<sup>30</sup>Bos and Golding, Scientific Foundations of Physical Fitness Programs, 12.

Kistler<sup>31</sup> adheres to the original premise that exercise and physical education programs and training methods are associated with physical fitness levels. He found that strength, endurance, and agility can be increased in male college students in eight weeks of special training, which included strenuous calisthenics, individual sports, and running an obstacle course.

Studies in this section indicate that physical exercise is associated with the status of personal fitness and that specialized physical education programs are effective in developing certain aspects of physical fitness. It was reported that weight training and isometric contractions are associated with developing and maintaining strength and endurance. The literature further indicated that running and vigorous activity are associated with cardiovascular health and fitness. In regard to possible inferences to the present study, the emphasis on evaluating strength, endurance, and cardiovascular function seems justifiable in that these elements have been reported by the literature as being related to vital elements of physical fitness. Also in regard to the possible relationship to the present work, the special training methods

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<sup>31</sup>J. W. Kistler, "A Study of the Results of Eight Weeks of Participation in a University Physical Fitness Program for Men," Research Quarterly, XV, (March, 1944), 23.

discussed seem to be associated with effective practices of improving individual weaknesses, which may be shown by students being tested. Recommendations from the literature on the use of various physical training techniques, related to the improvement and maintenance of physical fitness, would seem appropriate in attempting to improve individual weakness among the students being tested.

#### Other Influences on the Development of Physical Fitness

Previous studies cited seem to indicate that physical exercise is related to levels of attainment in personal fitness. Also that specialized physical education programs have been effective in developing and improving existing levels of physical fitness. An examination of other aspects of the development of physical fitness would also seem to be germane to the problem of describing and analyzing a physical education program.

One vital aspect in the improvement of physical fitness is motivation. Successful performance of any physical activity is reliant upon the level of motivation of the participant. Morehouse and Miller<sup>32</sup> emphasize the

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<sup>32</sup>L. E. Morehouse and A. T. Miller, Physiology of Exercise (St. Louis: The C. V. Mosby Company, 1967), 233-34.

importance of motivation in physical accomplishment in the following statement:

Possibly the most important factor in endurance is the willingness to endure the discomfort that accompanies the onset of fatigue. Studies of participants in sports with severe endurance demands, such as rowing, have served to emphasize that many participants are motivated by a need to resolve personal problems. It may be possible that measures of endurance are quite largely measures of the compulsive drives that motivate a person. Step tests, treadmill running, and similar measurements very seldom give a true estimate of the endurance of the subject being tested since he is seldom motivated to put forth his best efforts. Laboratory findings indicate that significant cardio-respiratory changes occur when motivational stress factors are evident and that a greater work output is elicited.

Johnson and Nelson<sup>33</sup> agree with Morehouse and Miller on the significant role that motivation plays in physical achievement and cite the following in regard to the role of motivation in physical testing:

Several studies have indicated the effects of motivation upon strength performance. For example, Nelson found that students who exerted more effort under the influence of motivational situations had greater strength loss than those less motivated. Johnson found that motivated isometric training groups significantly increased their strength, whereas a non-motivated isometric training group made little or no gain when tested under conditions of no consciously induced motivation. . . . Thus strength measures seem to be greatly influenced by the level of motivation present during training and testing.

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<sup>33</sup>Johnson and Nelson, Practical Measurements for Evaluation in Physical Education, 268.

In addition to motivation, Berger and Layne<sup>34</sup> emphasize the importance of attitude in physical testing achievement. These experimenters found a significant relationship between attitude toward physical education and strength in evaluating male college students using a strength test, motor ability test, and an attitude test.

In this discussion it has been indicated that proper motivation and mental attitude are instrumental in success in physical activity. Other reports indicate that human factors also play a vital part in successful physical performance. These factors include nationality, race, age, height, weight, body structure, philosophy of the physical education program participated in, and frequency of activity.

Considering the factor of nationality, in comparing English youth and American youth, Campbell and Pohndorf<sup>35</sup> administered the American Association of Health, Physical Education and Recreation Fitness Test and found that the English outscored the Americans in all of the items except

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<sup>34</sup>R. A. Berger and R. A. Layne, "Strength and Motor Ability as Factors in Attitude Toward Physical Education," Research Quarterly, XL, (October, 1969), 635.

<sup>35</sup>Campbell and Pohndorf, "Health and Fitness in the Modern World." Journal of American Association of Health, Physical Education and Recreation, (December, 1970), 59.

the arm power test for boys. In a similar study, Sloan<sup>36</sup> compared the physical fitness of college students in South Africa, the United States, and England, using the Harvard Step Test as the measuring instrument. He concluded that the English men exceeded both the South Africans and the Americans in performance. The English women did not show a significant advantage over the South Africans, yet both were superior to American women. Another study concerned with the factor of nationality in physical fitness evaluation was conducted by Knuttgen and Steendahl<sup>37</sup> in Denmark. The purpose of this study was to evaluate the effects of the Danish school physical education program in terms of the physical fitness of the students. The American Association of Health, Physical Education, and Recreation Youth Fitness Test was used as the measuring instrument. The authors found conclusive support that the outdoor phases of the physical education program were of particular value in promoting physical fitness in terms of circulo-respiratory fitness.

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<sup>36</sup>A. W. Sloan, "Physical Fitness of College Students in South Africa, the United States, and England," Research Quarterly, (May, 1963), 244-47.

<sup>37</sup>H. G. Knuttgen and K. Steendahl, "Fitness of Danish School Children," Research Quarterly, XXXIV, (March, 1963), 34.

In a study which considered the factor of race in the attainment of physical fitness, Ponthieux and Barker<sup>38</sup> found that race is an important consideration in physical fitness testing. These two experimenters administered the American Association of Health, Physical Education, and Recreation Youth Fitness Test to Negro and Caucasian fifth and sixth graders. It was found that the Negro boys exceeded the Caucasian boys significantly in the performance of pull-ups, standing broad jump, 50-yard dash, and the 600-yard run-walk. The Caucasian boys exceeded the Negro boys in performing sit-ups, while there was no significant difference in the softball throw and shuttle-run. Another study illustrating the racial factor in physical fitness was conducted by Ikeda.<sup>39</sup> He administered the Iowa Test of Motor Fitness to children, age 9-12, in Iowa, and in Tokyo, Japan. Included in the test battery were sit-ups, standing broad jump, shuttle-run, forward bend, grass-hopper, pull-ups for boys, bent arm hang for girls, and a dash. The subjects were measured in terms of height, weight, knee-finger length, and leg length.

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<sup>38</sup>D. G. Barker and N. A. Ponthieux, "Partial Relationships between Race and Fitness with Socioeconomic Status Controlled," Research Quarterly, (October, 1968), XXXIX, 773-75.

<sup>39</sup>Namiko Ikeda, "A Comparison of Physical Fitness of Children in Iowa, U.S.A., and Tokyo, Japan," Research Quarterly, (December, 1962), 541-42.

The findings of Ikeda<sup>40</sup> seem to indicate that some specific anthropometric measurements, such as height, weight, knee-finger length, and leg length, could have influenced the physical performance of the groups considered. The larger children, however, did not necessarily outperform the smaller ones. Ikeda also pointed out that unknown extrinsic factors, such as differences in cultural background and living conditions, could have affected the results. Ikeda further stated that another factor which could have influenced the results was that the Japanese children had longer and more frequent physical education class periods than the Iowans. Ikeda concluded that the Japanese exceeded the Iowa subjects in all motor performance tests, except one, sit-ups, even though the Iowa children were heavier, taller, and had longer legs.

Further implications of Ikeda's study regard age and body structure as other intrinsic factors, besides race, related to physical ability. Ikeda found that the scores on six of the eight test items increased with an accompanying increase in the age of the subjects. Even though the American children were taller and heavier, the Japanese scored higher in the overall results of the testing.

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<sup>40</sup>Ikeda, Research Quarterly.

Taking a different position, Cureton<sup>41</sup> seems to discount the age factor and states that most adult men could engage in more strenuous physical workouts. Cureton concludes that the principal problem in physical participation for middle-aged men is their attitude, lack of understanding, and lack of specific objectives.

Loveless<sup>42</sup> found that in attempting to determine the relationship of the Navy Fitness Test to age, height and weight, that there was little relationship between age and the scores accomplished on the physical fitness test in the 17 to 30 age category. In the subjects past 30 years of age, a consistent decrease in fitness scoring was noted. Loveless also concluded that height seemed to affect the test scores less than age and weight, with the "smallest mean scores on all the items made by the heaviest groups."

Agreement with the importance of body weight in physical performance comes from Sills and Everett.<sup>43</sup> They

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<sup>41</sup>Thomas K. Cureton, "Physical Fitness Improvement of a Middle Aged Man," Research Quarterly, (May, 1952), 149-159.

<sup>42</sup>James C. Loveless, "Relationship of War-Time Navy Physical Fitness Test to Age, Height, and Weight," Research Quarterly, XXIII, (October, 1952), 347-55.

<sup>43</sup>F. D. Sills and P. W. Everett, "The Relationship of Extreme Somatotypes to Performance in Motor and Strength Test," Research Quarterly, XXI, (May, 1953), 223-28.

point out that excess body weight is a deterrent in performing pull-ups, push-ups, and squat jumps.

The findings of the studies in this discourse could suggest that particular nationalities of people, certain races of people, and people with similar body types and physiques within certain age groups have an affinity toward particular types of physical performance.

Program philosophy is another important factor affecting the accomplishment of the physical fitness objective in physical education. At this point in time with student resistance to traditional programs at a high level of intensity, physical educators are having to take the "populist forum" and defend the need for required physical education programs in the educational system. Wendler<sup>44</sup> lends strong support to the physical education requirement in schools by emphasizing that the elective type of program does not meet the needs of the students, especially the students who have definite physical weakness and need special supervision. In a study analyzing the physical fitness of male college students, Wendler concluded that "boys most needful of strenuous exercise tend to elect activities which require the least amount of exertion," and that an

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<sup>44</sup>Arthur J. Wendler, "An Analysis of the Physical Fitness of Freshman Male Students at the State University of Iowa," Research Quarterly, XIII, (October, 1942), 323-326.

elective physical education program does not meet student needs.

Parkman<sup>45</sup> concurs with Wendler on the effectiveness of a structured, supervised physical education program. He found that in developing personal fitness an experimental group performing ten minutes of vigorous exercises a day, under supervised conditions, was as effective as a 150 minutes of physical education class meeting bi-weekly in a less structured setting.

Another important consideration in the development of physical fitness is presented by Johnson<sup>46</sup> who stresses the frequency of physical participation may be related to physical accomplishments. Johnson's findings indicate that students participating in physical education classes five days a week were superior in physical performance and score higher on physical testing than students enrolled in a two and three day a week program. In a similar study, Kistler<sup>47</sup> disputes Johnson's findings and states that

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<sup>45</sup>James E. Parkman, "An Analysis of the Physical Fitness of College Men as Shown by the American Association of Health, Physical Education and Recreation Fitness Test," Dissertation Abstracts, (July-August, 1966), 103A.

<sup>46</sup>LaVon C. Johnson, "Effects of a Five Day a Week Versus Two and Three Day a Week Physical Education Classes on Fitness, Skill, Adipose Tissue, and Growth," Research Quarterly, XL, (March, 1969), 93.

<sup>47</sup>J. W. Kistler, Research Quarterly.

college men made significant gains in physical fitness in meeting physical education classes three days a week for thirty minute outdoor workouts.

The literature in this section indicates that acceptable physical education programs and training methods were associated with improved physical fitness, but that other influences are also important in attaining a desired level of fitness. These factors include motivation, attitude, nationality, race, height, weight, age, body structure, program philosophy, and frequency of activity.

In regard to the present study, each of these factors were examined and considered in drawing conclusions in describing and analyzing the foreign university's physical education program in terms of the existing level of fitness among male majors.

#### Summary of Related Literature

This section discussed literature which was related to the problem of describing and analyzing physical education programs in terms of stated program objectives. Although some experiments were similar to the present study, distinguishing factors existed between the works reviewed and this study. The material in this chapter was organized around the following topics: 1) aims and objectives in physical education, 2) defining physical fitness,

- 3) effect of physical education on physical fitness, and
- 4) other influences on physical fitness.

