A COMPARATIVE STUDY OF THE SELECTED PHYSICAL FITNESS LEVEL OF SELECTED PHYSICAL EDUCATION WOMEN TEACHERS AND SELECTED WOMEN TEACHERS OF SUBJECTS OTHER THAN PHYSICAL EDUCATION BETWEEN TWENTY-SEVEN YEARS OF AGE AND FORTY YEARS OF AGE

A THESIS

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CHAPTER I

INTRODUCTION TO THE STUDY

Being physically fit means something different to each individual, but the "primary reason for total fitness is centered around the personal benefits derived from it."[1] Not only will the physically fit individual look, feel, and perform better, but a desirable level of fitness will allow the individual to lead an active, productive life.[2] Equally important, physical fitness connotes to the individual that the body possess strength, endurance, agility, and coordination.[3]

Characteristics describing the physically fit individual as stated by Willgoose[4] are:

(1) Strength enough to be ready for tasks encountered in everyday routine and in emergencies.

(2) Stamina (endurance) to continue necessary tasks without undue fatigue, and energy enough to participate in recreational activities after a days work.

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[1]Charles Peter Yost, "Total Fitness and Prevention of Accidents," Journal of Health, Physical Education and Recreation, XXXVIII (1967), 32-37.

[2]Herbert L. Jones, Margaret B. Schutt, and Ann L. Shelton, Science and Theory of Health (Dubuque, Iowa: William C. Brown Company Publishers, 1966), p. 170.

[3]Yost, "Total Fitness," p. 33.

[4]Carl E. Willgoose, Evaluation in Health Education and Physical Education (New York: McGraw Hill Book Company, 1961), pp. 16-17.

(3) Cardiorespiratory endurance for sustained effort in activities involving motion of the entire body.

(4) Agility to be able to make a wide range of movement easily.

(5) Speed to be able to move rapidly when personal safety demands it.

(6) Control to coordinate body movements skillfully.

As stated previously, the physically fit individual possesses strength enough to encounter daily routines and to meet emergencies. Morehouse and Miller[1] describes "strength as the ability to exert tension against resistance. This ability depends essentially on the contractile power of muscle tissue." Morehouse and Miller also state:

> The optimum amount of muscular strength for a person is slightly above that needed to meet the requirements of daily activity. A reserve of strength allows for emergency physical activity and occasional prolonged periods when adequate nutrition and hours of rest are reduced.[2]

This reserve of strength allows the individual to perform the daily tasks with greater ease and efficiency.[3]

When muscles are not used, or not used enough, they tend to become less elastic, weaker, and softer.[4] Norris and Shock support widespread evidence:

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[1]Laurance E. Morehouse and Augustus T. Miller, Physiology of Exercise, 5th. ed. (Saint Louis: The C. V. Mosby Company, 1967), p. 50.

[2]Ibid., p. 58. [3]Ibid.

[4]The President's Council on Physical Fitness, "Adult Physical Fitness," U. S. Government Printing Office, (1965), p. 5.

> . . . that after the age of 25 or 30, there is a gradual reduction of muscular strength and a decrease in the ability of the body to maintain coordinated muscle work for periods of long duration.[1]

As the muscles age they are greatly reduced in mass size; this is partially due to an increase in water, sodium, and chloride in the body which causes a loss of fibers.[2] Birren[3], in reviewing various research studies using male subjects, states that: "after the ages of twenty-five to thirty years the various muscle groups show differential decline and also, the various muscle groups appear to be susceptible to specific influences, among them perhaps differential use."

The physically fit individual possesses endurance or stamina which will allow him to perform daily tasks without undue fatigue, and energy enough to participate in recreational activities. Endurance, as stated by Davis and Logan[4] is of two kinds--muscular endurance and circulatory-respiratory endurance. Muscular endurance entails activities which are

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[1]Arthur H. Norris and Nathan W. Shock, "Exercise in the Adult Years -- With Special Reference to the Advanced Years," Science and Medicine of Exercise and Sports, p. 466.

[2]Kurt Wolff, The Biological, Sociological and Psychological Aspects of Aging (Springfield, Illinois: Charles C. Thomas, Publisher, 1959), p. 12.

[3]James E. Birren, "Principles of Research on Aging," Handbook of Aging and the Individual, edited by James E. Birren (Chicago: The University of Chicago Press, 1959), p. 13.

[4]Elwood Craig Davis and Gene A. Logan, Biophysical Values of Muscular Activity (Dubuque, Iowa: William C. Brown Company, 1961), p. 60.

performed over a long period of time and at a low rate of speed. Circulatory-respiratory endurance involves efficiency of the breathing apparatus and the ability of the heart and circulatory system to bring about an exchange of oxygen and carbon dioxide. A Joint Committee of the American Medical Association and the American Association of Health, Physical Education, and Recreation states:

> The more often the normal heart and circulatory system are required to move blood to active regions of the body, the more efficient they become. This is accomplished chiefly by improved muscular tone of the heart, an increase in its output of blood per minute, and an increase in the number of active capillaries in the lungs.[1]

Most authorities agree that the aging of the circulatory system promotes a decline in endurance.[2,3,4] Individuals who engage in training or body conditioning throughout life have found that they experience a lesser degree of endurance degradation than other persons of a comparable age who do not participate actively in physical exercise.[5]

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[1]American Medical Association and the American Association for Health, Physical Education, and Recreation Joint Committee, "Exercise and Fitness," Journal of Health, Physical Education, and Recreation, XXXV (May, 1964), pp. 42-44.

[2]Elsworth R. Buskirk and James E. Counsilman, "Special Exercise Problems in Middle Age," Science and Medicine of Exercise and Sports, edited by Warren R. Johnson (New York: Harper and Brothers Publishers, 1960), p. 499.

[3]Peter V. Karpovich, Physiology of Muscular Activity (5th ed.; Philadelphia: W. B. Saunders Company, 1965), p. 131.

[4]H. Harrison Clarke and David H. Clarke, Developmental and Adapted Physical Education (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1963), p. 118.

[5]Karpovich, Physiology of Muscular Activity, p. 164.

Willgoose[1] has also described the physically fit individual as having agility, speed, and coordination enough to control his body quickly and efficiently. Cureton refers to agility "as the ability to react quickly with controlled and nimble movements."[2] Coordination, as described by Fleishman, "is the ability to coordinate the simultaneous actions of different parts of the body while making gross body movements."[3]

The degree to which one is able to progress and achieve physical fitness is determined partly by heredity and partly by training. The extent to which the individual develops his own potential will depend upon his daily living practices and exercise habits.[4] Peebler states:

> All living tissue of the body have the peculiar and wonderful power of adaptability. If we put demands upon the functions of tissues, they have the power to increase in capacity to work so that they are able to meet the demands we are making and also to provide additional capacities so that they will be able to cope with even greater demands should they be made.[5]

The degree of adaptability varies with each individual. The greatest adaptability can be seen in the growing child until

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[1]Willgoose, Evaluation in Health Education and Physical Education, p. 16.

[2]Thomas Kirk Cureton, Jr., Physical Fitness and Dynamic Health (New York: The Dial Press, Inc., 1965), p. 42.

[3]Edwin A. Fleishman, Examiner's Manual for the Basic Fitness Tests (New Jersey: Prentice-Hall, Inc., 1964), p. 3.

[4]R. R. Doppen, "Physical Fitness," The Physical Educator XVI (December, 1959), 145.

[5]J. A. Peebler, Controlled Exercise for Physical Fitness, (Springfield, Illinois: Charles C. Thomas, Publisher, 1962), p. 43.

the age of sixteen and the power of adaptability seems to be very high up to the age of thirty; in many individuals this power is not diminished until forty years of age.[1]

Clarke and Clarke[2] cite a number of recent research studies which reveal that physically active persons are less likely to experience such disabling conditions as coronary heart attacks, duodenal ulcers, low back pain, and other internal disorders than do sedentary individuals. Kraus[3] found in his studies that low back pain is much more prevalent in the sedentary than in the physically active person. Cureton states:

> . . . physical decline involves deterioration of the circulatory system, and inadequate circulation of the blood prevents vital food elements from being distributed sufficiently throughout the body. As a consequence, we are likely to experience a state of fatigue, evidenced by poor posture, awkward movements and low endurance.[4]

Cureton[5] has expressed the belief that a decline in the circulatory system is brought about by stress, and Dr. Paul Dudley White[6] has indicated a belief that stress and strain are

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[1]Ibid., pp. 42-43.

[2]Clarke and Clarke, Developmental and Adapted Physical Education, p. 115.

[3]Hans Kraus, Backache, Stress and Tension (New York: Simon and Schuster, 1965), p. 52.

[4]Cureton, Physical Fitness and Dynamic Health, p. 22.

[5]Ibid., p. 29.

[6]Paul Dudley White, "Man's Best Medicine," Reader's Digest (September, 1959), p. 68.

counteracted and even prevented by exercise. Accumulating evidence, as stated by Hein and Ryan,[1] strongly suggests a relationship between the level of physical activity and the health of the cardiovascular system. The cardiovascular diseases which occur most frequently during the middle age are coronary and cerebral atherosclerosis which is a hardening of the inner lining, intima, of the arteries.[2] There is considerable evidence that a high level of cholesterol in the blood is influential in the development of atherosclerosis and Hein and Ryan write that, " . . . exercise is a potent factor in the maintenance of normal blood cholesterol levels and hence of circulatory fitness."[3]

The individual who allows his physical condition to deteriorate not only denies himself of an attractive appearance, but he may also be endangering his health.[4] Bortz states that "fitness implies a dynamic homeostasis, the ability to respond to life's physical, emotional and social ongoing demands."[5]

Because of the importance of maintaining a degree of physical fitness at all levels of life, the investigator proposed to undertake a study of the selected level of physical

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[1]Fred V. Hein and Allan J. Ryan, "The Contributions of Physical Activity to Physical Health," Research Quarterly, XXXI (May, 1960), pp. 263-275.

