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A COMPARATIVE STUDY OF FIFTY UNDERGRADUATE MEN MAJORS IN  
PHYSICAL EDUCATION AND FIFTY UNDERGRADUATE MEN MAJORS  
IN OTHER FIELDS AT NORTH TEXAS STATE COLLEGE WITH  
RESPECT TO SELECTED PERSONAL TRAITS

THESIS

Presented to the Graduate Council of the North  
Texas State College in Partial Fulfillment  
of the Requirements

For the Degree of

MASTER OF SCIENCE

By

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## CHAPTER I

### ORIENTATION TO THE STUDY

The founders of America brought with them the prevailing educational trends and characteristics of their native lands. Asceticism and scholasticism had greatly influenced the educational trends of the old world to emphasize training of the mind to the neglect of the training of the body. Therefore, it was natural that education was conceived by the early educators of this country as the process of training the mind only.

In early America the mass of the people lived upon the land and developed their bodies through the every-day activities of the prevailing simple agricultural environment. In a remarkably short period of time, the industrial age brought about many changes. Great numbers entered sedentary occupations, collected into shops, stores, and business houses, and clustered in large groups in one locality. This trend toward municipalities created a lack of play space. The working conditions became characterized by speed, intensity, emotional strain, and relatively little muscular activity.

To meet the need for normal physical growth of students in the crowded industrial centers, educators saw that it was necessary to supply a program of physical activities in the school curriculum. Thus, physical education got its start

in the public schools of this country. The primary goals of the original physical education program were to provide physical activity for children deprived of normal play activities and to develop the children physically. Due to the nature of the early physical education in the schools in America, the physical educators dealt chiefly with exercises and with skills. This brought about the characterization of the physical educator as a physically fit individual, highly developed in physical skills, but less interested and poorly versed in cultural areas. In other words, the physical educator was regarded as a so-called "muscle man" of all brawn and no brain.

Through the years, including the present time, educators in this country have tended to emphasize the academic aspect of education and to accept reluctantly the education of the physical aspect of the individual as a worthy part of the general curriculum. Educators have been working under the older psychological theory that the human organism could be divided into a physical component and a mental element. This dichotomy of mind and body is combated by all of the pertinent facts of modern psychology. The conception of the individual functioning as a whole as he interacts in the environment is substantiated by the view of modern psychology as set forth by Kilpatrick. He states:

. . . . when the organism is stirred to act . . . it always acts as a unitary whole. If a human is sufficiently stirred, he thinks, feels, has impulses, engages in bodily movements; and each of the manifestations cooperates with the others to serve the felt



need of the organism at the time . . . . In any typical instance of behavior the organism acts as a unitary whole. The word organism implies the organization of constituent parts to make up a working whole, one whole working as a unit. While for thought individual parts may be distinguished, they do not act separately, but cooperatively. . . . Every part and aspect of the organism is involved in every activity.<sup>1</sup>

Robinson says that mental facts cannot be properly studied apart from the physical environment of which they are surrounded. All mental states are followed by bodily activity of some sort. He states:

The modern psychologist bases his work upon the assumption that there is no thought, no feeling, no decision, no act-in fact nothing that can be called an instance of human nature-which is not fundamentally bound up with the operations of the body. This is not the axiom of an eccentric school of psychology. It is an axiom adopted by practically all psychologists.<sup>2</sup>

In light of modern psychology, physical education is conceived as education of the individual in which the unity of man is respected. It contributes to the total growth of the individual through selected motor activities.

Modern psychology and philosophy have affected the physical education program in America. This, in turn, has affected the type of person entering the field of physical education in such a way that no longer is the physical educator to be looked upon as a person interested only in skills. The investigator was interested in determining the type of young man entering the field of physical education today.

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<sup>1</sup>William H. Kilpatrick, Democracy and the Curriculum, John Dewey Society, Third Yearbook, pp. 349-351

<sup>2</sup>Edward S. Robinson, Man As Psychology Sees Him, pp. 205-262

### Statement of Problem

Therefore, the present study was undertaken to make a comparison of fifty undergraduate men majors in physical education and fifty undergraduate men majors in other fields at North Texas State College with respect to selected personal traits.

### Definition of Terms

The term, personal traits, as applied to the present study, means the qualities possessed by an individual which tend to characterize or identify him.

### Purposes of the Study

The purposes of the study were:

1. To determine the general characteristics of the undergraduate men majors in the field of physical education and men majors in other fields at North Texas State College.
2. To determine if the undergraduate men majors in physical education could be distinguished from the men majors in other fields at North Texas State College on the basis of these characteristics.
3. To determine how the undergraduate men majors in physical education compared with the majors in other fields at North Texas State College with respect to these characteristics.

### Limitations of the Study

This study was limited to fifty undergraduate men majors in physical education and fifty undergraduate men majors in other

fields at North Texas State College. It also was limited to selected personal traits.

#### Sources of the Data

The data were obtained from documentary and human sources. The documentary sources were professional literature; the human sources were students at North Texas State College and experts in the field.

#### Survey of Previous Studies

Various investigations were found to be of value to the present study because of their related interests. A study conducted by Duggan<sup>3</sup> was very similar to the present study. The two differ in that Duggan's study was limited to women majors and non-majors in physical education, and the present study was limited to men majors and non-majors in physical education. Duggan's study was undertaken as a dissertation for the Doctor of Philosophy Degree. Therefore, her study was conducted on a broader scale in regard to the number of subjects studied and the number of universities used in obtaining the data. Duggan's study compared majors and non-majors in physical education with respect to interests, general information, intelligence, motor ability, and personality. The group of subjects for the investigation were comprised of two hundred undergraduate women

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<sup>3</sup>Anne S. Duggan, A Comparative Study of Undergraduate Women Majors and Non-Majors in Physical Education with Respect to Certain Personal Traits.

physical education majors and two hundred non-majors enrolled in three state universities which offered four-year major programs in physical education. It was found that interests of the members of the two groups differed sharply when measured by the Duggan Interest Questionnaire. In recreations and amusements the majors showed a decided preference for the more rugged and outdoor sports and recreation activities while the non-majors tended to prefer less strenuous and quieter forms of recreation.

In extracurricular activities the majors revealed a strong preference for sport clubs, intramural athletics, athletic association, interscholastic athletics, hiking club, outing club, dance club, and Young Women's Association. The non-majors, on the other hand, showed their strongest differentiating preferences for literary organizations, language clubs, and Greek letter societies.

In regard to the characteristics of work, the majors preferred that work which kept them out-of-doors; which was dangerous, exciting, active, strenuous, and competitive in nature; which required enthusiasm; and which involved the use of materials. The strongest preferences of the non-majors were for work which was indoors and which was safe, quiet, and slow.

With respect to types of books listed in the section on literary preferences, no significant differences in tastes were found between the two groups.

The differentiating items among the list of school subjects were consistent with those in the section on extra-curricular activities. The majors indicated a marked preference for physical education, physiology, zoology, personal hygiene, and mathematics. The non-majors indicated a preference for literature, with modern languages and art falling just short of inclusion in the list of significant items.

The tastes of these two groups with respect to types of people were quite similar. The majors differed from the non-majors most in preferring those who liked to play games and those who were daring. The non-majors differed most from the majors in a positive dislike for those who dressed carelessly.

When tested for general information by the Duggan General Information Test, it was found that the non-majors were better informed than the majors in knowledge of miscellaneous current activities, fine arts, literature, and history and civics. In knowledge of sports, and science and education, the majors were, on the whole, better informed than the non-majors.

In two of the three universities studied, the majors and non-majors were comparable as far as their intelligence was concerned as measured by the Otis Self-Administering Test, Higher Examination, Form D. The majors and non-majors in Universities A and C showed an almost identical intelligence score both with reference to their mean scores and

with reference to the Otis norms for college students. The superiority of the non-majors in University B, however, was marked.

A significant difference was found between the major and non-major groups in emotional stability and dominance as measured by the Bernreuter Personality Inventory. The findings were in favor of the major group. They were found to be more emotionally stable, more extrovert, and more dominating, than the non-majors.

In measuring motor ability by the Brace Scale of Motor Ability and the Jump and Reach Test, the majors showed superior motor ability to the non-major group. The differences between the mean scores of the major and non-majors on the Brace Scale were entirely significant in the three institutions.

A second study related to the present one was undertaken by Walke<sup>4</sup> in an attempt to find the characteristic traits of men physical education majors and to ascertain whether the traits possessed by this group were similar to those found among majors in education and other groups. Majors in physical education were measured for intelligence, scholarship, physical status, socio-economic status, personality, leadership, and vocational interest.

In regard to intelligence as measured by the DeCamp Intelligence Test, the physical education group showed

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<sup>4</sup>Nelson Sumter Walke, Traits Characteristic of Men Majoring in Physical Education at the Pennsylvania State College

marked inferiority to the education and general education groups.

Scholastic records of the three groups in terms of total college-point averages revealed that the physical education group was extremely low when compared with the education and the general education groups. In this study the education and the general education groups surpassed the physical education group in intelligence and scholastic achievement according to all measures used.

The results of the medical examination showed that the physical education group was much superior to the education and the general education groups in health status. Data in this study showed that the socio-economic status of the general education group was higher than that of the other two groups.

With respect to personality, as measured by the Bernreuter Personality Inventory, members of the physical education group ranked slightly higher in emotional stability, higher in dominance, and slightly lower in self-sufficiency.

Using participation and offices held in extra-curricular activities in high school as a criterion for leadership, the data showed that the physical education group rated higher than the education and the general education groups by a wide margin.

A third study related to the present one was made by

Morris<sup>5</sup> in which the author compared personality traits and their effect upon teaching. In the study, Morris proposed to find out whether there seemed to be a constellation of traits which might appropriately be designated as significant factors of the "teaching personality" and to determine how these traits might be estimated.

The group of subjects for the investigation were comprised of 754 persons who were classified into seven groups, as follows:

1. The W group consisted of fifty-two teachers employed in high schools of a large city system where organization and supervision made it possible to secure ratings of their success in teaching. This group was composed of teachers who were rated as weak by their principals.

2. The S group of sixty-three teachers was the corresponding strong sampling from the same schools.

3. The T group of ninety-one teachers included those teachers rated as average by the same principals, and additional teachers from the same city system, for whom no definite ratings were available.

4. The E group of fifty-five persons, while composed chiefly of teachers, consisted, also, of graduate students of education who were members of a course in the administration of normal schools and teachers colleges.

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<sup>5</sup>Elizabeth Hunt Morris, *Personal Traits and Success in Teaching*



5. The A group included twenty-two members of the faculty of the State College for Teachers at Albany, New York, and twenty-one other adults, chiefly teachers, of the investigator's acquaintance.

6. The L group included forty-eight members of the New York State Library School. This group was of especial interest as it represented a vocational selection somewhat different from the other groups of the study.

7. The remaining 402 returns were from students of the State College for Teachers at Albany.

Morris constructed a trait index with a total of 175 items, designed to get some measure of the likes and dislikes, resourcefulness and insight, tact, degree of positiveness of judgment, and characteristic feeling-attitudes of people.

Morris then compared the trait-index results with the academic averages, health grades, intelligence test scores, practice teaching grades, public opinion test scores, "Sympathy" test scores, trait-index scores, emotional history records, estimates of teaching ability, and personal history blanks correlations of the subjects of the study. An interesting outcome was the evidence that characteristics of the individual might be helpfully brought out rather than obscured by mass results concerning the group of which he was a member. The investigator further found in the study that leadership was not a trait which was either prominent or relatively lacking in personalities

just as a quality. Morris said that it did not exist apart from the situations in which people showed a strong or a weak ability to direct, guide or lead. Morris believed the concept of leadership was a useful way of designating or referring to those forms of behavior which included broad interests, control of feeling, tactful management, readiness and ability to undertake activities, cooperativeness, enthusiasm, sympathy, and the like.

A recent study related to the present one was made by Roe<sup>6</sup> who compared the personality trait differences between popular and unpopular high school students. Roe undertook to determine what influence physical appearance, health and vigor, emotional stability and control, social aggressiveness, adaptability and tolerance, dependability, dependence on others for assistance and emotional support, social service and abilities have upon the popularity of high school students. The data for this study were collected by personality scales prepared by Merl E. Bonney of North Texas State College. They were in two forms, one called A Personality Scale - Rating Self, and the second entitled A Personality Scale - Rating Others. The scales were composed of 157 items. Each item used had some bearing on one of the nine personality traits under consideration in the study. Subjects for Roe's study were forty-five students

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<sup>6</sup>Wilder A. Roe, Personality Trait Differences Between Popular and Unpopular High School Students (Unpublished Master's thesis, Department of Education, North Texas State Teachers College, Denton, Texas, 1946)

in the popular group and thirty students in the unpopular group of the junior and senior high school students at North Texas State College Demonstration School.

According to Roe the popular students were superior to the unpopular students in physical appearance, health and vigor. The popular students were more stable and controlled than the unpopular. Both groups were low in self aggressiveness. The unpopular students seemed to have a slight lead over the popular students in adaptability and tolerance. The popular students were superior in dependableness and social service and abilities. The popular students were a better source of new experience to others than were the unpopular students.

## CHAPTER II

### PROCEDURES USED IN DEVELOPING THE STUDY

Procedures for development of the study are presented in this chapter.

#### Preliminary Procedures

A thorough study was made of professional literature pertaining to the study. This literature was from the fields of psychology, education, history, physical education and tests and measurements in the field of physical education.

A survey was made of previous studies which were similar or related to the present study.

