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OF THE FEMALE HEALTH, PHYSICAL EDUCATION
AND RECREATION MAJOR.

Middle Tennessee State University, D.A., 1973
Education, physical

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THE DEVELOPMENT OF A PSYCHOGRAPHIC PROFILE OF
THE FEMALE HEALTH, PHYSICAL EDUCATION
AND RECREATION MAJOR

By

Janice O. Hayes

A dissertation presented to the
Graduate Faculty of Middle Tennessee State University
in partial fulfillment of the requirements
for the degree Doctor of Arts

August, 1973

THE DEVELOPMENT OF A PSYCHOGRAPHIC PROFILE OF
THE FEMALE HEALTH, PHYSICAL EDUCATION
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ABSTRACT

THE DEVELOPMENT OF A PSYCHOGRAPHIC PROFILE OF THE FEMALE HEALTH, PHYSICAL EDUCATION AND RECREATION MAJOR

By Janice O. Hayes

The purpose of this study was to develop a graphic representation of the traits common to the female, junior and senior health, physical education and recreation major at Middle Tennessee State University.

The subjects were fifty-one voluntary, full-time, female majors in the health, physical education and recreation professional preparation program. The subjects were administered the following tests: (1) Lee-Thorpe Occupational Interest Inventory, (2) Allport-Vernon-Lindzey Study of Values, (3) Otis Self-Administering Tests of Mental Ability, (4) Wear Physical Education Attitude Scale, (5) Scott Motor Ability Test, (6) Cardiovascular Efficiency Test for Girls and Women and (7) a somatotype evaluation. Scores for subjects on the Cornell Index, American College Test, and the health, physical education and recreation grade-point average were secured from the offices of Admissions and Records and Guidance and Testing.

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The health, physical education and recreation grade-point average of the subjects constituted the independent variable for purposes of correlation, with each test and subtest. The Flanagan-Kelley technique was used to determine coefficients of correlation. In addition, the t-test was computed to determine the significance of difference between the experimental group and the norm means at the .05 level of confidence.

A psychographic profile utilizing standard scores was developed to display the measured traits of the subjects and the degree of existence of measured traits in comparison to the norms of the standardized tests.

Findings of this study indicated the following:

1. Correlation of the health, physical education and recreation grade-point average with each test variable indicated significant positive relationships with the (1) ACT composite scores, (2) Natural interests as measured by the Lee-Thorpe Occupational Interest Inventory, (3) cardiovascular fitness as measured by the Cardiovascular Efficiency Test for Girls and Women, (4) psychological health as measured by the Cornell Index, (5) intellectual aptitude as measured by the Otis Self-Administering Tests of Mental Ability, (6) Aesthetic values as measured by the Allport-Vernon-Lindzey Study of Values and (7) shoulder girdle strength and general motor ability as measured by

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the Scott Motor Ability Test. Significant negative relationships occurred with Business and Computational interests as measured by the Lee-Thorpe Occupational Interest Inventory.

2. Significant and greater mean scores for the subjects as compared to normative means were found to exist for the following measures: (1) all aspects of the Scott Motor Ability Test, (2) intellectual aptitude as measured by the Otis Self-Administering Tests of Mental Ability, (3) favorable attitude toward physical activity as measured by the Wear Physical Education Attitude Scale, (4) Political values as measured by the Allport-Vernon-Lindzey Study of Values, (5) Personal-Social interests, Natural interests, interests in the Arts, and Level of Interests as measured by the Lee-Thorpe Occupational Interest Inventory.

3. The means of the subjects were significantly lower than the norm means for the following measures: (1) Theoretical and Aesthetic values as measured by the Allport-Vernon-Lindzey Study of Values, (2) Mechanical, Business, Science and Computational interests as determined by the Lee-Thorpe Occupational Interest Inventory, and (3) ACT composite score.

4. Morphological classification yielded a predominant component of mesomorphy.

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5. The composite results of the battery of tests showed the subjects to significantly differ from the norms of eighteen of the twenty-five measures.

ACKNOWLEDGEMENTS

The writer wishes to express her appreciation to those persons who have been of assistance during this study, especially Dr. Martha Chambers whose capable guidance was of considerable value. Special acknowledgement is also due to Dr. Stanley Hall who continuously offered encouragement.

The writer is also grateful to the other members of her doctoral committee for their suggestions leading to the completion of the study. These persons are Dr. Robert C. Aden, Dr. Wallace Maples, Dr. Willard Kerr, and Dr. John Patten.

Appreciation is also extended to Dr. Glenn Reeder, Dr. James Martin and Dr. Frank Glass who gave of their time and materials necessary for the conduct of the study.

Finally, special acknowledgement is given to my husband Dean and daughters Erin and Kara for their understanding and patience throughout this study.

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Chapter 1

INTRODUCTION

In the specialized field of health, physical education and recreation, students appear to possess and display certain competencies and characteristics.¹ Too little attention is paid to the overall pattern of characteristics of the female health, physical education and recreation major. Persons often assume the female physical education major to have traits that, in fact, may not predominate.² Advisors of potential female health, physical education and recreation majors should have knowledge of the traits possessed by students attracted to the field and the competencies and characteristics of those students. Knowledge of specific characteristics and the frequency by which the characteristics are displayed by the female

¹Margery Servis and Reuben B. Frost, "Qualities Related to Success in Women's Physical Education Professional Preparation Program," Research Quarterly, XXXIII (May, 1967), 283-90.

²Daniel M. Landers, "Psychological Femininity and the Prospective Female Educator," Research Quarterly, XLI (May, 1970), 164-70; see also Helen M. Timmermans, "A Comparison Between Physical Education Majors and Non-majors in Certain Personality Traits," Research Quarterly, XXXIX (December, 1968), 1088-93.

health, physical education and recreation major may aid in the advising and/or selection of potential majors.³

STATEMENT OF THE PROBLEM

The purpose of this study was to develop a psychographic profile of the female health, physical education and recreation major at Middle Tennessee State University. This study attempted to delineate those traits most common to the female health, physical education and recreation major.

JUSTIFICATION OF THE STUDY

Persons majoring in various curricula display distinctive characteristics.⁴ Seldom is a composite pattern of characteristics of students in varied fields developed. An assessment of academic aptitude and achievement, attitudes, psychological and physical health could be supplemented with measures of interests, values and performance skills to provide a complete description of the female health, physical education and recreation major. Knowledge of the degree of existence of specific

³Harold M. Barrow and Rosemary McGee, A Practical Approach to Measurement in Physical Education (Philadelphia: Lea and Febiger, 1971), p. 123.

⁴Kenneth A. Feldman and Theodore M. Newcomb (eds.), The Impact of College on Students, II (San Francisco: Jossey-Bass, Inc., 1970), p. 170.

traits could provide a basis for advising the individual student in his choice of field of study.⁵

Defection from one curriculum to another field of study is common at colleges and universities today. Studies have indicated that the defectors differ in areas of attitudes and interests from those who remained in originally stated curricula.⁶ Iffert compared the initial subject-field choice of 6,247 males and females in college in 1950 to the enrolled program in 1953-54 and found 45.4 percent of the females originally indicating physical education as subject-field choice had defected.⁷ The Admissions and Records Office at Middle Tennessee State University reported that 807 of the 8,523 undergraduate full-time equivalent enrollees were undecided as to major fields of study in the Fall of 1972.⁸ Knowledge of present health, physical education and recreation majors' interests, attitudes, abilities, values, psychological and physical health could provide a frame of reference when advising such

⁵Carl Bereiter and Mervin B. Freedman, "Fields of Study and People in Them," The American College, ed. Nevitt Sanford (New York: John Wiley and Sons, Inc., 1962), p. 589.

⁶Feldman and Newcomb, 187.

⁷Feldman and Newcomb, II, 90.

⁸Frank Glass, Personal Interview, February, 1973.

potential majors. Clarke cited the importance of studying the interaction of forces within persons in order to develop an understanding of the whole.⁹

Advising at Middle Tennessee State University is done by faculty members in the stated field-choice of the student. The academic advisor is assigned to the student by either the Admissions Office or the chairman of the department of stated major. The Faculty Handbook of Middle Tennessee State University states the duty of the advisor to be the following:

The advisor approves a Trial Schedule and the registration card of the student at the beginning of each semester and makes certain the student is taking all the required courses. The advisor should keep a folder on each advisee containing trial schedules and other pertinent information such as grade reports, program changes and similar material.¹⁰

Suggestion is also made to the faculty advisors of students to "refer an advisee to the Dean of his school or to the Director of Counseling and Guidance" if the advisors so wish.¹¹ The Middle Tennessee State University Catalog states the "faculty advisor will assist the student

⁹ H. Harrison Clarke, Application of Measurement to Health and Physical Education (Englewood Cliffs, New Jersey: Prentice-Hall, Inc. 1959), p. 5.

¹⁰ Faculty Handbook, Middle Tennessee State University (1972), p. 22.

¹¹ Faculty Handbook.

in determining and carrying out an academic program which will meet the student's educational aims and goal."¹²

There is a need for a frame of reference with which the advisors may make evaluations.¹³ Information gained from objective personality measures could be very useful to the advisor if he is provided results of tests in such a manner that an overall pattern of measured characteristics reveal strengths and weaknesses, interests and abilities, attitudes and values, physical skills and health, as well as intellectual capacity.¹⁴ Knowing the personality traits of majors would provide a sounder foundation in the advising and/or selection of students to the field of study.¹⁵

Researchers attempting to identify traits held by the female health, physical education and recreation major have limited themselves to the analysis of one or several of the previously mentioned qualities, but none have attempted

¹²Middle Tennessee State University Catalog, Middle Tennessee State University (1972), p. 216.

¹³T. R. McConnell and Paul Heist, "The Diverse College Population," The American College, ed. Nevitt Sanford (New York: John Wiley and Sons, Inc., 1962), pp. 248-9.

¹⁴Floyd L. Ruch, Psychology and Life (Glenview, Illinois: Scott Foresman and Company, 1967), p. 174.

¹⁵Bereiter and Freedman, 589.

a holistic assessment.¹⁶ Gruber and others have conducted studies in an attempt to assess traits that appear to indicate success in teaching of physical education.¹⁷ A nomothetic holistic assessment of the female health, physical education and recreation major has been exiguous.

An effort in the understanding of traits possessed by the female health, physical education and recreation major may provide some guidance in the advising of potential majors and, perhaps, reveal information that would encourage further investigation of the subjects by interested researchers. The results of this study will provide information that may strengthen the departmental advisory program.

The findings of this study may be useful for curriculum evaluation, evaluation of testing procedures,

¹⁶ Servis and Frost; see also Gerald S. Kenyon, "Certain Psychosocial and Cultural Characteristics Unique to Prospective Teachers of Physical Education," Research Quarterly, XXXVI (March, 1965), 105-12; Constance Mynatt, "A Study of Differences in Selected Physical Performance Test Scores of Women in Tennessee Colleges," Research Quarterly, XXXI (March, 1960), 60-65.

¹⁷ Joseph John Gruber, "Personality Traits and Teaching Attitudes," Research Quarterly, XXXI (October, 1960), 434-39; see also Clifford Brownell, "The Preparation of Teachers in Health and Physical Education," American Physical Education Review, XXXIII (1929), 278-80; Elizabeth Graybeal, "A Consideration of Qualities Used by Administrators in Judging Effective Teachers in Physical Education," Research Quarterly, XLIV (1941), 741-44; J. E. Rolfe, "The Measurement of Teaching Ability," Journal of Experimental Education, XIV (1945), 52-75.

and as encouragement for follow-up studies to determine strengths and weaknesses in the professional preparation program.

DEFINITION OF TERMS

For the purpose of this study the following terms are defined in the manner in which the writer has used them. Further clarification will be presented as specific tools are described.

Aptitude test. Instrument designed to measure the ability of a person to learn or achieve in a particular area.

Attitude test. A measure to evaluate predispositions to stimuli and specific situations.

Battery. A group of standardized tests administered to the same subjects though not standardized on the same subjects.