[2]Norris and Shock, Exercise in the Adult Years, p. 467.

[3]Hein and Ryan, "The Contributions of Physical Activity to Physical Health," p. 270.

[4]Cureton, Physical Fitness and Dynamic Health, p. 26.

[5]Edward L. Bortz, "Exercise, Fitness and Aging," Exercise and Fitness, (The Athletic Institute, 1960), p. 3.

fitness of women teachers between twenty-seven years of age and forty years of age.

Statement of the Problem

The level of physical fitness components as determined by Fleishman's Basic Fitness Tests, of thirty physical education women teachers and thirty women teachers of subjects other than physical education were studied. The sixty women teachers were between twenty-seven years of age and forty years of age and were teaching on the secondary level in the Fort Worth Independent School District, Fort Worth, Texas, during the academic year of 1968-1969. A physical education attitude test was administered to subjects prior to the administration of the selected physical fitness tests. The attitude test was given in order to determine the relationship between the level of selected physical fitness components and expressed attitudes toward physical education as measured by the Carlos L. Wear Physical Education Attitude Scale.

Definitions and/or Explanations of Terms

The following definitions and/or explanations of terms were established for the purpose of clarification with respect to their use throughout the study:

Physical Fitness: The investigator accepted the definition of Clarke who states:

> Physical fitness is the ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and to meet unforeseen emergencies.[1]

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[1]H. Harrison Clarke, Application of Measurement to Health and Physical Education (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967), p. 14.

In the present study, physical fitness was defined as those components measured by the Fleishman Basic Fitness Tests.

Selected Physical Fitness Components: For the purpose of this study, the investigator measured the following components of physical fitness: (1) extent flexibility, (2) dynamic flexibility, (3) explosive strength, (4) static strength, (5) dynamic strength, (6) trunk strength, (7) gross body coordination and, (8) gross body equilibrium. The specific coefficients for reliability and validity for each of Fleishman's Basic Fitness Tests will be reported in Chapter II.

The investigator offers the following definitions of the tests that were administered from Fleishman's Basic Fitness Tests:

Fleishman's Basic Fitness Tests[1]

Extent Flexibility - the ability to flex or stretch the trunk and back muscles as far as possible in either a forward, lateral, or backward direction.

Dynamic Flexibility - the ability to make repeated, rapid flexing movements in which the resiliency of the muscles in recovery from strain or distortion is critical.

Explosive Strength - the ability to expend a maximum of energy in one or a series of explosive acts.

Static Strength - The maximum force which a subject can exert, for a brief period, where the force is exerted continuously up to this maximum.

Dynamic Strength - The ability to exert muscular force repeatedly or continuously over a period of time.

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[1]Fleishman, Examiner's Manual for the Basic Fitness Tests, pp. 3-4.

Trunk Strength - Dynamic strength specific to the trunk muscles and specifically the abdominal muscles.

Gross Body Coordination - ability to coordinate the simultaneous actions of different parts of the body while making gross body movements.

Gross Body Equilibrium - the ability of an individual to maintain his equilibrium, despite forces pulling him off balance, where he has to depend mainly on non-visual cues.

Attitude - The investigator accepts the definition of Good, who states that an attitude is:

> A readiness to react toward or against some situation, person, or thing, in a particular manner, . . . , to a particular degree of intensity.[1]

Purposes of the Study

The general purpose of this study was to test the following hypothesis: There is no difference between the physical fitness level of women physical education teachers and women teachers of subjects other than physical education who were between twenty-seven years of age and forty years of age. The specific purposes of the present study were:

1. To compare the expressed attitudes toward physical education of women physical education teachers and women teachers of subjects other than physical education who were between twenty-seven years of age and forty years of age.
2. To determine if there is a difference between the composite physical fitness test score of women

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[1]Carter V. Good (ed.), Dictionary of Education (2nd ed.,: 1959), p. 48.

physical education teachers and women teachers of subjects other than physical education between twenty-seven years of age and forty years of age.

3. To determine the relationship between the scores on the attitude inventory and the composite score on the physical fitness test of physical education women teachers between twenty-seven years of age and forty years of age.
4. To determine the relationship between the scores on the attitude inventory and the composite score on the physical fitness test of women teachers of subjects other than physical education between twenty-seven years of age and forty years of age.

Limitations of the Study

The present study was subject to the following limitations:

1. A total of thirty women physical education teachers between twenty-seven years of age and forty years of age who were teaching in the Fort Worth Independent School District, Fort Worth, Texas during the academic year of 1968-1969.
2. A total of thirty women teachers of subjects other than physical education between twenty-seven years of age and forty years of age who were teaching in the Fort Worth Independent School District, Fort Worth, Texas, during the academic year of 1968-1969.

3. The subjects for the two groups were secondary school teachers who volunteered for the study and who were between twenty-seven years of age and forty years of age.
4. Physical fitness as measured by Fleishman's Basic Fitness Tests.
5. Attitude toward physical education as measured by the Wear Physical Education Attitude Scale.

Review of Related Literature

An investigation revealed that the present study was not identical with any previous study. The following studies were found to be related to the present study.

In 1964, Wessel and Nelson[1] completed a study concorning the relationship between strength and attitudes toward physical education activity among college women. The study was concerned with: (1) the relationship between strength and attitude toward physical education among two hundred college women; and (2) strength in relation to two groups of women whose stated responses toward physical activity were extremes of high or low.

The sources of data employed a random selection of two hundred college women from the non-major required program at Michigan State University, East Lansing, Michigan, and the instructors in the Department of Health and Physical Education at

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[1]Janet A. Wessel and Richard Nelson, "Relationship Between Strength and Attitudes Toward Physical Education Activity Among College Women," Research Quarterly XXXV, No. 4 (December, 1964), pp. 562-569.

Michigan State University, East Lansing, Michigan. The subjects, whose mean age was 19.2 years of age, were obtained by using a table of random numbers. The Wear Short Form Attitude Inventory was selected as the instrument to use in measuring attitudes toward physical education. The instructors in the Department of Health and Physical Education at Michigan State University, East Lansing, Michigan, administered all tests during the first four weeks of the spring term. The dynamometric strength measures (hand grip, back lift, push and pull) used in the study were administered according to procedures described by McCloy. The reliability of responses on the questionnaire items was determined by rejecting a subject if her responses were not consistent on both tests.

The score was correlated by means of the Pearson Product Moment Method. The self-rating score and the results of the three questions used by Wear in his study were used to check the validity of the inventory. The correlation coefficients were calculated between strength and attitudes using the Pearson Product Moment Method. For each item on the questionnaire the subjects were divided into two groups. The reliability of the measures, the correlation with back strength, and the intercorrelations with attitude variables were analyzed. Mean grip strength scores for the groups were computed. In order to compare the mean strength scores for the high and low groups the investigator employed the critical ratio.

The following findings were reported: (1) a significantly large proportion of women students enrolled in physical education classes at Michigan State University indicated very favorable attitudes toward physical education as an activity course, (2) strength among college women is significantly related to attitudes toward physical education and physical activity as measured by the Wear Inventory Score, Self-Rating Scale, and the three questions used in his validity study, (3) the back lift strength measures was found to have a higher relationship to the attitude measures than hand grip, push and pull strength measure, (4) number of years of participation in high school physical education was significantly related only to the three questions, (5) grip strength was significantly related to the group of subjects who were consistently positive in their responses to questions on general attitudes toward physical education, (6) of all the characteristics which contribute to physical ability, none seemed to be as important to performance in sports and other physical activities as body strength. Strength, therefore, may be a factor for successful performance or achievement in physical education among college women.

In 1944, Loveless[1] conducted a study to observe the relationship of the scores made on the Navy Standard Physical fitness Test as to age, height, and weight. The test was designed to test strength, stamina, endurance, and some degree of agility.

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[1]James C. Loveless, "Relationship of the War-Time Navy Physical Fitness Test to Age, Weight, and Height," Research Quarterly, XXIII (October, 1952), pp. 347-355.

Approximately 14,000 naval personnel were given this test and a chance selection of 5,669 cases were used.

The test items were: (1) squat-thrusts, (2) sit-ups and push-ups, (3) squat jumps; and (4) pull-ups. The testee in charge recorded on each man's score card the number of successful attempts made in each event. Standard scores on these items were averaged to give the complete test score. The five events of the test were given during one physical training period of one hour. A five-minute rest period was allowed between events.

The findings of the test scores by age found a slight regression occurred from nineteen to twenty-eight years of age, an acceleration at the twenty-nine to thirty age group, and from this peak a sharp decline was noticed with increased age. The highest mean score on the squat-thrusts was made by the twenty-five to twenty-six age group and the lowest mean score was made by the oldest group, the thirty-five and above age group. Mean scores on the sit-ups were made by the seventeen to twenty-eight age groups and the lowest mean scores were made by the thirty-five and above age group. Mean scores on push-ups tended to decrease with age and the seventeen to thirty age groups varied very little from the average mean. The mean score on the pull-up test remained approximately the same through all age groups. Variability of age groups differed only slightly. Loveless concluded that there seemed to be a very little relationship between age and scores on the physical fitness test in the seventeen to thirty age group, however, consistently lower scores were made in all items of the test after thirty years of age.