#### Expected Outcomes

In the description and analysis of the foreign university's physical education program, it was expected that there would be little difference between the two test groups in the performance of the physical test items if only the duration of training sessions and the age factor of each group were considered. Both groups were involved in similar physical fitness activities for the same amount of time and all subjects were of college age. The American group had access to some weight training equipment which was not available to the Africans. The literature did indicate that factors other than age and conditions relating to training sessions could influence physical performance. These other factors include motivation, nationality, race, height, weight, and program philosophy.

Because the two groups tested were from different geographical locations, it would be expected that "unknown extrinsic factors," such as cultural background and values, could influence the physical fitness test scores. However, it was hoped that conclusions herein could provide a basis for analysis, and possible improvement, in the foreign university's physical education program, which had previously never been described and analyzed.

## CHAPTER 3

### RESEARCH PROCEDURES

This chapter discusses the general methods and procedures used in the present study. This section includes the following: (1) the subjects, (2) selection of groups, (3) the training period, (4) training equipment, (5) testing conditions, (6) the measuring instruments, and (7) statistical techniques.

#### THE SUBJECTS

Sixty-two male subjects were involved in the testing. Thirty-one were physical education majors enrolled at the University of Lourenco Marques in Lourenco Marques, Mozambique, in the fall of 1973. See Appendix B, page 94-101, for more details on Lourenco Marques, Mozambique. These thirty-one male physical education majors were attending the university's school of physical education. The other group was thirty-one male athletes participating in basketball and wrestling at a private liberal arts college in the United States in the fall of 1974. Twenty-seven of the athletes were basketball players and four were wrestlers.

Seventy-two students began the physical fitness testing. Sixty-two subjects completed all six of the test items. Subjects were disqualified from the study for improper performance of test items, physical injury, and for excessive tardiness to the testing areas.

In Group A, the American athletes, thirty-eight subjects began the testing and thirty-one completed all six test items. Group B, the African physical education majors, had thirty-four start the testing with thirty-one completing the six test items. Scores on each of the test items were recorded immediately after successful completion of that item.

All data germane to the testing was recorded on a physical fitness data sheet. This included the name, age, height, and weight of each subject in addition to proper space for recording performances in the six test items--standing broad jump, shuttle-run, 600-yard run-walk, 50-yard dash, pull-ups, and sit-ups. Each participant in the study was weighed and measured before the physical fitness testing was administered. The height of each subject was recorded in feet and inches. The weight of the subjects in the American group was registered in pounds. Since the only scale available to weigh the African group was registered in kilograms (2.2 pounds), the weights were recorded in kilograms and then converted to pounds. The test data is shown in Appendix A, page 91-92.

## SELECTION OF GROUPS

No attempt was made to use the methods of technical random sampling in assigning students to the groups. The students in the foreign university group were screened for acceptance to the school of physical education. The American male athletes were members of the varsity basketball team or the varsity wrestling team. Both groups, the African physical education majors and the American athletes, were participating in a physical education honors program within their particular academic environment in that each group member was selected on the basis of merit in a competitive screening process. Nixon and Jewett<sup>1</sup> state that physical educators should give special attention to physical education honors programs in that participants in the honors program have greater motivation and deeper emotional involvement than the average physical education student. The athlete and physical education major are, in general, more committed to excellence in physical education than the average student.

The University of Lourenco Marques had an enrollment of 2,500 students. These 2,500 students were studying

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<sup>1</sup>J. Nixon and A. Jewett, Physical Education Curriculum (New York: The Ronald Press Company, 1964), 152.

in the colleges of economics, medicine, agriculture, liberal arts, and teacher preparatory.

The physical education program<sup>2</sup> was organized into two divisions, voluntary student participation and teacher preparatory (major). Student participation was organized on a voluntary basis with an emphasis on team sports. During the academic year competitive tournaments were conducted in soccer, basketball, volleyball, gymnastics, and track and field. Only fifty students, all male, participated in the voluntary program during the 1973-74 academic year. Participation and attendance in this division of the physical education program were so inconsistent and so limited that it was impossible to organize a reliable population to participate in any physical fitness testing.

The physical education teacher training program consisted of two groups of physical education majors. One group was preparing to teach in the integrated public and private schools within the City School District of Lourenco Marques. Racially, this group was predominately white; however a few black and "racially mixed" students were also involved. All of these students resided within the city

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<sup>2</sup>Information on the structure and organization of the physical education program obtained from a personal interview with Carlos Abreu, head of the physical education department at the University of Lourenco Marques.

limits of Lourenco Marques. This group excluded themselves from the physical fitness testing.

The other group of physical education majors was preparing to teach in the "suburbs," all black native villages, lying outside of the city limits of Lourenco Marques. This group of majors were black Africans and each student resided in one of the suburbs, outside of the city of Lourenco Marques. Since this writer taught the African group of physical education majors, the physical fitness testing for the present study was conducted with this group of physical education majors. A photograph of a portion of a native village appears in Appendix C, page 103.

The method of selection and admission to the school of physical education (Conselho de Educacao de Fisica) was much different from the methods employed in American colleges and universities. Generally, in American higher education, students apply for admission through a college or university admissions office, which administers the selection procedures. High school grades, character references, personal interviews, and usually some type of general college entrance examination are used as criteria for acceptance.

At the school of physical education at the University of Lourenco Marques six hundred African males

and females, 18-22 years of age, made initial application to the physical education teacher training program. A preliminary written examination eliminated 50 percent of the applicants. The 50 percent, or nearly three hundred applicants, did not meet the minimum requirements for entrance on the written examination. After the initial written examination was administered, further entrance criteria included another written test and a physical education skills test. The physical education skills test included a measure of running, jumping, throwing, and gymnastic skill.

This second testing procedure eliminated another 50 percent of the applicants. The remaining 150 applicants gained entrance to the physical education school and were allowed to begin teacher training. The class of 150 students was divided into three sections. One section began study in October; another section began study in February; and the third section began study in April. The actual teacher preparation course lasted ten weeks and included participation and study in the areas of soccer, basketball, swimming, gymnastics, and track and field. The physical education majors participated in each of these activities and were required to demonstrate a minimum level of proficiency in performing the physical skills involved in each activity. In addition to the actual physical

participation in the skills, lectures were conducted concurrently with each of the areas. Students were required to attend classes six hours a day meeting six days a week.

Upon successful completion of the ten week physical education teacher training program, the physical education majors were placed in teaching positions in suburban African schools in their home villages. The majors then assumed full time teaching duties, but were on a probationary period of four weeks. During this four week period, the students were carefully supervised by traveling professors from the University of Lourenco Marques school of physical education. The African teachers were paid about one hundred dollars a month for their teaching duties. See Appendix C, page 104-106 for photographs of African physical education teachers and pupils.

The actual teaching staff at the University of Lourenco Marques school of physical education included five professors from the University of Lisbon in Portugal. The professors had earned the equivalent of a bachelor's degree in physical education. This writer participated as a visiting professor lecturing basically on basketball; conducting basketball clinics; and coaching the university's basketball team. All academic instruction was conducted in the Portuguese language.

Although the teacher preparation program seemed adequate relative to the cultural mores of the state of Mozambique; equipment, facilities, and budget were very limited by American standards. The present study was termed vital by the staff at the school of physical education at the University of Lourenco Marques. This study was the first attempt to describe and to analyze statistically the university's physical education program by ascertaining the level of physical fitness among male physical education majors.

Each year there is a turnover of students at the University of Lourenco Marques due to grade promotion, to military conscription, and to the mobility of the population. The male students tested were enrolled at the university for the entire fall term of the 1973-74 school year.

The other group, Group A, consisted of athletes participating in basketball and wrestling at a privately endowed, co-educational, liberal arts college with an enrollment of about 1,200, located in the United States of America. The physical education program at this institution is voluntary and oriented towards such recreational and lifetime sports as golf, tennis, swimming, boating, camping, hiking, paddle ball, badminton, and dance. Team games are generally not included in the physical education program; however team sports

are played on the intramural and intercollegiate basis. There are no physical education majors, per se, at this institution.

Male athletic teams at this American college participate in an athletic conference with member schools of similar size and philosophy. This institution does not award athletic scholarships and no admission is charged for athletic contests. Academic standards are very high and the philosophy of the institution makes academic-athletic balance a reality. The athletic director and four coaches all teach in the voluntary physical education program. Although few of the 1,200 students are actually enrolled in physical education classes, a large percentage of the student body participates in intramurals, athletics, or some other phase of the total physical education program.

#### THE TRAINING PERIOD

Each student participating in the study had been involved in his group's activities eight weeks prior to the physical fitness testing. Group A, the American athletes, were training for basketball or wrestling during this eight week period. Group B, the African physical education majors, were also involved in physical training in their program for a period of eight weeks prior to the testing.

Both groups, A and B, were involved in similar physical activity working toward similar objectives of physical fitness and skill in specific areas in the eight weeks of training prior to the testing. The training activities for both groups included distance running, sprints, calisthenics, rope jumping, agility training, and specialized fundamentals for each group's particular area of concentration. The American group was involved in weight training three days a week, but the Africans did not have adequate facilities to do so. Both groups were striving to reach a high level of physical fitness and the physical training methods concentrated on various components of physical fitness. These components included strength, endurance, cardiovascular efficiency, speed, agility, power, flexibility, balance, and coordination, as stated by Golding and Bos.<sup>3</sup>

Group A, the American athletes, trained two hours a day, five to six days a week for eight weeks prior to the testing. Approximately 60 percent of the training session was directed toward the objective of physical fitness with the remaining 40 percent of the training session devoted to special skill training in basketball or

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<sup>3</sup>L. A. Golding and R. R. Bos, Scientific Foundations of Physical Fitness Programs (Minnesota: Burgess Publishing Co., 1967).

wrestling. Group B, the African physical education majors, attended classes six hours a day, six days a week at the school of physical education. However, the student was involved in actual physical activity for only about three hours of this time, with about 40 percent of this time devoted to physical fitness and about 60 percent devoted to skills training. During the other three hours of the school's day, the student attended lectures, demonstrations, and watched films related to physical education.

#### TRAINING EQUIPMENT

Group A, the American athletes, trained under excellent physical conditions in a modern athletic complex. It includes a 220-yard indoor track; a universal weight machine; isometric equipment; a regulation 94 ft. by 50 ft. hard maple basketball floor; an olympic swimming pool; tennis courts; and a heat-regulated wrestling room.

Group B, the African physical education majors, normally trained outdoors on a rather limited athletic field. It included a 400-metre track; soccer field; and basketball courts. When rain prevented outdoor activity, classes moved to a small gymnasium for gymnastic instruction. A limited number of weights and no isometric equipment was available for class use. The facilities available to the Africans are shown in Appendix C, page 107.

## TESTING CONDITIONS

The experiment was conducted in two different geographical locations of the world during different academic years. The testing with Group A, the American athletes, was administered in the fall semester of 1974 on the campus of the American liberal arts college. The administration of the testing with Group B, the Africans, was conducted at the University of Lourenco Marques school of physical education in Lourenco Marques, Mozambique, in the fall semester of 1973. This writer conducted the testing at both sites.

Even though, as stated in the section on Training Equipment, the American facilities and equipment for training far exceeded the African situation, actual testing areas were similar. All six items were administered in a two and one half hour testing period. Running events were conducted on a track while the other items were tested indoors at both sites.

## THE MEASURING INSTRUMENTS

Physical fitness testing procedures as recommended by the American Alliance for Health, Physical Education and Recreation were used in this study. The six item

American Alliance for Health, Physical Education, and Recreation Youth Fitness Test<sup>4</sup> which Safrit<sup>5</sup> previously reported as being reliable and a justifiable technique in physical fitness testing, was selected as the measuring instrument. Expedience in test administration was a prime factor in the selection of this particular measuring instrument. The six test items included the standing broad jump, shuttle-run, 600-yard run-walk, 50-yard dash, pull-ups and sit-ups. For a detailed description of the Youth Fitness Test, see Appendix E, page 116-121.