#### Selection of Traits

Definite criteria were formulated for the selection of the traits to be used in appraising the students who were the subjects participating in the present study. These criteria were: (1) Those traits should be included which are important to individuals professionally engaged in the field of physical education; (2) those traits should be included which are used in previous studies making comparisons of the physical education major and the non-major; (3) and those traits should be selected which can be measured objectively and treated statistically.

Using the preceding criteria as guides the investigator found the following traits should be considered in the present study.

1. Motor ability--Brace defines motor ability as "that ability which is more or less general, which is more or less inherent, and which permits an individual to learn motor skills easily and to become readily proficient in them."<sup>1</sup>

A desirable degree of motor ability is generally recognized as an important asset to anyone desiring to become a physical education instructor. Since physical education deals with activities involving motor ability, a test helps to determine what kind of man is entering the physical education field in comparison to other majors in regard to this trait.

2. Intelligence--Baldwin says that practical application of intelligence testing aids greatly in diagnosing and understanding a pupil and in distinguishing one pupil from another.<sup>2</sup>

Since one of the purposes of this study listed in Chapter I was to determine if men majors in physical education can be distinguished from men majors in other fields on the basis of selected personal traits, the administering of an intelligence test to these two groups was considered by the

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<sup>1</sup>David Kingsley Brace, Measuring Motor Ability, pp. 14-15

<sup>2</sup>Robert D. Baldwin, "Once More the Question of Intelligence Tests," American School Board Journal, CXI (August, 1945), 23-24

investigator as being very helpful toward finding the answer to the above question.

3. Interests--Strong says, "Experimentally an interest is a response of liking. . . . Interest is an aspect of behavior, not an entity in itself."<sup>3</sup> Bingham states that an interest ". . . is a tendency to become absorbed in an experience and to continue in it. We usually want to do what we like to do; and we like to do what interests us."<sup>4</sup>

The modern curriculum in American schools is arranged to guide interests of the students toward educational objectives. For this reason, interests are analyzed as evidences of a liberal education. Briggs concludes that the liberally educated individual has a larger number, a wider variety, and a greater depth of interests than the individual not liberally educated.<sup>5</sup>

Strong has shown in his study that men engaged in a particular occupation have a characteristic set of likes and dislikes which distinguish them from men engaged in other professions.<sup>6</sup> Therefore, the investigator undertook as one of the purposes of this comparative study of undergraduate men majors and non-majors in physical education to make an

<sup>3</sup>Edward K. Strong, Vocational Interests of Men and Women, pp. 6-8

<sup>4</sup>Walter V. Bingham, Aptitudes and Aptitude Testing, pp. 61-62

<sup>5</sup>Thomas H. Briggs, Secondary Education, pp. 478-535

<sup>6</sup>Edward K. Strong, Manual for Vocational Interest Blank for Men, p. 48

inventory of their interests to determine if the two groups could be differentiated upon the basis of expressed preferences.

Again, the writer felt that the administration of an interest inventory to major and non-major groups in physical education would tend to show if the likes and hobbies of the students tested paralleled the major field in which they were engaged. Super states:

Men who find in their vocations an outlet for their major interest are likely to have hobbies which resemble their vocations, whereas men who do not have adequate vocational outlets tend to develop outside activities which rival their vocation in claiming time and thought. Those whose avocational activities supplement and extend their vocations not only tend to be better adjusted, but to be more stable vocationally. This shows how interests may operate to speed up or slow down the development of skills, the accumulation of knowledge, and vocational progress.<sup>7</sup>

The investigator felt justified in administering an interest inventory to men majors and non-majors in physical education for the purpose of determining a comparison of these two groups in this regard.

4. Personality.--Knapp defines an individual's personality as the sum total of his response patterns as they impress other people.<sup>8</sup> Shellow states that personality is the sum of qualities peculiar to some individual rational being.<sup>9</sup>

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<sup>7</sup>Donald E. Super, The Dynamics of Vocational Adjustment, p. 88

<sup>8</sup>Robert H. Knapp, "Are We Overlooking Personality?" The Nations Schools, XXXIV (September, 1944), 26

<sup>9</sup>Sadie Myers Shellow, How to Develop Your Personality, p. 1

The writer's aim in testing the two groups in the present study was to determine if there was a difference in the personalities of physical education majors and those engaged in other fields at North Texas State College. The degree of sociability, self-sufficiency, emotional stability, self-confidence, imagination, worry, daydreaming, and dominance and submission that an individual possesses contribute to his personality patterns. The above mentioned factors which go to make up the personality of an individual were the type of characteristics the investigator was attempting to measure when he selected personality for the comparison of majors and non-majors in physical education.

Another purpose for personality testing in the study was to determine whether physical education majors and those majoring in other fields were delinquent in the overall group patterns of personality. These patterns of personality are of great importance in the development of the well-integrated individual. Knapp says:

The responsibility of developing and guiding meaningful experiences so that they will make possible the development of worth-while social, character, emotional and other desirable aspects of the well-integrated personality is one of the major responsibilities of education today. Adjustment of the individual, both inward and outward, is of vital importance.<sup>10</sup>

5. Leadership.--Smith explains leadership as

. . . the mobilization of the men's energies for striving toward a goal which is clear in the mind of the leader, and usually in the other man's mind also.

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<sup>10</sup>Knapp, op. cit., p. 27



Leading and following are happening all the time with variation of awareness on both sides. Every man should be a boss and have one.<sup>11</sup>

Whether it is in the field of education, politics or business, leadership is important. Possession of certain traits, characteristics, and qualities makes an individual a leader. The fact that leadership is important in all fields is brought out in an investigation by Ashbrook in which he studied the qualities of men "judged foremost leaders" in physical education by a jury of experts and concluded that high school leadership, determined by the number of offices held and participation in various school activities, is an important manifestation of later success.<sup>12</sup>

Considering the opportunities a teacher has for influencing students, it is most desirable that he possess the qualities that make for leadership. Watson says of leadership:

Other studies indicate that high academic marks are of less predictive value for success in teaching than are good records in popularity, taking the initiative in groups, and successfully holding office in clubs. . . .<sup>13</sup>

Link supports this view in the statement that "Leadership is an aspect of social effectiveness - leaders are not born,

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<sup>11</sup>Allan A. Smith, "Opportunity," American School Board Journal, CLX (August, 1944), 16-17

<sup>12</sup>Willard P. Ashbrook, A Method of Selecting Students for Teacher Training in Physical Education, (Unpublished Doctor's dissertation, School of Education, New York University, 1930)

<sup>13</sup>G. H. Watson, "Teacher and Society," John Dewey Society, First Yearbook, (1937), p. 322

they are persons who have developed social effectiveness to an unusual degree."<sup>14</sup> Since leaders are not born the investigator felt a test of leadership administered to the major and non-major groups of the present study would help to determine the kind of man entering the physical education field in comparison to men majors in other fields.

#### Selection of Subjects for the Study

The subjects for the present study were selected from students of sophomore, junior, or senior classification enrolled in North Texas State College for the spring semester of the 1947-1948 session. The distribution of the subjects of the major group and of the non-major group by college classification is shown in Table 1.

TABLE 1

DISTRIBUTION OF SUBJECTS ACCORDING TO CLASSIFICATION FOR FIFTY UNDERGRADUATE MEN MAJORS IN PHYSICAL EDUCATION AND FIFTY UNDERGRADUATE MEN NON-MAJORS AT NORTH TEXAS STATE COLLEGE

Classification	Majors	Non-Majors
Sophomores	19	22
Juniors	15	16
Seniors	16	12
N =	50	50

<sup>14</sup>Henry C. Link, "Definition of Social Effectiveness and Leadership Through Measurement," Educational and Psychology Measurement, IV (January, 1944), 57-67

The investigator wished to obtain a random sampling of subjects for the study. Physical education classes required for graduation and advanced physical education classes required of physical education majors offered an opportunity to obtain a random sampling of majors and of non-majors because there was no predominating element in the enrollment of students in these classes that would affect the study.

All of the majors and non-majors in physical education classified as sophomores, juniors, and seniors who were enrolled in three of the required physical education classes for the spring semester of the 1947-1948 session were selected as subjects for the present study. Because of the small enrollment of upperclassmen in required physical education classes, especially of the major group, the investigator selected the remaining subjects from all of the majors and non-majors in physical education classified as sophomores, juniors, and seniors who were enrolled in three advanced classes in the Department of Health, Physical Education, and Recreation.

#### Selection of Tests to Measure Personal Traits

In order for a test to be recognized as a desirable one, it must meet certain standards. The criteria used in the selection of the tests for the present study were:

1. The test must be valid.
2. The test must be reliable.

3. The test should be objective.
4. The test should be of simple form.
5. The test should be standardized.
6. The test must be meaningful and worth doing.<sup>15</sup>

The tests used in this study were:

1. Iowa-Brace Motor Ability Test.--As a means of measuring motor ability the investigator sought a motor educability test rather than a skill test which might place the non-majors at a disadvantage. As a measure of motor ability the Iowa-Brace Scale of Motor Ability was chosen for the following reasons:

a. It was the most suitable test for the facilities which were available for this comparative study of men majors and non-majors.

b. The Iowa-Brace Scale has a reliability coefficient of .83.<sup>16</sup>

c. McCloy validated each item of the Iowa-Brace Scale by correlating it against a battery of motor tests. He reports the items are valid measures of motor ability.<sup>17</sup>

d. The test is not a measure of strength, size, maturity, or power.

e. The test measures to a greater extent the ability to learn new skills than speed, size, and strength.

<sup>15</sup>Charles H. McCloy, Tests and Measurements in Health and Physical Education, p. 17

<sup>16</sup>Ruth B. Glassow and Marion R. Broer, Measuring Achievement in Physical Education, p. 244

<sup>17</sup>Ibid., p. 253

f. The Iowa-Brace test subjects the individual to a more rigorous statistical examination than the original Brace Scale of Motor Ability.

g. The length of the Iowa-Brace test is somewhat reduced compared to the original Brace Scale.

h. The scale is simple to administer and requires no special equipment.

i. The directions are simple and clear, insuring standardized procedures as listed by McCloy as a requirement of a good test.

j. The system of scoring is simple and the resulting scores are in such form that they can be easily treated statistically.

The investigator made a thorough study of the test in order to insure a correct demonstration of each test item.

2. Otis Intelligence Test--The Otis Quick-Scoring Mental Ability Test, Gamma Test, Form Am, was chosen as the instrument to measure the intelligence of the subjects participating in the present study. The reasons for selecting this test were as follows:

a. Reliability coefficients of .90, .91, and .85 when corrected by the Spearman-Brown formula have been reported for this test.<sup>18</sup>

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<sup>18</sup>Arthur S. Otis, Manual of Directions for the Otis Quick - Scoring Mental Ability Test, Gamma Test, Forms Am and Bm, p. 5

b. All the items of the Otis Test are reported to have real validity with a median value of .61.<sup>19</sup>

c. The test is economical of time requiring only thirty minutes for administration.

d. A precise scoring key is available for scoring the test, which saves much time in scoring.

e. The test is standardized with norms for college men, thereby, offering basis for comparison of the present groups.

f. The test is simple to administer requiring no special equipment.

g. Scores for the test can easily be treated statistically. The test is self-administering.

h. Otis Intelligent Quotients are reported to be as reliable as those secured through individual testing.<sup>20</sup>

3. Duggan's Interest Questionnaire.--The author investigated a number of interest tests. Outstanding among recent studies of interest inventories was the publication, late in 1943, of Strong's Vocational Interests of Men and Women.<sup>21</sup> Strong shows through his findings that patterns of interest already are clear and stabilized enough at

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<sup>19</sup>Alphonse Chapanis, "Note on the Validity and Difficulty of Items in Form Am of the Otis Self-Administering Tests of Mental Ability," Journal of Experimental Education, V (March, 1937), 246-248

<sup>20</sup>Arthur E. Traxler, "Reliability, Constancy, and Validity of the Otis I.Q.," The Journal of Applied Psychology, XVIII (April, 1934), 241-251

<sup>21</sup>Edward K. Strong, Vocational Interests of Men and Women

adolescence to serve as useful guides in vocational counseling; that there is a high degree of relationship between scholastic interests and graduation from a selected course, although there is not the same degree of relationship between scholastic interests and grades in the course; and that there seems to be little difference in the teaching-interest scores of successful and unsuccessful teachers.

Two studies were undertaken by Jay<sup>22</sup> and Matthuson<sup>23</sup> in which they studied the physical education majors' interests in relation to those of comparable groups of non-majors. In high school subjects, the mean of both groups expressed their greatest preference for social science and their greatest dislike for mathematics. Athletics constituted the most popular high school activity for both groups of men, though the non-majors indicated a wider range of interest.

The foregoing inventories were not suitable to obtain the answers to the question set forth in this study: Can undergraduate men majors in physical education be distinguished from non-majors upon the basis of preferences which indicate different patterns of interest?

In her study Duggan constructed an interest questionnaire for testing undergraduate women majors in physical education and non-majors to find if they could be distinguished upon the basis of expressed preferences which indicate

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<sup>22</sup>Duggan, op. cit., p. 18

<sup>23</sup>Ibid., o. 19

a differential pattern of interests. Although Duggan constructed the Interest Questionnaire for use in testing women, the investigator felt it was just as applicable for testing men, and, therefore, selected it for use in the study.