Cardiovascular test. A means of measuring the ability of the circulatory system and respiratory system to adjust and recover from exercise and work.

Group test. An evaluative instrument administered to a number of individuals at the same time by the examiner.

Interest Inventory. An evaluation of general vocational fields that appeal to persons.

Knowledge test. Pen and paper evaluation of cognizance of facts and information.

Motor ability test. An evaluative tool to assess the present level of efficiency of motor performance.

Objective test. A tool of measurement in which the scoring is done with a single answer key and responses are considered either right or wrong.

Performance test. An examination that requires a motor response by the examinee.

Ponderal index. A measure of maximal achieved body mass over surface.

Psychographic profile. A graphic representation of the results of objectively measured traits with the results expressed in uniform or comparable terms.

Somatotype. Morphological description of the body structure.

Endomorphy. Morphological structure in which the digestive visceratonia dominates.

Mesomorphy. Morphological structure in which there exists a hard, rectangular and heavy body outline.

Ectomorphy. Morphological structure in which linearity and slender fragility of body segments prevail.

Values test. An instrument that measures the relative importance of motives held by persons.

DELIMITATIONS OF THE STUDY

A nomothetic approach to testing was conducted to allow convenience of follow-up studies. The general design

of the study limited subjects to full-time, junior and senior female health, physical education and recreation majors at Middle Tennessee State University.

LIMITATIONS OF THE STUDY

The results of this paper may not be representative of the female health, physical education and recreation majors at other institutions due to the diversity among institutions as well as the students who attend those institutions.

HYPOTHESES

For the purpose of this study, the following hypotheses underlay the research:

1. The results of the tests administered to the female subjects would show no significant differences from the given norms for the following variables:

- a. motor ability as measured by the Scott Motor Ability Test
- b. cardiovascular fitness as measured by the Cardiovascular Efficiency Test for Girls and Women
- c. intellectual aptitude as measured by the Otis Self-Administering Tests of Mental Ability

- d. attitude toward physical education as measured by the Wear Physical Education Attitude Scale
- e. strength of values as measured by the Allport-Vernon-Lindzey Study of Values
- f. psychological health as measured by the Cornell Index

2. There would be no significant differences in the mean composite ACT score of the subjects and the mean of the upperclass women at Middle Tennessee State University.

3. The health, physical education and recreation grade-point average of the female subjects would show no significant correlations with the variables as measured by the battery of tests.

4. The morphological classification of the subjects would indicate no predominant somatotype.

5. The vocational choices of the subjects as measured by the Lee-Thorpe Occupational Interest Inventory would indicate no specific vocational patterns of interest.

6. The composite results of the battery of tests would indicate no unifying pattern for the female physical education major.

Chapter 2

REVIEW OF RELATED LITERATURE

Research designed to determine specific personality traits of female physical education majors has been conducted by Duggan and others.¹⁸ However, research attempting a holistic assessment of the female physical education major has been sparse. Therefore, the review of literature concentrated on related studies in an attempt to develop background information.

The review of related literature was divided into three sections. The first section presented reviews describing traits related to success in teaching. Traits and characteristics related to success in teaching health and physical education as determined by research was presented in the second section. Section three related to literature defining specific measured traits of female physical education majors.

¹⁸Ann S. Duggan, "A Comparative Study of Undergraduate Women Majors and Non-majors in Physical Education with Respect to Certain Personal Traits," Research Quarterly, VIII (1937), 38-45; see also C. E. Ragsdale, "Personality Traits of College Majors in Physical Education," Research Quarterly, III (May, 1932), 243-48; Irene Palmer, "Personal Qualities of Women Teachers of Physical Education," Research Quarterly, IV (December, 1933), 31-48; Daniel M. Landers, "Psychological Femininity and the Prospective Female Physical Educator," Research Quarterly, (May, 1970), 164-70.

GENERAL TEACHER QUALITIES

The qualities of successful teachers have been of interest to researchers for many years. Charters and Waples conducted a comprehensive study of teacher traits. The 2,800 resulting traits were telescoped to twenty-five, and placed in rank order according to importance:

1. Good judgment
2. Self-control
3. Consideration
4. Enthusiasm
5. Magnetism
6. Adaptability
7. Breadth of Interest
8. Honesty
9. Cooperation
10. Refinement
11. Carefulness
12. Forcefulness
13. Leadership
14. Health
15. Attractiveness
16. Industry
17. Neatness
18. Dependability
19. Scholarship
20. Originality
21. Promptness
22. Open-mindedness
23. Progressiveness
24. Fluency
25. Thrift¹⁹

Crowley's research indicated that potential teachers should have academic intelligence, an understanding of general culture, literacy in written and oral forms,

¹⁹ W. W. Charters and Douglas Waples, The Commonwealth Teacher Training Study (Chicago: The University of Chicago Press, 1929), p. 55.

physical and emotional health, personal-social integration and an honest interest in the teaching profession.²⁰ Both Martin and Rolfe concluded from their studies that intelligence was the greatest factor in the prediction of success in teaching.²¹ Rolfe also indicated that personality was unrelated to success in teaching.²²

PHYSICAL EDUCATION TEACHER QUALITIES

Selection of high quality and capable candidates to the field of physical education has been emphasized by Brownell. He stressed the importance of evaluating academic achievement, physical fitness and results of sociability tests when considering the eligibility of a student to enter the professional preparation program.²³ Cassidy and Espenshade also supported the views of Brownell

²⁰F. M. Crowley, "Selection by Training Agencies," Phi Delta Kappan, XXIV (May, 1942), 348.

²¹L. O. Martin, The Prediction of Success for Students in Teacher Education (New York: Teachers College, Columbia University, 1944), p. 38; J. E. Rolfe, "The Measurement of Teaching Ability," Journal of Experimental Education, XIV (September, 1945), 52-74.

²²Rolfe, 52-74.

²³Clifford Brownell, "The Preparation of Teachers in Health and Physical Education," American Physical Education Review, XXXIII (May, 1929), 278-80.

in the selection of teacher candidates.²⁴ Espenshade found significant correlation between superior teachers and their past ratings of probable success and grades in physical activity courses.²⁵ McKinistry agreed with Espenshade's stress of achievement in motor ability skills and added the following characteristics as being necessary for the development of a successful physical education teacher: (1) physical fitness, (2) knowledge of principles of physical education and knowledge in the foundation sciences, (3) skill in teaching techniques and (4) character and personality.²⁶

Graybeal surveyed administrators to determine those characteristics deemed important to effective physical education teachers. The administrators responded to the survey indicating the following five characteristics: (1) knowledge in field of physical education, (2) physical health, (3) adequate skill development, (4) physical

²⁴Rosalind Cassidy, "Selection and Guidance of Students Who Wish to Undertake Professional Training in Physical Education," Research Quarterly, I Suppl., (March, 1930), 72-86; see also Anna Espenshade, "Selection of Women Major Students in Physical Education," Research Quarterly, XIX (May, 1948), 75-80.

²⁵Espenshade, 75.

²⁶Helen McKinistry, "Evaluation of Qualities and Capacities Essential for Teaching," Research Quarterly, IV (December, 1933), 6.

superiority and (5) understanding of students and recognition of need for developing physical fitness in students.²⁷ In a similar study, Blesh agreed essentially with Graybeal, but listed the components in rank order of importance. Blesh found the following components to be important to job success: (1) personality, (2) physical education activity skills, (3) cooperative interaction with individuals and groups, (4) professional interest in field, (5) intelligence and (6) achievement in academic work.²⁸

Thorpe conducted research to determine whether or not a pattern of similarity of personality variables existed among successful undergraduate students, graduate students and teachers of physical education and to compare the total to a norm group. By use of the Edwards Personal Preference Schedule, she found an existing pattern of similarity of personality variables among the successful women teachers, the graduate students, and senior majors in physical education. When the three physical education groups were combined, the total group was distinguishable

²⁷Elizabeth Graybeal, "A Consideration of Qualities Used by Administrators in Judging Effective Teachers of Physical Education," Research Quarterly, XII (December, 1941), 743-4.

²⁸Erwin T. Blesh, "Correlations Between Success in Student Teaching and Success on the Job," Research Quarterly, XIII (October, 1942), 397-9.

statistically from the norm on nine of the fifteen variables tested. Thorpe found the physical education subjects to be significantly higher in deference, order, dominance, and endurance. However, the subjects scored significantly lower than the norm on autonomy, succorance, nurturance, heterosexuality, and aggression variables.²⁹

FEMALE PHYSICAL EDUCATION MAJOR QUALITIES

Extensive research has been conducted to determine specific personality traits of female physical education majors as compared to females in other fields. Espenshade's study in which female physical education majors were compared to undergraduates in other fields showed significant differences in personality characteristics. The female health and physical education major displayed greater emotional stability, less neuroticism, and was more extraverted and dominating. Espenshade also suggested that the health and physical education grades were of value in predicting success of the females in professional preparation.³⁰ Ragsdale also found female physical

²⁹ Jo Ann Thorpe, "The Study of Personality Variables Among Successful Women Students and Teachers of Physical Education," Research Quarterly, XXIX (1958), 83-92.

³⁰ Espenshade, 75.

education students, as a group, to be more stable and extraverted than their non-major counterparts.³¹

Studies to determine differences existing between personality patterns of the female physical education major and the non-major were conducted by Timmermans. By use of the Guilford-Zimmerman Temperament Survey, Timmermans found the physical education major to score significantly higher on the General Activity trait and the Sociability trait.³² In Thorpe's study of personality variables, she found that among successful women students of physical education there existed significantly higher ratings in deference, order, dominance, and endurance as measured by the Edwards Personal Preference Schedule.³³ Kenyon found personality pattern differences to exist even with those who planned to teach in areas other than physical education.³⁴

Native intelligence has been used as a criterion in the selection of candidates into the professional

³¹Ragsdale, 248.

³²Helen M. Timmermans, "A Comparison Between Physical Education Majors and Non-majors in Certain Personality Traits," Research Quarterly, XXXIX (December, 1968), 1088-93.

³³Thorpe, 92.

³⁴Gerald S. Kenyon, "Certain Psychological and Cultural Characteristics Unique to Prospective Teachers of Physical Education," Research Quarterly, XXXVI (March, 1965), 105-12.

preparation program at various colleges and universities, according to Roundy.³⁵ The results of Duggan's study of female health, physical education and recreation majors at three universities revealed nearly identical mean intelligence scores for majors and non-majors.³⁶ Bookwalter's observations of physical education majors revealed the major (male and female composite) to be intellectually inferior to other students. However, he did find the physical education major to be superior in motor traits.³⁷ Mynatt tested the motor ability of women in twelve colleges and universities in Tennessee and found women physical education majors to be superior in performance to all other subjects.³⁸ Conclusions of motor superiority of the female physical education major have also been reported by Duggan.³⁹

³⁵Elmo Roundy, "The Responsibility of College Faculties in Preparing Professional Educators of Substance," The Physical Educator, XXIV (October, 1967), 125-26.

³⁶Duggan, 38-45.

³⁷K. W. Bookwalter, "Are High Schools Over-emphasizing Athletics?," The Physical Educator, I (April, 1941), 179-80.

³⁸Constance Mynatt, "A Study of Differences in Selected Physical Performance Test Scores of Women in Tennessee Colleges," Research Quarterly, XXXI (March, 1960), 60-65.

³⁹Duggan, 45.

Shaffer, Twomey and Pace researched the strength of values held by college students and found physical education majors to relegate significantly high importance to political, theoretical and social values.⁴⁰ Jacob, however, revealed that college students in general have a homogeneity of both values and attitudes.⁴¹ Servis and Frost supported the conclusions drawn by Jacob. Servis and Frost tested sixty-nine women physical education majors at Central Michigan University. The results of the women tested by the Allport-Vernon-Lindzey Study of Values showed little or no relationship to their success in the physical education professional program to stated values.⁴²

Anthropometry was one of the earliest means of personality and skill evaluation and measurement. Research classifying persons in terms of body type or body characteristics began generations ago. Hippocrates and Kretschmer were among the prominent constitutional type theorists in past ages. In recent times William Sheldon

⁴⁰Donald E. Super and John O. Cites, Appraising Vocational Fitness (New York: Harper and Brothers, 1962), p. 497; see also Kenneth A. Feldman and Theodore M. Newcomb, The Impact of College on Students II (San Francisco: Jossey-Bass, Inc., 1970), pp. 104-10.