Each subject was weighed and measured prior to the testing. In addition, name and age were recorded on the physical fitness data sheet, which also included the recording of fitness performance. Raw scores of each item were recorded immediately after the item was completed. This writer, assisted by a professor from the respective participating institutions, conducted the testing. A description of the six test items include the following:

1. The standing broad jump was performed by each subject placing his feet several inches apart behind a take-off line. Before jumping, the subject was instructed

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<sup>4</sup>American Alliance for Health, Physical Education and Recreation Youth Fitness Test Manual (Washington: National Education Association, 1975).

<sup>5</sup>M. J. Safrit, Evaluation in Physical Education (Englewood Cliffs: Prentice-Hall, 1973), 227.

to swing his arms backward and bend his knees. The jump was accomplished by simultaneously extending the knees and swinging the arms forward. Each subject was allowed three trials with the best jump being recorded in inches. The jumps were measured from the take-off line to the part of the body that touched the floor nearest the line.<sup>6</sup>

2. The shuttle-run was run by each subject and timed to the nearest tenth of a second. Two lines, as given by the American Alliance for Health, Physical Education, and Recreation Fitness Test Manual, were marked on a concrete basketball court thirty feet apart and parallel to each other. One of the parallel lines was designated as the starting point. Two blocks of wood, two inches by two inches by four inches, were placed behind the other parallel line. The subject was timed in sprinting from the starting line to the other line; picking up a block of wood and returning it to the starting line; and then repeating the act with the second block of wood. Two trials were allowed for each participant. The better of the two trials was recorded.<sup>7</sup>

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<sup>6</sup>American Alliance for Health, Physical Education, and Recreation Youth Fitness Test Manual, 20.

<sup>7</sup>American Alliance for Health, Physical Education, and Recreation Youth Fitness Test Manual, 19.

3. The 600-yard run-walk was performed on a track with the objective of the student to cover the 600-yard distance in as short a time as possible. Walking was permitted and the total time was recorded in seconds.<sup>8</sup>

4. The 50-yard dash was administered to two subjects at a time with two stopwatches being employed for timing purposes. The score was recorded in seconds to the nearest tenth of a second.<sup>9</sup>

5. The pull-up was performed as given by the American Alliance for Health, Physical Education, and Recreation Youth Fitness Test Manual. The hands were placed on the bar in an overhand position, and the arms were extended with no bend at the elbows. The starting position for the pull-up was in this completely extended position. Swinging of the body, or any other unnecessary body movement, disqualified that particular movement. The bar was of an adequate height, eight feet from and parallel to the floor, so that each participant could hang with arms and legs fully extended without the feet touching the

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<sup>8</sup>American Alliance for Health, Physical Education, and Recreation Youth Fitness Test Manual, 22.

<sup>9</sup>American Alliance for Health, Physical Education, and Recreation Youth Fitness Test Manual, 21.

floor. Scoring was determined by the number of repetitions performed.<sup>10</sup>

6. The sit-up was performed according to the standards of the American Association of Health, Physical Education, and Recreation Youth Fitness Test. The pupil started the exercise lying on his back on the floor with his legs extended and his feet spread about two feet apart. The hands of the pupil were positioned on the back of the neck with the fingers interlocked. Each pupil performing the sit-up was assigned a partner to hold the ankles down in contact with the floor at all times. The pupil performed the exercise by sitting up and turning the trunk to the left and touching the right elbow to the left knee, returning to starting position, then sitting up and touching the left elbow to the right knee. The exercise was repeated as many times as possible with one point awarded for each complete movement of touching elbow to knee. No score was allowed if the fingers lost contact with the head. One-hundred was designated as the limit.<sup>11</sup>

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<sup>10</sup>American Alliance for Health, Physical Education, and Recreation Youth Fitness Test Manual, 16.

<sup>11</sup>American Association of Health, Physical Education, and Recreation Youth Fitness Test (Washington: AAHPER Publications, 1961), 8.

Physical fitness cannot be represented by any one item, rather it must include several elements, as stated by Golding and Bos.<sup>12</sup> The American Alliance for Health, Physical Education, and Recreation Youth Fitness Test meets the requirements for physical fitness testing as recommended by Golding and Bos<sup>13</sup> and represents evaluation in several elements of physical fitness. These elements include three major items--strength, endurance, and cardiovascular efficiency--in addition to speed, agility, power, flexibility, balance and coordination. The use of an instrument which measured all of these elements was considered to be a sounder method of assessing conditions than one which measured only a portion of the elements of physical fitness.

#### STATISTICAL TECHNIQUES

In the present study, the following statistical techniques were employed: (1) a comparison of the means between the two test groups, Group A and Group B, on the test items by use of the t test, and (2) a comparison of medians among Group A and Group B with the College Norms.

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<sup>12</sup>Golding and Bos, Scientific Foundations of Physical Fitness Programs, 1.

<sup>13</sup>Golding and Bos, Scientific Foundations of Physical Fitness Programs.

The .05 level of confidence, which indicates the degree of probability that any differences could have occurred "by chance," was judged to be a satisfactory criterion for the type of data measured. Since the present study was concerned with physical fitness testing, and not to data critical to the physiology of the human anatomy, the .05 level was used.<sup>14</sup>

#### Tests of Statistical Significance

The following hypotheses were tested:

HO<sub>1</sub>: There will be no significant differences in age, height, and weight between the two test groups.

HO<sub>2</sub>: There will be no significant differences in comparing the two test groups in the performance of each of the six test items.

HO<sub>3</sub>: There will be no significant differences in comparing the two test groups with established College Norms as computed from the medians of the six test items.

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<sup>14</sup>Henry E. Garrett, Statistics in Psychology and Education, 6th ed., (New York: David McKay Co., Inc., 1966), 215-17.

The t test was employed to determine if statistically significant differences existed between the means of the two test groups on each of the six physical fitness test items. These items included the standing broad jump, shuttle-run, 600-yard run-walk, 50-yard dash, pull-ups, and sit-ups. In addition, the mean age, mean height, and mean weight of the two groups were compared. This data is shown in the graphs in Appendix D, page 109-114.

If the computed values of t equalled or exceeded the table values, statistically significant differences existed. If the computed values of t were less than the table values, statistically significant differences did not exist.<sup>15</sup>

In comparing the two test groups with the established College Norms, the Median Test was used, as only percentile scores of the Norms were available. The Median Test, a non-parametric statistical test, was employed in the present study to compare medians of Group A and Group B with the College Norms. Siegel<sup>16</sup> describes the Median

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<sup>15</sup>Allen L. Edwards, Statistical Analysis (New York: Holt, Rinehart, and Winston, 1965), 138-40.

<sup>16</sup>Sidney Siegel, Non-Parametric Statistics (New York: McGraw-Hill, 1956), 111.

Test by stating the following:

The Median Test will give information as to whether it is likely that two independent groups (not necessarily of the same size) have been drawn from the same population with the same median. . . . The test may be used whenever the scores for the two groups are in at least an ordinal scale.

## CHAPTER 4

### ANALYSIS OF THE DATA

The purpose of this chapter is to analyze the data. The results of these analyses are included. This chapter presents the following: (1) presentation of the mean, median, and standard deviation of Group A (the American athletes) and Group B (the African physical education majors) on each of nine items--age, height, weight, the standing broad jump, shuttle-run, 600-yard run-walk, 50-yard dash, pull-ups, and sit-ups; (2) comparisons between the means of Group A with Group B on these nine items; and (3) comparisons among Group A and Group B with the Norms for college men on the six item American Alliance for Health, Physical Education, and Recreation Youth Fitness Test using median scores as the basis for comparison.

### TEST RESULTS

#### Presentation of Means, Medians, and Standard Deviations

Age presented in years. Group A had a mean age of 19.13, a median of 19.00, and a standard deviation of 1.31. Group B showed a mean age of 20.00 years, a median

of 19.00, and a standard deviation of 2.27. Table 1 shows this information.

Table 1  
A Comparison of Mean, Median, and Standard Deviation in Age (Years)

	N	Mean	Median	Standard Deviation
Group A	31	19.13	19.00	1.31
Group B	31	20.00	19.00	2.27

Height presented in inches. Group A had a mean height of 72.39, a median of 73.00, and a standard deviation of 3.08. Group B showed a mean height of 65.90, a median of 67.00, and a standard deviation of 9.68. This material is shown in Table 2.

Table 2  
A Comparison of Mean, Median, and Standard Deviation in Height (Inches)

	N	Mean	Median	Standard Deviation
Group A	31	72.39	73.00	3.08
Group B	31	65.90	67.00	9.68

Weight presented in pounds. Group A showed a mean weight of 165.48, a median of 165.00, and a standard deviation of 12.79. Group B had a mean weight of 139.19, a median of 139.00, and a standard deviation of 14.27. This information is shown in Table 3.

Table 3

A Comparison of Mean, Median, and Standard Deviation in Weight (Pounds)

	N	Mean	Median	Standard Deviation
Group A	31	165.48	165.00	12.79
Group B	31	139.19	139.00	14.27

Standing broad jump presented in inches. In the standing broad jump, Group A had a mean of 92.74, a median of 96.00, and a standard deviation of 8.85. Group B showed a mean of 87.71, a median of 90.00, and a standard deviation of 7.45. This material is illustrated in Table 4.

Table 4

A Comparison of Mean, Median, and Standard Deviation in the Standing Broad Jump (Inches)

	N	Mean	Median	Standard Deviation
Group A	31	92.74	96.00	8.85
Group B	31	87.71	90.00	7.45

Shuttle-Run presented in seconds. The shuttle-run showed Group A with a mean of 8.95, a median of 8.70, and a standard deviation of 0.53; while Group B had a mean of 10.90, a median of 10.90, and a standard deviation of 0.55. Table 5 shows these measures.

Table 5

A Comparison of Mean, Median, and Standard Deviation in the Shuttle-Run (Seconds)

	N	Mean	Median	Standard Deviation
Group A	31	8.95	8.70	0.53
Group B	31	10.90	10.90	0.55

600-Yard Run-Walk presented in seconds. The computation of scores in the 600-yard run-walk showed Group A with a mean of 107.68, a median of 108.00, and a standard deviation of 7.53. Group B had a mean of 98.71, a median of 99.00, and a standard deviation of 4.66. This information is illustrated in Table 6.

Table 6

A Comparison of Mean, Median, and Standard Deviation in the 600-Yard Run-Walk (Computed in Seconds)

	N	Mean	Median	Standard Deviation
Group A	31	107.68	108.00	7.53
Group B	31	98.71	99.00	4.66

50-Yard Dash presented in seconds. In the 50-yard dash, Group A had a mean of 6.09, a median of 6.10, and a standard deviation of 0.33; and Group B showed a mean of 6.59, a median of 6.60, and a standard deviation of 0.33. This material is presented in Table 7.

Table 7

A Comparison of Mean, Median, and Standard Deviation in the 50-Yard Dash (Computed in Seconds)

	N	Mean	Median	Standard Deviation
Group A	31	6.09	6.10	0.33
Group B	31	6.59	6.60	0.33

Pull-ups presented in repetitions. The computation of pull-ups showed Group A with a mean of 6.74, a median of 6.00, and a standard deviation of 2.28. Group B had a mean of 8.41, a median of 9.00, and a standard deviation of 2.69. Table 8 shows this material.

Table 8

A Comparison of Mean, Median, and Standard Deviation in Pull-ups (Computed in Repetitions)

	N	Mean	Median	Standard Deviation
Group A	31	6.74	6.00	2.28
Group B	31	8.41	9.00	2.69

Sit-ups presented in repetitions. In the sit-up testing, Group A had a mean of 88.16, a median of 100.00, and a standard deviation of 18.14; while Group B showed a mean of 61.81, a median of 55.00, and a standard deviation of 21.29. This information is shown in Table 9.

Table 9

A Comparison of Mean, Median, and Standard Deviation in Sit-ups (Computed in Repetitions)

	N	Mean	Median	Standard Deviation
Group A	31	88.16	100.00	18.14
Group B	31	61.81	55.00	21.29

Comparisons Among Groups in Age, Height, and Weight

Age. In the computation of age, the means of the raw scores of the two test groups were compared. The null hypothesis that there were no significant differences between the mean ages of Group A and Group B was supported at the .05 level of confidence.