Duggan's Interest Questionnaire is composed of 312 items. It was constructed in accordance with the following criteria:

- a. The items of the interest questionnaire should be within the field of experience of undergraduate college women and should be expressed in a vocabulary readily understood by the same group.
- b. Items soliciting preference reactions should sample adequately a wide area of interests allied with work, play, and social relationships.
- c. Provision should be made for the individual to exercise adequate choice in the statement of his preferences.
- c. Responses to the interest questionnaire should be susceptible to objective scoring and statistical evaluation.
- e. The interest questionnaire should be self-administrative.
- f. The time required for the administration of the questionnaire should not exceed thirty minutes.<sup>24</sup>

The items Duggan chose for the Interest Questionnaire were divided into seven sections as follows:

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<sup>24</sup>Ibid., p. 22



Part I. Recreations and Amusements

Part II. Extracurricular Activities

Part III. Paired Characteristics of Work

Part IV. Literary Preferences

Part V. Characteristics of People

Part VI. School Subjects

Part VII. Prominent Women

The Duggan Interest Questionnaire was chosen for use in this study for the following reasons:

a. Duggan reports reliability coefficients of .90 as compared with the average reliability of .80 of Strong's occupational scoring keys<sup>25</sup> and the average reliability of .79 reported by Cowdery.<sup>26</sup>

b. The questionnaire was constructed in order to answer directly the question set forth in this study pertaining to interests.

c. Responses to the questionnaire are susceptible to objective scoring and statistical evaluation.

d. The questionnaire is self-administrative.

e. The time required for administration of the questionnaire is only thirty minutes, and the scale is simple to administer.

f. The directions are simple and clear insuring standardized procedures.

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<sup>25</sup>Ibid., p. 46

<sup>26</sup>Ibid.

g. The questionnaire has available an accompanying scoring key which may be administered simply and quickly with no requirement of special equipment.

4. Bernreuter Personality Inventory.--One of the best known and modern tests dealing with personality is the Bernreuter Personality Inventory. The Personality Inventory<sup>27</sup> represents a new departure in the measurement of personality in that it measures several different aspects at one time.

Six personality trait scales have been prepared for the Inventory used in the present study, namely: neuroticism, self-sufficiency, dominance-submission, introversion-extroversion, self-confidence, and sociability. Bernreuter describes the foregoing six measures as follows:<sup>28</sup>

The B1-N scale is a measure of neurotic tendency. Persons scoring high on this scale tend to be emotionally unstable. Those scoring above the ninety-eight percentile would probably benefit from psychiatric or medical advice. Those scoring low tend to be very well balanced emotionally.

The B2-S scale is a measure of self-sufficiency. Persons scoring high on this scale prefer to be alone, rarely ask for sympathy or encouragement, and tend to ignore the advice of others. Those scoring low dislike solitude and often seek advice and encouragement.

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<sup>27</sup>Robert G. Bernreuter, Manual For the Personality Inventory, p. 1

<sup>28</sup>Ibid.

The B3-1 scale is a measure of introversion-extroversion. Persons scoring high on this scale tend to be introverted; that is, they are imaginative and tend to live within themselves. Scores above the ninety-eight percentile bear the same significance as do similar scores on the B1-N scale. Those scoring low are extroverted; that is, they rarely worry, seldom suffer emotional upsets, and rarely substitute daydreaming for action.

The B4-D scale is a measure of dominance-submission. Persons scoring high on this scale tend to dominate others in face-to-face situations. Those scoring low tend to be submissive.

The F1-C scale is a measure of confidence in one's self. Persons scoring high on this scale tend to be hamperingly self-conscious and to have feelings of inferiority; those scoring above the ninety-eight percentile would probably benefit from psychiatric or medical advice. Those scoring low tend to be wholesomely self-confident and to be very well adjusted to their environment.

The F2-S scale is a measure of sociability. Persons scoring high on this scale tend to be nonsocial, solitary, or independent. Those scoring low tend to be sociable and gregarious.<sup>29</sup>

The Bernreuter Inventory consists of 125 questions to which the individual may respond by encircling "yes", "no",

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<sup>29</sup>Scales F1-C and F2-S were prepared by John C. Flanagan. John C. Flanagan, Factor Analysis in the Study of Personality, Stanford University, California

or "?" to indicate his agreement, disagreement, or doubtfulness in answering each of the items.

As a measure of personality the Bernreuter Personality Inventory was chosen for the following reasons:

a. It is economical both in cost and in time required for administration.

b. Bernreuter Personality Inventory has been used successfully with high-school students, with college students, and with adults. It is suitable for use with either sex.

c. Percentile norms, which enable the layman to know how he compares with others, have been prepared for the three groups listed above.

d. Bernreuter reports coefficients of reliability ranging from .78 to .91.<sup>30</sup>

e. Bernreuter reports validity coefficients of correlation ranging from .84 to 1.00, corrected for attenuation, when the Inventory scores were correlated with scores of the Thurstone Neurotic Inventory, The Bernreuter Self-Sufficiency Test, the Laird G2 Introversion Test, and the Allport Ascendance-Submission Reaction Study.<sup>31</sup>

f. Bernreuter reports coefficients of correlations ranging from .88 to .95 for the inter-correlations between the various scales of the Inventory.<sup>32</sup>

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<sup>30</sup>Bernreuter, op. cit., p. 4

<sup>31</sup>Ibid., pp. 5-6

<sup>32</sup>Ibid., p. 5

g. A study by Stagner reports that the Scales of B1-N and B2-S of the Inventory are high and that B4-D is good. Stagner reports the reliability of the scales range from .80 to .88 and that they are probably satisfactory for group work.<sup>33</sup>

h. The Bernreuter Personality Inventory is self administering and no instructions are necessary except those appearing in the blank.

1. There are no time limits, but very few subjects require more than twenty-five minutes to complete the Inventory.

j. The Inventory is simple to administer and requires no special equipment.

5. Yeager Leadership Test--The Yeager Leadership Test<sup>34</sup> is one of the few tests that has been devised for the purpose of measuring qualities of leadership. The investigator was guided in selecting the Yeager Test for measuring leadership for the following reasons:

a. The test is simple to administer and requires no special equipment.

b. The test is self-administrative.

c. The length of the Yeager Test is fairly short and requires only ten minutes to administer.

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<sup>33</sup>Ross Stagner, "Validity and Reliability of the Bernreuter Personality Inventory," The Journal of Abnormal and Social Psychology, (1934), p. 418

<sup>34</sup>Tressa C. Yeager, An Analysis of Certain Traits of Selected High-School Seniors Interested in Teaching, pp. 14-19

d. The directions are clear and simple insuring standardized procedures.

e. The test is susceptible to objective and simple scoring and to statistical evaluation.

f. The test has an accompanying scoring key constructed in accordance with agreement among experts as to weights that should be assigned to offices in extra-curricular activities.

Yeager's Leadership Test measures leadership by participation in extracurricular activities. The individual receives credit for each office held. Since not all offices are of equal importance, it was necessary for Yeager to devise a system by which each office holder received credit proportionate to the importance of his office. This was accomplished by getting a jury of experts to weight the offices in extra-curricular activities. The jury of experts was nationally known individuals who had made a thorough study of extra-curricular activities and their importance in the school life of the student. There was a comparatively low degree of disagreement in the weights for the various assignments by the members of the jury. The mean weights for the activities are used as the values to be assigned to each office in the extra-curricular program.

#### Administration of the Tests

The tests of this study were administered in the classrooms and gymnasium proper of the Men's and Women's Gymnasiums

of North Texas State College at regular class periods during the spring semester of 1948. One instructor was available to aid the investigator in the administration of each of the tests.

1. Iowa-Brace Motor Ability Test.--The Iowa-Brace Test consists of twenty-one events in the nature of stunts. However, a student is tested with only ten of the twenty-one stunts. Six batteries of ten stunts each have been drawn up for age groups of each of the two sexes.

The Iowa-Brace Test was administered as suggested by McCloy.<sup>35</sup> The students were arranged in two lines about ten feet apart with six feet between the participants in each line. Each student was given a score card on which he wrote his name. He then exchanged the card with the student opposite him in order that they could score each other. A sample of the scoring card used is given in the appendix.

A full explanation of the scoring procedure was then given by the investigator. If the student failed on the first attempt he was given a second trial. A zero was marked for failure to perform the stunt correctly and an "X" was marked for successful performance of the stunt. Two points were given for performing the stunt correctly on the first attempt and one point was given for performing the stunt correctly on the second trial. The highest possible score was twenty.

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<sup>35</sup>McCloy, op. cit., pp. 74-75

One row of students was seated on the floor for the purpose of scoring the other row of students. The test was then fully explained and an incorrect demonstration given of each stunt with pointers on what constituted failure of the stunt. After each incorrect demonstration, a correct demonstration was given of each stunt. The row of students standing performed five of the ten stunts. A thorough explanation and demonstration was given for each stunt before the students attempted the stunt. The students were not allowed to practice the stunt before their first trial. After the students in the first row had completed five of the ten stunts they were seated on the floor to grade the other row. The students of the second row performed the five stunts previously performed by those of the first row. They then performed five new stunts. This was continued until both rows had completed all ten of the stunts. The Motor Ability Tests were collected as the students left.

2. Otis Intelligence Test--The Otis Intelligence Test was administered according to directions given in the Manual of Directions for the Otis Quick-Scoring Mental Ability Test, Gamma Test, Form Am.<sup>36</sup> The investigator carefully explained the directions to the students. The subjects were guaranteed confidential treatment of the findings. Tests were passed out to the students with the instructions to read only the first page, to fill in the blanks, and to answer the sample blanks on that page.

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<sup>36</sup>Otis, op. cit., pp. 2-3



After the investigator was sure that all of the students understood the directions, he directed the students to turn to page two, which was the Answer Sheet, and tear it off. The students were then given directions as to how they should use the Answer Sheet by a demonstration. The investigator then explained to the students that they were not expected to answer all of the questions but to do the best they could. The students were told they had thirty minutes to spend on the test. As soon as everything was in readiness the investigator gave the signal for the students to start. The time the test was started and the time the test would end were written on the board in order to eliminate any possible mistake in timing. As soon as the thirty minutes were up the students were directed to lay down their pencils. The Answer Sheets and Test Booklets were then collected.

3. Duggan Interest Questionnaire--The Interest Questionnaire was administered according to the directions set forth by Duggan.<sup>37</sup> Each student was given a questionnaire and allowed to read the directions at the top of the first page. The investigator then explained that they were to circle "L" if they liked an item of the questionnaire; that they were to circle "I" if they were indifferent toward an item; that they were to circle "D" if they disliked an item. The students were directed to answer all the items,

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<sup>37</sup>Duggan, op. cit., p. 22

to work as rapidly as possible, and to record their first impressions. There was no time limit on the questionnaire. The students were not allowed to talk to each other in order to obtain the true interest and knowledge of the items of the questionnaire of each subject.

The test administered to the subjects of the present study was the same as Duggan's with the exception of a few questions which were eliminated because they applied only to women. The papers were scored with a key from Duggan's study. Part VII was excluded entirely in the questionnaire taken of the subjects of the present study. The Interest Questionnaires were collected as the students left the room.

4. Bernreuter Personality Test--The Bernreuter Personality Test was administered to the 100 majors and non-majors participating in the present study in accordance with the directions set forth by Bernreuter.<sup>38</sup> No instructions were necessary except those appearing on the blank. To insure understanding of the instructions, the investigator read them aloud while the students being tested read them silently. The investigator explained that each student should interpret the questions for himself so that none of the questions would be invalidated. Each student was urged to cooperate thoroughly and to be sincere in his answers in order to obtain more accurate results. The

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<sup>38</sup>Bernreuter, op. cit., p. 4

exact nature of the traits being measured were not revealed before the subjects finished as directed by Bernreuter. The subjects were guaranteed confidential treatment of the findings. There was no time limit. The Personality Tests were collected as the students left the room.

5. Yeager Leadership Test--The Yeager Leadership Test was administered in accordance with directions set forth by the author. The students were told that the questionnaire intended to disclose their participation in extracurricular activities but only while enrolled at North Texas State College. For each office or position held the students were directed to put an "X" in the blank beside it. If they had held such an office twice or more they were directed to put the number of "X's" in the blank equivalent to the number of times they had held the position. The students were directed to work accurately and rapidly and to be sincere in their answers in order to obtain accurate results. There was no time limit. The Leadership Tests were collected as the students left the room.

A few of the extracurricular activities listed in Yeager's Test were eliminated because they would not apply to the situation of the present study.

#### Treatment of the Data

The five tests used in the present study were scored and tabulated. Data from the five tests were treated statistically. Statistical computations on each of the

tests were made to determine for both the major and non-major group:<sup>39</sup>

1. The range
2. The median
3. The mean
4. Quartile one and three
5. The standard deviation
6. The standard error of the mean
7. The standard error of the standard deviation
8. The difference between the means of the major and non-major groups
9. The difference between the standard deviations of the major and non-major groups
10. The standard error of the difference between the means of the major and non-major groups
11. The standard error of the difference between the standard deviations of the major and non-major groups
12. The critical ratio of the means
13. The critical ratio of the standard deviations

In order to judge the significance of the size of the standard error of the means, of the difference of the means, of the standard error of the standard deviations, and of the difference of the standard deviations, the investigator chose the .05 level of accuracy as proposed by Fisher<sup>40</sup>

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<sup>39</sup>H. E. Garrett, Statistics in Psychology and Education

<sup>40</sup>R. A. Fisher, The Design of Experiments, 15-16, 38-43

and reported by Garrett to be acceptable as standard for most experimental work.<sup>41</sup> The .05 level of accuracy for each measure was obtained by finding  $\pm 1.96 \sigma_m$  of the standard error for each measure. The results of the computation mark the limits between which are found ninety-five percent of the cases in a normal distribution.