⁴¹Philip Jacob, Changing Values in College: An Exploratory Study of the Impact of College Teaching (New York: Harper and Brothers, 1957), p. 17.

⁴²Servis and Frost, 288.

has become noted in the area of somatotyping. Sheldon has classified persons according to three major body types and body components.⁴³ Sheldon described the three primary body types as endomorphy, mesomorphy and ectomorphy. The endomorph is characterized by massive abdominal viscera with underdeveloped muscles; the mesomorph component displays a sturdy physique, a prominent musculature with broad shoulders and a tapering body to the waist; ectomorphy is characterized by body linearity and fragility. Sheldon did not type each person using only one of the components, but the degree of existence of each of the components, thus yielding a three digit description.⁴⁴

As these components occur in nature they are single, continuous variables. The designation of the somatotype merely serves the purpose of bracketing a physique within defined boundaries . . . but the somatotype provides the basis for a morphological taxonomy that is both comprehensive and statistically manipulable.⁴⁵

⁴³ Donald K. Mathews, Measurement in Physical Education (2d. ed.; Philadelphia: W. B. Saunders Company, 1963), pp. 223-5.

⁴⁴ Robert M. Liebert and Michael D. Speigler, Personality: An Introduction to Theory and Research (Homewood, Illinois: Dorsey Press, 1970), pp. 104-10.

⁴⁵ William H. Sheldon, The Varieties of Temperament: A Psychology of Constitutional Differences (New York: Harper, 1942), pp. 4-5.

Cureton and Metheny state that anthropometry is basic to measurement in physical education.⁴⁶ Perbix found women who chose physical education as a major at the University of Illinois predominantly displayed mesomorphic traits.⁴⁷ Research by Garrity found that females who were successful in physical fitness performances had a predominant component of mesomorphy in their constitutional patterns.⁴⁸

From the preceding review of related literature, the qualities and competencies which researchers deem necessary for the evaluation, prediction of success, and advising of potential physical education majors has centered on the following characteristics: (1) personality, (2) professional competencies, (3) intelligence, (4) attitudes and (5) physical aptitudes.

⁴⁶Thomas K. Cureton and Eleanor Metheny, "Anthropometry and Body Mechanics," Measurement and Evaluation Materials, (Washington, D. C.: The Association, 1950).

⁴⁷Joyce A. Perbix, "Relationship Between Somatotype and Motor Fitness in Women," Research Quarterly, XXXV (March, 1954), pp. 84-90.

⁴⁸H. M. Garrity, "Relationship of Somatotypes of College Women to Physical Fitness Performance," Research Quarterly, XXXVII (October, 1966), 340-52.

Chapter 3

RESEARCH PROCEDURES

INTRODUCTION

A discussion of the procedures followed in the investigation has been presented. Description of the subjects, an analysis of the instruments used in the testing, and the procedures followed in the collection of data has been indicated.

SOURCE OF DATA

The subjects for this study were fifty-one volunteers from the population of seventy-eight full-time, female, junior and senior health, physical education and recreation majors at Middle Tennessee State University.

Selected tests were administered by the investigator to obtain data from the subjects. The following data were collected from the offices of Admissions and Records and Guidance and Testing: grade-point average in health, physical education and recreation courses, composite score of the American College Test (ACT) and the Cornell Index (CI) score. ACT scores and CI scores were not available for some of the transfer students.

ADMINISTRATIVE PROCEDURES

The battery of tests was administered to fifty-one volunteer subjects from a population of seventy-eight female, junior and senior health, physical education and recreation majors at Middle Tennessee State University during the Spring semester of 1973.

Following an orientation meeting explaining the purpose and significance of the study, the subjects began the testing program until all tests were administered to all subjects. All data collection occurred between the hours of nine o'clock A.M. and four o'clock P.M.

The testing of subjects took place in Alumni Memorial Gymnasium at Middle Tennessee State University and in the office of the researcher. The time of test administration was determined by the class schedules and convenience of the subjects. All testing was done on an individual basis by the researcher. The tests of the subjects were identified by a student number to encourage sincere answers and to ease any anxiety about the testing. The subjects were limited to a maximum of ninety minutes of testing per day.

SELECTIVE TESTING INSTRUMENTS

The testing instruments were selected to provide an objective description of the following traits and

competencies: (1) physical fitness and morphological typology, (2) general motor skills, (3) values and interests, (4) mental ability and achievement and (5) psychological adjustment. Selection of the testing instruments was based on test reliability, the availability of norms, objectivity, utility in follow-up studies, and ease of administration and scoring.

Cornell Index (Form N2)

When selecting a test to measure psychological health, the single most important criterion was that the instrument be able to indicate those persons with serious personal and psychological disturbances. The Cornell Index provided a simple means of obtaining objective and standardized data on personality adjustment. The data obtained by the Cornell Index can be subjected to statistical analysis.

Reliability has been determined using the Kuder-Richardson technique. The computed reliability coefficient is .95. Validity was obtained by administration to six hundred persons free of personality disturbances and four hundred persons with disturbances. Subjects came from five parts of the United States.

The Cornell Index is a group test composed of 101 standardized questions to be answered "yes" and "no." The questions are designed to differentiate persons with

serious personal and psychosomatic disturbances from the population. The items of the questionnaire are grouped with reference to bodily or behavioral symptoms.⁴⁹ The Index is intended to indicate emotional adjustment rather than to differentiate and/or define specific personality deviations.

The Cornell Index has been found valuable in use with women. Hanawalt found the Index correlated .81 with Bell's Adjustment Inventory.⁵⁰ Mann undertook standardization of the Cornell Index with the college students at Michigan State College and found the tool to be a satisfactory screening device in differentiating college students with personality madadjustments.⁵¹

A raw score of thirteen or more, plus one or more of the indicated stop items, was used to indicate persons with disorders. By using Method C scoring, a great majority of psychologically unfit or potentially unfit

⁴⁹ Arthur Weider, Harold Wolff, Keeve Brodam, Bela Mittelman and David Wechsler, Cornell Index Manual, Revised (New York: Psychological Corporation, 1949), pp. 2-3.

⁵⁰ Nelson G. Hanawalt, Fourth Mental Measurement Yearbook, ed. Oscar Krisen Buros (Highland Park, New Jersey: Gryphon Press, 1953), p. 81.

⁵¹ William Mann, "The Validation of the Cornell Index with Freshmen at Michigan State College," The American Psychologist, V (July, 1950), pp. 134-50.

persons can be identified. A few persons with good mental health may be included in the unfit category.⁵²

Allport-Vernon-Lindzey Study of Values

This instrument was designed to measure the relative prominence of basic interests, evaluative attitudes and motives in the following categories: (1) Theoretical, (2) Economic, (3) Aesthetic, (4) Social, (5) Political and (6) Religious.⁵³

Split-half reliability coefficients using the Spearman-Brown technique of the six scores of the 1951 revision ranged from .84 to .95.⁵⁴ Repeat reliability, after one or two months, yielded coefficients between .77 and .93. Validity was verified by contrasting groups. Differing educational and occupational samples displayed significant differences.⁵⁵ While the Study of Values measures values that are far broader than precise occupational interests, Moshin and Seashore conducted

⁵²Weider, Wolff, Brodman, Mittelman and Wechsler, 4.

⁵³Gordon W. Allport, Phillip E. Vernon and Gardner Lindzey, Study of Values Manual, 3d. ed., (Boston: Houghton Mifflin Company, 1970), pp. 3-5.

⁵⁴Allport, Vernon, Lindzey.

⁵⁵Anne Anastasi, Psychological Testing (New York: The Macmillan Co., 1961), pp. 553-4.

studies that indicated distinctive profiles of values by persons of differing vocational assemblages.⁵⁶

The general norms for the test are based on a college population. Norms for men and women are available separately.

Otis Self-Administering Tests of Mental Ability (OSAT)
(Higher Examination-Form B)

The purpose of the Otis Self-Administering Tests of Mental Ability is to measure mental ability or the extent of maturity of the mind. Otis proposed that mental ability cannot be directly measured, but the effect mental ability has had on the person to gain knowledge and mental skills can be objectively measured.⁵⁷

The Otis Self-Administering Tests of Mental Ability were designed specifically for use with college students and adults. Reliability coefficients vary from .90 to .97 between forms when the twenty minute time limit is imposed. For validation purposes the Higher Examination Form B was administered to 2,516 college students from twenty-one colleges throughout the United States. Validation was also developed by correlating the Otis

⁵⁶Allport, Vernon, Lindzey, 16.

⁵⁷Arthur S. Otis, Otis Quick-Scoring Mental Ability Test of Directions for Gamma Tests (New York: Harcourt Brace and World, Inc., 1954), p. 1.

Self-Administering Tests of Mental Ability with the Army Alpha and the Stanford-Binet Intelligence Test.⁵⁸

The instrument consists of seventy-five mixed items arranged in order of difficulty. The order was determined by the number of students passing items during preliminary testing.⁵⁹

Lee-Thorpe Occupational Interest Inventory

The purpose of the Lee-Thorpe Occupational Interest Inventory is to identify interests of persons according to broad vocational categories. The Inventory yields scores in the following areas: (1) Personal-social, (2) Natural, (3) Mechanical, (4) Business, (5) the Arts, (6) the Sciences, (7) Verbal interests, (8) Manipulative interests and (9) Computational interests. The test also discriminates as to high, medium and low levels of interests.⁶⁰

The Inventory is not timed, but generally requires thirty minutes to complete. Reliability coefficients for

⁵⁸ Donald E. Super and John O. Crites, Appraising Vocational Fitness (New York: Harper and Brothers, 1962), pp. 104-5.

⁵⁹ Arthur S. Otis, Otis Self-Administering Tests of Mental Ability for Intermediate and Higher Examinations (New York: Harcourt and Brace and World, Inc., 1956), p. 3.

⁶⁰ Edwin A. Lee and Louis P. Thorpe, Manual of Occupational Interest Inventory adv. rev., (Monterey, California: California Test Bureau, 1956), p. 3.

the subtests range from .71 to .93. A repeat reliability evaluation of the forced choice Inventory is dependent upon the stability of the interests of the testee. Validity has been determined by source of items.⁶¹ Significant relationships have been found between the Lee-Thorpe and the Kuder Preference Record.⁶²

The results of the Lee-Thorpe Occupational Interest Inventory have been used for educational guidance and counseling, research and vocational selection purposes. The test is often used in conjunction with the Dictionary of Occupational Titles.⁶³

Normative data based on twenty-five thousand high school and college students and adults is available separately for males and females.⁶⁴

⁶¹Lee and Thorpe, 6-7.

⁶²R. Jacobs, "A Brief Study of the Relationship Between Scores on the Lee-Thorpe Occupational Interest Inventory and Scores on the Kuder Preference Record," Education Records Bulletin, LVII (1951), 79-85; see also H. C. Lingren, "A Study of Certain Aspects of the Lee-Thorpe Occupational Interest Inventory," Journal of Educational Psychology, XXXVIII (1947), 353-62; E. C. Roeber, "The Relationship Between Parts of the Kuder Preference Record and Parts of the Lee-Thorpe Interest Inventory," Journal of Educational Research, XLII (1949), 598-608.

⁶³Lee and Thorpe, 24.

⁶⁴Lee and Thorpe, 34-36.

American College Test (ACT)

The American College Testing Program has devised a test used as a qualifying examination for admission to colleges and universities throughout the country. The test was initiated in 1959.

The examination consists of 219 multiple choice questions based on the Iowa Tests of Educational Development. Scale scores range from one to thirty-six with a standard deviation of five. Four subtests of educational development in the following areas form the body of the examination: (1) English usage, (2) mathematics, (3) social studies reading and (4) natural science reading.