The difference between the mean of Group A, 19.13, and the mean of Group B, 20.00, was not significant as the computed  $t$  value, -1.85, did not equal the table value of 2.00. This information is presented in Table 10.

Table 10  
A Comparison in Age, Computed in Years,  
Between Group A and Group B

	Mean	Computed $\underline{t}$	Table Value	Significantly Different at .05 Level of Confidence?
Group A	19.13	-1.85	2.00	No
Group B	20.00			

Height. In comparing the mean height of Group A with Group B, a null hypothesis was established that no significant differences existed. The null hypothesis was rejected at the .05 level of confidence. The mean of Group A, 72.39, was compared with the mean of Group B, 65.90, and the computed value of  $\underline{t}$ , 3.55, exceeded the table value of 2.00. This indicated that a statistical significance existed between the means of the two groups. Table 11 illustrates these findings.

Table 11  
A Comparison in the Height, Computed in Inches,  
Between Group A and Group B

	Mean	Computed $\underline{t}$	Table Value	Significantly Different at .05 Level of Confidence?
Group A	72.39	3.55	2.00	Yes
Group B	65.90			

Weight. In comparing the means of the two test groups in body weight, a null hypothesis stated that significant differences did not exist between the means of Group A and Group B. This null hypothesis was not accepted as the mean of Group A, 165.48, showed statistical significance over the mean of Group B, 139.19. The computed  $t$  of 7.64 exceeded the table value of 2.00. Table 12 contains this information.

Table 12

A Comparison in the Weight, Computed in Pounds,  
Between Group A and Group B

	Mean	Computed $t$	Table Value	Significantly Different at .05 Level of Confidence?
Group A	165.48	7.64	2.00	Yes
Group B	139.19			

Standing Broad Jump. In the standing broad jump, the mean of Group A, 92.74, exceeded the mean of Group B, 87.71. The null hypothesis, which stated that no significant differences existed, was rejected. The  $t$  score of 2.42 was greater than the table value of 2.00, indicating that a significant difference existed. Table 13 shows this material.

Table 13

A Comparison of the Standing Broad Jump, Computed in Inches, Between Group A and Group B

	Mean	Computed $\underline{t}$	Table Value	Significantly Different at .05 Level of Confidence?
Group A	92.74	2.42	2.00	Yes
Group B	87.71			

Shuttle-Run. The comparison between the mean of Group A, 8.95, and the mean of Group B, 10.90, indicated that a statistically significant difference existed. The null hypothesis which stated that homogeneity existed was rejected, as the  $\underline{t}$  score of -14.18 exceeded the table value of 2.00. (The lower score is superior.) This information is presented in Table 14.

Table 14

A Comparison of the Shuttle-Run, Computed in Seconds, Between Group A and Group B

	Mean	Computed $\underline{t}$	Table Value	Significantly Different at .05 Level of Confidence?
Group A	8.95	-14.18	2.00	Yes
Group B	10.90			

600-Yard Run-Walk. The results of the 600-yard run-walk showed Group A with a mean of 107.68 and Group B with a mean of 98.71. Thus the null hypothesis, which stated that no significant differences existed, was rejected, as the computed  $t$  of 5.64 exceeded the table value of 2.00. (The lower score is the better in this measure.) Table 15 shows this information.

Table 15  
A Comparison of the 600-Yard Run-Walk, Computed in Seconds, Between Group A and Group B

	Mean	Computed $t$	Table Value	Significantly Different at .05 Level of Confidence?
Group A	107.68	5.64	2.00	Yes
Group B	98.71			

50-Yard Dash. In computing the 50-yard dash scores, statistical significance was in evidence. Group A had a mean of 6.09 and Group B, 6.59. (Lower score is the better.) The computed  $t$  value of -5.97 was larger than the table value of 2.00, indicating that statistical significance existed. The null hypothesis claiming homogeneity between the groups was rejected. This material is shown in Table 16.

Table 16

A Comparison of Completion Time of the 50-Yard Dash,  
Computed in Seconds, Between Group A and Group B

	Mean	Computed $\underline{t}$	Table Value	Significantly Different at .05 Level of Confidence?
Group A	6.09			
Group B	6.59	-5.97	2.00	Yes

Pull-ups. In the pull-up testing, Group A showed a mean of 6.74, while Group B had a mean of 8.41. Statistical significance existed in this comparison as the computed  $\underline{t}$  value of -2.65 exceeded the table value of 2.00. The null hypothesis, which stated that there was no significant differences between the groups, was rejected. Table 17 illustrates these findings.

Table 17

A Comparison in Pull-ups, Computed in Repetitions,  
Between Group A and Group B

	Mean	Computed $\underline{t}$	Table Value	Significantly Different at .05 Level of Confidence?
Group A	6.74			
Group B	8.41	-2.65	2.00	Yes

Sit-ups. Group A had a mean of 88.16, with Group B showing a mean of 61.81 in sit-up testing. The null hypothesis indicating homogeneity between the groups was rejected, as the computed  $t$  score of 5.24 was larger than the table value of 2.00. Table 18 shows this information.

Table 18

A Comparison in Sit-ups, Computed in Repetitions,  
Between Group A and Group B

	Mean	Computed $t$	Table Value	Significantly Different at .05 Level of Confidence?
Group A	88.16	5.24	2.00	Yes
Group B	61.81			

Comparing the Groups with  
Established Norms

In comparing Group A with the College Norms by use of the Median Test, results showed that statistical significance existed. The null hypothesis, which stated that significant differences did not exist, was rejected. The value of 20.52, computed from the total scores on the six test items, exceeded the table value of 11.07 at the .05 level of confidence. Group A had 21 scores greater than the median of College Norms in the standing broad jump; 29 greater in the shuttle-run; 23 greater in the 600-yard run-walk; 31 greater in the 50-yard dash; 14 greater in

pull-ups; and 29 greater in sit-ups. This information is shown in Table 19.

Table 19

A Comparison of the Median of Group A with the Median of the College Norms

	Standing Broad Jump	Shuttle Run	600-Yard Run-Walk	50-Yard Dash	Pull- ups	Sit- ups
Number of Subjects Scoring Greater Than Median of College Norms	21	29	23	31	14	29
Number of Subjects Scoring Less Than Median of College Norms	8	1	6	0	8	1
Total	29	30	29	31	22	30
National Norms	87	9.7	112	6.8	6	47

Using the Median Test, the comparison of the median of Group B with the median of the College Norms indicated that statistical significance existed. The null hypothesis, which claimed no significant differences were present, was rejected. The computed value of 87.88 was greater than the

table value of 11.07. Group B was shown to have 17 scores greater than the Norms in the standing broad jump; 0 greater in the shuttle-run; 31 greater in the 600-yard run-walk; 24 greater in the 50-yard dash; 21 greater in pull-ups; and 22 greater in sit-ups. Table 20 illustrates this information.

Table 20

A Comparison of the Median of Group B with  
the Median of the College Norms

	Standing Broad Jump	Shuttle Run	600-Yard Run-Walk	50-Yard Dash	Pull- ups	Sit- ups
Number of Subjects Scoring Greater Than Median of College Norms	17	0	31	24	21	22
Number of Subjects Scoring Less Than Median of College Norms	12	31	0	5	5	9
Total	29	31	31	29	26	31
National Norms	87	9.7	112	6.8	6	47

## CHAPTER 5

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to describe and to analyze one phase of the physical education program at a foreign university by ascertaining the existing level of physical fitness among male physical education majors. The results, which were secured in relation to the problem with implications for possible modifications in future procedures, are presented in this chapter.

### SUMMARY

This study was conducted within the constraints of an educational program at a foreign university. Consideration for some of the more subtle factors, such as cultural differences, was given in the problem of describing and analyzing the foreign university's physical education program with regard to the criterion of physical fitness. This discussion is an analysis of the physical education program under study in relation to the results of physical fitness testing.

### Analysis of the Findings

An explanation of the results of the testing and consideration for the measuring instruments used indicate the following:

1. In comparing age, height, and weight of Group A, American athletes, with Group B, African male physical education majors, results showed that no significant difference existed between the two groups in age. With regard to height and weight, statistical significance existed between the two groups with Group A found to be taller and heavier than Group B.

These findings agree with those of Ikeda<sup>1</sup> who found in a similar study that American children were heavier and taller than Japanese children of the same age. Further support on the height and weight factors comes from Sloan.<sup>2</sup> He compared college men from South Africa, England, and the United States in age, height, and weight, while conducting physical fitness testing. The college men from the United States were found to be significantly taller and heavier than South African and English students of the same age.

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<sup>1</sup>Namiko Ikeda, "A Comparison of the Physical Fitness of Children in Iowa, U.S.A., and Tokyo, Japan," Research Quarterly, XXXIII, (December, 1962), 541.

<sup>2</sup>A. W. Sloan, "Physical Fitness Among College Students in South Africa, U.S.A., and England," Research Quarterly, XXXIV, (May, 1963), 244.

2. Considering the results of the standing broad jump, Group A exceeded Group B at a statistically significant level. An explanation of this superiority may lie in the differences in specialized training methods employed by the two groups. Group A, the Americans, participated in supervised weight training three days a week in conjunction with their normal training sessions. Group B, the Africans, had very limited weight training equipment and did no supervised work with weights.

Chui<sup>3</sup> offers support to this explanation of Group A's superiority in the standing broad jump. In comparing a weight trained group to another group who participated in a physical education program excluding weight training, he found that athletic power, which included the standing broad jump, increased significantly only in the weight trained group. Capen<sup>4</sup> gives further support to this explanation by reporting that in an eleven week study weight training was found to be more effective than general exercise in developing muscular strength and general athletic power. The standing broad jump was one of the

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<sup>3</sup>Edward Chui, "The Effect of Systematic Weight Training on Athletic Power," Research Quarterly, XXI, (October, 1950), 193.

<sup>4</sup>Edward K. Capen, "The Effect of Systematic Weight Training on Power, Strength, and Endurance," Research Quarterly, XXI, (May, 1950), 92.

test items included in the measure of athletic power in Capen's study.

3. In the shuttle-run, Group A exceeded Group B at a statistically significant level. This writer offers a subjective explanation of the outcome of the testing on this particular item. Group A, the Americans, approached each of the test items with obvious determination. Group B, the Africans, also showed interest and enthusiasm in all of the test items except the shuttle-run. Group B was apathetic, even disinterested in regard to the performance of this test item. There seemed to be no apparent or obvious reason for this inconsistency. Subtle cultural differences between the two groups may give insight in attempting to explain this situation.

Social status among peers is of extreme value to most Americans. Sage,<sup>5</sup> in discussing the interplay between sport and social status in America, comments as follows:

The need to achieve personal power, prestige, or status in one's group is considered one of man's basic acquired needs. . . .

Most studies on boys from elementary school through college have shown that athletic skill and physical performance is related to social status and prestige.

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<sup>5</sup>George H. Sage, Sport and American Society: Selected Readings (London: Addison-Wesley Publishing Co., 1970), 121.

From Sage's comments on the importance of the relationship between physical prowess and social status among American youth, an implication germane to this discussion may be made. Possibly the elements of social status and prestige served to motivate the American athletes in this study. Morehouse and Miller<sup>6</sup> cite the importance of motivation in physical accomplishment by stating that fitness scores may very well be an indication of the "compulsive drives that motivate a person." Johnson and Nelson<sup>7</sup> lend further support to this explanation and mention the role of motivation. They emphasize that strength measures are greatly influenced by motivational levels present during training sessions.

The value system of the African is almost diametrically opposed to the American mentality. The African physical education majors who participated in this study are not products of a success oriented society. Their life in the African village is very slow, casual, even still primitive. In addition, African students tend to embody the Portuguese philosophy of life, since the

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<sup>6</sup>L. E. Morehouse and A. T. Miller, Physiology of Exercise (St. Louis: The C. V. Mosby Co, 1967), 233-34.