In order to judge the significance of the difference between the means of the major and of the non-major groups and the significance of the difference between the standard deviations of the major and of the non-major groups in the various tests used in the study, the standard error of the difference of the means and the standard error of the difference of the standard deviations were computed. A critical ratio was computed by dividing the difference of the means by the standard error of the difference of the means. Likewise, a critical ratio was computed by dividing the difference of the standard deviations by the standard error of the difference of the standard deviations. In each case the critical ratio of the given measure was compared with the  $\frac{X}{G}$  value of 1.96 which in the positive and negative directions marks off the limits within which are ninety-five percent of the cases in a normal distribution.

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<sup>41</sup>Garrett, op. cit., pp. 187-203

Formulation of the Summary, Conclusions, and  
Recommendations for Further Study

A summary of the study and of the findings was made and conclusions were drawn from the findings of the data. Recommendations for further studies were made.

### CHAPTER III

#### FINDINGS OF THE STUDY

The findings of the study are presented in this chapter.

#### Iowa-Brace Motor Ability Test

The scores on the Iowa-Brace Motor Ability Test made by fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College are presented in Table 2.

TABLE 2

DISTRIBUTION OF SCORES FOR THE IOWA-BRACE MOTOR ABILITY TEST FOR FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Scores in Terms of Points	Number of Students	
	Majors	Non-Majors
18 - 20	16	3
15 - 17	23	18
12 - 14	8	17
9 - 11	1	8
6 - 8	2	3
3 - 5	0	1
0 - 2	0	0
	N = 50	N = 50

The scores range from eight to twenty for the major group and from five to twenty for the non-major groups. Individuals in both the major and non-major groups attained

the highest possible score of twenty. However, the major group surpasses the non-major group in that sixteen major students made scores in the highest interval of eighteen - twenty, whereas only three non-majors made scores in the highest interval. Two members of the major group made a low score of eight, whereas one member of the non-major group made a low score of five.

TABLE 3

COMPARISON OF MEASURES OF CENTRAL TENDENCY ON IOWA-BRACE MOTOR ABILITY TEST ADMINISTERED TO FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Test	Majors N = 50			Non-Majors N = 50			$D_{M_1 M_2}$
	Md	Me	$\bar{G}_M$	Md	Me	$\bar{G}_M$	$\bar{G}_D$
Iowa-Brace Test	16.32	16	.406	13.39	13.42	.424	4.39

In Table 3 measures of central tendency are presented for the Iowa-Brace Motor Ability Test for fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College. The median score for the major group is 16.32. The median score for the non-major group is 13.39. The mean score for the major group is sixteen. The mean score for the non-major group is 13.42. The major group surpasses the non-major group on the Iowa-Brace Motor Ability Test as indicated by both measures of central tendency.



The reliability of the mean for the major group was determined by computing the standard error of the mean,  $\sigma_m$  which is .406. The significance of the standard error of the mean for the major group at the .05 level of accuracy is .80. At this level the probability is ninety-five chances out of one hundred that the mean of sixteen obtained for the major group on the Iowa-Brace Motor Ability Test does not vary from the true mean by more than  $\pm .80$ . That is, the true mean falls between 15.20 and 16.80. According to Garrett<sup>1</sup> "the sampling error allowable in a mean depends upon the purpose of the experiment; the standards of accuracy set up, the units in terms of which measurement is made and other factors." Interpreting the findings of the significance of the standard error of the mean on the .05 level of accuracy in terms of the unit of measurement in the Iowa-Brace Motor Ability Test, namely a separate and distinct stunt, the investigator concludes that the obtained mean of sixteen for the majors has a desirable degree of reliability.

The reliability of the mean for the non-major group was determined by computing the standard error of the mean, which is .424. The significance of the standard error of the mean for the non-major group at the .05 level of accuracy is .83. At this level the probability is ninety-five chances out of one hundred that the mean of 13.42 obtained

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<sup>1</sup>H. E. Garrett, Statistics in Psychology and Education, p. 187

for the non-major group on the Iowa-Brace Motor Ability Test does not vary from the true mean by more than  $\pm .83$ . That is, the true mean falls between 12.59 and 14.25. The obtained mean of 13.42 for the non-majors has a desirable degree of reliability.

The difference between the means for the two groups is .587. The critical ratio for the difference in the means of the two groups is 4.39. This ratio is 2.2 times as large as necessary to be considered significant at the .05 level of accuracy. Therefore, the difference in mean scores is considered significant to distinguish the undergraduate men majors and the undergraduate men non-majors of the present study on the Iowa-Brace Motor Ability Test.

The variability of the scores was obtained by computing the quartiles and the standard deviations. Quartile one for the major group is 14.69. Quartile three is 18.15. The inter-quartile range is 3.46. Quartile one for the non-major group is 11.58. Quartile three for the non-major group is 15.91. The inter-quartile range is 4.32. Quartile one for the major group is 3.10 higher than quartile one for the non-major group. Quartile three for the major group is 2.23 higher than quartile three for the non-major group.

TABLE 4

COMPARISON OF THE VARIABILITY OF SCORES ON THE IOWA-BRACE MOTOR ABILITY TEST ADMINISTERED TO FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Test	Majors N = 50			Non-Majors N = 50			$\frac{D_4 - D_2}{S.D.}$
	Q <sub>1</sub>	Q <sub>3</sub>	S.D.	Q <sub>1</sub>	Q <sub>3</sub>	S.D.	
Iowa-Brace Test	14.69	18.15	2.87	11.58	15.91	3.00	.311

The standard deviation for the major group is 2.87. The standard deviation for the non-major group is 3.00. In comparison with the non-majors, the fifty undergraduate men majors in physical education of the present study shows less variability in scores on the Iowa-Brace Motor Ability Test as measured by the inter-quartile range and the standard deviation.

The reliability of the standard deviation for the major group was determined by computing the standard error, which is .287. The significance of the standard error of the standard deviation for the major group at the .05 level of accuracy is .56. At this level the probability is ninety-five chances out of one hundred that the standard deviation of 2.87 obtained for the major group on the Iowa-Brace Motor Ability Test does not vary from the true standard deviation by more than  $\pm$  .56. That is, the true standard deviation falls between 2.31 and 3.43. The investigator

concludes that the obtained standard deviation of 2.87 for the majors has a desirable degree of reliability.

The reliability of the standard deviation for the non-major group was determined by computing the standard error of the standard deviation which is .30. The significance of the standard error of the standard deviation for the non-major group at the .05 level of accuracy is .59. It may be stated with confidence that the standard deviation for the non-major group on the Iowa-Brace Motor Ability Test does not vary from the true standard deviation by more than  $\pm$  .59. That is, the true standard deviation falls between 3.59 and 2.41. The obtained standard deviation of 3.0 for the non-major group has a desirable degree of reliability.

The difference between the standard deviations for the two groups on the Iowa-Brace Motor Ability Test is .129. The standard error of this difference is .415. The critical ratio for the difference in the standard deviations of the two groups is .31. This ratio is only .15 as large as necessary to be considered significant at the .05 level of accuracy. Therefore, the difference between the standard deviation is not significant to distinguish the undergraduate men majors and non-majors of the present study for the variability of scores made on the Iowa-Brace Motor Ability Test.

In summary, it is concluded on the basis of the statistical confirmation of the reliability of the mean scores and of the significance of the difference in the mean scores of

the two groups, that the major group of the present study is distinctly superior to the non-major group in motor ability. This finding coincides with that reported by Walke<sup>2</sup> in a comparative study of 455 undergraduate men majors and non-majors in physical education. Again, the finding parallels that reported by Duggan<sup>3</sup> and by Cozens and Cubberly<sup>4</sup> in studies dealing with women majors in physical education.

#### Otis Intelligence Test

The scores on the Otis Intelligence Test made by fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College are presented in Table 5.

The scores range from thirty-two to sixty-nine for the major group and from twenty-nine to sixty-seven for the non-major group. Two persons of the major group made a high score of sixty-nine, whereas one person of the non-major group made a high score of sixty-seven. One person of the major group made a low score of thirty-three, whereas one person of the non-major group made a low score of thirty-one.

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<sup>2</sup>Walke, op. cit., p. 36

<sup>3</sup>Duggan, op. cit., p. 93

<sup>4</sup>Frederick W. Cozens and Hazel J. Cubberly, "Achievement Scales in Physical Education for College Women," The Research Quarterly of the American Physical Education Association, VI (March, 1935), 14-23

TABLE 5

DISTRIBUTION OF SCORES FOR THE OTIS INTELLIGENCE TEST FOR FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Scores in Terms of Points	Number of Students	
	Majors	Non-Majors
68 - 70	3	0
65 - 67	2	3
62 - 64	2	7
59 - 61	1	5
56 - 58	4	6
53 - 55	5	2
50 - 52	5	2
47 - 49	5	1
44 - 46	6	3
41 - 43	4	5
38 - 40	5	10
35 - 37	5	3
32 - 34	3	1
29 - 31	0	2
26 - 28	0	0
	N = 50	N = 50

In Table 6 measures of central tendency are presented for the Otis Intelligence Test for fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College. The median score for the major group is 47.7. The median score for the non-major group is 49.5. The mean score for the major group is 48.6. The mean score for the non-major group is 49.5. The non-major group slightly surpasses the major group on the Otis Intelligence Test as indicated by both measures of central tendency.

TABLE 6

COMPARISON OF THE MEASURES OF CENTRAL TENDENCY OF THE OTIS INTELLIGENCE TEST ADMINISTERED TO FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Test	Majors N = 50			Non-Majors N = 50			$D_{M_1, M_2}$
	Md	Me	$\sigma_M$	Md	Me	$\sigma_M$	$\sigma_D$
Otis Intelligence Test	47.7	48.6	1.41	49.5	49.5	1.55	.61

The reliability of the mean for the major group was determined by computing the standard error of the mean which is 1.41. The significance of the standard error of the mean for the major group at the .05 level of accuracy is 2.76. At this level the probability is ninety-five chances out of one hundred that the mean of 48.6 obtained for the major group on the Otis Intelligence Test does not vary from the true mean by more than  $\pm 2.76$ . That is, the true mean falls between 45.8 and 51.36. Interpreting the findings of the significance of the standard error of the mean of the .05 level of accuracy in terms of the unit of measurement in the Otis Intelligence Test, namely, a question with a positive and set answer, the investigator concludes that the obtained mean of 48.6 for the majors has a fair degree of reliability.

The reliability of the mean for the non-major group on the Otis Intelligence Test was determined by computing

the standard error of the mean, which is 1.55. The significance of the standard error of the mean for the non-major group at the .05 level of accuracy is 3.03. At this level the probability is ninety-five chances out of one hundred that the mean of 49.5 obtained for the non-major group on the Otis Intelligence Test does not vary from the true mean by more than  $\pm$  3.03. That is, the true mean falls between 46.47 and 52.83. The obtained mean of 49.5 for the non-major group has a fair degree of reliability.

The difference between the means for the two groups is .9. The standard error of this difference is 2.09. The critical ratio for the difference in the means of the two groups is .44. The critical ratio is only .22 as large as necessary to be considered significant at the .05 level of accuracy. Therefore, this difference is not considered significant to distinguish the undergraduate men majors and non-majors of the present study for the mean scores made on the Otis Intelligence Test.

The variability of the scores on the Otis Intelligence Test was obtained by computing the quartiles and the standard deviation. Quartile one for the major group is 40.2. Quartile three is 55.2. The inter-quartile range is fifteen. Quartile one for the non-major group is 39.45. Quartile three for the non-major group is 60.0. The inter-quartile range is 20.55. Quartile one for the major group is .75 higher than quartile one for the non-major group. Quartile three for the major group is 4.8 lower than quartile three for the non-major group.



TABLE 7

COMPARISON OF THE VARIABILITY OF SCORES ON THE OTIS INTELLIGENCE TEST ADMINISTERED TO FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Test	Majors N = 50			Non-Majors N = 50			$\frac{D_1 - D_2}{\sigma_{D_1}}$
	Q <sub>1</sub>	Q <sub>3</sub>	S.D.	Q <sub>1</sub>	Q <sub>3</sub>	S.D.	
Otis Intelligence Test	40.2	55.2	9.99	39.45	60	10.98	.392

The standard deviation for the major group is 9.99. The standard deviation for the non-major group is 10.98. The variability of scores for the Otis Intelligence Test is less for the major group than for the non-major group when measured by the inter-quartile range and the standard deviation.

The reliability of the standard deviation for the major group was determined by computing the standard error, which is .999. The significance of the standard error of the standard deviation for the major group at the .05 level of accuracy is 1.95. At this level the probability is ninety-five chances out of one hundred that the standard deviation of 9.99 obtained for the major group on the Otis Intelligence Test does not vary from the true standard deviation by more than  $\pm 1.95$ . That is, the true standard deviation falls between 8.04 and 11.94. The investigator concludes that the obtained standard deviation of 9.99 for the majors has a desirable degree of reliability.

The reliability of the standard deviation for the non-major group was determined by computing the standard error of the standard deviation which is 1.09. The significance of the standard error of the standard deviation for the non-major group at the .05 level of accuracy is 2.16. It may be stated with confidence that the standard deviation for the non-major group on the Otis Intelligence Test does not vary from the true standard deviation by more than  $\pm 2.16$ . That is, the true standard deviation falls between 8.82 and 13.14. The obtained standard deviation of 10.98 for the non-major group has a desirable degree of reliability.

The difference in the standard deviations for the two groups is .99. The standard error of this difference is 1.47. The critical ratio of the difference of the standard deviations of the two groups is .67. The critical ratio is only .33 as large as necessary to be considered significant at the .05 level of accuracy. The difference in the standard deviations is not significant to distinguish the undergraduate men majors and non-majors of the present study for the variability of scores made on the Otis Intelligence Test.