Reliabilities have been determined by an odd-even procedure and interform correlations vary from the natural science correlation of .69 to .86 on the composite score.⁶⁵ Norms are based on summary findings for sample colleges participating in previous years 1968, 1969, and 1970 Standard Research Services.⁶⁶

⁶⁵Wimburn L. Wallace, Seventh Mental Measurements Yearbook, ed. Oscar Krisen Buros, Vol. I (Highland Park, New Jersey: Gryphon Press, 1972), p. 330.

⁶⁶Your College Freshmen: Interpretative Guide to ACT Research Services for Higher Education (Iowa City, Iowa: The American College Testing Program, 1971), pp. 152-6.

Scott Motor Ability Test

General Motor Ability (GMA) combines both motor educability and achievement.⁶⁷ Scott developed a general motor ability test for college women. One form of the resulting test consists of a Basketball Throw, a Broad Jump and an Obstacle Race. Reliability coefficients for individual items range from .79 to .94.⁶⁸ The battery yields a multiple correlation coefficient of .87 when correlated to subjective ratings of sports ability, skill items associated with most common sports, and total points from McCloy's General Motor Ability Test.⁶⁹ Reliability was also based upon the results of tests administered to University of Iowa women. Validity was obtained by correlating the Scott GMA scores with two of McCloy's tests of motor ability.⁷⁰

The Basketball Throw for distance measures arm and shoulder girdle strength and coordination of body and arms.⁷¹ A space of eighty feet long and twenty feet wide

⁶⁷ M. Gladys Scott and Esther French, Measurement and Evaluation in Physical Education (Iowa City, Iowa: The American College Testing Program, 1971), pp. 152-6.

⁶⁸ Barry L. Johnson and Jack K. Nelson, Practical Measurements for Evaluation in Physical Education (Minneapolis: Burgess Co., 1969), p. 128.

⁶⁹ Scott and French, 351.

⁷⁰ Scott and French, 345-50.

⁷¹ Scott and French, 358.

was utilized for the throw. The subject stood behind the indicated throwing line and threw the ball as far as possible. Three trials were given and the distances of each were scored to the nearest foot. Only the greatest distance thrown was used in the determination of the GMA.

The Broad Jump measures explosive power, which is related to leg strength, coordination and balance of the moving body. The subject stood with feet parallel behind a take-off board and jumped as far forward as possible. The farthest distance traveled between the starting line to the nearest body part touching the landing surface after the jump was measured to the nearest inch. The subject was given three trials and the greatest distance jumped was selected for use.

The Obstacle Race test is designed to measure speed, agility, and general body coordination. The subject began the race in a lying supine position with heels touching the starting line. Time spent was kept while the subject rose, ran to step with both feet in three consecutive squares, twice circled a standard, crawled under a crossbar of eighteen inches, ran to a line which she touched with her hand and then ran to another designated line, repeated the preceding sequence touching the lines with her feet, and finally sprinted across the end line. Score in terms of seconds to the nearest tenth of a second was determined with a stop watch.

The GMA was found for each subject by using the following formula:

$$2 \times \text{basketball throw distance} + 1.4 \text{ broad jump distance} - \text{obstacle race score} = \text{GMA}$$

Scores for each item and the composite GMA were found on a chart indicating the equivalent T-scores. Norms were available for each item as well as for the composite score.⁷²

Cardiovascular Efficiency Test for Girls and Women (CET)

The Cardiovascular Efficiency Test by Hodgkins and Skubic is a modification of the Harvard Step Test developed by Brouha and associates in the Harvard Fatigue Laboratories during World War II. The Harvard Step Test was developed with intent to measure the ability of the heart and circulatory system to adapt and recover from physical stress. Validity was based upon endurance in treadmill running, maximum heart rate per minute, and the blood lactate level.⁷³

The Cardiovascular Efficiency Test for Girls and Women correlates .79 with the five minute Harvard Step Test.

⁷²Scott and French, 353-4.

⁷³Lucien Brouha, "The Step Test: A Simple Method of Measuring Physical Fitness for Muscular Work in Young Men," Research Quarterly, XIV (March, 1943), 31-36.

Repeat reliability of the Hodgkins and Skubic test revealed a coefficient of .82.⁷⁴

The Hodgkins and Skubic test required the subject to step up and down twenty-four times a minute on a bench eighteen inches high. Each time the subject was required to step onto the bench, the body was to remain erect. The stepping continued for three minutes unless the subject stopped from exhaustion or was unable to maintain the rhythm of stepping before the three minutes was reached. The duration of stepping was recorded in seconds. Pulse rate of the subject was felt at the carotid artery and was counted from one to one and a half minutes after cessation of stepping. The following formula was used to determine the cardiovascular efficiency score:

$$\text{CES} = \frac{\text{Number of seconds completed} \times 100}{\text{Recovery pulse} \times 5.6}^{75}$$

The cardiovascular efficiency scores were transcribed by the researcher using the mean of college female norm and the standard deviation.⁷⁶

⁷⁴Vera Skubic and Jean Hodgkins, "Cardiovascular Efficiency Test for Girls and Women," Research Quarterly, XXXIV (May, 1963), 193-96.

⁷⁵Vera Skubic and Jean Hodgkins, "Cardiovascular Efficiency Test Scores for College Women in the United States," Research Quarterly, XXXIV (December, 1963), 456.

⁷⁶Skubic and Hodgkins, 456.

Wear Physical Education Attitude Scale

The purpose of the Wear Physical Education Attitude Scale is to determine the attitude held by physical education majors toward physical education courses. The Wear test developed by Carlos Wear in 1951 consists of forty statements to which the subject rates the statements on a five point scale.⁷⁷ This Likert Technique of scoring requires the subject to rate each statement on a five point scale reflecting the degree of agreement or disagreement held.⁷⁸ Wear formulated statements concerned with (1) physical well-being, (2) muscular strength and coordination, (3) total physical and muscular endurance, (4) acquisition of muscular skills, (5) resources for leisure, (6) social relationships and (7) safety habits.⁷⁹

To establish validity Wear utilized an external criterion of individual ratings of general attitude toward physical education. Validity was accepted at face value and the reliability for the test has been reported as high as .98.⁸⁰

⁷⁷ Carlos L. Wear, "The Evaluation of Attitude Toward Physical Education as an Activity Course," Research Quarterly, XXII (1951), 114-26.

⁷⁸ Rensis Likert, "Technique for the Measurement of Attitudes," Archives of Psychology, XXII (June, 1932), 1.

⁷⁹ Carlos L. Wear, "Construction of Equivalent Forms and Attitude Scale," Research Quarterly, XXVI (1955), 115.

⁸⁰ Johnson and Nelson, p. 399.

Somatotyping

The body and mind of a person are housed in a single unit. In each individual differences in structure of the body exist. Therefore, the body structure must also relate to the behavior of each person. An understanding of the morphological structure to the total behavior of an individual is necessary.⁸¹ Willgoose states:

The classification of pupils according to constitutional type can provide a basic framework for understanding pupil attitudes, interests, and general adaptability to physical exercise and social contacts in the gymnasium-playground laboratory.⁸²

In the early 1920s Sheldon began an investigation of morphological typology.⁸³ Sheldon continued his studies of somatotyping at Harvard University, Columbia University College of Physicians and Surgeons, the Oregon Medical School, and many other hospitals and institutions throughout the country. His findings are based on forty-six thousand men, between the ages of eighteen and sixty-five, and several thousand women.⁸⁴

⁸¹ Carl E. Willgoose, Evaluation in Health and Physical Education (New York: McGraw Hill Company, 1961), p. 288.

⁸² Willgoose.

⁸³ Willgoose, 291.

⁸⁴ Willgoose.

Sheldon postulated three basic body types-- endomorphy, mesomorphy, and ectomorphy. Persons vary in degree of each component. Persons are not typed on the basis of one component, but on the existence of degree of all components. The strength of each component is indicated by an assignment of three numbers ranging from one to seven. In somatotyping, the first numeral indicates the strength of endomorphy, the second indicates mesomorphy, and the third relates to the ectomorphic component.

In this study each person was evaluated on the seven point scale for each component. The following five regions of the body were evaluated to determine the degree of each component: (1) head, neck and face, (2) thoracic trunk, (3) arms, hands, and shoulders, (4) abdominal trunk and (5) legs and feet. The average of the five areas for each component will be determined yielding the three digit estimated somatotype.⁸⁵ The above procedure was repeated by an associate and the resulting estimated somatotype ratings of the investigator and associate were averaged. To further validate the morphological classification, the ponderal index was determined for each subject using the Willgoose Nomograph.⁸⁶ The ponderal index was found on

⁸⁵Thomas K. Cureton, "Body Build as a Framework for Interpreting Physical Fitness and Athletic Performance," Research Quarterly, Suppl., XII (1941), 301-30.

⁸⁶Willgoose, 297.

Sheldon's Chart for Calculating Somatotype from Ponderal Index.⁸⁷ The given somatotypes on the chart were compared to the estimated rating and the nearest of the chart ratings to the estimated rating was selected as the true somatotype rating. The true rating was then found on Sheldon's descriptive Classification Chart.⁸⁸ The descriptive ratings of the subjects were organized on a frequency chart according to dominant morphological structure. The average type of the subjects was determined by adding the sums for each component and dividing by the number of subjects.

APPLICATION OF TEST DATA

The arithmetic means, medians and standard deviations were computed for all variables. The means of variables were transcribed to a standard score and plotted on a profile indicating the relationship of the subjects to the normative data. One standard deviation on either side of the mean of each variable was determined for the psychographic profile. A Gaussian curve was assumed for normative data.

The profile provides an appropriate means of summarizing the multiple measurements by a graphic

⁸⁷ William H. Sheldon, Atlas of Men (New York: Harper and Brothers, (1954), p. 13.

⁸⁸ Willgoose, 295.

representation. The magnitude of the scores as well as the difference existing from the norm can easily be seen. Since the results were presented in profile form, all scores of the variables tested were transcribed to a common unit, the T-score. In this way the profile permits evaluation of the total group and displays the interaction of the variables in quantifiable terms.⁸⁹ T-scores were used for ease of interpretation as well as the convenience of computing on a 0-100 scale.⁹⁰

The profile of test results could be used by the faculty advisor in that objective data has been organized to represent various types of traits to be considered. The advisor's understanding of the tests and test scores coupled with other information provided by subjects could form a composite picture. The psychographic profile may allow for consideration of the quantitative data of the total group and the interaction of mutual attributes within the group.⁹¹

⁸⁹E. F. Lindquist, ed., Educational Measurement (Washington, D. C.: American Council on Education, 1951), pp. 795-808.

⁹⁰Benjamin H. Massey, "The Use of T-scores in Physical Education," The Physical Educator, X (March, 1953), 20-1.

⁹¹Lindquist, 804-5.

The grade-point average in health, physical education and recreation suggested by Espenshade as a possible predictor of success in the professional preparation program⁹² will become the independent variable of the study. The composite mean of the health, physical education and recreation grade-point average of these subjects was correlated with the variables from each of the tests. The Flanagan Method was used to determine variable discrimination.⁹³

The Flanagan technique utilized the results of the twenty-seven percent who made the highest scores on each test variable and the lowest twenty-seven percent of the scores. Responses to both upper and lower groups were recorded. The number of subjects in the upper twenty-seven percent exceeding the median was determined and converted to percent of the highest group. The number of subjects in the lowest twenty-seven percent of the total exceeding the median was determined and converted to percent of the lowest group. The results were entered on the Kelley-Flanagan Table and the resulting coefficient of

⁹² Anna Espenshade, "Selection of Women Major Students in Physical Education," Research Quarterly, XIX (May, 1948), 75-80.

⁹³ John C. Flanagan, "General Considerations in the Selection of Test Items and a Short Method of Estimating the Distribution," Journal of Educational Psychology, XXX (December, 1939), 674-80.

correlation was read.⁹⁴ The five percent level of confidence was used as the minimum level of probability in determining significant difference between means of subjects and means of norm groups for each variable. The t-ratio was used in determining significant differences.