In 1964, Hearn[1] completed a study designed to measure the fitness of thirty-eight women, ages thirty to sixty, enrolled in a program of conditioning exercise at the Tarleton State College, Stephenville, Texas. The purpose of this study was to test the fitness of thirty-eight middle aged women before and after participation in ten weeks of prescribed conditioning exercise. The tests administered were: (1) the pulse ratio step-test for cardiovascular efficiency, (2) curl down test for abdominal strength and endurance, (3) the broad jump test for leg strength, (4) modified push-ups for arm strength, (5) bend and reach for forward trunk flexibility, and (6) agility run test for speed and agility. Postural photographs were taken before and after the period of exercise. The subjects were scheduled in weekly evening classes at Tarleton State College and were given conditioning exercises for ten weeks. The subjects, also, were given a Weekly Home Exercise Schedule which prescribed ten minutes of daily exercise which were to be performed twice each day. The high exercise group, referred to as Group I, consisted of nineteen subjects and the low exercise group, referred to as Group II, consisted of nineteen subjects. The statistical method used to treat the data was analysis of variance by using the F ratio to determine the significance of differences between the means of the data collected from the initial and final administration of the tests. An analysis of variance was used between

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[1]Linda S. Hearn, "A Study of the Fitness of Selected Women, Ages Thirty to Sixty, Enrolled in a Program of Conditioning Exercises at the Tarleton State College, Stephenville, Texas," (unpublished Master's thesis, College of Health, Physical Education, and Recreation, Texas Woman's University, Denton, Texas, 1965).

Group I, the high exercise group, and Group II, the low exercise group, to determine if either group had a significant gain within itself on any of the specific elements of fitness after participating in the ten week program of conditioning exercise. Hearn concluded that a program of prescribed conditioning exercises for middle age women contributes to a significant increase in test scores of agility, forward trunk flexibility, leg strength, arm and shoulder girdle strength, abdominal strength, and posture.

In 1947, Fisher and Birren[1] conducted a study to determine the relationship between age and strength of subjects who were Navy personnel at the Naval Medical Research Institute and the Medical Field Research Laboratory, Camp Lejeune, North Carolina. Data also were collected from subjects working at two trinitrotoluene (TNT) plants. The subjects were placed into six groups: (1) Naval personnel group, made up of seventy-two enlisted men, officers and seamen, (2) Camp Lejeune group, made up of ninety-seven hospital corpsmen, (3) Students of the Women's Naval Reserve comprised of 161 subjects, (4) manual workers in the two trinitrotoluene plants. Data were taken from three plants, Plant I included 313 men subjects (5) Plant II made up of 239 subjects; and (6) Plant III included ninety-six women subjects.

Smedley hand dynamometers were used as a means of testing strength. The naval personnel were tested on both hands; the

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[1]M. Bruce Fisher and James E. Birren, "Age and Strength," Journal of Applied Psychology, Vol. XXXI (February, 1947), pp. 490-497.

industrial groups were tested on the preferred hand only. The test procedure required the subject to squeeze the hand dynamometer at three second intervals, beginning with a squeeze of 27 kg. (18 kg. for women) and increasing the force exerted each time by an increment of 3 kg. until the subject was able to achieve the required increase in level of performance. Correlation coefficients between dynamometer score and age, height, and weight were calculated separately for the six groups of subjects and showed some consistency. The data of the two groups of male industrial workers were combined for treatment by analysis of variance, and a significant relationship was found between age and strength. The data of the male naval subjects were treated the same and the F ratio was not quite significant at the 6 per cent level. Fisher and Birren's findings indicated that muscular strength increases up to the middle or late twenties and declines continuously thereafter.

In 1960, Sloan[1] completed a study concerning the effect of training on physical fitness of women students. The study was concerned with testing the subjects' physical fitness for strenuous exertion. The subjects were sixty-one women student teachers, aged seventeen to twenty years, at Cape Town Training College. All of the subjects had been passed as fit on a routine medical examination. The subjects were divided into four groups and each group was tested at the beginning of the school year and again

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[1]A. W. Sloan, "Effect of Training on Physical Fitness of Women Students," Journal of Applied Physiology XVI (January 1961), pp. 167-169.

four and nine months later. The groups consisted of: (1) thirteen students in their third year of training, specializing in physical education; their weekly program included two and one-half hours of gymnastics, two hours of dancing and at least two hours of games, (2) sixteen third year students, specializing in infant-school teaching; they spent forty minutes a week at gymnastics, and attendance at games was not obligatory, (3) nineteen first year of general training; did gymnastics for forty minutes a week, attendance at games was obligatory; and (4) thirteen first year of general training they did not have any gymnastics, but attendance at games was obligatory.

The Harvard step test was employed to test the subjects' physical fitness for strenuous exertion. From this test a fitness index was derived that was directly porportional to the duration of performance of strenuous exercise up to a maximum period of five minutes and inversely proportional to the pulse rate thereafter. For the purpose of this study the test was modified by reducing the height of the step from twenty inches to eighteen inches. The height and weight of each subject were measured at the beginning of the investigation, and each subject was asked whether she was menstruating at the time of the test.

In addition to the fitness index the resting pulse was counted and the rate was calculated from three half-minute readings taken at half-minute intervals. The resting pulse was counted either several hours after the test or on a different

day. Sloan did not state the statistical method she employed to calculate the scores.

The following findings were reported: (1) in the series as a whole there was no correlation between fitness index and either height or weight, (2) no evidence that menstruation influenced performance of the test, (3) at the beginning of the investigation the physical education students had higher fitness indexes than the others and they improved with training, (4) lesser degrees of physical training caused no significant increase in fitness index, but by the end of the four months there was a significant difference in fitness index between the general course students who did gymnastics and those who did not; and (5) changes in the resting pulse were less consistent, and resting pulse rates showed little correlation with fitness index.

Summary

In this Chapter the investigator described several of the benefits of good physical fitness, as well as the results of poor physical fitness. The definition of the physically fit individual, as explained by leading authorities in the area of physical education, includes strength, stamina, cardio-respiratory endurance, agility, speed, and coordination.

Muscle strength is defined as the ability to exert tension against resistance. Without use, muscles tend to become less elastic, weaker, and softer. Endurance is of two kinds, muscular endurance and circulatory-respiratory endurance.

Individuals who engage in training or body conditioning throughout life have a lesser degree of endurance degradation than do individuals who do not participate actively in physical exercise.

Physical fitness is determined partly by heredity and partly by training. A decline in physical fitness comes with age, but the rate of decline is uncertain and the extent of the decline is partly dependent on the individual's exercise habits in adult life.

Physical decline may lead to serious ailments such as coronary heart attacks, duodenal ulcers, low back pain, and other internal disorders. Regular exercise is now considered a help in retarding the onset of certain organic diseases.

This Chapter also included the statement of the problem, the definition and/or explanation of terms with respect to their use throughout the study, the limitations of the study, and a review of related literature.

In Chapter II the investigator will present and discuss procedures utilized in the development of the study.

CHAPTER II

PROCEDURES FOR THE DEVELOPMENT OF THE STUDY

The present study was developed as a result of the investigator's interest in a comparison of the physical fitness level of physical education women teachers and women teachers of subjects other than physical education who were between twenty-seven years of age and forty years of age and teaching in the Fort Worth Independent School District, Fort Worth, Texas, during the academic year of 1968-1969.

In this chapter the procedures followed in the development of the study are presented. These procedures are described in detail under the following major headings: (1) Sources of Data; (2) Preparation for the administration of tests; and (3) Treatment of data. The chapter concludes with a brief summary.

Sources of Data

The data utilized in this study were gathered from both human and documentary sources. The human sources were faculty members in selected components of the Texas Woman's University, Denton, Texas, administrators, thirty volunteer physical education women teachers between twenty-seven years of age and forty years of age, and thirty volunteer women

teachers of subjects other than physical education who were between twenty-seven years of age and forty years of age who were teaching on the secondary level in the Fort Worth Independent School District, Fort Worth, Texas, during the academic year of 1968-1969.

The documentary sources included books, periodicals, professional magazines, research studies, published and unpublished theses and dissertations. Scores were recorded for each subject on the following tests: (1) Carlos L. Wear Physical Education Attitude Scale,[1] and (2) Fleishman's Basic Fitness Tests.[2]

Criteria for the Selection of Tests

The criteria designated by the investigator for selecting the test items to be used were those considered standard in the selection of tests and test items: validity, reliability, objectivity, and administrative economy. The investigator also considered other criteria pertinent in selecting the test items: standardized directions, accurate scoring, tests should involve one performer only, and tests should provide a sufficient number of trials.[3]

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[1]Carlos L. Wear, "The Evaluation of Attitude Toward Physical Education as an Activity Course," Research Quarterly, XXII (1951), 114-126.

[2]Fleishman, Examiner's Manual for the Basic Fitness Tests, pp. 3-4.

[3]M. Gladys Scott and Esther French, Measurements and Evaluation in Physical Education (Dubuque, Iowa: William C. Brown Company, 1959), p. 10.

Validity - The investigator accepts the definition of Scott and French[1] who state that validity "is the degree to which a test measures what it purports to measure."

Reliability - Garrett[2] states "a test is said to be reliable when it is consistent."

Objectivity - Clarke[3] states that objectivity means "the degree of uniformity with which various individuals score the same tests."

Administrative economy - Clarke[4] states two factors should be kept in mind when considering the economy of tests: (1) money costs, and (2) time required of subjects and testers.

Selection and Description of Tests

After establishing the criteria for the selection of the test items, the investigator selected two test areas: (1) physical fitness; and (2) expressed attitude toward physical education. The selection of the attitude test and the physical fitness test was made upon the basis of their

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[1]Ibid., p. 19.

[2]Henry E. Garrett, Elementary Statistics, 2nd. ed. (New York: David McKay Company, Inc., 1962), p. 107.

[3]Clarke, Application of Measurement, p. 36.

[4]Ibid., p. 41.

suitability for women between twenty-seven years of age and forty years of age. A detailed description of the physical fitness test is reported below.