In summary, the conclusion is reached after consideration of the statistical confirmation of the reliability of the mean and the difference of the means and of the significance of the difference of the means that the fifty undergraduate men majors and the fifty undergraduate men non-majors in physical education of the present study cannot be distinguished in intelligence as measured by the Otis

Intelligence Test. Duggan reports that there is no significant difference in mean intelligence scores of undergraduate women majors and non-majors when the group from each of the three institutions furnishing the subjects for the study is considered separately.<sup>5</sup>

#### Duggan Interest Questionnaire

The Interest Questionnaire was scored by the weighted scores evolved by Duggan<sup>6</sup> after determining through preliminary studies that the plus sign could be used to indicate the distinguishing preference of physical education majors and the minus sign could be used to indicate the distinguishing preference of non-majors. The scores on the Duggan Interest Questionnaire made by fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College are presented in Table 8.

The scores range from fifty-one to 144 for the major group and from - 62 to 111 for the non-major group. One person of the major group made a high score of 144, whereas one person of the non-major group made a high score of 111. One person of the major group made a low score of fifty-one, whereas one person of the non-major group made a low score of - 62.

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<sup>5</sup>Duggan, op. cit., p. 25

<sup>6</sup>Ibid., p. 87

TABLE 8

DISTRIBUTION OF SCORES FOR THE DUGGAN INTEREST QUESTIONNAIRE FOR FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Scores in Terms of Points	Number of Students	
	Majors	Non-Majors
138 - 148	3	0
127 - 137	5	0
116 - 126	3	0
105 - 115	7	2
94 - 104	7	4
83 - 93	7	2
72 - 82	6	3
61 - 71	7	5
50 - 60	5	10
39 - 49	0	7
28 - 38	0	6
17 - 27	0	3
6 - 16	0	2
- 4 - (-5 )	0	1
-15 - (-5 )	0	2
-26 - (-16)	0	1
-37 - (-27)	0	0
-48 - (-38)	0	1
-59 - (-49)	0	0
-70 - (-60)	0	1
	<u>0</u>	<u>1</u>
	N = 50	N = 50

In Table 9 measures of central tendency are presented for the Duggan Interest Questionnaire for fifty undergraduate men majors and fifty non-majors in physical education at North Texas State College. The median score for the major group is 93.5. The median score for the non-major group is 50.6. The mean score for the major group is 94.6. The mean score for the non-major group is 46.86. The pattern of interests of the major group indicated by the median and mean scores on the Duggan Interest Questionnaire

is in keeping with the findings of Duggan in testing the interests of women majors and non-majors.<sup>7</sup>

TABLE 9

COMPARISON OF MEASURES OF CENTRAL TENDENCY ON THE DUGGAN INTEREST QUESTIONNAIRE ADMINISTERED TO FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Test	Majors N = 50			Non-Majors N = 50			$D_{M_1, M_2}$
	Md	Me	$\sigma_M$	Md	Me	$\sigma_M$	$\sigma_D$
Duggan Interest Questionnaire	93.5	94.6	3.65	50.6	46.86	5.19	7.52

The reliability of the mean for the major group was determined by computing the standard error of the mean which is 3.65. The significance of the standard error of the mean for the major group at the .05 level of accuracy is 7.22. At this level the probability is ninety-five chances out of one hundred that the mean of 94.6 obtained for the major group on the Duggan Interest Questionnaire does not vary from the true mean by more than  $\pm 7.22$ . That is, the true mean falls between 87.38 and 101.82. Interpreting the findings of the significance of the standard error of the mean of the .05 level of accuracy in terms of the unit of measurement in the Duggan Interest Questionnaire, namely an item with a computed positive or negative average

<sup>7</sup>Ibid., p. 14

weight, the investigator concludes that the obtained mean of 94.6 for the majors has a desirable degree of reliability.

The reliability of the mean for the non-major group was determined by computing the standard error of the mean, which is 5.19. The significance of the standard error of the mean for the non-major group at the .05 level of accuracy is 10.32. At this level the probability is ninety-five chances out of one hundred that the mean of 46.86 obtained for the non-major group on the Duggan Interest Questionnaire does not vary from the true mean by more than  $\pm 10.32$ . That is, the true mean falls between 36.54 and 57.18. The obtained mean of 46.86 for the non-major group has a desirable degree of reliability.

The difference in the means for the two groups is 47.74. The standard error of this difference is 6.34. The critical ratio for the difference in the means of the two groups is 7.52. The critical ratio is 3.8 times as large as necessary to be considered significant at the .05 level of accuracy. Therefore, this difference is considered significant to distinguish the undergraduate men majors and the undergraduate men non-majors of the present study for the mean scores made on the Duggan Interest Questionnaire.

The variability of the scores was obtained by computing the quartiles and the standard deviations. Quartile one for the major group is 72.4. Quartile three is 113.1. The inter-quartile range is 40.7. Quartile one for the non-major group is 30.25. Quartile three is 68.2. The

inter-quartile range is 37.95. Quartile one for the major group is 42.15 higher than quartile one for the non-major group. Quartile three for the major group is 44.9 higher than quartile three for the non-major group.

TABLE 10

COMPARISON OF THE VARIABILITY OF SCORES ON THE DUGGAN INTEREST QUESTIONNAIRE ADMINISTERED TO FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Test	Majors N = 50			Non-Majors N = 50			$D_{b_1} - b_2$ $b_{D_b}$
	Q <sub>1</sub>	Q <sub>3</sub>	S.D.	Q <sub>1</sub>	Q <sub>3</sub>	S.D.	
Duggan Interest Questionnaire	72.4	113.1	25.85	30.25	68.2	36.74	2.42

The standard deviation for the major group is 25.85. The standard deviation for the non-major group is 36.74. The variability of scores for the Duggan Interest Questionnaire is less for the non-major group than for the major group when measured by the inter-quartile range, but the variability of scores is less for the major group than for the non-major group when measured by the standard deviation.

The reliability of the standard deviation for the major group was determined by computing the standard error, which is 2.58. The significance of the standard error of the standard deviation for the major group at the .05 level of accuracy is 5.10. At this level the probability is ninety-five chances out of one hundred that the standard deviation of 25.85 obtained for the major group on the

Duggan Interest Questionnaire does not vary from the true standard deviation by more than  $\pm 5.10$ . That is, the true standard deviation falls between 20.75 and 30.95. The investigator concludes that the obtained standard deviation of 25.85 for the majors has a desirable degree of reliability.

The reliability of the standard deviation for the non-major group was determined by computing the standard error of the standard deviation which is 3.67. The significance of the standard error of the standard deviation for the non-major group at the .05 level of accuracy is 7.26. It may be stated with confidence that the standard deviation for the non-major group on the Duggan Interest Questionnaire does not vary from the true standard deviation by more than  $\pm 7.26$ . That is, the true standard deviation falls between 29.48 and 44.0. The obtained standard deviation of 36.74 for the non-major group has a desirable degree of reliability.

The difference in the standard deviations for the two groups is 10.89. The standard error of this difference is 4.49. The critical ratio for the difference in the standard deviations of the two groups is 2.42. The critical ratio is 1.22 times as large as necessary to be considered significant at the .05 level of accuracy. This difference is significant to distinguish the undergraduate men majors and non-majors of the present study for the variability of scores made on the Duggan Interest Questionnaire. In summary, it



is concluded on the basis of the statistical confirmation of the reliability of the mean scores and of the significance of the difference in the mean scores of the two groups that the major and non-major groups of the present study can be readily distinguished with reference to their differential pattern of interests as measured by the Duggan Interest Questionnaire. The findings parallel that reported by Duggan.<sup>8</sup>

Table 11 presents the distribution of scores on each item of the Duggan Interest Questionnaire to show the expressed preferences which distinguish the undergraduate men physical education majors from the non-majors of the present study. In Table 11 the column headed with L shows the number of subjects who like each item of the Duggan Interest Questionnaire; the column headed with I shows the number of subjects who are indifferent toward each item; and the column headed with D shows the number of subjects who dislike each item.

In recreations and amusements the physical education majors show a decided preference for the following items which are listed in rank order:

1. Visiting Friends Informally
2. Basketball
3. Movies
4. Baseball

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<sup>8</sup>Ibid., pp. 70-71

5. Swimming
6. Radio Programs
7. Amusement Parks
8. Picnics
9. Social Dancing
10. Tennis

In recreations and amusements the non-majors show a decided preference for the following items which are listed in rank order:

1. Movies
2. Picnics
3. Automobiling
4. Radio Programs
5. Musical Comedies
6. Swimming
7. Visiting Friends Informally
8. Amusement Parks
9. Tennis
10. Baseball

It is interesting to note that in the top ten ranking items in recreations and amusements both the majors and non-majors select visiting friends informally, movies, baseball, swimming, radio programs, amusement parks, picnics, and tennis. The majors select basketball and social dancing to rank in the top ten items, whereas the non-majors differ to select automobiling and musical comedies to rank in the top ten items.

In recreations and amusements the physical education majors show dislike for the following items which are listed in rank order:

1. Writing Poetry
2. Writing Stories
3. Sewing
4. Writing Articles
5. Interpretive Dancing
6. Playing Violin
7. Concerts
8. Writing Letters
9. Fortune Tellers
10. Making Formal Calls

In recreations and amusements the non-majors show dislike for the following items which are listed in rank order:

1. Sewing
2. Writing Poetry
3. Writing Stories
4. Fortune Tellers
5. Writing Letters
6. Writing Articles
7. Folk Dancing
8. Making Formal Calls
9. Reading With One or More
10. Playing Violin

In the lower ten ranking items in recreations and amusements both the majors and non-majors show dislike for

writing poetry, writing stories, sewing, fortune tellers, writing articles, playing violin, writing letters, and making formal calls. The majors show dislike for interpretive dancing and concerts to rank these items in the lower ten items, whereas the non-majors differ to show dislike for folk dancing and reading with one or more to rank these items in the lower ten items.

TABLE 11

DISTRIBUTION OF SCORES ON EACH ITEM OF THE DUGGAN INTEREST QUESTIONNAIRE FOR FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
Part I. Receptions and Amusements						
Amusement Parks	46	4	0	41	7	2
Animal Zoos	41	8	1	39	9	2
Archery	33	17	0	28	21	1
Art Galleries	9	28	13	12	31	7
Automobiling	43	7	0	45	5	0
Badminton	39	10	1	32	15	8
Banquets	26	19	5	26	7	7
Baseball	48	2	0	40	9	1
Basketball	49	1	0	39	10	1
Bicycling	41	9	0	31	17	2
Bowling	41	5	4	39	11	0
Bridge	16	19	15	15	28	7

TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
Part I. Recreations and Amusements						
Camping	40	9	1	37	16	7
Canoeing	39	10	1	39	9	2
Checkers	23	17	10	29	12	9
Chess	13	23	14	12	23	15
Concerts	12	16	22	18	16	16
Croquet	31	18	1	24	25	1
Crossword Puzzles	19	17	14	15	21	14
Drawing	11	21	18	20	22	8
Entertaining Guest	30	16	4	26	20	4
Fencing	10	29	11	13	29	8
Folk Dancing	23	13	14	9	21	20
Fortune Tellers	9	22	19	6	19	25
Gardening	18	18	14	18	19	13
Golf	42	7	1	27	17	6
Hockey	37	11	2	17	26	7
Horseback Riding	40	10	0	38	9	3
Horseshoes	34	15	1	28	17	5
Iceskating	33	16	1	20	27	3
Interpretative Dancing	11	15	24	8	27	15
Jigsaw Puzzles	21	22	7	15	27	8
Lectures	16	18	16	15	25	10
Making Formal Calls	11	20	19	11	19	20
Mountain Climbing	26	19	5	28	16	8

TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
Part I. Receptions and Amusements						
Movies	49	0	1	47	2	1
Museums	30	16	4	36	12	2
Musical Comedies	43	6	1	44	5	1
Painting	12	21	17	16	22	12
Picnics	45	4	1	46	4	0
Ping Pong	42	7	1	40	8	2
Playing Piano	17	28	5	19	26	5
Playing Violin	3	25	22	6	26	18
Poker	38	6	6	35	9	6
Quoits	17	25	8	6	32	12
Radio Programs	47	2	1	45	4	1
Reading Alone	35	11	4	37	7	6
Reading With One or More	14	25	11	12	19	19
Receptions	14	21	15	13	29	8
Roller Skating	39	8	3	32	10	8
Sewing	4	17	29	3	15	32
Skiing	20	25	5	18	29	3
Soccer	34	10	6	22	23	5
Social Dancing	45	2	3	36	7	7
Sun Bathing	40	8	2	35	13	2
Swimming	47	3	0	44	4	2
Tap Dancing	11	25	14	6	29	15
Tennis	44	4	2	40	9	1

TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
<b>Part I. Recreations and Amusements</b>						
Theatre	38	8	4	40	8	2
Tobogganing	29	17	4	19	28	3
Visiting Friends Informally	50	0	0	44	4	2
Walking Alone	22	15	13	30	12	8
Walking With Others	41	9	0	40	7	3
Writing Articles	8	16	26	14	15	21
Writing Letters	12	18	20	10	15	25
Writing Poetry	3	11	36	8	14	28
Writing Stories	5	12	33	11	12	27
<b>Part II. Extracurricular Activities</b>						
Annual	35	11	4	28	20	2
Athletic Association	49	1	0	30	17	3
Choral Club	5	25	20	10	26	14
Dance Club	17	24	9	23	18	9
Debating Society	4	25	21	12	25	13
Dramatic Club	9	18	23	10	26	14
Greek Letter Societies	6	23	21	9	26	15
Hiking Club	42	5	3	23	21	6
Intramural Athletics	50	0	0	36	12	2
Interscholastic Athletics	48	2	0	4	35	14
Language Clubs	9	20	21	6	28	16

TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
<b>Part II. Extracurricular Activities</b>						
Literary Societies	7	26	17	6	28	16
Magazine	45	5	0	33	15	2
Newspaper	48	2	0	35	14	1
Oratorical Society	5	24	23	5	37	8
Orchestra	30	11	9	26	18	6
Outing Club	41	8	1	26	22	2
Religious Organizations	24	18	3	20	23	7
Scholarship Societies	24	19	7	17	30	3
Sports Clubs	48	2	0	37	13	0
Student Government	33	11	6	24	21	5
Welfare and Social Service	35	10	5	20	28	2
<b>Part III. Characteristics of Work</b>						
	L	I	D	L	I	D
Active Work	45	4	1	40	7	3
Carrying Out Plans	38	11	1	39	9	2
Dangerous Work	20	17	13	9	25	16
Long Hours Good Salary	35	12	3	28	7	15
Indoor Work	14	20	16	17	19	14
Initiating Own Plans	36	12	2	40	7	3
Noncompetitive Work	10	24	16	15	19	16
Original Work	34	15	1	41	5	4



TABLE 11--Continued

Interest Part III. Characteristics of Work	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
Outdoor Work	46	3	1	37	9	4
Routine Mechanical Work	18	17	15	11	14	25
Safe Quiet Work	12	25	13	19	21	10
Sedentary Work	4	36	10	5	37	8
Slow Careful Work	9	24	17	11	14	25
Work in Same Place	11	20	19	10	14	26
Working Alone	12	14	24	12	16	22
Work in Different Places	41	5	4	35	8	7
Directing Others	37	8	5	33	10	7
Short Hours Small Salary	3	8	39	3	8	39
Fast, Rapid Work	30	16	4	23	17	10
Following Directions	24	20	6	15	26	9
Working With People	45	4	1	42	6	2
Work Involving Competi- tion	41	7	2	30	13	7
Attention to Details	27	20	3	25	21	4
Working With Others	45	5	0	44	6	0
Involving Little Respon- sibility	9	25	16	10	25	15
Working With Things	39	10	1	37	8	5
Involving Much Respon- sibility	27	19	4	18	23	9
Work Requiring Enthusiasm	43	6	1	42	6	2

TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
<b>Part III. Characteristics of Work</b>						
Work Yielding Quick Results	37	12	1	40	8	2
Work Requiring Patience	17	23	10	16	21	13
Work Yielding Slow Results	7	20	23	4	19	27
Involving Broad Planning	21	18	11	20	20	10
<b>Part IV. A. Literary Preferences</b>						
	L	I	D	L	I	D
Adventure Stories	41	7	2	44	5	1
Biographies	31	15	4	34	10	6
Essays	17	19	14	18	19	13
Love Stories	15	17	18	11	25	14
Mystery Stories	41	4	5	29	14	7
Philosophical Books	13	22	15	17	21	12
Plays	19	18	13	18	22	10
Poetry	15	17	18	15	20	15
Religious Books	18	22	10	12	24	14
Scientific Treatises	12	25	13	19	20	11
<b>Part IV. B. Magazines</b>						
	L	I	D	L	I	D
American-	34	14	2	31	17	2
American Mercury	13	30	7	14	32	4

TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
Part IV. B. Magazines						
Arts and Decoration	8	23	19	12	29	9
Asia	5	36	9	8	36	6
Atlantic Monthly	25	19	6	24	20	6
Ballyhoo	8	36	6	5	40	5
Bird Lore	10	26	14	8	29	13
Bookman	4	36	10	6	37	7
Classical Journal	6	26	18	7	33	10
College Humor	44	6	0	30	18	2
Colliers	48	2	0	45	5	0
Cosmopolitan	29	17	4	30	13	7
Country Gentleman	25	21	4	25	18	7
Current History	16	26	8	15	26	9
Drama	9	22	19	7	32	11
Delineator	3	31	16	0	43	7
Etude	7	37	6	5	36	9
Forum	6	33	11	10	30	10
Golden Book	6	33	11	4	41	5
Golfer's Magazine	31	15	4	13	31	6
Good Housekeeping	25	18	7	15	26	9
Harper's Magazine	23	23	4	22	26	2
Harper's Bazaar	20	24	6	16	30	4
House and Garden	7	35	8	15	26	9
House Beautiful	15	25	10	18	24	8

TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
Part IV. B. Magazines						
Hygeia	31	15	4	21	24	5
Journal of Chemical Education	9	23	18	9	29	12
Journal of Health and Physical Education	47	2	1	13	30	7
Journal of Political Economy	15	26	9	12	30	8
Ladies Home Journal	16	26	8	10	28	12
Liberty	41	8	1	40	9	1
Life	47	3	0	46	2	2
Literary Digest	29	18	3	28	18	4
McCall's Magazine	24	19	7	29	16	5
Mentor	7	35	8	7	37	5
Mind	5	38	7	8	38	4
Modern Art	10	24	16	9	31	10
Modern Screen	28	16	6	19	26	5
Musical Courier	8	29	13	7	37	6
Nation	22	23	5	17	30	3
Nat'l. Ed. Assn. Journal	21	21	8	8	38	4
National Geographic	28	20	2	34	13	3
Nature	33	13	4	25	21	4
New Outlook	21	25	4	12	34	4
New Republic	19	28	3	12	35	3
Outlook	18	26	6	7	41	2

TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
Part IV. B. Magazines						
Photoplay	32	15	3	22	24	4
Physical Culture	36	11	3	17	27	6
Pictorial Review	15	31	4	19	28	3
Popular Astronomy	16	24	10	15	29	6
Popular Science	32	15	3	38	10	2
Readers' Digest	49	0	1	47	2	1
Red Book	20	25	5	26	21	3
Review of Reviews	10	32	8	16	32	2
Saturday Evening Post	47	3	0	47	3	0
School and Society	20	24	6	12	33	5
Science	24	18	8	28	19	3
Scribner's	14	30	6	10	36	4
Snappy Stories	24	22	4	15	30	5
Sportsman	49	0	1	34	14	2
Stage	11	26	13	10	32	8
Survey	8	35	7	10	37	3
Theatre Arts Monthly	13	21	16	7	36	7
Time	46	2	2	48	2	0
Town and Country	23	22	5	18	29	3
Travel	36	11	3	27	20	3
True Stories	34	7	9	12	19	19
Vanity Fair	13	28	9	10	34	6
Vogue	17	22	11	7	36	7

TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
<b>Part IV. B. Magazines</b>						
Whiz Bang	15	27	8	7	36	7
Woman's Home Companion	11	30	9	8	32	10
World Events	37	10	3	21	27	2
<b>Part V. Characteristics of People</b>						
Aggressive People	39	7	4	26	14	10
Awkward People	1	23	26	0	26	24
Cordial People	38	10	2	31	19	0
Daring People	29	19	2	15	21	4
Dependent People	28	11	11	20	17	13
Distant, Reserved People	5	31	14	7	28	15
Extravagant People	5	22	23	11	27	12
Emotional People	8	22	20	8	22	20
Energetic People	44	6	0	43	6	1
Frank People	42	7	1	44	5	1
Girls Who Pet	35	11	4	32	15	3
Good Sports	50	0	0	43	7	0
Impulsive People	7	29	24	16	24	10
Independent People	29	15	6	38	11	1
Lackadaisical People	2	38	10	4	40	6
Loyal People	50	0	0	45	5	0
Masculine Women	7	20	23	0	12	38

TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
Part V. Characteristics of People						
Self-confident People	43	6	1	39	10	1
Socially Minded People	26	20	4	31	16	3
Submissive People	4	37	9	12	20	18
Unconventional People	6	30	14	12	25	13
Very Intellectual People	23	23	4	27	18	5
Belligerent People	2	24	24	2	29	19
Cautious People	22	27	1	14	32	4
Men Who Drink	6	32	12	9	26	15
Optimistic People	21	25	4	26	24	0
Outstanding Leaders	45	5	0	35	14	1
People With Self-control	50	0	0	44	6	0
People With Strict Morals	16	30	4	19	25	6
People With Artistic Taste	15	27	8	23	14	3
People Who Dress Care- lessly	4	12	34	7	16	27
People Who Like To Play Games	45	5	0	26	21	3
People Who Feel Inferior	2	31	17	3	30	17
People Who Feel Superior	5	15	30	3	14	33
People With Excellent Physique	28	21	1	20	28	2
Punctual People	47	2	1	30	20	0
Religious People	28	21	1	27	20	3
Secretive People	7	29	14	3	22	25

TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
<b>Part V. Characteristics of People</b>						
Self-centered People	5	16	29	5	18	27
Well-groomed People	46	3	1	38	12	0
Women Who Drink	6	21	23	12	18	20
Women Who Smoke	6	22	22	7	25	18
Women Who Chew Gum	11	35	4	14	31	5
Women Who Swear	1	10	39	5	17	28
<b>Part VI. School Subjects</b>						
Ancient Languages	4	11	35	20	22	8
Art	5	25	20	17	19	14
Biology	28	16	6	19	18	13
Botany	25	14	11	18	20	12
Chemistry	16	19	15	18	19	13
Dramatics	12	19	19	15	21	14
English Composition	12	7	31	13	16	21
History	20	22	8	26	12	12
Home Economics	11	29	10	6	25	19
Public Speaking	23	18	9	17	23	10
Religious Education	20	20	10	11	28	11
Literature	14	13	23	20	19	11
Mathematics	24	16	10	24	16	10
Modern Languages	12	21	17	15	23	12



TABLE 11--Continued

Interest	Majors N = 50			Non-Majors N = 50		
	L	I	D	L	I	D
Part VI. School Subjects						
Music	24	16	10	23	19	8
Personal Hygiene	44	6	0	27	17	6
Physical Education	50	0	0	38	11	1
Physics	17	16	17	24	19	7
Physiology	40	8	2	18	30	2
Psychology	35	14	1	37	12	1
Sociology	31	17	2	24	22	4
Zoology	25	17	8	19	24	7

In extracurricular activities the physical education majors show a decided preference for the following items which are listed in rank order:

1. Intramural Athletics
2. Athletic Association
3. Interscholastic Athletics
4. Sports Clubs
5. Newspaper

In extracurricular activities the non-majors show a decided preference for the following items which are listed in rank order:

1. Sports Clubs
2. Intramural Athletics

3. Newspaper
4. Interscholastic Athletics
5. Magazine

In the top five ranking items in extracurricular activities both the majors and non-majors select intramural athletics, interscholastic athletics, sports clubs, and newspapers. The majors select athletic associations to rank in the top five items, whereas the non-majors differ to select magazines to rank in the top five items.

In extracurricular activities the physical education majors show dislike for the following items which are listed in rank order:

1. Dramatic Club
2. Debating Society
3. Oratorical Society
4. Greek Letter Societies
5. Language Clubs

In extracurricular activities the non-majors show dislike for the following items which are listed in rank order:

1. Literary Societies
2. Language Clubs
3. Greek Letter Societies
4. Choral Club
5. Dramatic Club

In the lower five ranking items in extracurricular activities both the majors and non-majors show dislike for dramatic clubs, Greek letter societies, and language clubs. The

majors show dislike for debating societies and oratorical societies to rank these items in the lower five items, whereas the non-majors differ to show dislike for literary societies and choral clubs to rank these items in the lower five items.

In characteristics of work the physical education majors show a decided preference for the following items which are listed in rank order:

1. Outdoor Work
2. Working With Others
3. Active Work
4. Working With People
5. Work Requiring Enthusiasm

In characteristics of work the non-majors show a decided preference for the following items which are listed in rank order:

1. Working With Others
2. Work Requiring Enthusiasm
3. Working With People
4. Original Work
5. Work Yielding Quick Results

In the top five ranking items in characteristics of work both the majors and non-majors select working with others, work requiring enthusiasm, and working with people. The majors select active work and outdoor work to rank in the top five items, whereas the non-majors differ

to select original work and work yielding quick results to rank in the top five items.

In characteristics of work the physical education majors show dislike for the following items which are listed in rank order:

1. Short Hours Small Salary
2. Working Alone
3. Work Yielding Slow Results
4. Work in Same Place
5. Slow Careful Work

In characteristics of work the non-majors show dislike for the following items which are listed in rank order:

1. Short Hours Small Salary
2. Work Yielding Slow Results
3. Work in Same Place
4. Routine Mechanical Work
5. Slow Careful Work

In the lower five ranking items in characteristics of work both the majors and non-majors show dislike for short hours small salary, work yielding slow results, work in the same place, and slow careful work. The majors show dislike for working alone to rank this item in the lower five items, whereas the non-majors differ to show dislike for routine mechanical work to rank this item in the lower five items.

In literature the physical education majors show a decided preference for the following items which are listed in rank order:

1. Adventure Stories
2. Mystery Stories
3. Biographies
4. Plays
5. Religious Books

In literature the non-majors show a decided preference for the following items which are listed in rank order:

1. Adventure Stories
2. Biographies
3. Mystery Stories
4. Scientific Treatises
5. Plays

In the top five ranking items in literature both the majors and non-majors select adventure stories, mystery stories, biographies, and plays. The majors select religious books to rank in the top five items, whereas the non-majors differ to select scientific treatises to rank in the top five items.