The purpose of this chapter was to discuss the procedures followed for appraisal of the traits of the fifty-one junior and senior females enrolled in the health, physical education and recreation professional preparation program at Middle Tennessee State University. An additional purpose was to describe the selected objective measures used in evaluating characteristics and competencies.

Eight standardized tests, a somatotype rating, and the calculated grade-point average of health, physical education and recreation coursework was used to measure organic, neuromuscular, mental and psychological traits of the female, junior and senior physical education, health and recreation majors at Middle Tennessee State University.

⁹⁴Truman L. Kelley, "The Selection of Upper and Lower Groups for the Validation of Test Items," The Journal of Educational Psychology, XXX (January, 1939), 17-24.

Chapter 4

STATISTICAL TREATMENT OF THE DATA

The purpose of this study was to develop a psychographic profile of the female, junior and senior health, physical education and recreation major by determining traits common to the women in the professional preparation program.

This study hypothesized that the female major in the health, physical education and recreation professional preparation program was no different in measured factors than the female college student in general and that the major displayed no unifying pattern of characteristics.

To test the hypothesis, the t-ratio was used to determine significance of difference at the .05 level of confidence between the mean of the experimental group on each variable and the mean of the norm. The t-ratio was run on each variable using the standard error of means and standard error of difference.⁹⁵

The Flanagan-Kelley technique was used to determine correlation of the health, physical education and recreation grade-point average, using the four-point scale, with each

⁹⁵Benton, J. Underwood and others, Elementary Statistics (New York: Appleton-Century-Crofts, Inc., 1954), p. 127-129.

of the tested variables. The highest and lowest twenty-seven percent of health, physical education and recreation grade-point averages of the subjects was ascertained. The median of each variable was used to determine the number of subjects in both the highest and lowest twenty-seven percent of the total exceeding that score. The resulting numbers of successes in the highest and lowest twenty-seven percent were transcribed to percentages of each group. The percentages were located on "A Table of Values of the Coefficient of Correlation in a Normal Bivariate Population Corresponding to Given Proportions of Successes" and the correlation coefficient was read.⁹⁶ The level of significance at the .05 level of confidence was shown by a table representing the "Values of 'r' at the 5% and 1% Levels of Significance."⁹⁷

Raw scores for all variables were converted to T-scores by the formulation of T-score tables or using the given T-scores.⁹⁸ The mean T-score for each variable was

⁹⁶M. Gladys Scott and Esther French, Measurement and Evaluation in Physical Education (Dubuque, Iowa: Wm. C. Brown Publ., 1959), p. 131.

⁹⁷Underwood and others, 231.

⁹⁸Barry L. Johnson and Jack Nelson, Practical Measurements for Evaluation in Physical Education (Minneapolis, Minn.: Burgess Publ. Co., 1969), p. 32-4.

computed and placed on the psychographic profile. The psychographic profile provided comparison of the results of the subjects with results of the norms in standard score terms.

Somatotyping was conducted by evaluating the degree of endomorphy, mesomorphy, and ectomorphy in five designated body regions. Averages for each component were calculated and the resulting three digit description was compared to Sheldon's somatotype conclusion. Sheldon's conclusions were determined by the ponderal index of the subject. A frequency distribution using descriptive terms of the somatotype ratings was developed to graphically connote the most common somatotypes among the subjects.

TEST RESULTS

Cornell Index

Analysis of the Cornell Index for the experimental group indicated no significant difference of mean score to the norm group mean. The subjects did not significantly differ in psychological health from the 462 female subjects that formed the norm base.⁹⁹ The determined t-ratio was 1.71. This information is shown in Table 1. Correlation

⁹⁹Arthur Weider and others, Cornell Index Manual, Revised (New York: Psychological Corporation, 1949), p. 7.

of the Cornell Index to the grade-point average in major courses yielded an "r" of .33. The correlation was significant at the .05 level of confidence. This information is presented in Table 2.

The mean T-score for the Cornell Index was calculated to be 52.41. Data indicating T-score means for all variables are shown in Table 3.

Allport-Vernon-Lindzey Study of Values

Analysis of the test results of the Allport-Vernon-Lindzey Study of Values of the subjects showed the mean scores of the Theoretical, Aesthetic and Political factors to be significantly different from the means of the norms. Significance at the .05 level of confidence indicated the observed difference was not due to caprice of sampling. The means of the subjects on the Theoretical and Aesthetic factors were significantly lower than the norm means, while the mean of the subjects on the Political factor was significantly greater. This information is in Table 4.

Correlation of the health, physical education and recreation grade-point averages of the subjects to the scores achieved on each factor of the Allport-Vernon-Lindzey Study of Values indicated no significance, except for the Aesthetic variable. Information is shown in Table 5. The means of each factor measured in the Allport-Vernon-Lindzey Study of Values were converted to T-scores

Table 1
Analysis of Difference Between
Means of Subjects and Norm
on the Cornell Index

	Subjects	Norm	Total	t-ratio
N	44	462	506	
Mean	6.5	8.42		
S.D.	5.77	7.48		
S.E.M.	.92	.35		
df	43	461	504	1.71

Table 2
 Correlation Coefficient Between Health,
 Physical Education and Recreation
 Grade-point Averages of Subjects
 and Cornell Index Scores

Test	Median	N	df	Suc.L.27%	Suc.U.27%	r
Cornell Index	5.25	44	22	3	7	.33*

*Significant at .05 level of confidence.

Table 3
T-Score Means For Variables

Variable ¹	N	ST	T-Mean
1	44	2306	52.41
2	51	2302	45.14
3	51	2648	51.92
4	51	2360	46.28
5	51	2737	53.67
6	51	2758	54.08
7	51	2061	40.42
8	51	2977	58.37
9	51	2769	54.29
10	51	2788	54.67
11	51	2121	41.59
12	51	2408	47.22
13	51	2778	54.47
14	51	2160	42.35
15	51	2726	53.45
16	51	2665	52.26
17	51	2208	43.30
18	51	2780	54.51
19	48	2234	46.54
20	51	3264	64.01
21	51	2969	58.22
22	51	3232	63.37
23	51	3259	63.90
24	51	2544	49.88
25	51	3286	64.43

¹(1) Cornell Index; Allport-Vernon-Lindzey Study of Values, (2) Theoretical, (3) Economical, (4) Aesthetic, (5) Social, (6) Political (7) Religious; (8) Otis Self-Administering Test of Mental Ability; Lee Thorpe Occupational Interest Inventory, (9) Personal-Social, (10) Natural, (11) Business, (12) Mechanical, (13) Arts, (14) Sciences, (15) Verbal, (16) Manipulative, (17) Computational, (18) Level of Interests; (19) ACT; Scott Motor Ability Test, (20) Basketball Throw, (21) Standing Broad Jump, (22) Obstacle Race, (23) General Motor Ability; (24) Cardiovascular Efficiency Test for Girls and Women, (25) Wear Physical Education Attitude Scale.

Table 4
 Analysis of Differences Between Means
 of Subjects and Norm on Factors
 of the Allport-Vernon-Lindzey
Study of Values

Variable	Subjects	Norm	t-ratio
Theoretical			
Mean	33.12	35.75	
S.D.	11.97	7.19	
S.E.M.	1.69	.20	
N	51	1289	2.64*
Economic			
Mean	39.12	37.87	
S.D.	7.60	7.30	
S.E.M.	1.07	.20	
N	51	1289	1.10
Aesthetic			
Mean	39.59	42.67	
S.D.	5.78	8.34	
S.E.M.	.82	.23	
N	51	1289	3.01*
Social			
Mean	44.49	43.03	
S.D.	5.98	7.02	
S.E.M.	.85	.20	
N	51	1289	1.43
Political			
Mean	40.37	37.84	
S.D.	5.28	6.23	
S.E.M.	.75	.17	
N	51	1289	2.64*
Religious			
Mean	43.37	43.81	
S.D.	9.12	9.40	
S.E.M.	1.29	.26	
N	51	1289	.35

*Significant at .05 level of confidence

Table 5
 Correlation Coefficient Between Health,
 Physical Education and Recreation
 Grade-point Average of Subjects
 and Allport-Vernon-Lindzey
Study of Values Factors^a

Variables	Median	Suc.L.27%	Suc.U.27%	r
Theoretical	32.75	8	8	.00
Economic	39.00	9	7	-.14
Aesthetic	38.38	6	10	.29*
Social	45.29	6	3	-.21
Political	40.20	6	6	.00
Religious	44.67	5	4	-.07

^aN=51

*Significant at .05 level of confidence.

for comparison on the psychograph with means of the 1289 college and university females from the norm group.¹⁰⁰

Otis Self-Administering Tests of Mental Ability (OSAT)

Analysis of the OSAT data of the subjects revealed a significantly higher mean than the mean of 2516 students enrolled in colleges and universities throughout the United States who comprised the norm.¹⁰¹ This information is shown in Table 6.

A correlation of .29 between the grade-point averages of the subjects and the OSAT scores was shown to be significant at the .05 level of confidence. These data are reported in Table 7. The data from administration of the OSAT were converted to T-scores according to the Otis table.¹⁰²

Lee-Thorpe Occupational Interest Inventory (OII)

Analysis of the OII showed significant differences between the experimental group means and the norm means on eight of the ten measures. This information is related in

¹⁰⁰Gordon W. Allport, Phillip E. Vernon and Gardner Lindzey, Study of Values Manual (3d. ed.; Boston: Houghton Mifflin Co., 1970), p. 12.

¹⁰¹Arthur S. Otis, Otis Self-Administering Tests of Mental Ability for Intermediate and Higher Examinations (New York: Harcourt Brace and World, Inc., 1956), p. 6.

¹⁰²Otis, Interpretation Chart, p. 4.

Table 6
 Analysis of Difference Between
 Means of Subjects and Norm
 on the OSAT

	Subjects	Norm	Total	t-ratio
N	51	2516	2567	
Mean	58.37	50		
S.D.	10.28	10		
S.E.M.	1.41	20		
df	50	2515	2565	6.59 [*]

^{*}Significant at .05 level of confidence.

Table 7
 Correlation Coefficient Between Health,
 Physical Education and Recreation
 Grade-point Average of
 Subjects and OSAT
 Scores^a

Test	Median	Suc.L.27%	Suc.U.27%	r
OSAT	39.75	4	8	.29 [*]

^aN=51

^{*}Significant at .05 level of confidence.

Table 8. The means of the subjects were significantly greater than the norm means on the following measure: (1) Personal-Social, (2) Natural, (3) Arts and (4) Level of Interests. The means of the subjects were significantly lower at the .05 level of confidence than the means of the college female group in the measures of Business, Mechanical, Science, and Computational interests.

Correlation procedures between the health, physical education and recreation grade-point averages of the subjects and the variables of the Lee-Thorpe Occupational Interest Inventory yielded three measures of significant relationship. A positive relationship existed with Natural interests and significant relationships occurred with Business and Computational interests. This information is located in Table 9. T-scores were provided for the raw scores.¹⁰³

American College Test (ACT)

Significant difference of means was found between the female subjects and the 23,341 college and university women comprising the normative base for the ACT.¹⁰⁴ The

¹⁰³ Edwin A. Lee and Louis P. Thorpe, Manual of Occupational Interest Inventory adv. rev. (Monterey, California: California Test Bureau, 1956), p. 35.

¹⁰⁴ Your College Freshmen: Interpretive Guide to ACT Research Services for Higher Education (Iowa City, Iowa: The American College Testing Program, 1971), p. 67.