<sup>7</sup>Barry L. Johnson and Jack K. Nelson, Practical Measurements for Evaluation in Physical Education (Minneapolis: The Burgess Publishing Co., 1961), 241.

Portuguese have had political control of the country for several hundred years. Alexander<sup>8</sup> comments on this influence and the Portuguese mentality in the following:

The Portuguese, like all Latin people, are a cheerfully philosophical and unhurried lot. An observer once remarked: 'The Portuguese believe life is best savoured at leisure, and the art they attach most importance to is the art of enjoyment.' This lack of urgency is often irksome to foreigners. . . .

Thus, the significant differences between Group A and Group B in the performance of the shuttle-run could possibly have been related to cultural differences of the two groups. It appeared that Group B lost concentration and was unable to sustain a consistent effort during the shuttle-run testing.

4. The results of the 600-yard run-walk showed Group B scoring significantly better than Group A. These results could possibly be related to the racial factor. Group B was composed entirely of blacks, while Group A had twenty-nine whites and two blacks. Related to the racial factor in physical fitness is the work of Ponthieux and Barker.<sup>9</sup> In comparing fifth and sixth grade pupils, these writers found that the male black students exceeded the

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<sup>8</sup>D. Alexander, Mozambique: A Guide to the Territory (Cape Town: The Rustica Press, 1971), 3.

<sup>9</sup>N. A. Ponthieux and D. G. Barker, "Relationships Between Race and Physical Fitness," Research Quarterly, XXXIX, (October, 1968), 468.

male white students at a statistically significant level in the 600-yard run-walk.

In another possible explanation of the results, Loveless<sup>10</sup> tested the relationship of physical fitness test scores to age, height, and weight. He observed that there was a decrease in physical fitness scores with an increase in body weight. Relative to the present study and this particular test item, Group A was significantly heavier than Group B. However, this factor may be negligible as body weight has not seemed to be a factor in most of the other comparisons between the two groups.

5. Considering the results of the 50-yard dash, Group A exceeded Group B at a level of statistical significance.

The findings of Group A surpassing Group B in the 50-yard dash agree with those of Chui.<sup>11</sup> This writer found that in comparing a group which trained with weights and a group which did no isotonic training only the weight trained group showed a significant mean gain in the 50-yard dash. Pre-test and post-test results were compared between the two groups. Further support to the findings of the

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<sup>10</sup>James C. Loveless, "Relationship of the War-time Navy Physical Fitness Test to Age, Height, and Weight," Research Quarterly, XXIII, (October, 1952), 347.

<sup>11</sup>Chui, Research Quarterly, 193.

present study were presented by Capen. In a study similar to Chui's, Capen<sup>12</sup> concluded that a weight trained group showed a larger mean gain than a non-weight trained group in the 300-yard dash after an eleven week treatment period. Group A trained three times a week in a supervised weight program, while Group B did no specialized isotonic training.

6. The results of the pull-up testing showed Group B scoring higher than Group A at a statistically significant level.

The work of Ikeda<sup>13</sup> supports these findings. In comparing the physical fitness of American boys with Japanese boys, both 9-12 years old, the Japanese exceeded the Americans at a statistically significant level.

The Kraus-Weber test,<sup>14</sup> which was administered in East Pakistan in 1958, indicated that the physical fitness of Pakistani girls and boys fell below the European level. The Pakistanis, however, did score better than the Americans. One area of obvious weakness among the American group was in the arm and shoulder region.

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<sup>12</sup>Capen, Research Quarterly, 92.

<sup>13</sup>Ikeda, Research Quarterly, 541.

<sup>14</sup>Hans Kraus and Ruth Hirschland, "Minimum Muscular Fitness Tests in School Children," Research Quarterly, XXV, (May, 1954).

Another factor in the results of the chinning test may be related to the body weight of the test groups. Group A, the Americans, were significantly heavier than Group B, the Africans. McCloy<sup>15</sup> comments on the influence of body weight in performing the pull-up by emphasizing that added body weight handicaps individuals in doing pull-ups.

7. In the sit-up testing, statistical significance was shown between the two test groups, as Group A exceeded Group B.

These findings are supported by Ikeda<sup>16</sup> who found that Japanese children scored better than American children in five of seven items in physical fitness testing. One of the items in which the Americans outscored the Japanese was sit-ups. In a similar study Noguchi and Yoshida<sup>17</sup> administered the American Association of Health, Physical Education, and Recreation Youth Fitness Test, which was employed in the present study, to Japanese and American children. The Americans exceeded the Japanese in only one item, sit-ups.

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<sup>15</sup>Charles H. McCloy, "A New Method of Scoring Chinning and Dipping," Research Quarterly, (December, 1931), 133-143.

<sup>16</sup>Ikeda, Research Quarterly.

<sup>17</sup>Noguchi and K. Yoshida, "Comparative Study of Motor Fitness between Japanese and American Youth," (Research Society for Motor Ability, Kagashim University, 1959).

Considering the racial factor in analyzing the results of sit-up testing, Ponthieux and Barker<sup>18</sup> found black children of the fifth and sixth grade level generally more fit than whites. However, in administering a seven item fitness test, sit-ups was the only item in which both white boys and girls surpassed the blacks.

8. Both Group A and Group B surpassed the median of the College Norms at a level of statistical significance. This outcome was expected, as both test groups were participating in physical education honors programs and had been screened for selection on the basis of physical prowess. The College Norms<sup>19</sup> were determined by testing 2,200 American college men randomly selected from various areas of the United States. Also, the two test groups had been involved in specialized physical training eight weeks prior to the testing.

Kistler<sup>20</sup> lends support to the value of specialized training in improving fitness. He found that endurance, strength, and agility were significantly increased

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<sup>18</sup>Ponthieux and Barker, Research Quarterly, 468.

<sup>19</sup>American Alliance for Health, Physical Education, and Recreation Test Manual (Washington: AAHPER Publications, 1975), 10-11.

<sup>20</sup>J. W. Kistler, "A Study of the Results of Eight Weeks of Participation in a University Physical Fitness Program for Men," Research Quarterly, XV, (March, 1944), 23.

in male college students in eight weeks of special physical training. In Kistler's study, the special training included strenuous calisthenics, individual sports, and running an obstacle course.

Lending further support to the advantage of regular physical workouts in relation to improved physical performance is Johnson.<sup>21</sup> She supports the desirability of five-day a week student participation in physical education, as opposed to two days a week or three days a week. She cites a test group in the five-day a week program as showing statistical significance over the two day a week groups and three day a week groups in (1) percentage reduction of body fat; (2) higher activity skill; and (3) higher physical fitness levels.

#### Summary of the Results

The following results were obtained from statistical treatment of the data:

(1) Group A, the Americans, were taller and heavier than Group B, the Africans, at a statistically significant level. There was no significant difference in age between Group A and Group B.

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<sup>21</sup>LaVon C. Johnson, "Effects of a Five-Day-a-Week vs. Two and Three Day-a-Week Physical Education Class on Fitness, Skill, Adipose Tissue, and Growth," Research Quarterly, XL, (March, 1969), 93.

(2) Group A surpassed Group B at a significant level in performance of the standing broad jump, shuttle-run, 50-yard dash, and sit-ups.

(3) Group B scored higher than Group A at a statistically significant level in the 600-yard run-walk and pull-ups.

(4) Both Group A and Group B exceeded the College Norms at a statistically significant level in using the Median Test to determine one score representative of all six test items.

Decisions were made on the tested hypotheses from results obtained in the present study as follows:

$HO_1$ : There was no significant differences in comparing the two test groups in age, height, and weight. Rejected.

$HO_2$ : There was no significant differences in comparing the two test groups in the performance of each of the six test items. Rejected.

$HO_3$ : There was no significant differences in comparing the two test groups with the established College Norms as computed from the medians of the six test items. Rejected.

## CONCLUSIONS

Based on the results obtained from the present study, the following conclusions have been drawn:

(1) The American athletes, as compared to the African physical education majors, showed superiority in terms of physical fitness.

(2) Limited equipment and lack of expertise among the faculty probably contributed to certain areas of weakness, especially concerning the use of specialized training to build strength and endurance. Unreliable sources of revenue for the physical education program may have been related to the inadequate equipment.

(3) Cultural mentality and societal values were probably related to the limited scope of the program.

(4) The complicated interplay of racial differences within the culture may have been a subtle factor in the overall ineffectiveness of the program in terms of realizing physical fitness.

(5) Geographical isolation may have contributed to the results in that exposure to progressive techniques was limited.

(6) Overall, the effort of the faculty and students was commendable under the circumstances. Philosophically speaking, the ramifications of the complexities of the foreign physical education program described may

parallel the complicated social, economic, and political labyrinth on the African continent. The foreign physical education program described and analyzed in the present study could be viewed as a microcosm of a very complicated continent.

### RECOMMENDATIONS

It appeared that the foreign university physical education program should concentrate on the possibility of acquiring some isotonic and isometric equipment for the purpose of building strength among its physical education majors. It would probably be impossible for this institution to purchase any sophisticated equipment, such as a Universal weight training machine. This writer, however, pointed out to the department head at the foreign university that the few weights available could be used more effectively and that a simple isometric rack could be constructed at small cost. A systematic combination isotonic and isometric strength building program could then be followed.

Extrinsic factors, such as cultural mentality, geographical isolation, and unreliable sources of revenue, make it difficult to cut to the heart of the problem and make absolute recommendations for possible improvements in the physical education program under study. Exposure to more progressive cultures, both for the faculty and

students in the school of physical education, would probably expedite attempts at improvement. Student and faculty exchange with South African, European, and American universities would seem to be an effective method to broaden the scope of the program principals. Exposure to secondary sources, especially films, would also aid in this effort toward an awakening. Difficult as these recommendations may seem, in considering the extrinsic factors previously mentioned, efforts of the suggested nature would probably be the most effective course of action in attempting a solution to the problem.

Some suggestions for further study include the following:

- (1) Conduct a similar study using a larger population to establish physical fitness norms in the foreign country.
- (2) Attempt comparisons between the foreign physical education majors in the present study and a group which would be considered homogeneous for purposes of program evaluation.
- (3) Conduct a study to determine the effect of cultural exchange programs on the attitudes of participating physical education faculty and students.

## APPENDIXES

APPENDIX A

RAW DATA USED IN STUDY

Group B	Age	Hgt.	Wgt.	Stdg. Broad Jump	Shuttle Run	600-yard Run-walk	50-yard Dash	Chin- ups	Sit- ups
B- 1	19	66	136	94	11.0	90	6.6	14	75
B- 2	20	65	139	84	11.1	99	7.1	10	95
B- 3	21	68	132	94	10.4	93	6.5	5	64
B- 4	19	68	139	85	11.4	105	6.4	6	84
B- 5	20	63	110	73	10.6	103	6.6	8	74
B- 6	28	69	141	91	10.3	97	7.0	5	44
B- 7	19	67	130	87	10.4	96	6.7	9	60
B- 8	20	70	169	91	10.7	99	6.4	14	100
B- 9	19	73	165	81	11.1	102	6.8	9	40
B-10	19	63	113	74	10.8	103	6.6	9	53
B-11	28	73	144	96	10.4	101	6.3	9	48
B-12	18	67	136	85	11.4	105	6.4	6	46
B-13	19	65	140	81	11.1	102	6.8	9	40
B-14	19	73	132	94	10.4	93	6.7	6	55
B-15	20	68	150	91	10.4	97	6.5	10	80
B-16	19	64	144	94	10.1	92	6.0	10	100
B-17	20	68	144	91	10.3	97	6.7	7	60
B-18	19	68	123	87	10.5	96	6.4	9	40
B-19	19	66	110	90	11.5	96	6.4	9	50
B-20	20	67	137	82	11.6	103	6.6	10	68
B-21	19	66	144	103	10.3	99	6.0	8	100
B-22	19	65	136	94	12.2	95	6.9	12	42
B-23	21	68	153	90	10.9	92	6.1	5	49
B-24	20	70	154	94	11.6	97	7.3	5	44
B-25	20	66	156	80	11.1	99	7.3	6	80
B-26	19	67	150	90	11.2	103	6.6	4	40
B-27	18	74	128	81	10.4	102	6.6	7	30
B-28	19	65	130	94	11.7	105	6.7	11	50
B-29	20	68	159	94	10.1	104	6.0	10	50
B-30	21	67	132	70	11.2	105	6.7	6	55
B-31	19	64	139	84	11.6	90	6.6	13	100