In literature the physical education majors show dislike for the following items which are listed in rank order:

1. Love Stories
2. Poetry
3. Philosophical Books
4. Essays
5. Scientific Treatises

In literature the non-majors show dislike for the following items which are listed in rank order:

1. Poetry
2. Religious Books
3. Love Stories
4. Essays
5. Philosophical Books

In the lower five ranking items in literature both the majors and non-majors show dislike for love stories, poetry, philosophical books, and essays. The majors show dislike for scientific treatises to rank this item in the lower five items, whereas the non-majors differ to show dislike for religious books to rank this item in the lower five items.

In magazines the physical education majors show a decided preference for the following items which are listed in rank order:

1. Sportsman
2. Readers' Digest
3. Colliers
4. Life
5. Saturday Evening Post
6. Journal of Health and Physical Education
7. Time
8. College Humor
9. Liberty
10. World Events

In magazines the non-majors show a decided preference for the following items which are listed in rank order:

1. Time
2. Saturday Evening Post
3. Readers' Digest
4. Life
5. Colliers
6. Liberty
7. Popular Science
8. Sportsman
9. National Geographic
10. American

In the top ten ranking items in magazines both the majors and non-majors select Sportsman, Readers' Digest, Colliers, Life, Saturday Evening Post, Time, and Liberty. The majors select College Humor, World Events, and the Journal of Health and Physical Education to rank in the top ten items, whereas the non-majors differ to select Popular Science, National Geographic, and American to rank in the top ten items.

In magazines the physical education majors show dislike for the following items which are listed in rank order:

1. Arts and Decoration
2. Drama
3. Classical Journal
4. Journal of Chemical Education
5. Delineator
6. Modern Art

7. Theatre Arts Monthly
8. Bird Lore
9. Musical Courier
10. Stage

In magazines the non-majors show dislike for the following items which are listed in rank order:

1. True Stories
2. Bird Lore
3. Journal of Chemical Education
4. Ladies Home Journal
5. Drama
6. Classical Journal
7. Woman's Home Companion
8. Modern Art
9. Forum
10. Etude

In the lower ten ranking items in magazines both the majors and non-majors show dislike for Drama, Classical Journal, Journal of Chemical Education, Modern Art, and Bird Lore. The majors show dislike for Arts and Decoration, Delineator, Theatre Arts Monthly, Musical Courier, and Stage to rank these items in the lower ten items whereas, the non-majors differ to show dislike for True Stories, Ladies Home Journal, Woman's Home Companion, Forum, and Etude to rank these items in the lower ten items.

In characteristics of people the physical education majors show a decided preference for the following items which are listed in rank order:



1. Good Sports
2. Loyal People
3. People with Self-control
4. Punctual People
5. Well-groomed People
6. Outstanding Leaders
7. People Who Like to Play Games
8. Energetic People
9. Self-confident People
10. Frank People

In characteristics of people the non-majors show a decided preference for the following items which are listed in rank order:

1. Loyal People
2. People With Self-control
3. Frank People
4. Good Sports
5. Energetic People
6. Self-confident People
7. Well-groomed People
8. Independent People
9. Outstanding People
10. Girls Who Pet

In the top ten ranking items in characteristics of people both the majors and non-majors select good sports, loyal people, people with self-control, well-groomed people, energetic people, self-confident people, and frank people.

The majors select punctual people, outstanding leaders, and people who like to play games to rank in the top ten items, whereas the non-majors differ to select independent people, outstanding people, and girls who pet to rank in the top ten items.

In characteristics of people the physical education majors show dislike for the following items which are listed in rank order:

1. Women Who Swear
2. People Who Dress Carelessly
3. People Who Feel Superior
4. Self-centered People
5. Awkward People
6. Belligerent People
7. Impulsive People
8. Extravagant People
9. Women Who Drink
10. Masculine Women

In characteristics of people the non-majors show dislike for the following items which are listed in rank order:

1. Masculine Women
2. People Who Feel Superior
3. Women Who Swear
4. Self-centered People
5. People Who Dress Carelessly
6. Secretive People
7. Awkward People

8. Emotional People
9. Women Who Drink
10. Belligerent People

In the lower ten ranking items in characteristics of people both the majors and non-majors show dislike for women who swear, people who dress carelessly, people who feel superior, self-centered people, awkward people, belligerent people, women who drink, and masculine women. The majors show dislike for impulsive people and extravagant people to rank these items in the lower ten items, whereas the non-majors differ to show dislike for secretive people, and emotional people to rank these items in the lower ten items.

In school subjects the physical education majors show a decided preference for the following items which are listed in rank order:

1. Physical Education
2. Personal Hygiene
3. Physiology
4. Psychology
5. Sociology

In school subjects the non-majors show a decided preference for the following items which are listed in rank order:

1. Physical Education
2. Psychology
3. Personal Hygiene
4. History
5. Physics

In the top five ranking items in school subjects both the majors and non-majors select physical education, personal hygiene, and psychology. The majors select physiology and sociology to rank in the top five items, whereas the non-majors differ to select history and physics to rank in the top five items.

In school subjects the physical education majors show dislike for the following items which are listed in rank order:

1. Ancient Languages
2. English Composition
3. Literature
4. Art
5. Dramatics

In school subjects the non-majors show dislike for the following items which are listed in rank order:

1. Ancient Languages
2. English Composition
3. Home Economics
4. Dramatics
5. Art

In the lower five ranking items in school subjects both the majors and non-majors show dislike for ancient languages, English composition, dramatics, and art. The majors show dislike for literature to rank this item in the lower five items, whereas the non-majors differ to show dislike for home economics to rank this item in the lower five items.

## Bernreuter Personality Test

Bl-N Scale.--This is a measure of neurotic tendency. Persons scoring high on this scale tend to be emotionally unstable. Those scoring low tend to be very well balanced emotionally. The scores on the Bl-N Scale of the Bernreuter Personality Test made by fifty undergraduate men major and fifty undergraduate men non-majors in physical education at North Texas State College are presented in Table 12.

TABLE 12

DISTRIBUTION OF SCORES FOR THE BL-N SCALE OF THE BERNREUTER PERSONALITY TEST FOR FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Scores in Terms of Points	Number of Students	
	Majors	Non-Majors
140 - 159	0	1
120 - 139	0	0
100 - 119	1	0
80 - 99	0	0
60 - 79	1	2
40 - 59	1	4
20 - 39	2	0
0 - 19	1	3
- 20 - (-1 )	1	5
- 40 - (-21)	6	5
- 60 - (-41)	2	3
- 80 - (-61)	7	4
-100 - (-81)	1	8
-120 - (-101)	7	5
-140 - (-121)	5	4
-160 - (-141)	5	3
-180 - (-161)	5	3
-200 - (-181)	5	0
	N = 50	N = 50

The scores range from -198 to +114 for the major group and from -175 to +142 for the non-major group. Two persons

of the major group made a low score of -198, whereas one person of the non-major group made a low score of -175. One person of the major group made a high score of +114, whereas one person of the non-major group made a high score of +142.

TABLE 13

COMPARISON OF MEASURES OF CENTRAL TENDENCY ON THE BERNREUTER PERSONALITY TEST ADMINISTERED TO FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Scale	Majors N = 50			Non-Majors N = 50			$\frac{D_{M_1 M_2}}{\sigma_D}$
	Md	Me	$\sigma_M$	Md	Me	$\sigma_M$	
B1-N Scale	-106.3	-87.3	10.24	-70.5	-57.7	10.15	-2.85
B2-S Scale	8.95	14.0	3.42	-3.85	2.6	6.32	1.59
B3-I Scale	-53.5	-48.1	6.06	-35.5	-33.5	5.96	-1.69
B4-D Scale	62.0	63.5	8.33	45.5	36.2	8.16	2.34
F1-O Scale	-67.25	-51.0	11.06	-39.5	-28.0	10.7	-1.49
F2-S Scale	-62.5	-63.1	5.79	-40.6	-34.6	7.46	-3.02

In Table 13 measures of central tendency are presented for the B1-N Scale of the Bernreuter Personality Test for fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College. The median score for the major group is -106.3.

The median score for the non-major group is -70.5. The mean score for the major group is -87.3. The mean score for the non-major group is -57.7. The major group shows greater emotional stability than the non-major group on the B1-N Scale of the Bernreuter Personality Test as indicated by both measures of central tendency.

The reliability of the mean for the major group was determined by computing the standard error of the mean which is 10.24. The significance of the standard error of the mean for the major group at the .05 level of accuracy is 20.27. At this level the probability is ninety-five chances out of one hundred that the mean of -87.3 obtained for the major group on the B1-N Scale of the Bernreuter Personality Test does not vary from the true mean by more than  $\pm 20.27$ . That is, the true mean falls between -107.57 and -67.03. Interpreting the findings of the significance of the standard error of the mean of the .05 level of accuracy in terms of the unit of measurement in the Bernreuter Personality Test, namely an attitude question with a computed positive or negative weight, the investigator concludes that the obtained mean of -87.3 for the majors has a desirable degree of reliability.

The reliability of the mean for the non-major group was determined by computing the standard error of the mean, which is 10.15. The significance of the standard error of the mean for the non-major group at the .05 level of accuracy is 19.89. At this level the probability is

ninety-five chances out of one hundred that the mean of -57.7 obtained for the non-major group on the B1-N Scale of the Bernreuter Personality Test does not vary from the true mean by more than  $\pm 19.89$ . That is, the true mean falls between -77.59 and -37.81. The obtained mean of -57.7 for the non-major group has a desirable degree of reliability.

The difference in the means for the two groups is -29.6. The standard error of this difference is 10.38. The critical ratio of the difference of the means is -2.85. This ratio is 1.45 times as large as necessary to be considered significant at the .05 level of accuracy. Therefore, this difference is considered significant to distinguish the undergraduate men physical education majors and the undergraduate men non-majors of the present study for the mean scores made on the B1-N Scale of the Bernreuter Personality Test.

The variability of the scores was obtained by computing the quartiles and the standard deviation. Quartile one for the major group is -150.5. Quartile three is -23.84. The inter-quartile range is 126.66. Quartile one for the non-major group is -110.5. Quartile three for the non-major group is -10.5. The inter-quartile range is 100.00. Quartile one for the major group is 40.0 lower than quartile one for the non-major group. Quartile three for the major group is 13.34 lower than quartile three for the non-major group.



A comparison of the variability of scores on the Bernreuter Personality Test administered to fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College is presented in Table 14.

TABLE 14

COMPARISON OF THE VARIABILITY OF SCORES ON THE BERNREUTER PERSONALITY TEST ADMINISTERED TO FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Scale	Majors N = 50			Non-Majors N = 50			$\frac{D_{51}-D_{27}}{D_{50}}$
	Q <sub>1</sub>	Q <sub>3</sub>	S.D.	Q <sub>1</sub>	Q <sub>3</sub>	S.D.	
B1-N Scale	-150.5	-23.84	72.4	-110.5	-10.5	71.8	.059
B2-S Scale	-32.29	26.0	24.2	-28.63	29.0	44.7	4.03
B3-I Scale	-81.58	-19.0	42.9	-68.72	-6.34	42.1	.124
B4-D Scale	29.0	117.7	58.9	-7.37	78.87	57.7	.145
F1-G Scale	-113.0	2.62	79.2	-69.82	21.37	75.7	.319
F2-S Scale	-86.33	-37.0	40.9	-67.37	-11.75	52.8	1.77

The standard deviation for the major group is 72.4. The standard deviation for the non-major group is 71.8. The variability of scores for the B1-N Scale of the Bernreuter Personality Test is less for the non-major

group than for the major group when measured by the inter-quartile range and the standard deviation.

The reliability of the standard deviation for the major group was determined by computing the standard error of the standard deviation which is 7.24. The significance of the standard error of the standard deviation for the major group at the .05 level of accuracy is 14.19. It may be stated with confidence that the standard deviation for the major group on the B1-N Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 14.19$ . That is, the true standard deviation falls between 58.21 and 86.59. The obtained standard deviation of 72.4 for the major group has a desirable degree of reliability.

The reliability of the standard deviation for the non-major group was determined by computing the standard error of the standard deviation which is 7.18. The significance of the standard error of the standard deviation for the non-major group at the .05 level of accuracy is 14.07. It may be stated with confidence that the standard deviation for the non-major group on the B1-N Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 14.07$ . That is, the true standard deviation falls between 57.73 and 85.87. The obtained standard deviation of 71.8 for the non-major group has a desirable degree of reliability.

The difference in the standard deviation for the two groups is .6. The standard error of this difference is 10.19. To determine the significance of the standard error of the difference of the standard deviations the critical ratio was computed. This result of .059 is only .030 as large as necessary to be considered significant at the .05 level of accuracy. This difference is not significant to distinguish the undergraduate men majors and non-majors of the present study for the variability of scores made on the B1-N Scale of the Bernreuter Personality Test.

In summary, it is concluded on the basis of the statistical confirmation of the reliability of the mean scores and of the significance of the difference in the mean scores of the two groups that the major group of the present study is decidedly less neurotic than the non-major group of the present study. This finding coincides with that reported by Walke.<sup>9</sup> Again, the finding parallels that reported by Duggan.<sup>10</sup>

B2-S Scale.--This is a measure of self-sufficiency. Persons scoring high on this scale prefer to be alone, rarely ask for sympathy or encouragement, and tend to ignore the advice of others. Those scoring low dislike solitude and often seek advice and encouragement. The scores on the B2-S Scale of the Bernreuter Personality Test

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<sup>9</sup>Walke, op. cit., p. 42

<sup>10</sup>Duggan, op. cit., p. 33

made by fifty undergraduate men majors and fifty non-majors in physical education at North Texas State College are presented in Table 15.