Table 8
 Analysis of Differences Between Means
 of Subjects and Norm on Factors
 of the Lee-Thorpe Occupational
 Interest Inventory

Variables	Subjects	Norm	t-ratio
Personal-Social			
Mean	54.29	50	
S.D.	8.09	10	
S.E.M.	1.14	1.10	
N	51	84	2.87*
Natural			
Mean	54.67	50	
S.D.	8.64	10	
S.E.M.	1.22	1.10	
N	51	84	3.07*
Mechanical			
Mean	41.59	50	
S.D.	5.18	10	
S.E.M.	.73	1.10	
N	51	84	6.22*
Business			
Mean	41.22	50	
S.D.	9.22	10	
S.E.M.	1.30	1.10	
N	51	84	5.67*
Arts			
Mean	54.47	50	
S.D.	8.60	10	
S.E.M.	1.22	1.10	
N	51	84	2.94*
Sciences			
Mean	42.35	50	
S.D.	10.06	10	
S.E.M.	1.42	1.10	
N	51	84	4.82*

Table 8 (continued)

Variables	Subjects	Norm	t-ratio
Verbal			
Mean	52.41	50	
S.D.	9.14	10	
S.E.M.	1.29	1.10	
N	51	84	1.50
Manipulative			
Mean	52.26	50	
S.D.	5.36	10	
S.E.M.	.76	1.10	
N	51	84	1.66
Computational			
Mean	43.29	50	
S.D.	6.35	10	
S.E.M.	.90	1.10	
N	51	84	4.75*
Level of Interests			
Mean	54.51	50	
S.D.	11.72	10	
S.E.M.	1.66	1.10	
N	51	84	2.27*

*Significant at .05 level of confidence.

Table 9
 Correlation Coefficient Between Health,
 Physical Education and Recreation
 Grade-point Average of Subjects
 and Lee-Thorpe Occupational
 Interest Inventory

Variables	Median	Suc.L.27%	Suc.U.27%	r
Personal-Social	27.78	6	4	-.14
Natural	14.67	2	8	.43*
Mechanical	13.89	5	6	.07
Business	17.33	8	3	-.36*
Arts	29.60	7	7	.00
Sciences	14.31	6	4	-.14
Verbal	21.58	7	4	-.21
Manipulative	19.00	8	5	-.21
Computational	11.42	9	5	-.29*
Level of Interests	65.67	7	5	-.14

*Significance at .05 level of confidence.

mean of the experimental group was significantly lower than the norm mean. Significance was determined by the t-test. These data are shown in Table 10.

The Flanagan-Kelley technique of correlation showed positive and significant relationship between the health, physical education and recreation grade-point average and the ACT composite score at the .05 level of confidence. These data are presented in Table 11. T-scores were computed for the raw scores of the ACT by using the formula recommended by Johnson and Nelson.¹⁰⁵

Scott Motor Ability Test

Analysis of the Scott Motor Ability Test, which yielded scores on three subtests and a composite score, showed significant differences from the means of the norm. The means of the subjects on the Basketball Throw, the Standing Broad Jump, the Obstacle Race and General Motor Ability were significantly greater than the means of 2,500 university women who formed the normative base.¹⁰⁶ Table 12 indicates the results of the subjects.

Correlation of the Scott Motor Ability Test with the grade-point average of the subjects from health, physical education and recreation courses was found

¹⁰⁵Johnson and Nelson, 32-4.

¹⁰⁶Scott and French, 353-4.

Table 10
 Analysis of Difference Between
 Means of Subjects and Norm
 on the ACT

	Subjects	Norm	Total	t-ratio
N	48	23,341	23,392	
Mean	17.38	19.7		
S.D.	4.01	5		
S.E.M.	.57	.03		
df	47	23,340	23,390	4.00*

* Significant at .05 level of confidence

Table 11

Correlation Coefficient Between Health, Physical
Education and Recreation Grade-point
Average of Subjects and ACT
Composite Scores^a

Test	Median	Suc.L.27%	Suc.U.27%	r
ACT	17.25	3	10	.50*

^aN=48

* Significant at .05 level of confidence.

Table 12
 Analysis of Difference Between Means
 of Subjects and Norms on the
Scott Motor Ability Test

Variable	Subjects	Norm	t-ratio
Basketball Throw			
Mean	64	50	
S.D.	12.44	10	
S.E.M.	1.76	.20	
N	51	2,500	10.00*
Standing Broad Jump			
Mean	58.22	50	
S.D.	14.13	10	
S.E.M.	2.00	.20	
N	51	2,500	5.54*
Obstacle Race			
Mean	63.37	50	
S.D.	13.20	10	
S.E.M.	1.87	.20	
N	51	2,500	9.28*
General Motor Ability			
Mean	60.90	50	
S.D.	7.86	10	
S.E.M.	1.11	1.15	
N	51	2,500	12.14*

*Significant at .05 level of confidence.

significant for two of the factors. Significance was found with the Basketball Throw and General Motor Ability. Information is presented in Table 13. The data for the Scott Motor Ability Test were converted to T-scores according to the Scott's T-Scales for Motor Ability for College Women.¹⁰⁷

Cardiovascular Efficiency Test for Girls and Women (CET)

The data of the CET were analyzed to determine significance of difference between the mean and the experimental group and the mean of the 2,360 college and university women from sixty-six universities.¹⁰⁸ The t-test indicated no significant difference between the means. This information is shown in Table 14.

Correlation of the health, physical education and recreation grade-point average with the CET revealed a positive significant relationship at the .05 level of confidence. Data are presented in Table 15. T-scores were calculated for each raw score and the T-score mean determined for inclusion in Table 20.

¹⁰⁷ Scott and French.

¹⁰⁸ Johnson and Nelson, 305.

Table 13
 Correlation Coefficient Between Health, Physical
 Education and Recreation Grade-point
 Average of Subjects and
Scott Motor Ability
Test^a

Variables	Median	Suc.L.27%	Suc.U.27%	r
Basketball Throw	49.00	5	9	.29 [*]
Standing Broad Jump	67.25	7	8	.07
Obstacle Race	21.40	6	7	.07
General Motor Ability	176.00	4	9	.36 [*]

^aN=51

^{*}Significant at .05 level of confidence.

Table 14
 Analysis of Difference Between Means of Subjects
 and Norms on the Cardiovascular
Efficiency Test for
Girls and Women

Variable	Subjects	Norm	Total	t-ratio
N	51	2,360	2411	
Mean	48.81	48.9		
S.D.	10.12	10.4		
S.E.M.	1.43	.21		
df	50	2,359	2409	.07

Table 15

Correlation Coefficient Between Health, Physical
Education and Recreation Grade-point
Average of Subjects and the
Cardiovascular Efficiency
Test for Girls and
Women^a

Test	Median	Suc.L.27%	Suc.U.27%	r
CET	49.15	6	12	.43*

^aN=51

*Significant at .05 level of confidence.

Wear Physical Education Attitude Scale

The mean of the subjects on the Wear Physical Education Attitude Scale yielded a significant difference from the mean of the norm group. The mean of the subjects was significantly greater as determined by the t-test. Data are shown in Table 16. However, neutral correlation between the health, physical education and recreation grade-point average and the Wear Physical Education Attitude Scale indicated support for the thesis that the two factors are relatively independent of each other. This information in in Table 17. The data for the Wear Physical Education Attitude Scale were converted to T-scores according to the Wear T-score table.¹⁰⁹

Somatotyping

Evaluation of the morphological structure of the subjects by the researcher and an associate yielded an average body type of 2-5-3. The basic component displayed by the subjects was mesomorphy. The predominance of this component was indicated by the five in the three digit description. Comparison of Sheldon's rating of the subjects by use of ponderal index also revealed a mean description of 2-5-3. Data are shown in Table 18. The frequency of body types according to word description is in Table 19.

¹⁰⁹Johnson and Nelson, 401.

Table 16

Analysis of Difference Between Means of Subjects
and Norms on the Wear Physical Education
Attitude Scale

Variables	Subjects	Norm	Total	t-ratio
N	51	472	523	
Mean	64.43	50		
S.D.	6.93	10		
S.E.M.	.98	.46		
df	50	471	521	12.02*

*Significant at .05 level of confidence.

Table 17

Product-Moment Correlation Coefficient Between Health,
Physical Education and Recreation Grade-point
Average of Subjects and the
Wear Physical Education
Attitude Scale^a

Test	Median	Suc.L.27%	Suc.U.27%	r
<u>Wear Attitude</u> <u>Inventory</u>	181.75	6	7	.07

^aN=51

Table 18
Somatotype Ratings of Subjects

Subjects	Estimated Rating	Ponderal Index	Sheldon's Rating
1	3-6-2	12.60	3-6-2
2	2-4-4	13.35	2-5-4
3	4-4-2	12.05	5-5-1
4	2-6-1	12.30	2-7-1
5	3-7-1	12.30	2-7-1
6	2-5-3	13.15	3-5-4
7	2-4-5	13.55	2-4-4
8	4-7-1	12.60	3-6-2
9	3-6-1	12.40	3-6-1
10	1-4-4	13.20	2-5-3
11	3-5-3	13.40	3-4-4
12	3-6-2	13.00	3-5-3
13	3-6-2	12.10	3-7-1
14	3-6-2	13.20	3-6-2
15	2-4-4	12.56	2-4-4
16	2-5-2	13.20	2-5-3
17	2-5-2	13.00	2-5-2
18	3-5-3	13.00	3-5-3
19	3-6-2	12.85	3-5-2
20	3-5-2	12.70	4-5-2
21	2-4-4	13.10	2-4-4
22	1-6-2	12.65	1-7-2
23	2-7-1	13.10	2-7-1
24	1-2-6	14.15	1-3-6
25	2-5-3	12.95	2-6-3
26	1-3-6	13.40	1-3-6
27	3-6-1	12.60	2-6-3
28	2-5-3	12.95	2-6-3
29	2-5-3	12.75	2-5-3
30	3-6-2	12.80	2-6-2
31	2-3-6	13.20	2-3-6
32	4-6-1	12.40	3-6-1
33	1-5-4	13.20	2-5-3
34	2-5-3	12.70	2-5-3
35	2-5-3	12.40	2-5-3
36	2-4-4	13.10	2-4-4
37	4-5-1	12.55	4-5-1
38	3-6-1	12.55	2-6-1
39	1-4-3	13.55	2-4-4
40	2-5-3	12.60	2-5-3

Table 18 (Continued)

Subjects	Estimated Rating	Ponderal Index	Sheldon's Rating
41	4-6-1	12.55	4-5-1
42	3-6-1	12.85	3-5-2
43	2-4-4	13.10	1-4-4 ¹¹⁰
44	2-3-6	13.40	2-3-6
45	1-5-2	12.90	1-6-2
46	3-6-1	12.85	3-5-2
47	3-6-2	13.30	3-6-2 ¹¹⁰
48	1-3-6	13.20	1-3-6 ¹¹⁰
49	2-4-4	13.70	2-4-5
50	2-5-2	12.90	1-6-2
51	2-6-2	12.50	2-6-1

¹¹⁰Determined by frequency ratios¹¹⁰

¹¹⁰Carl E. Willgoose, Evaluation in Health and Physical Education (New York: McGraw Hill Co., 1961), p. 302.

Table 19
Frequency Distribution of Somatotype
Descriptions of Subjects

Body Type	N
Endomorph-mesomorph	1
Endomorphic mesomorph	13
Extreme mesomorph	10
Ectomorphic mesomorph	11
Mesomorph-ectomorph	6
Balance of components	10
Total	51

PSYCHOGRAPHIC PROFILE

The means of the variables were converted to T-scores and entered on the psychographic profile for comparison with norm means. Table 3 displays T-score means of all variables. The profile indicated graphically the differences on tested variables between the subjects and the general college female. The psychographic profile is shown in Table 20.

SUMMARY

The purposes of this chapter were to report the findings of the tests administered to the subjects, to compare the mean scores of the subjects to means of the norm groups and to determine correlation of the variables with the health, physical education and recreation grade-point averages of the subjects. An additional purpose was to report the results in relation to the stated hypotheses. The following statements summarize the contents of this chapter:

1. The motor ability mean scores of the subjects, as measured by the Scott Motor Ability Test were significantly higher than the given norms on all four factors. Correlation of the Scott Motor Ability Test to the health, physical education and recreation grade-point average was significant at the .05 level of confidence with shoulder girdle strength and general motor ability.