The Selected Physical Fitness Tests

Fleishman's Basic Fitness Test, designed for men, was selected over other fitness tests because of its reliability, validity, ease of administration and application for women teachers between twenty-seven years of age and forty years of age. Fleishman's test also seemed applicable to women of this age, as reported by Fleishman,[1] because " . . . the norms presented for eighteen year olds can be used as base lines for adult performances in college, military, and other conditioning programs." Fleishman[2] reported the reliability and the factor loading of the Fleishman Fitness Test was higher than other tests which measure the same factors. Fleishman[3] stated the primary factor loading is an index of the degree to which a test measures a particular fitness factor. The primary factors measured in this study are: (1) extent flexibility, (2) dynamic flexibility, (3) explosive strength, (4) static strength, (5) dynamic strength, (6) trunk strength,

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[1]Fleishman, Examiner's Manual for the Basic Fitness Tests, p. 6.

[2]Edwin A. Fleishman, The Structure and Measurement of Physical Education (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964), 83.

[3]Fleishman, Examiner's Manual for the Basic Fitness Tests, p. 25.

(7) gross body coordination; and (8) gross body equilibrium. The definitions of the basic fitness factors measured are summarized in Chapter I, page 9.

The twist and touch test (originally called) is designed to measure extent flexibility. Fleishman[1] reported a reliability of .90, and the primary factor loading is .49. An explanation of this test is as follows:

> Draw a measuring scale on the wall. The scale is 30" long and is marked off in half inch intervals from 0" to 30". A line is drawn on the floor, perpendicular to the wall, in line with the 12" mark on the scale. Right-handed subject stands with his feet together and perpendicular to this line on the floor. Subject stands far enough from the wall so that he can just touch the wall with his left fist when his arm is held horizontal from the shoulder. Subject keeps his feet in place and extends his right arm out to his side, at shoulder height. The palm faces the floor with fingers extended and together. From this position he twists clockwise (around his back), as far as possible, so that he touches the scale on the wall with his right hand. The subjects score is the farthest point reached (in inches), and held for at least two seconds.[2]

The bend, twist, and touch test (originally called) was used to measure dynamic flexibility. The reliability of the dynamic flexibility test, as reported by Fleishman,[3] is .92, and the primary factor loading is .50. Explanation of the dynamic flexibility test by Fleishman is as follows:

> With his back to the wall and hands together, the subject bends forward, touches an "X" between his feet, straightens,

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[1] Ibid., p. 128.

[2] Fleishman, Examiner's Manual, p. 30.

[3] Fleishman, The Structure of Measurement, p. 128.

twists to the left and touches an "X" behind him on the wall. He repeats the cycle, alternately twisting to the right and to the left, doing as many as possible in the time allowed. Record the number of cycles completed in 20 seconds.[1]

Explosive strength was measured by the shuttle run test. The reliability of the primary factor measured is .85, and the primary factor loading is .77.[2]

Two parallel lines twenty yards apart are made on the floor. The subject stands behind one line and on the signal "GO" he is to run to the opposite line, touch the floor on the far side of it with either foot, return to the start line, and repeat. He is told to cover the one way distance five times for a total of 100 yards. On his last lap he is to go "all-out" to cross the finish line standing up. The object is to cover the distance as fast as possible.

The observers at each end note that the student has touched over the line. They also watch that the student does not get confused and (a) stop short, not running five times, or (b) treat the last lap as if he was to turn around again.

One observer is stationed at the start line and one at the finish line. The observer at the finish line has a stop watch. The subject's score is the length of time required to run the 100 yards in one trial.[3]

In this study, static strength was measured by the hand grip test. Fleishman[4] stated the reliability of the static strength test is .91, and the primary factor loading is .72. As stated by Fleishman the static strength test is as follows:

The dynamometer is placed in the palm of the subjects preferred hand. The dial should be facing away from the palm. Subject stands and holds his hand down his side, away from his body, palm facing his side. When

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[1] Ibid., p. 130.

[2] Ibid.

[3] Ibid.

[4] Ibid., p. 128.

> told to "squeeze," he is to squeeze the dynamometer once, sharply and steadily as hard as he can. Each subject gets three trials separated by at least a full minute of rest. Record the highest reading of the three squeezes.[1]

To measure dynamic strength the investigator used the pull-up test. Fleishman[2] reported the reliability of the dynamic strength test is .93, and the primary factor loading is .81.

> The subject jumps up and grips the bar with his palms facing the body. From his hanging position, at the signal "START", he pulls himself up by his arms until he can place his chin over the bar. He then lowers his body to a fully extended position. The subject does as many pull-ups as possible until he is no longer able to pull himself up. Record the number of times the subject has pulled himself up correctly.[3]

Leg lifts were selected to measure trunk strength. Fleishman[4] reported the reliability of the trunk strength test to be .89, with a primary factor loading of .47. As stated by Fleishman the leg lift test is as follows:

> The student lies flat on his back with his hands clasped behind his neck. A partner should hold the examinee's elbows to the ground. The subject is told to raise his legs, keeping them straight, until they are vertical, and then to return them to the ground. He is to do these leg lifts as fast as he can, doing as many as possible in 30 seconds.[5]

To measure gross body coordination, the cable jump test was selected. The reliability of the cable jump test

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[1] Fleishman, Examiner's Manual, p. 38.

[2] Ibid., p. 24.

[3] Ibid., p. 39.

[4] Ibid., p. 24.

[5] Ibid., p. 40.

is .70, and the primary factor loading is .56.[1] A description of the test follows:

> A 24 inch length rope is required.
> Subject jumps over a rope, through his arms and lands on his feet. Subject does not hit the rope with his feet or lose hold of it while jumping, nor does the subject lose his balance when landing. Record the number of correct jumps out of five attempts.[2]

The Balance Test is used to measure gross body equilibrium. The reliability of the balance test, as stated by Fleishman,[3] is .82, and the primary factor loading of the gross body equilibrium test is .72. As stated by Fleishman the Balance Test is as follows:

> The Balance Test consists of using a piece of wood $1\frac{1}{2}$" high, 3/4" wide, and 24" long.
> Subject stands long ways on the wood with the preferred foot. Hands are placed on the hips, after the subject has his balance he tells the examiner and the time is started. The subjects eyes are closed. Two trials are given with the eyes closed and hands on hips. Record the number of seconds the student maintains his balance. Each trial is recorded separately and then added together for a total score.[4]

The Expressed Attitude Test

Prior to the selection of the expressed attitude test to be employed, the investigator surveyed the related literature to determine the tests most frequently administered to measure expressed attitudes toward physical education. The Carlos L. Wear Physical Education Attitude Inventory[5] was

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[1] Ibid., p. 24.

[2] Ibid., p. 42.

[3] Ibid., p. 24.

[4] Ibid., p. 43.

[5] Carlos L. Wear, "The Evaluation of Attitude Toward Physical Education as an Activity Course," Research Quarterly XXII (1951), 114, 126.

selected to measure the subject's expressed attitudes toward physical education. The Wear attitude inventory seemed applicable for the subjects of this study, in that the test would serve as a guide as to the intensity of the groups attitudes toward physical education. The reliability of the Wear Short Form of the Attitude Inventory is .96, and Wear maintains that the validity of the inventory has been established by:

> (a) the use of certain criteria in the wording of statements; (b) a comprehensive sampling or tapping of important outcomes; (c) the demonstration of a substantial relationship between scores made on the Inventory and certain other data regarding attitudes toward physical education; (d) the demonstration of significant differences between attitudes, as evaluated by the use of Inventory scores, of certain groups of individuals who might presumably differ.[1]

Although the attitude test was designed for college men, Wear[2] states that the inventory is equally suited for use with women.

When taking the Wear Attitude Inventory test the subject is asked to respond to each statement presented by selecting one of five choices: strongly agree, agree, undecided, disagree, or strongly disagree.[3] A copy of the attitude inventory and the method of scoring the test can be found in the Appendix.

Selection of Subjects

The investigator wrote to the Superintendent of the Fort Worth Independent School District, Fort Worth, Texas,

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[1] Ibid. [2] Ibid. [3] Ibid.

asking permission to use selected women teachers as subjects for the present study. A copy of the letter to the Superintendent of the Fort Worth Independent School District, Fort Worth, Texas, and his written permission can be found in the Appendix.

A cluster random sampling was made of the thirty-three secondary schools in the Fort Worth Independent School District to obtain women teacher of subjects other than physical education to participate in the present study. Of the total secondary schools in the Fort Worth Independent School District, one-third of the secondary schools constituted the sample for the present study. The investigator employed the lottery method to determine the eleven secondary schools who participated in the present study. A form letter was sent to women teachers from the selected schools who taught subjects other than physical education and who were between twenty-seven years of age and forty years of age. A copy of the form letter can be found in the Appendix. The first thirty volunteer women teachers of subjects other than physical education who were between twenty-seven years of age and forty years of age participated in the study from the eleven elementary schools.

The investigator also secured from the Administration Office of the Fort Worth Independent School District a list of women physical education teachers between twenty-seven years of age and forty years of age who were teaching in the

secondary schools of the Fort Worth Independent School District, Fort Worth, Texas, during the academic year of 1968-1969. The investigator mailed a form letter to the secondary physical education women teachers between twenty-seven years of age and forty years of age asking them to be a volunteer subject for the present study. After the form letters were returned, the first thirty women physical education teachers who indicated their willingness to be participants were selected.

The investigator made arrangements with each volunteer subject as to the exact time and place the test would be administered to her. A detailed description of the administrative procedures follows.

Preparation for the Administration of Tests

Prior to the administration of the physical fitness tests, score cards were prepared for each individual subject. The score cards were designed to record each subject's score on the extent flexibility test, the dynamic flexibility test, the shuttle run test, pull-ups, the leg lifts, the cable jump test, the balance test, and the hand grip test. Prior to the physical fitness testing, the Carlos L. Wear expressed attitude test was given to each subject on the appointed testing date. The investigator had answer sheets and copies of the Wear Inventory printed for each subject. A sample score card can be found in the Appendix.