Group A	Age	Hgt.	Wgt.	Stdg. Broad Jump	Shuttle Run	600-yard Run-walk	50-yard Dash	Chin- ups	Sit- ups
A- 1	18	70	185	85	9.5	101	5.4	5	79
A- 2	18	67	148	84	9.8	103	5.6	7	100
A- 3	21	68	150	77	9.6	116	5.9	5	100
A- 4	18	71	172	92	9.1	103	6.0	7	94
A- 5	21	70	170	93	9.5	99	6.2	11	100
A- 6	18	67	135	80	9.4	110	5.7	11	68
A- 7	23	75	175	96	9.4	108	6.0	10	85
A- 8	21	76	180	98	8.7	113	6.0	9	100
A- 9	19	79	175	97	8.3	111	5.9	6	100
A-10	20	72	165	100	8.3	104	5.9	8	100
A-11	20	69	165	91	8.5	96	6.0	10	100
A-12	20	73	180	98	8.7	97	6.1	8	100
A-13	19	76	180	102	9.0	98	6.0	5	100
A-14	20	75	170	87	9.6	112	6.5	6	47
A-15	18	72	150	97	8.0	107	6.1	7	100
A-16	21	73	165	83	8.5	108	6.7	6	100
A-17	20	73	165	72	9.6	135	6.5	5	50
A-18	18	76	160	87	9.3	113	6.7	1	75
A-19	18	73	165	97	8.6	109	6.2	6	100
A-20	18	70	160	92	8.7	116	6.3	6	38
A-21	18	74	170	91	8.7	101	6.1	3	100
A-22	19	75	170	97	9.7	112	6.5	7	100
A-23	19	74	160	107	8.7	105	6.5	6	75
A-24	18	72	165	97	8.6	109	6.1	6	100
A-25	18	70	185	85	9.5	101	5.4	5	79
A-26	19	75	170	107	8.7	109	6.5	6	75
A-27	18	66	135	80	9.4	110	5.7	11	68
A-28	18	73	165	97	8.6	109	6.2	6	100
A-29	20	72	165	100	8.3	114	5.9	8	100
A-30	18	72	150	104	8.0	107	6.1	7	100
A-31	19	76	180	102	9.0	102	6.0	5	100

APPENDIX B

SUBJECTIVE ANALYSIS

## SUBJECTIVE ANALYSIS

### An American Educator's Impressions of Mozambique

#### The Job Responsibilities

This writer spent three years in Lourenco Marques, Mozambique (Portuguese East Africa), working as a physical education advisor and basketball coach--employed by Portugal and paid in Portuguese currency, the escudo. The first year was with the University of Lourenco Marques in the official capacity of physical education advisor and basketball coach. Actually, the majority of the responsibility rested in the basketball coaching duties. After the first year in Lourenco Marques, the position at the university was non-existent due to a de-emphasis on the extracurricular program. This de-emphasis was brought about by police intervention into some rather questionable student activities, regarded as subversive by authorities.

After having spent a rather hectic first year working in the school of physical education, coaching in a very competitive semi-professional basketball league, and attempting to adjust to life in general in Mozambique, this writer spent the summer holidays traveling and conducting basketball clinics in the neighboring countries of Rhodesia and South Africa. Upon returning to the

University of Lourenco Marques in the fall after the holidays, it was revealed that this writer's position no longer existed. At that point, contact was made with Sporting Clube de Lourenco Marques, an affiliate of Sporting Club of Lisbon--one of the large sports clubs in Europe. A contract was negotiated and responsibility rested mainly in coaching the club basketball team and teaching physical education in a private Portuguese school. Life with Sporting was much less hectic and the Portuguese language proficiency was finally reaching a comfortable level. Probably the fact that the basketball team won the city championship of Lourenco Marques, the Provincial Championship of Mozambique, National Championship of Portugal, and represented Portugal in the European Cup Championships was one of the primary sources in an improvement in this writer's life in Mozambique.

After having completed two rather difficult, but interesting years in Mozambique, this writer returned to the United States for the summer (1973). However, at the end of the summer another contract was offered and the lure of the travel was impossible to resist. This third year was spent in a similar capacity as with Sporting Clube, physical education advisor and basketball coach, but the employer was Grupo Desportivo which was also a sports club. The year passed, a coup occurred in Portugal,

and this writer returned to Europe and then to the United States after life had been more than extenuating in the days after the coup.

Lourenco Marques--the City; Mozambique--the Country

Lourenco Marques is located in Mozambique, in East Africa. The city is an interesting combination of the cultures of European Portugal and Southern Africa. A sleepy, seaport city of 250,000 people, the continental look is present with sidewalk cafes lining the streets among a modern downtown area. It is not unusual, however, to see the cultural contrasts as an African mother may be breast feeding her child on a street corner. The weather is superb, but rather monotonous. The sun shines nearly every day of the year creating a tropical climate, with seasons exactly reversed from the United States. Social life includes the cinema; unusual restaurants; the beach; and an extreme spectator interest in basketball, which is played ten months out of the year.

There was a well-kept 18-hole golf course at a private country club, of which this writer opted to join, replete with modern swimming pool, squash courts, and club house. Also, beautiful hard-surface and clay tennis courts were available; however, most of the tennis was played in the evenings under the lights to escape the extreme heat of the day.

Mozambique, also known as Portuguese East Africa, is administered as a state of Portugal, and with eight million people, is second only to metropolitan Portugal in population among Portuguese territories. Alexander<sup>1</sup> comments on the state of Mozambique and its capital city, Lourenco Marques, as follows:

. . . Mozambique lies between the latitudes of 10 and 25 South, which means it is very much a tropical country: hot and humid in summer, but pleasant in winter. . . . Concerning Mozambique's population, the whites number around 200,000, which is not much less than Rhodesia's white population. There are about 25,000 Indians and 3,500 Chinese, who are mainly shopkeepers, market gardeners, fisherman, and restaurateurs. The remainder of the population are Africans belonging to forty-three different tribes. The largest are the Ronga (around Lourenco Marques). . . . The two largest cities are Lourenco Marques with over 250,000 people (70,000 whites), and Beira which has a population of more than 100,000 (16,000 whites). . . . The province has some sizeable foreign communities. There are English and South African colonies of Lourenco Marques, and the German and Swiss communities of the north. . . . The language spoken is Portuguese.

Alexander<sup>2</sup> further states that Mozambique's economy relies largely on agriculture and foreign trade and that writer offers further explanation of economic matters

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<sup>1</sup>Douglas Alexander, Mozambique: A Guide to the Territory (Cape Town: The Rustica Press, 1971), 2-3.

<sup>2</sup>Alexander, Mozambique: A Guide to the Territory, 7.

in Mozambique as follows:

Mozambique's economy is based largely on agriculture and transit traffic through the ports of Lourenco Marques and Beira to South Africa, Rhodesia, Swaziland, Malawi, and Zambia. With so much fertile plain - watered by great rivers like the Incomati, Limpopo, Save, Busi, Pungue, and Zambezi, and thickly populated with African labour - Mozambique is inevitably a rich agricultural country. Farm products roughly comprise 30 percent of Mozambique's gross national product. Various crops account for nine of the province's top twelve export items. . . . Over 85 percent of the population is involved in cultivation. Less than 10 percent of the land, however, is farmed. . . . The main crops are cotton, sugar, tea, sisal, rice, maize, timber, tobacco, coconuts, and cashew nuts. . . .

#### Organization of Physical Education and Sport in Lourenco Marques

The School of Physical Education, Conselho Provincial de Educacao de Fisica e Desportos, trains physical education teachers for suburban schools (strictly African students), the city schools (African and Portuguese), and private schools. In addition, the Conselho provides tutelage and leadership for the private sports clubs, which are the major force in sport in Mozambique (as in Europe). This writer did testing for the present study with physical education majors at the School of Physical Education.

Physical education is taught in both the elementary and secondary schools and there is also a very low-key extramural athletic program administered in these schools.

But the heart of athletic competition is in the sports clubs. These clubs, which number eight in Lourenco Marques, have their own facilities for soccer, basketball, track and field, court soccer (futebol salao), rifle and pistol matches, and swimming. The clubs field teams in sport from junior high school age through high school. After an athlete has reached the age of 18, he then becomes a member of the senior team. Senior team players are subsidized by club officials and members. Players normally compete until about age 30. Subsidization may occur in the form of giving players preference in jobs, housing, meals, and cash payments.

The sports club actually is a combination of the American junior high, high school, and college athletic programs in one. Club officials are normally affluent people from industry, commerce, and government, while Club members come from all walks of life. It is not unusual for a club to have a roster of 1,500 members. Clubs are financed from government funds (each club getting an equal allowance), gate receipts, and contributions from members. Club loyalties are very strong and most social fraternization is among members of the same sports club.

Basketball is the major sport in Mozambique. Club teams compete at all age levels for championships. The senior champion of the city of Lourenco Marques

advances to provincial competition. The winner of the Mozambique provincial tournament qualifies for the National Championship, which involves the champion of metropolitan Portugal and Angola. The winner of the National Tournament, played each year at a rotating site in either Angola, Mozambique, or Portugal, is declared National Champion and represents Portugal in the European Cup Championship with both Eastern and Western European countries. The competition is very keen and most important games are played to capacity crowds of 7,000 to 8,000 people.

#### Mozambique: The Future

As was mentioned in a previous section, a coup did occur in Portugal, which had far reaching effects on the Portuguese world (Angola, metropolitan Portugal, Portuguese Guinea, Macau, and Mozambique). In essence, Portugal was having a difficult time financing wars in her African states against purported "liberation groups." These wars, especially in Mozambique and Angola, are portrayed as attempts of the African people to gain freedom and equal footing with the Portuguese. In Southern Africa, it is a well known fact that there is strong communist support in all of the conflicts and that large numbers of Chinese are working in and, in a sense, occupying Tanzania and Zambia, located north of Mozambique. It appears that the

possibility of Chinese domination in East Africa is drawing closer to a reality. The last stronghold may be South Africa, minerally the richest country in the world and definitely a key in future world politics. In summary, Mozambique's future looks to be, at least, uncertain.