Table 20

Profile of Female, Junior and Senior Health, Physical
Education and Recreation Majors at
Middle Tennessee State
University

Comparison Group:		T-Score	20	30	40	50	60	70	80
OSAT*		58.37					x		
	Wear*	64.43						x	
CI		52.41				x			
CET		49.88				x			
Scott Motor Ability	Basketball Throw*	64.01						x	
	Standing Broad Jump*	58.22					x		
	Obstacle Race*	63.37						x	
	General Motor Ability*	63.90						x	
	Theoretical*	45.14				x			
Study of Values	Economic	51.91					x		
	Aesthetic*	46.28				x			
	Social	53.67					x		
	Political*	54.08					x		
	Religious	40.41				x			
	Personal-Social*	54.29					x		
	Natural*	54.67					x		
	Mechanical*	47.22					x		
	Business*	41.59				x			
	Arts*	54.47						x	
OII	Sciences*	42.35				x			
	Verbal	53.45					x		

Table 20 (Continued)

Comparison Group:		T-Score	20	30	40	50	60	70	80
Standardized Norms									
OII	Manipulative	52.26				x			
	Computational*	43.29			x				
	Level of Interest*	54.51				x			
ACT*	46.54			x					

*Significant at .05 level of confidence.

2. The subjects showed no significant difference on the mean score for the CET from the given mean norm. There was, however, a positive and significant correlation of the CET scores with the grade-point averages in health, physical education and recreation course work of the subjects.

3. Intellectual aptitude of the subjects as determined by the OSAT showed a significantly higher mean than the norm mean. The significant correlation between the intellectual aptitude of the subjects and the health, physical education and recreation grade-point averages indicated that the measures appear to be relatively dependent upon each other.

4. Attitudes held toward the importance of physical activity as measured by the Wear Physical Education Attitude Scale indicated a significantly greater mean for the subjects as compared to the norm mean. A neutral correlation was shown between the health, physical education and recreation grade-point averages of the subjects and their Wear Physical Education Attitude Scale scores.

5. The strength of values of the subjects as measured by the Allport-Vernon-Lindzey Study of Values test yielded both significant and insignificant differences between means, depending upon the specific factor measured. The strength of values of the subjects was significantly

greater than the norm on the Political measure, but significantly lower than the norm on the Theoretical and Aesthetic measures. The thesis of no significant differences from the norm was shown on the Economic, Social, and Religious measures. Significant correlation of the Aesthetic measure was found with the health, physical education and recreation grade-point averages of the subjects.

6. Psychological health of the subjects as indicated by the Cornell Index supported the thesis of no significant difference from the norm. Correlation of the Cornell Index scores with the health, physical education and recreation grade-point averages indicated the measures to be dependent upon each other.

7. The thesis that no significant difference existed for the ACT composite scores of the subjects and the national female norms was not accepted. The ACT composite score mean of the subjects was significantly lower than the norm mean. Correlation of the ACT composite score with the grade-point average in the professional preparation program yielded a significant, positive relationship.

8. The vocational interests of the subjects as measured by the Lee-Thorpe Occupational Interest Inventory showed significant differences from the norm on eight of the ten variables. The mean of the subjects was significantly

higher on the Personal-Social, Natural, Arts, and Level of Interests; the mean of the subjects was significantly lower than the mean of the norm on Business, Mechanical and Computational interests. No significant differences between means was found on Verbal and Manipulative interests. Correlation of interests and the health, physical education and recreation grade-point average was found on three measures. A significant positive relationship occurred with Natural interests. Significant negative relationships occurred with Business and Computational interests.

9. Morphological classification of the subjects indicated the predominant body type to be mesomorphy. Both the researcher's method and Sheldon's ponderal index approach to somatotyping yielded identical mean results. The three most common descriptive somatotypes were endomorphic mesomorph, ectomorphic mesomorph and extreme mesomorph.

10. Correlation of the health, physical education and recreation and grade-point average with each test variable indicated significant positive relationships with the (1) ACT composite scores, (2) Natural interests as measured by the Lee-Thorpe Occupational Interest Inventory, (3) cardiovascular fitness as measured by the CET, (4) psychological health as measured by the Cornell Index, (5) intellectual aptitude as measured by the Otis

Self-Administering Tests of Mental Ability, (6) Aesthetic values as measured by the Study of Values and (7) general motor ability and shoulder girdle strength measured by the Scott Motor Ability Test.

11. The composite results of the battery of tests revealed the female subjects to be significantly different from the norms in intellectual aptitude, attitude toward physical activity, achievement as measured by the ACT, Theoretical, Social and Political values as well as Personal-Social, Natural, Mechanical, Arts, Science, and Computational interests. The subjects were also significantly different from the norm mean in all measures of motor ability.

Chapter 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

The purpose of this study was to develop a psychographic profile of the female health, physical education and recreation major at Middle Tennessee State University by delineating the traits most common to the major.

Fifty-one of seventy-eight full-time, female junior and senior health, physical education and recreation majors voluntarily participated in this research. The subjects were administered the following tests by the researcher:

- (1) Otis Self-Administering Tests of Mental Ability,
- (2) Wear Physical Education Attitude Scale, (3) Cardio-vascular Efficiency Test for Girls and Women, (4) Allport-Vernon-Lindzey Study of Values, (5) Lee-Thorpe Occupational Interest Inventory, (6) the Scott Motor Ability Test and (7) a somatotype evaluation. Results of the following tests were secured by permission from the Offices of Admissions and Records and Guidance and Testing: (1) Cornell Index, (2) ACT composite scores, and (3) grades for health, physical education and recreation coursework. The results of the tests and evaluations produced twenty-seven scores for each subject.

Correlation of the health, physical education and recreation grade-point average for each variable, excluding the somatotype evaluation, was determined by the Flanagan-Kelley technique. The means of the variables were compared to the means of the norms for each variable to determine significant differences at the .05 level of confidence.

A psychographic profile representing the means of the subjects to the means of the norms in standard score terms was developed. The psychographic profile presents a pattern of traits that distinguish the female health, physical education and recreation major from the college female in general.

CONCLUSIONS

The research indicated that the grade-point average of the subjects and the results of several measures were relatively dependent upon each other. Females with the highest grade-point averages in the professional preparation program tended to achieve higher scores in the measures of psychological health, aesthetic values, intellectual aptitude, natural or outdoor interests, achievement testing, shoulder girdle strength and general motor ability, as well as cardiovascular fitness than their peers. The opposite appeared to be true of the females achieving the lowest grade-point averages in the professional preparation program.

The tested females showed distinctive characteristics as compared to the norms on many of the measures. The subjects displayed high values placed on leadership, great interest in interpersonal relationships, outdoor activities and the arts. The maturity of interests of the subjects appeared to be well-established. As might be expected, the strength, flexibility, agility, co-ordination, and general motor ability of the subjects was greater than that of the norm group.

One measure, the intellectual aptitude of subjects, was shown to be greater for the subjects than the mean of the norm group. This information is contrary to research previously cited.

In terms of the originally stated hypotheses, the data drawn from this study warrant the following conclusions:

1. The hypothesis that no significant difference existed between the subjects and the given norms for the Scott Motor Ability Test was rejected as the subjects indicated significant differences on the Basketball Throw, the Standing Broad Jump, the Obstacle Race and the General Motor Ability at the .05 level of confidence.

2. The data drawn from administration of the Cardiovascular Efficiency Test for Girls and Women supported the thesis that no significant difference existed between the subjects and the norms.

3. The hypothesis that no significant difference existed between the subjects and norms on intellectual aptitude as measured by the Otis Self-Administering Tests of Mental Ability was rejected. The mean score of the subjects was significantly greater at the .05 level of confidence than the mean of the norm group.

4. The results of the Wear Physical Education Attitude Scale required rejection of the null hypothesis of no significant difference. The subjects indicated significantly more favorable attitudes toward physical education.

5. The thesis of no significant difference between the subjects and the norm group in strength of values as measured by the Allport-Vernon-Lindzey Study of Values was accepted only for the Economic, Social and Religious values. The hypothesis was rejected for measures of Theoretic, Aesthetic and Political values. Theoretic and Aesthetic values were shown to be significantly lower than the norm, while the Political values of the subjects appeared to be significantly greater.

6. Acceptance of the thesis of no significant difference between the subjects and norm on psychological health, as measured by the Cornell Index, was based on test data.

7. Significant difference was shown between the ACT composite scores of the subjects and the norm, thus

requiring rejection of the null hypothesis. The ACT composite scores of the subjects were significantly lower than the norm group.

8. The results of the Lee-Thorpe Occupational Interest Inventory yielded positive, negative and neutral significance of subjects to the norm. The thesis of no difference was rejected on eight of the ten measures, Positive significant differences from the normative data was determined for Personal-Social interests, Natural interests, interest in the Arts, and maturity or Level of Interests. Negative, but significant differences were found for Mechanical, Science interests and Computational interests. The null hypothesis was accepted for Verbal and Manipulative interests.

9. The hypothesis that the morphological classification of the subjects would indicate no predominant somatotype was rejected. Mesomorphy was determined as the predominant body component by both the researcher's evaluative procedures and Sheldon's classification technique using the ponderal index.

10. The hypothesis that the health, physical education and recreation grade-point average of the subjects would indicate no significant correlation with the tested variables was accepted for fifteen of the twenty-five variables. Positive significant relationships were found

between the health, physical education and recreation grade-point averages and the ACT composite score, Natural interests as measured by the Lee-Thorpe Occupational Interest Inventory, psychological health as measured by the Cornell Index, shoulder girdle strength and general motor ability as measured by the Scott Motor Ability Test, Aesthetic values as measured by the Study of Values, and cardiovascular fitness as measured by the CET. The null hypothesis for the above variables was rejected.

11. The composite results of the battery of tests displayed a pattern of traits for the female physical education major at Middle Tennessee State University. The majors differed significantly from the norms on eighteen of the twenty-five variables.

RECOMMENDATIONS

Several factors were identified in this study as being basic to the female junior and senior health, physical education and recreation major at Middle Tennessee State University. The following recommendations for use of resulting data for further study are submitted:

1. The motor ability and cardiovascular fitness of females appear to be basic to success in the professional preparation program. The CET and Scott Motor Ability Tests

should be administered to females indicating a desire to major in health, physical education and recreation.

2. A similar study needs to be conducted with female freshman and sophomore health, physical education and recreation majors to determine whether the same traits, competencies and characteristics exist.

3. Similar studies conducted at other institutions preparing female health, physical education and recreation majors are recommended.

4. Because this study measured only specified traits, other tests and measures should be administered to expand the scope of this study.