The physical fitness tests were administered individually to each subject at approximately 4:30 p. m. on the chosen day that was convenient for the subject. All of the tests were administered in the school gymnasium where the individual subject was teaching at the time of the testing. To keep all variables as equal as possible for each subject, the order of administering the test was identical for each subject. A more strenuous test was followed by a less strenuous test. Rest periods of approximately five minutes were allowed between the more strenuous tests, which were the leg lift test and the dynamic flexibility test. The order of administering the physical fitness tests were: (1) the extent flexibility test; (2) the leg-lift test; (3) hand-grip test; (4) gross body coordination test; (5) pull-ups; (6) dynamic flexibility; (7) Balance test; and (8) the shuttle run test.

Equipment needed for administering the physical fitness tests included a stop watch, hand dynamometer, the balance board, a piece of 24" rope, a tape measure, and a bar for the pull-up test. The stop watch, hand dynamometer, the 24" rope, and the tape measure were obtained by the investigator from the Physical Education Department of the Fort Worth Independent Schools. The balance board and the scale used to measure extent flexibility were made by the Woodshop at the Handley Junior High School, Fort Worth, Texas. With the exception of the bar used for the pull-ups, this equipment

was transported by the investigator to the various schools where the testing was administered. The bar for the pull-ups was found to be available in the gymnasiums of the various schools.

Each of the selected physical fitness tests were explained and demonstrated to the subjects by the investigator at the time of each test administration. Prior to the actual collection of data from each test, the subjects were given three practice trials. During the practice trials the investigator corrected any errors on the part of the subject and/or answered any questions the subject asked concerning the test.

After a brief orientation to the study and familiarization with the test, the subject was timed, counted and/or measured and a score was recorded for each test. All tests were administered, timed, measured, and/or counted by the investigator. A trained assistant aided the investigator by recording the test scores.

Treatment of Data

The procedures which follow include those related to selecting the statistical techniques, studying the statistical evidence resulting from the tests employed, and treating the data. The investigator tabulated the data collected with respect to the raw scores yielded by the tests chosen to measure extent flexibility, dynamic

flexibility, explosive strength, static strength, dynamic strength, trunk strength, gross body coordination, gross body equilibrium, and expressed attitudes toward physical education of each subject.

The investigator reviewed the purposes of the study as set forth in the hypothesis. The major consideration involved the selection of the statistical techniques which would be helpful in treating the data collected from the expressed attitude test and the physical fitness test. The statistical techniques will be discussed in terms of treating the data in relation to the hypothesis and the specific purposes of the study as stated in Chapter I.

The statistical techniques of primary importance were the various tests of significance to be employed in analyzing differences between means and between correlation coefficients. The investigator chose an analysis of variance to determine the significance of difference between the means of two sets of scores. An analysis of variance was chosen to determine if there was a significant difference between the composite scores on the expressed attitude test toward physical education of the thirty women physical education teachers and the thirty teachers of subjects other than physical education. A one-way analysis of variance for equal groups was also chosen to determine if there was a significant difference between the selected physical fitness test scores of the

women physical education teachers and the women teachers of subjects other than physical education. Guilford[1] states: "the test for determining the significance between two variances and with appropriate degrees of freedom applied to the two variances the F ratio can be interpreted as significant or not."

To determine the degree of relationship between two sets of scores a coefficent of correlation technique was needed. Koenker[2] states: "Correlation is most frequently computed by using Karl Pearson's product-moment method." In the present study, the statistical data were treated by means of the Pearson Product Moment Correlation technique to determine the relationship between the scores on the attitude inventory and the scores on the physical fitness tests of the women physical education teachers and the teachers of subjects other than physical education. The results of the analysis of data are presented in narrative and tabular format in Chapter III.

Summary

The investigator outlined in this chapter the procedures followed in the development of the study. These procedures included those which were related to sources of data, methods of

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[1]J. P. Guilford, Fundamental Statistics in Psychology and Education (New York: McGraw-Hill Book Company, 1965), p. 270.

[2]Robert H. Koenker, Simplified Statistics (Bloomington, Illinois: McKnight and McKnight Publishing Company, 1961), p. 51.

collecting data, and those which were preliminary to the collection of data. Preliminary procedures involved the selection of instruments, the selection of subjects, and the preparation for the administration of the tests.

Instruments selected were the following: the extent flexibility test to measure extent flexibility, the dynamic flexibility test for measuring dynamic flexibility, the shuttle run for measuring agility, the hand dynamometer for measuring static strength, the pull-up test for measuring dynamic strength, leg lifts for measuring trunk strength, the cable jump test for measuring gross body coordination, a balance test for measuring gross body equilibrium, and the Carlos L. Wear Physical Education Attitude Inventory for measuring expressed attitudes.

Subjects for the study were thirty volunteer women physical education teachers who are between twenty-seven years of age and forty years of age and thirty volunteer women teachers of subjects other than physical education who are between twenty-seven years of age and forty years of age. The subjects were teachers in the Fort Worth Independent School District, Fort Worth, Texas, during the academic year of 1968-1969.

The physical fitness test was administered to each subject individually and all of the testing for each individual was done in one testing session. The order of

administering the tests was identical for each subject. The place of testing was at the various schools where the subjects were teaching.

Procedures for analyzing data consisted of selecting appropriate statistical techniques to treat the data. Analysis of variance was selected to compare expressed attitudes between the two groups. The analysis of variance was also selected to determine if there was a difference between the selected physical fitness test scores of the two groups. The Pearson Product Moment Correlation technique was used to determine the relationship between the scores on the attitude inventory and the scores on the physical fitness tests of the two groups.

In Chapter III the investigator will present and discuss the analysis of data.

CHAPTER III

PRESENTATION OF THE FINDINGS

In this chapter, the investigator will present an analysis of the data, interpret the findings, and test the hypothesis and the specific purposes that were stated in Chapter I. A summary of the chapter will be presented. The formulas used in all computations can be found in the Appendix.

Sixty volunteer women teachers between twenty-seven years of age and forty years of age, teaching on the secondary level in the Fort Worth Independent School District, Fort Worth, Texas, during the academic year of 1968-1969 participated in the study. The two groups were categorized as follows: thirty physical education women teachers and thirty women teachers of subjects other than physical education.

Comparisons of Expressed Attitudes Toward Physical Education of Women Physical Education Teachers and of Women Teachers of Subjects Other Than Physical Education

Scores of the two different groups on the Wear Attitude Inventory were compared through the application of a one-way analysis of variance for equal groups. Table 1 presents the means and standard deviations of sixty women teacher's scores on the Wear Attitude Inventory. Table 2

presents a summary of the one-way analysis of variance with respect to expressed attitudes toward physical education. Based upon the data collected, at the assigned significance level of .05, there was a significant difference between the women physical education teachers and the women teachers of subjects other than physical education with respect to scores on the Wear Attitude Inventory.

TABLE 1

MEANS AND STANDARD DEVIATIONS OF SIXTY WOMEN TEACHER'S SCORES ON THE WEAR ATTITUDE INVENTORY

	WOMEN PHYSICAL EDUCATION TEACHERS			TEACHERS OF SUBJECTS OTHER THAN PHYSICAL EDUCATION		
	M	SD	SE_M	M	SD	SE_M
Expressed Attitudes	178.30	10.80	1.97	165.57	7.46	1.36

A study of Table 1 reveals that the mean score on the Wear Attitude Inventory of women physical education teachers was 178.30 and the mean of women teachers of subjects other than physical education was 165.57. The Standard Deviation of 10.80 and 7.46, respectively showed that the scores of women teachers of subjects other than physical education were more closely clustered around the mean than those of the women physical education teachers.

TABLE 2

ANALYSIS OF VARIANCE OF SIXTY WOMEN TEACHER'S SCORES ON THE WEAR ATTITUDE INVENTORY

SOURCE	SS	df	MS	F	P
Between Groups	2432.0667	1	2432.0667	27.3177	P .05
Within Groups	5163.6667	58	89.0287		
Total	7595.7334	59			

F-Value required for significance

.05 = 4.00

Note: .001 = 11.97

A study of Table 2 reveals the ratio of the between groups mean square to the within groups mean square obtained an F ratio of 27.3177. The obtained F is greater than that required for significance at the .05 level, which indicates that women physical education teachers scored significantly higher on the Wear Attitude Inventory than did women teachers of subjects other than physical education.

Comparison of the Physical Fitness Test Scores of Women Physical Education Teachers and Women Teachers of Subjects Other Than Physical Education

An analysis of variance was used to compare the composite scores of the two groups on the selected physical fitness tests. Based upon the data collected from the physical

fitness tests there was no significant difference between the composite scores of women physical education teachers and women teachers of subjects other than physical education. Table 3 presents the means and standard deviations of sixty women teacher's composite scores on the physical fitness tests. Table 4 presents a summary of the analysis of variance with respect to composite scores upon the selected physical fitness tests.

TABLE 3

MEANS AND STANDARD DEVIATIONS OF SIXTY WOMEN TEACHER'S SCORES ON THE PHYSICAL FITNESS TESTS

	WOMEN PHYSICAL EDUCATION TEACHERS			TEACHERS OF SUBJECTS OTHER THAN PHYSICAL EDUCATION		
	M	SD	SE_M	M	SD	SE_M
Physical Fitness	410.19	52.38	9.38	389.33	53.05	9.69

A study of Table 3 reveals that the composite physical fitness mean score for women physical education teachers was 410.19, and the mean score of women teachers of subjects other than physical education was 389.33. The standard deviation of 42.38 and 53.05, respectively, shows that the scores of both groups were clustered around the mean in approximately the same amount.