APPENDIX C

PHOTOGRAPHS



Figure 1

Photograph of a Portion of an African Village



Figure 2

Photograph of an African Teacher with Pupils  
in Basketball Instruction



Figure 3

Photograph of African Teachers with Pupils  
in Roll Call Order



Figure 4

Photograph of African Teachers with Pupils  
in Gymnastic Instruction



Figure 5

Photograph of Facilities Available for the African  
Physical Education Program

(basketball pavilion, 400-metre track, and soccer stadium)

APPENDIX D

GRAPHS

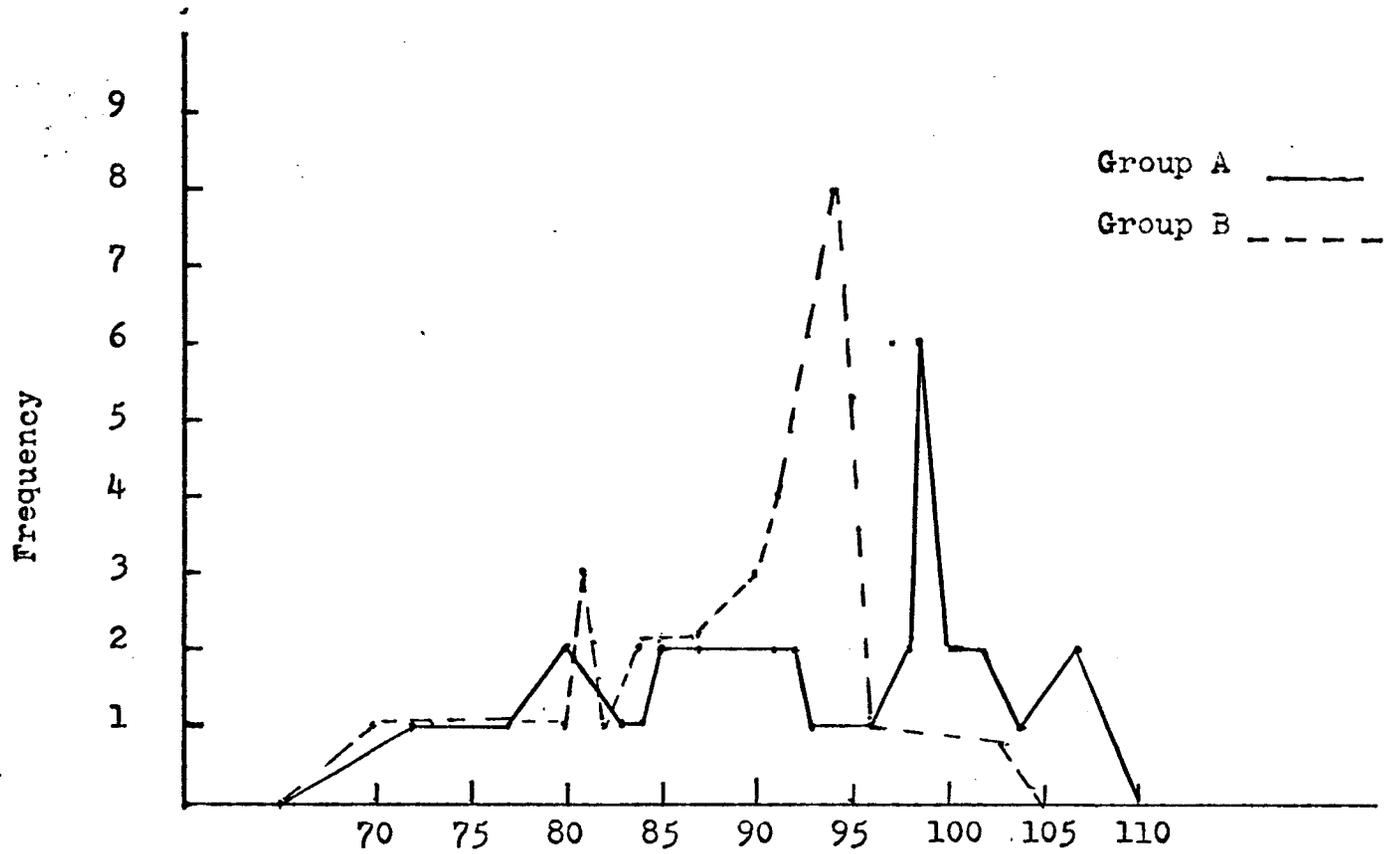


Figure 6  
 Standing Broad Jump in Inches  
 Group A and Group B

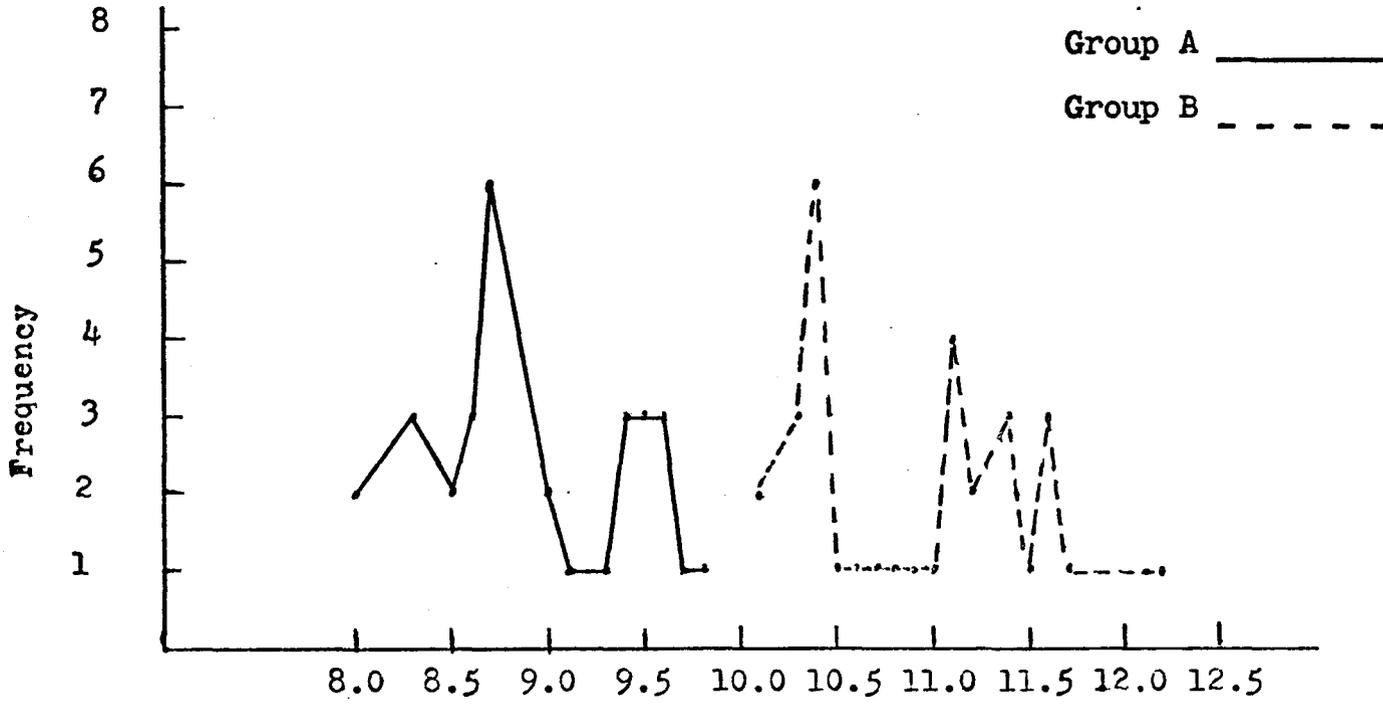


Figure 7  
 Shuttle Run in Seconds  
 Group A and Group B

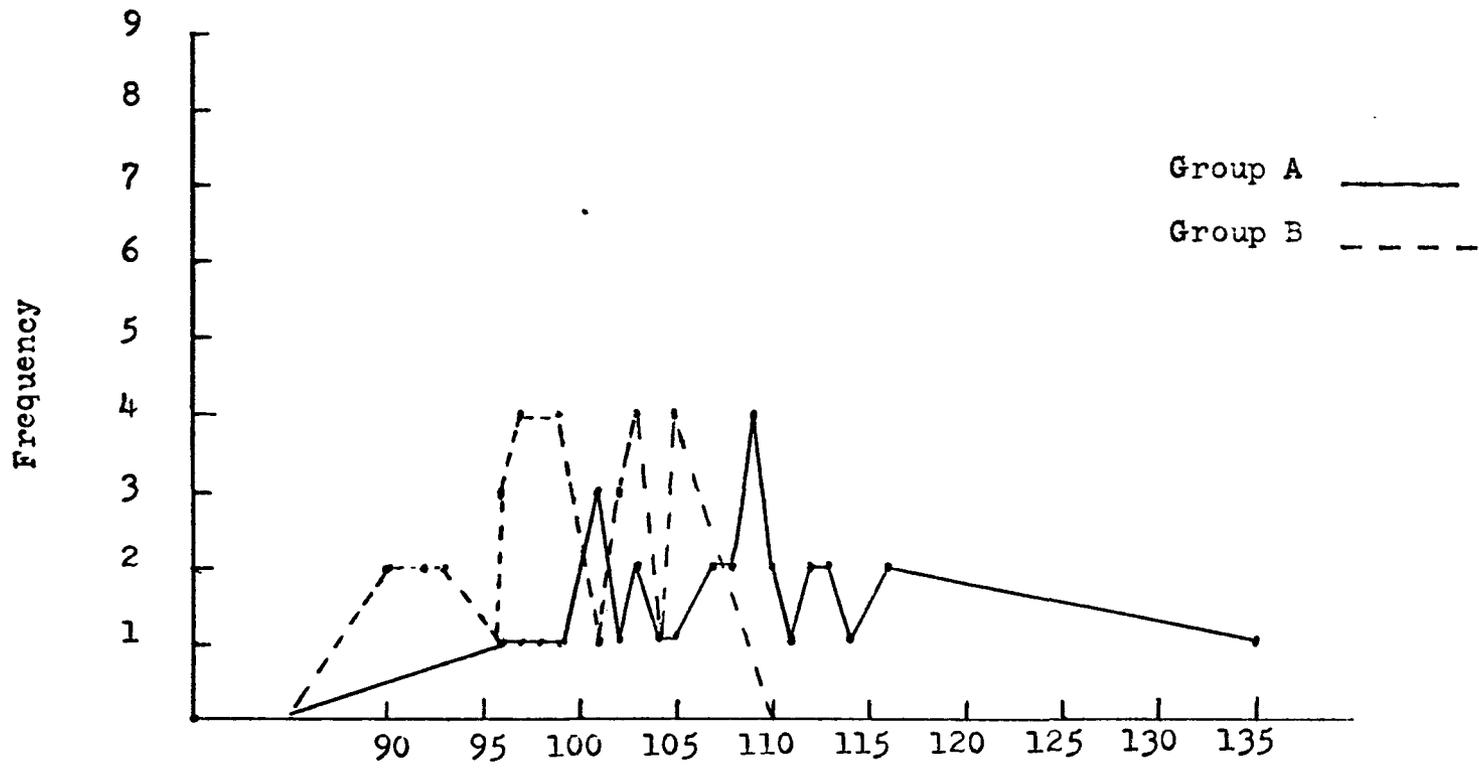


Figure 8  
 600-Yard Run-Walk in Seconds  
 Group A and Group B

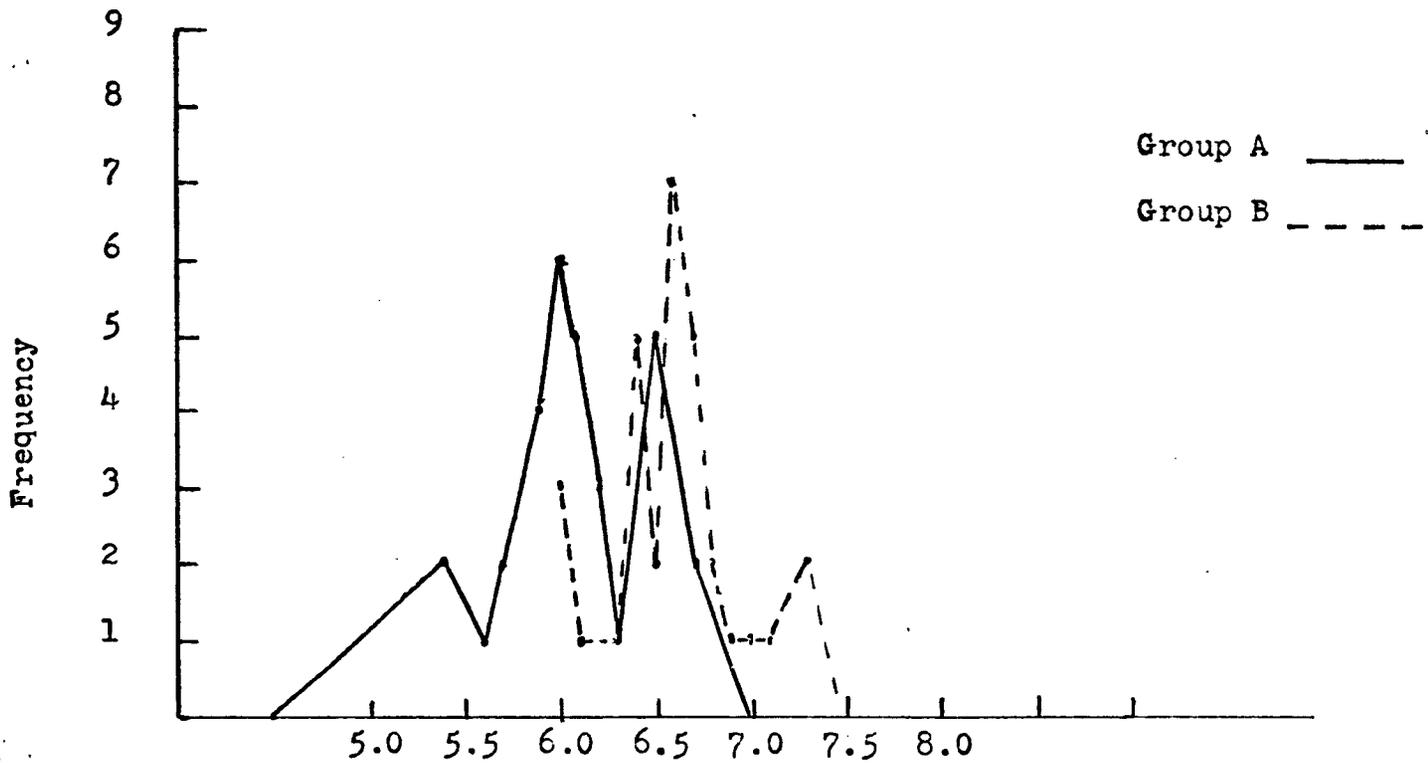


Figure 9  
 50-Yard Dash in Seconds  
 Group A and Group B

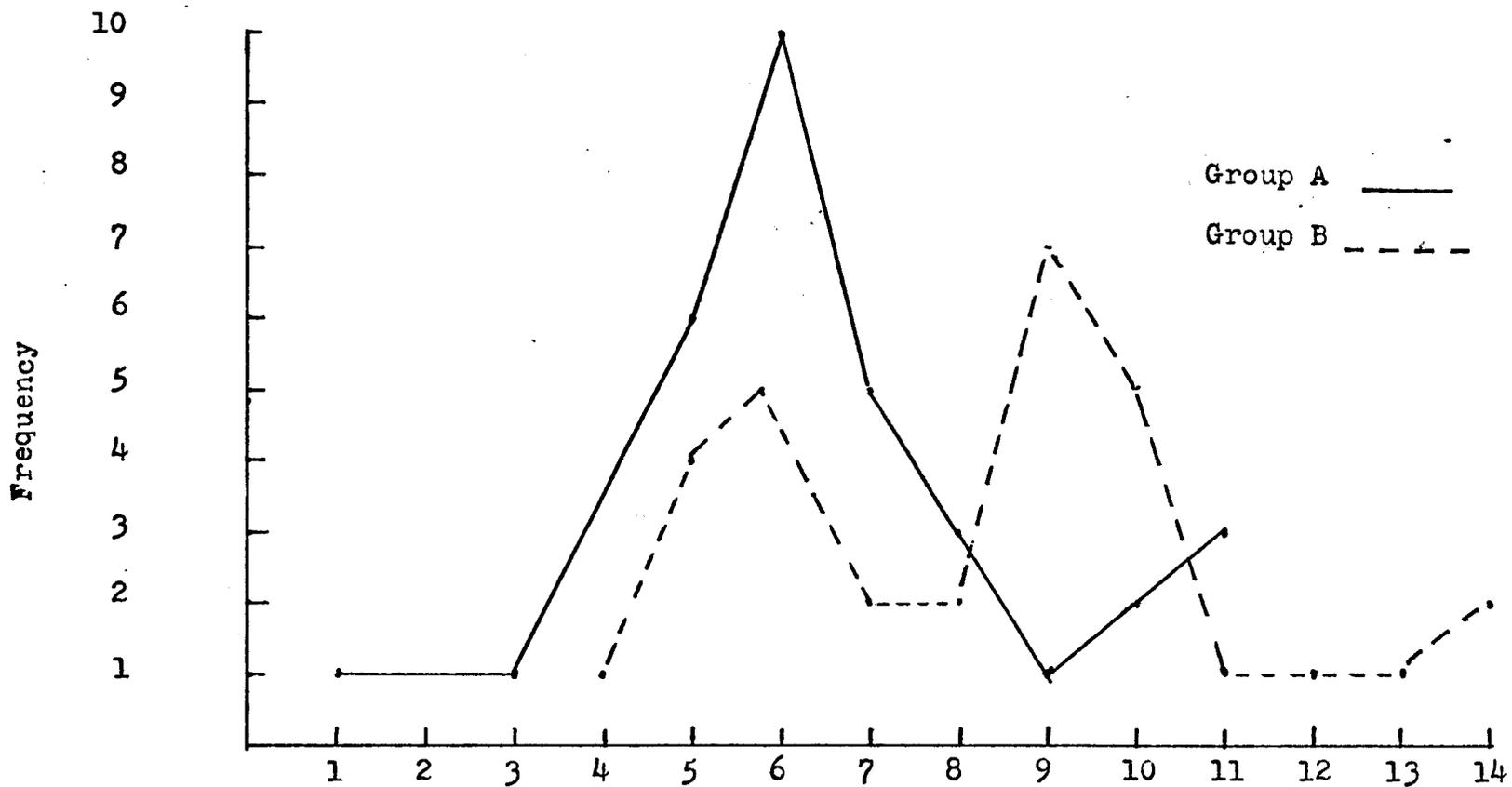


Figure 10

Pull-ups in Repetitions  
Group A and Group B

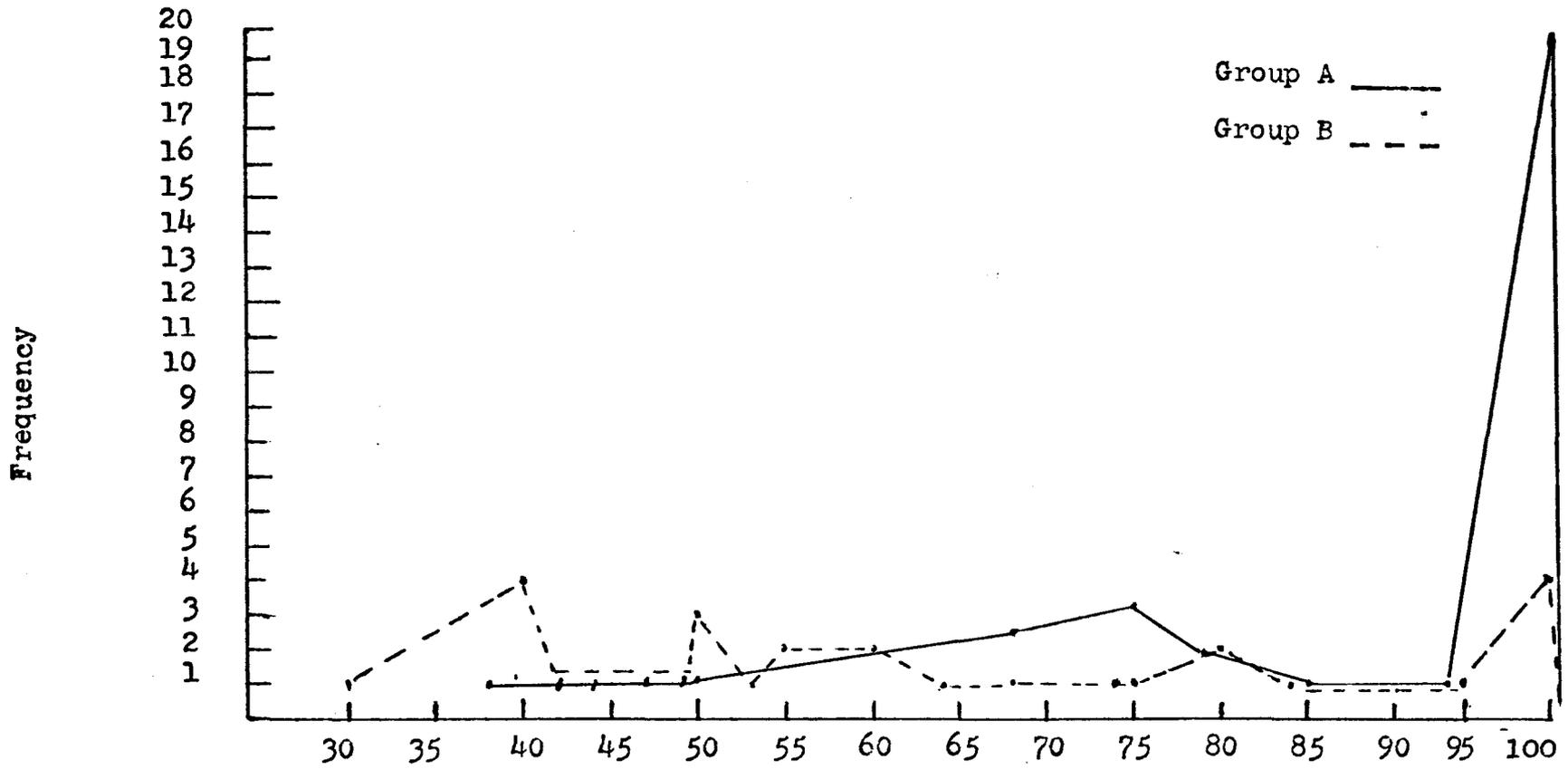


Figure 11

Sit-ups in Repetitions  
Group A and Group B

APPENDIX E

WRITTEN DESCRIPTION OF TEST ITEMS FROM THE AMERICAN  
ALLIANCE OF HEALTH, PHYSICAL EDUCATION,  
AND RECREATION TEST MANUAL

## STANDING BROAD JUMP

### Equipment

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

### Description

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

### Rules

1. Allow three trials.
2. Measure from the take-off line to the heel or other part of the body that touches the floor nearest the take-off line.
3. When the test is given indoors, it is convenient to tape the tape measure to the floor at right angles to the take-off line and have the pupils jump along the tape. The scorer stands to the side and observes the mark to the nearest inch.

### Scoring

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

## SHUTTLE RUN

### Equipment

Two blocks of wood, 2 inches x 2 inches x 4 inches, and stopwatch. Pupils should wear sneakers or run barefooted.

### Description

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

### Rules

Allow two trials with some rest between.

### Scoring

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

## 600-YARD RUN-WALK

### Equipment

Track or marked area, and stopwatch.

### Description

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

### Rules

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

### Scoring

Record in seconds.

## 50-YARD DASH

### Equipment

Two stopwatches or one with a split-second timer.