APPENDICES

APPENDIX A
RAW DATA USED IN
THE STUDY

Table 21

Raw Data From Wear Physical Education Attitude Scale,
CET, OSAT, CI and ACT

Subject	Wear	CET	OSAT	CI	ACT
1	165	57.39	46	6	12
2	173	44.80	49	2	15
3	177	45.27	31	3	11
4	185	55.41	45	--	16
5	177	51.02	54	5	18
6	188	57.39	67	4	20
7	189	49.45	44	18	17
8	181	49.45	58	27	21
9	175	44.95	49	9	16
10	183	44.64	39	10	14
11	193	38.75	39	13	14
12	175	53.57	51	1	22
13	184	44.80	50	2	15
14	192	47.95	59	--	--
15	178	58.44	27	--	9
16	194	51.55	58	7	14
17	174	44.89	67	11	19
18	180	44.03	70	0	21
19	200	59.52	65	0	28
20	169	48.70	62	5	20
21	170	36.76	51	1	15
22	182	28.57	48	6	15
23	181	50.22	59	4	18
24	200	42.85	46	2	17
25	200	54.47	48	4	18
26	200	49.45	70	3	25
27	168	37.94	63	11	24
28	188	49.45	64	6	21
29	170	48.70	41	18	15
30	195	49.45	61	3	21
31	176	60.66	61	--	11
32	187	52.69	64	1	24
33	177	51.02	58	5	24
34	178	42.85	56	6	18
35	172	53.57	70	--	--
36	141	53.57	44	9	19
37	182	49.45	61	--	20
38	170	53.57	44	14	14

Table 21 (Continued)

Subject	Wear	CET	OSAT	CI	ACT
39	189	49.45	44	--	14
40	175	51.55	63	5	19
41	194	29.76	70	0	22
42	185	61.85	46	0	17
43	183	49.45	36	1	--
44	183	49.45	45	7	18
45	172	59.52	27	11	14
46	186	48.70	54	16	17
47	192	39.19	63	1	18
48	181	51.55	45	7	16
49	197	52.69	35	9	12
50	179	48.70	39	2	14
51	187	39.97	35	10	12

Table 22
 Raw Data From Allport-Vernon-Lindzey
Study of Values

Subject	Theor.	Econ.	Aes.	Soc.	Polit.	Relig.
1	38	55	48	41	46	12
2	31	44	35	50	39	41
3	31	40	35	50	34	50
4	25	46	38	40	45	46
5	37	33	47	41	36	46
6	26	33	33	54	46	47
7	32	43	38	49	32	46
8	49	35	46	51	28	45
9	29	44	36	42	45	44
10	36	29	35	45	41	54
11	34	38	40	47	49	32
12	48	34	37	44	42	28
13	38	31	45	38	45	42
14	38	41	34	44	34	49
15	37	44	36	27	46	50
16	32	42	36	38	51	41
17	26	46	33	49	40	46
18	26	36	47	42	39	50
19	21	38	33	53	38	57
20	30	42	37	49	47	34
21	33	38	38	44	40	47
22	28	44	39	45	34	50
23	27	38	43	49	39	44
24	39	40	52	42	42	25
25	28	32	33	41	49	57
26	31	38	55	48	35	33
27	43	43	37	44	45	29
28	35	36	45	48	36	40
29	35	43	39	39	42	32
30	31	30	40	45	34	55
31	40	35	38	42	44	41
32	27	44	46	40	42	41
33	36	37	42	43	38	45
34	25	48	40	41	44	42
35	37	40	37	47	32	43
36	40	38	44	41	40	37
37	36	31	29	44	44	56
38	27	46	44	39	35	49

Table 22 (Continued)

Subject	Theor.	Econ.	Aes.	Soc.	Polit.	Relig.
39	37	44	37	49	40	34
40	34	46	42	44	36	38
41	22	40	41	43	41	53
42	33	25	35	47	42	58
43	47	38	39	22	48	46
44	53	42	42	44	33	40
45	22	29	33	52	49	45
46	29	44	46	42	36	43
47	24	28	42	50	45	51
48	34	31	31	52	37	55
49	24	38	35	56	40	47
50	36	48	40	45	39	32
51	31	46	37	47	35	44

Table 23

Raw Data From Lee-Thorpe Occupational
Interest Inventory

Subject	Personal- Social	Natural	Mechani- cal	Business	Arts	Science	Verbal	Manipula- tive	Computa- tional	Level of Interest
1	17	26	16	18	29	14	14	17	11	64
2	28	7	15	22	32	13	22	22	16	57
3	31	7	7	28	35	12	30	20	16	59
4	26	18	15	22	28	10	22	16	12	55
5	32	16	13	17	24	17	26	19	9	66
6	29	6	14	28	28	14	26	21	19	77
7	20	22	22	17	23	16	18	16	12	56
8	28	14	15	16	21	26	18	16	12	65
9	25	9	8	30	33	15	28	23	20	76
10	29	24	12	15	21	9	21	20	7	68
11	28	30	9	16	26	14	21	17	7	63
12	31	21	14	7	19	28	18	13	10	75
13	26	27	8	13	30	13	23	17	11	67
14	31	8	4	26	31	18	29	21	20	72
15	28	7	13	25	22	24	20	23	20	74
16	24	7	16	20	34	19	19	18	17	69
17	32	15	13	21	32	7	28	17	8	65
18	28	11	7	26	25	15	28	19	20	69
19	32	22	17	16	24	9	19	19	13	49
20	25	11	14	20	27	16	21	22	13	58
21	31	9	20	17	28	16	19	23	11	73
22	18	26	14	18	25	14	18	20	8	63
23	13	11	17	23	32	14	22	19	15	60
24	22	10	12	13	36	22	18	15	13	79
25	34	15	9	15	34	13	27	19	9	59
26	26	29	9	16	29	10	19	18	16	79
27	27	11	14	27	28	12	28	23	15	84
28	26	12	17	16	39	8	23	25	9	42
29	25	17	16	13	32	16	19	22	13	57
30	21	20	6	15	32	16	26	18	11	72
31	29	16	17	14	23	21	16	26	9	62
32	20	18	14	15	40	11	21	21	9	59
33	30	11	10	20	30	19	25	21	14	62
34	29	11	16	22	35	7	27	21	11	50

Table 23 (Continued)

Subject	Personal- Social	Natural	Mechani- cal	Business	Arts	Science	Verbal	Manipu- lative	Computa- tional	Level of Interest
35	29	7	15	24	29	14	28	26	19	61
36	28	22	16	10	25	18	16	16	9	67
37	27	7	11	23	30	22	25	19	18	73
38	25	30	17	10	22	12	15	11	7	44
39	26	13	10	23	32	18	27	22	17	67
40	30	17	11	11	36	14	22	22	8	65
41	30	18	10	18	31	13	29	17	7	70
42	28	15	15	18	30	13	23	17	12	66
43	23	14	25	6	27	27	14	15	11	61
44	27	19	11	16	26	18	20	22	10	73
45	28	13	13	21	30	14	21	17	14	81
46	24	13	14	15	35	16	21	28	8	66
47	32	25	14	7	33	9	22	17	1	67
48	29	23	11	13	26	16	19	18	10	77
49	28	24	14	16	33	4	21	16	6	36
50	29	9	16	26	28	12	27	19	16	62
51	23	8	16	24	29	20	22	18	17	81

Table 24
Raw Data From Scott Motor
Ability Test

Subject	Basketball Throw	Standing Broad Jump	Obstacle Race	General Motor Ability
1	60	76	20.7	205.7
2	39	61	25.0	138.0
3	46	55	24.7	144.3
4	65	67	24.0	199.8
5	48	66	23.2	155.2
6	41	56	22.4	138.0
7	68	72	23.0	213.8
8	69	65	21.5	207.5
9	45	70	20.9	167.1
10	39	63	21.8	144.4
11	52	59	22.8	163.8
12	56	72	19.7	193.1
13	52	65	20.6	174.4
14	40	78	22.0	167.2
15	39	60	23.6	137.4
16	46	76	20.2	178.2
17	40	66	20.5	151.9
18	44	63	21.6	154.6
19	50	69	21.4	188.2
20	68	76	20.0	222.4
21	49	52	21.1	149.7
22	53	73	21.0	187.2
23	71	73	19.6	207.8
24	63	78	20.3	214.9
25	66	69	24.4	204.2
26	59	75	20.2	202.8
27	45	72	20.3	170.5
28	61	66	21.2	193.2
29	47	69	21.3	169.3
30	39	62	22.0	142.8
31	37	66	20.8	145.6
32	49	70	23.0	173.0
33	36	61	23.0	134.4
34	49	69	21.0	173.4
35	59	71	21.5	195.9
36	59	63	18.7	187.5
37	60	64	22.8	186.8
38	69	63	19.6	206.6

Table 24 (Continued)

Subject	Basketball Throw	Standing Broad Jump	Obstacle Race	General Motor Ability
39	39	72	21.8	157.0
40	47	65	21.6	151.4
41	47	75	21.7	177.3
42	57	64	21.6	182.0
43	47	81	20.0	187.4
44	47	63	22.2	160.0
45	60	88	19.1	224.1
46	47	66	20.0	166.4
47	39	68	22.2	151.0
48	61	74	20.0	205.6
49	56	61	21.7	175.7
50	37	67	21.3	180.5
51	57	83	21.2	209.0

Table 25

Raw Data From Health, Physical Education
and Recreation Grade-point Average

Subject	Grade-point Average	Subject	Grade-point Average
1	3.6111	27	3.6098
2	3.1400	28	3.7273
3	2.3478	29	2.5909
4	3.1429	30	3.7778
5	2.7692	31	3.3542
6	3.2632	32	3.7111
7	3.1795	33	3.3077
8	3.6667	34	2.8542
9	2.7949	35	2.4667
10	2.5455	36	3.2000
11	3.0192	37	3.3386
12	3.5758	38	3.7097
13	3.2490	39	2.7174
14	3.4468	40	3.7143
15	2.9512	41	3.3659
16	3.4595	42	3.3438
17	3.2500	43	3.1007
18	3.0732	44	3.7568
19	3.5708	45	3.1022
20	3.0263	46	3.2143
21	3.1071	47	3.2128
22	3.1515	48	3.3333
23	3.5116	49	2.6000
24	3.5172	50	2.3611
25	3.5000	51	2.6071
26	3.0000		

APPENDIX B
SCOTT MOTOR ABILITY
TEST FORM

SCOTT MOTOR ABILITY TEST

Social Security Number _____ Testing number _____

1. Basketball throw for distance T-score

Trial one _____

Trial two _____

Trial three _____

2. Standing broad jump T-score

Trial one _____

Trial two _____

Trial three _____

3. Obstacle race T-score

Time lapsed to the nearest tenth of a second _____

GENERAL MOTOR ABILITY FORMULA

2 x basketball distance + 1.4 x broad jump - obstacle
race time

2 x _____ + 1.4 x _____ - _____

GMA = _____

T-score _____

APPENDIX C

CARDIOVASCULAR EFFICIENCY TEST FOR
GIRLS AND WOMEN TEST FORM

CARDIOVASCULAR EFFICIENCY TEST

Social Security Number _____ Testing number _____

Number of seconds completed _____

Pulse rate for thirty seconds _____

Cardiovascular Efficiency Rating Score

$$\text{CES} = \frac{\text{time} \times 100}{\text{pulse} \times 5.6} =$$

CES = _____

Equivalent T-score = _____

APPENDIX D

SOMATOTYPE RATING
FORM

SOMATOTYPE RATING

Social Security Number _____ Testing number _____

Regional Estimate Number One

Region of the Body	Endomorphy	Mesomorphy	Ectomorphy
I. Head, face, and neck	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
II. Thoracic trunk	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
III. Arms, hands and shoulders	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
IV. Abdominal trunk	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
V. Legs and feet	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Average of five regions	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7

SOMATOTYPE RATING (Continued)

Regional Estimate Number Two

Region of the Body	Endomorphy	Mesomorphy	Ectomorphy
I. Head, face and neck	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
II. Thoracic trunk	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
III. Arms, hands and shoulders	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
IV. Abdominal trunk	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
V. Legs and feet	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Average of five regions	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7

Average of regional estimates _____ Height _____

Weight _____ Weight _____ Averaged weight _____

Ponderal Index _____

Estimated somatotype _____

Sheldon's true somatotype _____

Descriptive somatotype _____

Predominant characteristic _____

Secondary characteristic _____

APPENDIX E

CORRESPONDENCE
WITH SUBJECTS

MIDDLE TENNESSEE STATE UNIVERSITY

MURFREESBORO, TENNESSEE 37130

HEALTH, PHYSICAL EDUCATION AND RECREATION DEPARTMENT

Box 535
Middle Tennessee State
University
Murfreesboro, Tenn. 37130

Dear

Janice Hayes, doctoral student, is conducting research which involves the junior and senior, female, health, physical education and recreation majors at Middle Tennessee State University. She would very much appreciate your cooperation in the research.

A short explanatory meeting will be held Tuesday, April 10th at 11:00 A.M. in Room 101 of the Murphy Athletic Center. This meeting will indicate the need for your participation and the purpose of the research. If you are unable to attend the meeting at this time, please call Mrs. Hayes at 898-2194 during the day or 898-4276 in the evening. You may also meet with her in her office, Room 225 of the Alumni Memorial Gymnasium, within the next week.

If you are student teaching at the present time and cannot attend the meeting, please contact Mrs. Hayes as soon as you are able to do so.

Your cooperation is very much desired and may prove helpful to the Health, Physical Education and Recreation Department as well as those girls who follow you in the program.

Thank you,

Janice C. Hayes

JCH:bg

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BIBLIOGRAPHY

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C. PERSONAL INTERVIEW

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