TABLE 4

SUMMARY TABLE FOR ANALYSIS OF VARIANCE OF THE PHYSICAL FITNESS TESTS

	SS	df	MS	F	P
Between Groups	6531.2457	1	6531.2457	2.3198	n.s.
Within Groups	163295.1358	58	2815.4333		
Total	169826.3815	59			

F-Value required for significance

.05 = 4.00

Table 4 presents the results of the statistical treatment of the scores on the physical fitness test. Examination of the table reveals the ratio of the between groups mean square to the within groups mean square achieved an F ratio of 2.3198. The obtained F is not greater than that required for significance at the .05 level; therefore, there was no significant difference between the women physical education teacher's level of physical fitness and the physical fitness level of women teachers of subjects other than physical education.

Relationship Between Expressed Attitudes Toward Physical Education and the Physical Fitness Test of Physical Education Women Teachers

The Pearson Product Moment Correlation was used to determine the relationship between the scores on the attitude

inventory and the composite scores on the physical fitness tests of women physical education teachers. Table 5 presents a summary of the results of the Pearson Product Moment Correlation with respect to the scores of expressed attitude toward physical education and the composite physical fitness scores of women physical education teachers. All coefficients were compared to a table of the correlation coefficients for the different levels of significance.[1]

TABLE 5

RELATIONSHIP OF ATTITUDES TOWARD PHYSICAL EDUCATION AND OVER-ALL PHYSICAL FITNESS OF WOMEN PHYSICAL EDUCATION TEACHERS

SOURCE	M	SD	df	r	p
Expressed Attitudes	178.300	10.7955	28	.2308	n.s.
Physical Fitness	410.1946	52.38			

r-value required for significance

.05 = .3494

Table 5 presents the results of the correlation of expressed attitudes toward physical education and over-all physical fitness of women physical education teachers. Examination of the table reveals that the correlation between expressed attitudes and over-all physical fitness was .2308.

[1]Koenker, Simplified Statistics, p. 145.

The required r-value for significant at .05 level, with 28 degrees of freedom, is .3494. These results would indicate that there was not a significant relationship between expressed attitudes toward physical education and over-all physical fitness of women physical education teachers.

Relationship Between Expressed Attitudes Toward Physical Education and the Sum Score on the Physical Fitness Tests of Women Teachers of Subjects Other Than Physical Education

The relationship between the scores on the attitude inventory and the composite scores on the physical fitness test of women teachers of subjects other than physical education was determined by Pearson Product Moment Correlation. Table 6 presents the results of the Pearson Product Moment Correlation of scores from the Wear Attitude Inventory and physical fitness of women teachers of subjects other than physical education.

TABLE 6

RELATIONSHIP OF ATTITUDES TOWARD PHYSICAL EDUCATION AND OVER-ALL PHYSICAL FITNESS OF WOMEN TEACHERS OF SUBJECTS OTHER THAN PHYSICAL EDUCATION

SOURCE	M	SD	df	r	p
Expressed Attitudes	165.5666	7.4566	28	0.1660	n.s.
Physical Fitness	389.3280	53.0454			

r-value required for significance

.05 .3494

Examination of Table 6 reveals that the r-value of 0.1660 failed to reach the demanded level of confidence. The results would indicate that there was not a significant relationship between expressed attitudes toward physical education and over-all physical fitness of women teachers of subjects other than physical education.

Tests of Hypothesis and Specific Purposes

Upon the basis of the results of the analysis of data through the application of the analysis of variance and Pearson's Product Moment Correlation the general hypothesis and the specific purposes stated in the first chapter were tested. The results of the applied tests are presented below.

General Hypothesis

> There is no significant difference between the selected physical fitness of selected women physical education teachers and selected women teachers of subjects other than physical education between twenty-seven years of age and forty years of age.

The hypothesis was treated by means of an analysis of variance. For 28 degrees of freedom the obtained F value of 2.3198 was not significant at the .05 level. The findings indicated that selected women physical education teachers between twenty-seven years of age and forty years of age did not perform significantly better than selected women teachers of subjects other than physical education upon the selected physical fitness tests.

Specific Purposes

The specific purposes of the present study and the results of the applied tests are:

A. To compare the expressed attitudes toward physical education of selected women physical education teachers and of selected women teachers of subjects other than physical education between twenty-seven years of age and forty years of age.

The data collected for this study, by means of a one-way analysis of variance for equal groups served as the basis for assuming that selected women physical education teachers scored higher on the Wear Attitude Inventory than did selected women teachers of subjects other than physical education. The F-ratio of 27.3177 was significant at the .001 level.

B. To determine the relationship between the score on the attitude inventory and the composite score on the selected physical fitness tests of selected women physical education teachers between twenty-seven years of age and forty years of age.

This specific purpose was tested through the application of the Pearson Product Moment Correlation technique. The obtained r-value of 0.2308 was not significant at the .05 level. The data collected for this study failed to provide sufficient information for the investigator to assume that there was a high relationship between expressed attitudes toward physical education and the physical fitness level of women physical education teachers.

C. To determine the relationship between the score on the attitude inventory and the composite score

on the selected physical fitness tests of selected women teachers of subjects other than physical education between twenty-seven years of age and forty years of age.

The data collected for this specific purpose was tested through the application of the Pearson Product-Moment Correlation technique. The obtained r-value of 0.1660 was not significant at the .05 level. The findings indicated, therefore, that there was no significant relationship between expressed attitudes toward physical education and over-all physical fitness level of women teachers of subjects other than physical education.

Summary

In this chapter the investigator presented an analysis of the data and tested the general hypothesis and the specific purposes of the study. Based upon the findings, the investigator failed to reject the general hypothesis. There was no significant difference between the over-all physical fitness of selected women physical education teachers and selected women teachers of subjects other than physical education between twenty-seven years of age and forty years of age.

Based upon the data collected, the investigator found that women physical education teachers scored higher on the expressed attitude test toward physical education than did teachers of subjects other than physical education.

The data collected to determine the relationship between expressed attitudes and physical fitness levels of

women physical education teachers and women teachers of subjects other than physical education failed to reveal a significant relationship between expressed attitudes and over-all physical fitness.

Chapter IV will present a summary of the study, conclusions, a discussion of the findings, and recommendations for future studies.

CHAPTER IV

SUMMARY, FINDINGS OF THE STUDY, CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE STUDIES

This chapter will include a summary of the investigation, present findings of the study, conclusions and recommendations for future studies.

Summary of the Investigation

Physical fitness has been defined by leading authorities in the area of physical education as strength, stamina, cardiorespiratory endurance, agility, speed, and coordination. It has been stated that physical fitness is determined partly by heredity and partly by training. A decline in physical fitness comes with age, but the rate of decline is uncertain and the extent of the decline is partly dependent on the individual's exercise habits in adult life.

Physical decline may lead to serious ailments such as coronary heart disease, low back pain, neuromuscular tension, and fatigue. Regular exercise is now considered a help in retarding the onset of certain organic diseases.

Different components of the physical fitness level of university women physical education majors and non-majors have been studied for years; but there has been only limited

investigation of physical education teachers and teachers of subject matters other than physical education several years after their university work has been completed. Authorities have found that there are measurable differences between the physical fitness level of university students whose major sequence is physical education and students pursuing other curriculums. The investigator hypothesized, in the present study, that there would be no significant variation in the physical fitness level of women physical education teachers and women teachers of subjects other than physical education who were between twenty-seven years of age and forty years of age.

The research design involved a total of sixty volunteer women teachers between twenty-seven years of age and forty years of age who were teaching on the secondary level in the Fort Worth Independent School District, Fort Worth, Texas, during the academic year of 1968-1969. The women teachers were divided into two groups. One group consisted of thirty women physical education teachers and the other group consisted of thirty women teachers of subjects other than physical education.

For the purpose of this study, the following components of physical fitness were measured: (1) extent flexibility, (2) dynamic flexibility, (3) explosive strength, (4) static strength, (5) dynamic strength, (6) trunk strength, (7) gross body coordination and, (8) gross body equilibrium,

as described in the Fleishman Physical Fitness Tests. In order to determine the relationship between the level of physical fitness and expressed attitudes toward physical education, the Carlos L. Wear Physical Education Attitude Scale was given to each of the subjects prior to the administration of the physical fitness test.

The general purpose of this study was to test the general hypothesis: There is no difference between the physical fitness level of women physical education teachers and teachers of subjects other than physical education who were between twenty-seven years of age and forty years of age. The specific purposes of the present study were: (1) to compare the expressed attitudes toward physical education of women physical education teachers and women teachers of subjects other than physical education who are between twenty-seven years of age and forty years of age, (2) to determine the relationship between the scores on the attitude inventory and the composite scores on the physical fitness test of physical education women teachers between twenty-seven years of age and forty years of age and, (3) to determine the relationship between the scores on the attitude inventory and the composite scores on the physical fitness test of women teachers of subjects other than physical education between twenty-seven years of age and forty years of age.

Fleishman's Basic Fitness test was selected to determine the level of physical fitness of the sixty women teachers. Instruments selected to measure the physical fitness components were: the extent flexibility test to measure extent flexibility, the dynamic flexibility test for measuring dynamic flexibility, the shuttle run for measuring agility, the hand dynamometer for measuring static strength, the pull-up test for measuring dynamic strength, leg lifts for measuring trunk strength, the cable jump test for measuring gross body coordination, and a balance test for measuring gross body equilibrium.

The physical fitness test was administered to each subject individually and all of the testing for each individual was done in one testing session. The order of administering the tests was identical for each subject. The place of testing was at the various schools where the subjects were teaching.