### Description

It is preferable to administer this test to two pupils at a time. Have both take positions behind the starting line. The starter will use the commands "Are you ready?" and "Go!". The latter will be accompanied by a downward sweep of the starter's arm to give a visual signal to the timer, who stands at the finish line.

### Rules

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

### Scoring

Record in seconds to the nearest tenth of a second.

## PULL-UP

### Equipment

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

### Description

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

### Rules

1. Allow one trial unless it is obvious that the pupil has not had a fair chance.
2. The body must not swing during the execution of the movement. The pull must in no way be a snap movement. If the pupil starts swinging, check this by holding your extended arm across the front of the thighs.
3. The knees must not be raised and kicking of the legs is not permitted.

### Scoring

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

## SIT-UP

### Equipment

Mat or floor.

### Description

The pupil lies on his back, either on the floor or on a mat, with legs extended and feet about two feet apart. His hands are placed on the back of the neck with the fingers interlaced. Elbows are retracted. A partner holds the ankles down, the heels being in contact with the mat or floor at all times. The pupil sits up, turning the trunk to the left and touching the right elbow to the left knee, returns to starting position, then sits up turning the trunk to the right and touching the left elbow to the right knee. The exercise is repeated, alternating sides.

### Rules

1. The fingers must remain in contact behind the neck throughout the exercise.
2. The knees must be on the floor during the sit-up but may be slightly bent when touching elbow to knee.
3. The back should be rounded and the head and elbows brought forward when sitting up as a "curl" up.
4. When returning to starting position, elbows must be flat on the mat before sitting up again.

### Scoring

One point is given for each complete movement of touching elbow to knee. No score should be counted if the fingertips do not maintain contact behind the head, if knees are bent when the pupil lies on his back or when he begins to sit up, or if the pupil pushes up off the floor from an elbow. The maximum limit in terms of number of sit-ups shall be one hundred.

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