An analysis of variance was chosen to determine if there was a significant difference between the composite scores on the expressed attitude test toward physical education of women physical education teachers and teachers of subjects other than physical education. A one-way analysis of variance for equal groups was also chosen to determine if there was a significant difference between the composite physical fitness test scores of women physical education

teachers and women teachers of subjects other than physical education. The statistical data were treated by means of the Pearson Product Moment Correlation technique to determine the relationship between the scores on the attitude inventory and the composite scores on the physical fitness test of women physical education teachers and teachers of subjects other than physical education.

Findings of the Study

The general hypothesis that guided the present investigation stated that there would be no significant difference between the physical fitness of women physical education teachers and women teachers of subjects other than physical education who were between twenty-seven years of age and forty years of age. The investigator failed to reject the general hypothesis. The investigation was also guided by specific purposes which were (1) to compare the expressed attitudes toward physical education of women physical education teachers and of women teachers of subjects other than physical education between twenty-seven years of age and forty years of age, (2) to determine the relationship between the score on the attitude inventory and the composite score on the selected physical fitness test of women physical education teachers between twenty-seven years of age and forty years of age, and (3) to determine the relationship between the score on the attitude inventory and the composite score on the

physical fitness test of women teachers of subjects other than physical education between twenty-seven years of age and forty years of age. Based upon the statistical data collected for the present study, the investigator found that women physical education teachers score higher on the expressed attitude inventory than do women teachers of subjects other than physical education. The data also failed to provide sufficient information for the investigator to assume there was a significant relationship between expressed attitudes and physical fitness.

Conclusions of the Study

As a result of the statistical findings of this investigation the following conclusions are drawn.

1. There is no significant difference between the physical fitness level of women physical education teachers and women teachers of subjects other than physical education who were between twenty-seven years of age and forty years of age.
2. Women physical education teachers scored higher on the expressed attitude inventory than did women teachers of subjects other than physical education.
3. The findings indicated that there was no significant relationship between expressed attitudes

and the level of physical fitness of women physical education teachers who were between twenty-seven years of age and forty years of age.

4. A significant relationship was not found between expressed attitudes and the level of physical fitness of women teachers of subjects other than physical education who were between twenty-seven years of age and forty years of age.

The statistical findings which support the general hypothesis that there is no significant difference between the physical fitness of women physical education teachers and women teachers of subjects other than physical education cannot be determined from a population of women teachers between twenty-seven years of age and forty years of age. Additional information concerning the recreational activities, the past and present exercise habits of the selected women teachers would be beneficial in determining the cause of the physical fitness level of the women teachers. Many of the teachers stated that they engaged in recreational activities after school and also performed daily exercises, such as jogging and exercises that strengthened the abdominals. Other teachers indicated that they engaged in little or no physical activity. A lack of significant differences may be found in

that the subject could have been exhausted after a full day of teaching and lacked the motivation to perform to her capacity on the tests administered during this study. The time for the testing may have been a significant factor. If the tests had been given at a later time in the evening, the subject would have had time to rest and relax before being tested. The investigator believes that a more reliable indication of the physical fitness level might have been obtained if the testing had been done in two sessions rather than one. Other factors involved in determining the selected fitness level may be the subjects' past experiences and attitudes toward physical fitness. It is the belief of the investigator that the extent of the influence of related factors upon the lack of differences between the two group requires further investigation, which was beyond the scope of this study.

Recommendations for Future Studies

The following suggestions are recommended for further investigation:

A. The rate of decline of the physical fitness level of women physical education teachers between twenty-seven years of age and forty years of age.

B. The rate of decline of the physical fitness level of women teachers of subjects other than physical

education between twenty-seven years of age and forty years of age.

C. The effect of participation in recreational activities upon the level of physical fitness of adult women.

D. The effect of motivation on physical fitness scores of adult women.

APPENDIX

FORT WORTH INDEPENDENT SCHOOL DISTRICT
3210 West Lancaster
Fort Worth, Texas 76107

JULIUS TRUELSON
SUPERINTENDENT

November 22, 1968

Miss Mary Joyce Baker
Handley Junior High School
2925 Haynie Street
Fort Worth, Texas 76112

Dear Miss Baker:

You have my approval to conduct a study on the comparison of the physical fitness of selected physical education teachers and non-physical education teachers for your graduate work at Texas Woman's University.

This is approved on your statement that it will be on a volunteer basis and tests administered after school hours.

A copy of this letter is being sent to Doctor Virginia Hicks at Texas Woman's University as requested.

Sincerely,

Julius Truelson

Julius Truelson
Superintendent

JT:w

Dear _____,

This letter is being sent to ask you to be a volunteer for a study I am presently conducting in partial requirement for a Master of Art Degree in Physical Education, at the Texas Woman's University, Denton, Texas.

The study entails the testing of selected women teachers teaching on the secondary level in the Fort Worth Independent School District. The tests are comprised of a battery of physical fitness tests, which will not be difficult to perform and will not require more than thirty minutes of your time.

If you agree to be a subject for this study the time and place for the testing will be at your convenience.

Please check in the space below if you will/or will not be a participant for this study. Mail your reply in the enclosed envelope and if additional information is needed, please contact me at the Handley Junior High School, Fort Worth, Texas.

Thanking you in advance for your consideration and help on the above matter, I remain,

Sincerely,

Mary Joyce Baker

☐ Yes, I will be a volunteer subject.

☐ No, I will not be a volunteer subject.

INDIVIDUAL DATA CARD

NAME _____ MARRIED _____ YES _____ NO

DATE OF BIRTH _____ TEACHING AREA: _____

EXTENT FLEX.	DYNAMIC FLEX.	SHUTTLE-RUN	PULL-UPS	LEG LIFTS	COMPOSITE SCORE
CABLE-JUMP	BALANCE	HAND-GRIP			

RAW SCORES FOR THE FLEISHMAN'S EXTENT FLEXIBILITY TEST

Subjects	Women Physical Education Teachers	Subjects	Women Teachers of Subjects Other Than Physical Education
1	19 inches	1	12 inches
2	17	2	16
3	24	3	8
4	14	4	9
5	12	5	18
6	20	6	16
7	17	7	18
8	9	8	14
9	17	9	17
10	12	10	18
11	18	11	10
12	17	12	15
13	17	13	14
14	16	14	10
15	16	15	13
16	15	16	16
17	18	17	12
18	16	18	12
19	16	19	22
20	11	20	12
21	16	21	14
22	15	22	16
23	11	23	14
24	13	24	11
25	13	25	10
26	17	26	12
27	14	27	14
28	16	28	13
29	14	29	29
30	11	30	16

RAW SCORES FOR THE FLEISHMAN'S DYNAMIC FLEXIBILITY TEST

Subjects	Women Physical Education Teachers	Subjects	Women Teachers of Subjects Other Than Physical Education
1	15 cycles	1	13 cycles
2	16	2	6
3	15	3	6
4	7	4	5
5	8	5	15
6	17	6	14
7	9	7	13
8	6	8	10
9	8	9	10
10	10	10	15
11	11	11	7
12	14	12	10
13	13	13	14
14	13	14	7
15	10	15	13
16	9	16	8
17	11	17	10
18	11	18	10
19	12	19	13
20	9	20	11
21	15	21	12
22	14	22	12
23	6	23	14
24	8	24	9
25	8	25	8
26	10	26	8
27	7	27	8
28	11	28	13
29	13	29	5
30	11	30	10

RAW SCORES FOR THE FLEISHMAN'S PULL-UP

TEST FOR DYNAMIC STRENGTH

Subjects	Women Physical Education Teachers	Subjects	Women Teachers of Subjects Other Than Physical Education
1	2	1	0
2	2	2	0
3	0	3	0
4	0	4	0
5	0	5	0
6	3	6	0
7	0	7	1
8	0	8	0
9	2	9	0
10	1	10	2
11	0	11	0
12	1	12	1
13	0	13	1
14	0	14	2
15	1	15	0
16	0	16	1
17	2	17	0
18	0	18	0
19	0	19	1
20	0	20	0
21	0	21	1
22	0	22	0
23	1	23	0
24	0	24	0
25	1	25	0
26	1	26	0
27	0	27	0
28	0	28	0
29	0	29	0
30	0	30	

RAW SCORES OF THE FLEISHMAN'S HAND-GRIP TEST FOR STATIC STRENGTH

Subjects	Women Phsyical Education Teachers	Subjects	Women Teachers of Subjects Other Than Physical Education
1	80 Pounds	1	60 Pounds
2	80	2	62
3	60	3	65
4	68	4	70
5	61	5	68
6	75	6	75
7	66	7	81
8	61	8	79
9	79	9	75
10	85	10	90
11	70	11	65
12	76	12	81
13	62	13	73
14	70	14	60
15	68	15	66
16	60	16	63
17	85	17	45
18	65	18	60
19	73	19	85
20	61	20	63
21	72	21	73
22	75	22	62
23	54	23	70
24	72	24	71
25	78	25	68
26	70	26	67
27	45	27	40
28	60	28	66
29	54	29	45
30	64	30	59

RAW SCORES FOR THE FLEISHMAN'S LEG-LIFT

TEST FOR TRUNK STRENGTH

Subjects	Women Physical Education Teachers	Subjects	Women Teachers of Subjects Other Than Physical Education
1	16	1	9
2	18	2	15
3	19	3	14
4	17	4	10
5	10	5	17
6	17	6	14
7	16	7	17
8	20	8	14
9	20	9	17
10	14	10	20
11	16	11	15
12	16	12	15
13	14	13	16
14	15	14	16
15	13	15	16
16	14	16	16
17	23	17	7
18	14	18	14
19	13	19	18
20	10	20	12
21	16	21	13
22	20	22	15
23	8	23	13
24	11	24	11
25	16	25	7
26	13	26	10
27	5	27	5
28	16	28	19
29	10	29	6
30	12	30	13

RAW SCORES FOR THE FLEISHMAN'S

SHUTTLE-RUN TEST

Subjects	Women Physical Education Teachers	Subjects	Women Teachers of Subjects Other Than Physical Education
	Seconds		Seconds
1	24.1	1	29.2
2	23.3	2	32.2
3	27.5	3	22.9
4	23.4	4	26.7
5	24.6	5	25.3
6	19.5	6	25.2
7	27.7	7	28.5
8	26.3	8	23.5
9	24.8	9	29.2
10	23.5	10	22.5
11	23.2	11	26.8
12	25.6	12	26.0
13	22.9	13	24.8
14	28.2	14	24.9
15	26.5	15	26.4
16	27.2	16	25.9
17	25.6	17	30.3
18	25.6	18	33.3
19	28.7	19	27.6
20	27.9	20	35.3
21	29.6	21	31.8
22	25.0	22	25.6
23	27.4	23	25.4
24	30.0	24	28.1
25	21.4	25	33.2
26	27.0	26	25.7
27	32.0	27	32.0
28	32.5	28	28.0
29	30.5	29	35.9
30	33.1	30	34.9

RAW SCORES FOR THE FLEISHMAN'S CABLE-JUMP TEST FOR GROSS BODY COORDINATION

Subjects	Women Physical Education Teachers	Subjects	Women Teachers of Subjects Other Than Physical Education
	Correct Tries		Correct Tries
1	5	1	5
2	5	2	2
3	1	3	1
4	4	4	5
5	5	5	5
6	4	6	5
7	3	7	5
8	2	8	4
9	5	9	5
10	5	10	4
11	5	11	5
12	5	12	5
13	4	13	5
14	5	14	5
15	5	15	5
16	5	16	4
17	5	17	5
18	5	18	5
19	5	19	4
20	5	20	5
21	5	21	5
22	2	22	5
23	5	23	3
24	5	24	3
25	5	25	5
26	4	26	5
27	5	27	5
28	4	28	5
29	3	29	0
30	5	30	5

RAW SCORES FOR THE FLEISHMAN'S BALANCE TEST

FOR GROSS BODY EQUILIBRIUM

Subjects	Women Physical Education Teachers	Subjects	Women Teachers of Subjects Other Than Physical Education
	Seconds		Seconds
1	2.0	1	1.0
2	2.3	2	2.2
3	7.0	3	3.2
4	5.0	4	2.2
5	1.0	5	6.0
6	5.0	6	4.0
7	4.5	7	3.0
8	3.2	8	6.0
9	5.4	9	6.0
10	5.0	10	4.0
11	4.0	11	3.0
12	4.0	12	5.0
13	3.0	13	7.0
14	3.0	14	0.0
15	5.0	15	2.0
16	1.0	16	3.0
17	6.0	17	3.0
18	2.0	18	6.0
19	1.0	19	6.0
20	1.0	20	4.0
21	5.0	21	1.0
22	1.5	22	5.0
23	0.0	23	1.5
24	2.0	24	2.0
25	7.0	25	0.0
26	5.0	26	3.0
27	3.0	27	5.0
28	3.0	28	1.0
29	1.5	29	2.0
30	0.0	30	0.0

RAW SCORES FOR THE CARLOS L. WEAR

EXPRESSED ATTITUDE TEST

Subjects	Women Physical Education Teachers	Subjects	Women Teachers of Subjects Other Than Physical Education
1	181	1	158
2	168	2	174
3	178	3	170
4	187	4	174
5	174	5	170
6	169	6	173
7	164	7	164
8	164	8	173
9	186	9	160
10	168	10	158
11	172	11	160
12	174	12	174
13.	195	13	160
14	184	14	164
15	198	15	178
16	166	16	158
17	178	17	145
18	169	18	168
19	186	19	165
20	164	20	167
21	191	21	162
22	189	22	180
23	168	23	172
24	184	24	164
25	194	25	176
26	188	26	160
27	160	27	160
28	194	28	160
29	182	29	170
30	174	30	160

CARLOS L. WEAR - PHYSICAL EDUCATION

ATTITUDE INVENTORY

Directions - Please read carefully: Below you will find some statements about physical education. We would like to know how you feel about each statement. You are asked to consider physical education only from the standpoint of its place as an activity course taught during a regular class period. No reference is intended in any statement to interscholastic or intramural athletics. People differ widely in the way they feel about each statement. There are no right or wrong answers.

You have been provided with a separate answer sheet for recording your reaction to each statement. (a) Read each statement carefully, (b) go to the answer sheet, and (c) opposite the number of the statement place a circle around the word (or words) which best expresses your feeling about the statement. After reading a statement you will know at once, in most cases, whether you agree or disagree with the statement. If you agree, then decide whether to place a circle around "agree" or "strongly agree." If you disagree, then decide whether to place the circle around "disagree" or "strongly disagree." In case you are undecided (or neutral) concerning your feeling about the statement, then place a circle around "undecided." Try to avoid placing a circle around "undecided" in very many instances.

Wherever possible, let your own personal experience determine your answer. Work rapidly, do not spend much time on any statement. This is not a test, but is simply a survey to determine how people feel about physical education. Your answers will in no way affect your grade in any course. Please answer each statement as you actuallly feel about it. Be sure to answer every statement.

Statements

1. If for any reason a few subjects have to be dropped from the college program, physical education should be one of the subjects dropped.
2. Associations in physical education activities give people a better understanding of each other.
3. Physical education activities provide no opportunities for learning to control the emotions.

4. Engaging in vigorous physical activity gets one interested in practicing good health habits.
5. Physical education is one of the more important subjects in helping to establish and maintain desirable social standards.
6. The time spent in getting ready for and engaging in a physical education class could be more profitably spent in other ways.
7. Vigorous physical activity works off harmful emotional tensions.
8. A person's body usually has all the strength it needs without participation in physical education activities.
9. I would take physical education only if it were required.
10. Participation in physical education activities tends to make one a more socially desirable person.
11. Participation in physical education makes no contribution to the development of poise.
12. Physical education in schools and colleges does not receive the emphasis that it should.
13. Because physical skills loom large in importance in youth, it is essential that a person be helped to acquire and improve such skills.
14. Physical education classes are poor in opportunities for worthwhile social experiences.
15. Both team and individual sport actitities should be included in a physical education program.
16. A person would be better off emotionally if he did not participate in physical education.
17. Skill in active games or sports is not necessary for leading the fullest kind of life.
18. It is possible to make physical education a valuable subject by proper selection of activities.
19. Physical education does more harm physically than it does good.
20. Developing a physical skill brings mental relaxation and relief.
21. Associating with others in some physical education activity is fun.
22. Physical education classes provide nothing which will be of value outside of the class.
23. Physical education classes provide situations for the formation of attitudes which will make one a better citizen.
24. Rhythmic activities should not be a part of the physical education program.
25. Physical education situations are among the poorest for making friends.
26. Belonging to a group, for which opportunity is provided in team activities, is desirable experience for a person.
27. There is not enough value coming from physical education to justify the times consumed.

28. Physical education is an important subject in helping a person gain and maintain all-round good health.
29. Physical education skills make worthwhile contributions to the enrichment of living.
30. No definite beneficial results come from participation in physical education activities.
31. People get all the physical exercise they need in just taking care of their daily work.
32. Engaging in group physical education activities is desirable for proper personality development.
33. All who are physically able will profit from an hour of physical education each day.
34. Physical education activities tend to upset a person emotionally.
35. Physical education make a valuable contribution toward building up an adequate reserve of strength and endurance for everyday living.
36. For its contributions to mental and emotional well-being physical education should be included in the program of every school.
37. Physical education tears down sociability by encouraging people to attempt to surpass each other in many of the activities.
38. I would advise anyone who is physically able to take physical education.
39. Participation in physical education activities makes for a more wholesome outlook on life.
40. As far as improving physical health is concerned a physical education class is a waste of time.[1]

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[1]Wear, Carlos L. "The Evaluation of Attitude Towards Physical Education as an Activity Course." Research Quarterly, XXII (1951), 114-126.

Name _____

1.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
2.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
3.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
4.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
5.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
6.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
7.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
8.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
9.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
10.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
11.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
12.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
13.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
14.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
15.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
16.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
17.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
18.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
19.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
20.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
21.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
22.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
23.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
24.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
25.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
26.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
27.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
28.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
29.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
30.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
31.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
32.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
33.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
34.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
35.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
36.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
37.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
38.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
39.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
40.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree[1]

[1]Wear, Carlos L. "The Evaluation of Attitude Towards Physical Education as an Activity Course." Research Quarterly XXII (1951), 114-126.

STATISTICAL FORMULAS USED IN THE STUDY

1. One-Way analysis of variance for equal groups.[1]

Between-sets sum of squares and between-sets variance

$$d_s = M_s - M_t \qquad \text{(Deviation of a set mean from the grand mean)}$$

$$(MS)_b = \frac{(SS)_b}{k-1} = \frac{n\, d^2_s}{k-1} \qquad \text{(Between-sets mean square)}$$

$(SS)_b$ = sum of squares for between sets

Within-sets sum of squares and within-sets variance

$$(MS)_w = \frac{(SS)_w}{k(n-1)} = \frac{x^2_s}{k(n-1)} = \frac{x^2_s}{n-k} \qquad \text{(Within-sets mean square)}$$

$(SS)_w$ = within-sets sum of squares and x_s a deviation of an observation from its set mean.

2. Pearson Product-Moment Correlation[2]

$$r = \frac{N(X'Y') - (X')(Y')}{N(X^2) - (X')^2 \quad N(Y'^2) - (Y')^2}$$

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[1]Guilford, Fundamental Statistics in Psychology and Education, p. 270.

[2]Koenker, Simplified Statistics, p. 59.

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