TABLE 15

DISTRIBUTION OF SCORES FOR THE B2-S SCALE OF THE BERNREUTER PERSONALITY TEST FOR FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Scores in Terms of Points	Number of Students	
	Majors	Non-Majors
115 - 129	0	2
100 - 114	0	1
85 - 99	0	0
70 - 84	0	1
55 - 69	3	1
40 - 54	5	4
25 - 39	5	5
10 - 24	2	3
- 5 - 9	8	9
- 20 - (-6 )	9	5
- 35 - (-21)	7	12
- 50 - (-36)	4	4
- 65 - (-51)	2	2
- 80 - (-66)	2	0
- 95 - (-81)	2	1
-110 - (-96)	1	0
	<u>1</u>	<u>0</u>
	N = 50	N = 50

The scores range from -109 to +64 for the major group and from -87 to +126 for the non-major group. One person of the major group made a low score of -109, whereas one person of the non-major group made a low score of -87. One person of the major group made a high score of +64, whereas one person of the non-major group made a high score of +126.

In Table 13, page 88, measures of central tendency are presented for the B2-S Scale of the Bernreuter Personality

Test for fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College. The median score for the major group is 8.95. The median score for the non-major group is -3.85. The mean score for the major group is 14.0. The mean score for the non-major group is 2.6. The non-major group shows greater self-sufficiency than the major group on the E2-S Scale of the Bernreuter Personality Test as indicated by both measures of central tendency.

The reliability of the mean for the major group was determined by computing the standard error of the mean which is 3.42. The significance of the standard error of the mean for the major group at the .05 level of accuracy is 6.7. At this level the probability is ninety-five chances out of one hundred that the mean of fourteen obtained for the major group on the E2-S Scale of the Bernreuter Personality Test does not vary from the true mean by more than  $\pm 6.7$ . That is, the true mean falls between 7.3 and 20.7. The investigator concludes that the obtained mean of fourteen for the majors has a desirable degree of reliability.

The reliability of the mean for the non-major group was determined by computing the standard error of the mean which is 6.32. The significance of the standard error of the mean for the non-major group at the .05 level of accuracy is 12.38. At this level the probability is ninety-five chances out of one hundred that the mean of 2.6 obtained for the non-major group on the E2-S Scale of the Bernreuter Personality

Test does not vary from the true mean by more than  $\pm 12.38$ . That is, the true mean falls between -10.22 and -14.98. The obtained mean of 2.6 for the non-major group has a desirable degree of reliability.

The difference between the means for the two groups is 11.6. The standard error of this difference is 7.14. The critical ratio for the difference in the means of the two groups is 1.59. This ratio is only .81 times as large as necessary to be considered significant at the .05 level of accuracy. Therefore, the difference in mean scores is not considered significant to distinguish the undergraduate men majors and non-majors of the present study on the E2-S Scale of the Bernreuter Personality Test.

The variability of the scores for the E2-S Scale is shown in Table 14 on page 91. Quartile one for the major group is -32.29. Quartile three is 26.0. The inter-quartile range is 57.63. Quartile one for the major group is 3.66 lower than quartile one for the non-major group. Quartile three for the major group is 3.0 lower than quartile three for the non-major group.

The standard deviation for the major group is 24.2. The standard deviation for the non-major group is 44.7. The variability of scores for the E2-S Scale of the Bernreuter Personality Test is less for the non-major group than for the major group when measured by the inter-quartile range, but the variability of scores is less for the major group than for the non-major group when measured by the standard deviation.

The reliability of the standard deviation for the major group was determined by computing the standard error, which is 2.42. The significance of the standard error of the standard deviation for the major group at the .05 level of accuracy is 4.74. At this level the probability is ninety-five chances out of one hundred that the standard deviation of 24.2 obtained for the major group on the B2-S Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 4.74$ . That is, the true standard deviation falls between 19.46 and 28.94. The investigator concludes that the obtained standard deviation of 24.2 for the majors has a desirable degree of reliability.

The reliability of the standard deviation for the non-major group was determined by computing the standard error of the standard deviation which is 4.47. The significance of the standard error of the standard deviation for the non-major group at the .05 level of accuracy is 8.76. It may be stated with confidence that the standard deviation for the non-major group on the B2-S Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 8.76$ . That is, the true standard deviation falls between 35.94 and 53.46. The obtained standard deviation of 44.7 for the non-major group has a desirable degree of reliability.

The difference between the standard deviations for the two groups on the B2-S Scale of the Bernreuter Personality

Test is 20.5. The standard error of this difference is 5.08. The critical ratio for the difference in the standard deviations of the two groups is 4.03. This ratio is 2.05 times as large as necessary to be considered significant at the .05 level of accuracy. Therefore, the difference between the standard deviations is significant to distinguish the undergraduate men majors and non-majors of the present study for the variability of scores made on the B2-S Scale of the Bernreuter Personality Test.

In summary, the conclusion is reached after consideration of the statistical confirmation of the reliability of the mean and the difference of the means and of the significance of the difference of the means that the fifty undergraduate men majors and the fifty undergraduate men non-majors in physical education of the present study cannot be distinguished in self-sufficiency as measured by the B2-S Scale of the Bernreuter Personality Test. This finding coincides with that reported by Walke.<sup>11</sup> Again, the finding parallels that reported by Duggan.<sup>12</sup>

B3-I Scale.--This is a measure of introversion-extroversion. Persons scoring high on this scale tend to be introverted. Those scoring low on this scale tend to be extroverted. The scores on the B3-I Scale of the Bernreuter Personality Test made by fifty undergraduate men majors and

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<sup>11</sup>Walke, op. cit., p. 40

<sup>12</sup>Duggan, op. cit., p. 96



fifty non-majors in physical education at North Texas State College are presented in Table 16.

TABLE 16

DISTRIBUTION OF SCORES FOR THE B3-I SCALE OF THE BERNREUTER PERSONALITY TEST FOR FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Scores in Terms of Points	Number of Students	
	Majors	Non-Majors
85 - 99	0	1
70 - 84	0	0
55 - 69	0	0
40 - 54	3	1
25 - 39	1	3
10 - 24	1	2
- 5 - 9	3	5
- 20 - (-6 )	5	9
- 35 - (-21)	5	4
- 50 - (-36)	6	3
- 65 - (-51)	5	8
- 80 - (-66)	8	7
- 95 - (-81)	7	6
-110 - (-96)	4	1
-125 - (-111)	2	0
	N = 50	N = 50

The scores range from -118 to +50 for the major group and from -96 to +92 for the non-major group. One person of the major group made a low score of -118, whereas one person of the non-major group made a low score of -96. One person of the major group made a high score of +50, whereas one person of the non-major group made a high score of +92.

In Table 13, page 88, measures of central tendency are presented for the B3-I Scale of the Bernreuter Personality Test for fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas

State College. The median score for the major group is -53.5. The median score for the non-major group is -35.5. The mean score for the major group is -48.1. The mean score for the non-major group is -33.7. The major group tends to be more extroverted than the non-major group on the B3-I Scale of the Bernreuter Personality Test as indicated by both measures of central tendency.

The reliability of the mean for the major group was determined by computing the standard error, which is 6.06. The significance of the standard error of the mean for the major group at the .05 level of accuracy is 11.87. At this level the probability is ninety-five chances out of one hundred that the mean of -48.1 obtained for the major group on the B3-I Scale of the Bernreuter Personality Test does not vary from the true mean by more than  $\pm 11.87$ . That is, the true mean falls between -59.97 and -36.23. The investigator concludes that the obtained mean of -48.1 for the majors has a desirable degree of reliability.

The reliability of the mean for the non-major group was determined by computing the standard error of the mean which is 5.96. The significance of the standard error of the mean for the non-major group at the .05 level of accuracy is 11.73. At this level the probability is ninety-five chances out of one hundred that the mean of -33.7 obtained for the non-major group on the B3-I Scale of the Bernreuter Personality Test does not vary from the true mean by more than  $\pm 11.73$ . That is, the true mean falls

between -45.43 and -21.97. The obtained mean of -33.7 for the non-majors has a desirable degree of reliability.

The difference between the means for the two groups is -14.4. The standard error of this difference is 8.49. The critical ratio for the difference in the means of the two groups is -1.69. This ratio is only .86 times as large as necessary to be considered significant at the .05 level of accuracy. Therefore, the difference in mean scores is not considered significant to distinguish the undergraduate men majors and the undergraduate men non-majors of the present study on the E3-I Scale of the Bernreuter Personality Test.

The variability of the scores for the E3-I Scale is shown in Table 14 on page 91. Quartile one for the major group is -81.58. Quartile three is -19.0. The inter-quartile range is 62.58. Quartile one for the non-major group is -68.72. Quartile three is -6.34. The inter-quartile range is 62.38. Quartile one for the major group is 12.86 lower than quartile one for the non-major group. Quartile three for the major group is 12.66 lower than quartile three for the non-major group.

The standard deviation for the major group is 42.9. The standard deviation for the non-major group is 42.2. The variability of scores for the E3-I Scale of the Bernreuter Personality Test is less for the non-major group than for the major group when measured by the inter-quartile range and the standard deviation.

The reliability of the standard deviation for the major group was determined by computing the standard error which is 4.29. The significance of the standard error of the standard deviation for the major group at the .05 level of accuracy is 8.4. At this level the probability is ninety-five chances out of one hundred that the standard deviation of 42.9 obtained for the major group on the B3-I Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 8.4$ . That is, the true standard deviation falls between 34.5 and 51.3. The investigator concludes that the obtained standard deviation of 42.9 for the majors has a desirable degree of reliability.

The reliability of the standard deviation for the non-major group was determined by computing the standard error of the standard deviation which is 4.22. The significance of the standard error of the standard deviation for the non-major group at the .05 level of accuracy is 8.27. It may be stated with confidence that the standard deviation for the non-major group on the B3-I Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 8.27$ . That is, the true standard deviation falls between 33.93 and 50.47. The obtained standard deviation of 42.2 for the non-major group has a desirable degree of reliability.

The difference between the standard deviations for the two groups on the B3-I Scale of the Bernreuter Personality Test is .7. The standard error of this

difference is 6.01. The critical ratio for the difference in the standard deviations of the two groups is .124. This ratio is only .06 times as large as necessary to be considered significant at the .05 level of accuracy. Therefore, the difference between the standard deviations is not significant to distinguish the undergraduate men majors and non-majors of the present study for the variability of scores made on the B3-I Scale of the Bernreuter Personality Test.

In summary, the conclusion is reached after consideration of the statistical confirmation of the reliability of the mean and the difference of the means and of the significance of the difference of the means that the fifty undergraduate men majors and the fifty undergraduate men non-majors in physical education of the present study cannot be distinguished in extroversion-introversion as measured by the B3-I Scale of the Bernreuter Personality Test. This finding coincides with that reported by Walke.<sup>13</sup>

B4-D Scale.--This is a measure of dominance-submission. Persons scoring high on this scale tend to dominate others in face-to-face situations. Those scoring low tend to be submissive. The scores on the B4-D Scale of the Bernreuter Personality Test made by fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College are presented in Table 17.

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<sup>13</sup>Walke, op. cit., p. 40

TABLE 17

DISTRIBUTION OF SCORES FOR THE B4-D SCALE OF THE BERNREUTER PERSONALITY TEST FOR FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Scores in Terms of Points	Number of Students	
	Majors	Non-Majors
160 - 174	1	1
145 - 159	2	1
130 - 144	4	0
115 - 129	7	1
100 - 114	1	2
85 - 99	5	6
70 - 84	3	4
55 - 69	4	7
40 - 54	7	5
25 - 39	5	3
10 - 24	2	3
- 5 - 9	1	4
-20 - (-6 )	4	4
-35 - (-21)	1	4
-50 - (-36)	1	1
-65 - (-51)	0	0
-80 - (-66)	2	2
-95 - (-81)	0	2
	N = 50	N = 50

The scores range from -79 to +164 for the major group and from -94 to +165 for the non-major group. One person of the major group made a low score of -79, whereas one person of the non-major group made a low score of -94. One person of the major group made a high score of +164, whereas one person of the non-major group made a high score of +165.

In Table 13, page 88, measures of central tendency are presented for the B4-D Scale of the Bernreuter Personality Test for fifty undergraduate men majors and

fifty undergraduate men non-majors in physical education at North Texas State College. The median score for the major group is 62.0. The median score for the non-major group is 45.5. The mean score for the major group is 63.5. The mean score for the non-major group is 36.2. The major group tends to be more domineering than the non-major group on the B4-D Scale of the Bernreuter Personality Test as indicated by both measures of central tendency.

The reliability of the mean for the major group was determined by computing the standard error of the mean which is 8.33. The significance of the standard error of the mean for the major group at the .05 level of accuracy is 16.3. At this level the probability is ninety-five chances out of one hundred that the mean of 63.5 obtained for the major group on the B4-D Scale of the Bernreuter Personality Test does not vary from the true mean by more than  $\pm 16.3$ . That is, the true mean falls between 47.2 and 79.8. Interpreting the findings of the significance of the standard error of the mean of the .05 level of accuracy in terms of the unit of measurement in the B4-D Scale of the Bernreuter Personality Test the investigator concludes that the obtained mean of 63.5 for the majors has a fair degree of reliability.

The reliability of the mean for the non-major group on the B4-D Scale of the Bernreuter Personality Test was determined by computing the standard error of the mean which is 8.16. The significance of the standard error of

the mean for the non-major group at the .05 level of accuracy is 15.99. At this level the probability is ninety-five chances out of one hundred that the mean of 36.2 obtained for the non-major group on the B4-D Scale of the Bernreuter Personality Test does not vary from the true mean by more than  $\pm 15.99$ . That is, the true mean falls between 20.21 and 52.19. The obtained mean of 36.2 for the non-major group has a fair degree of reliability.

The difference between the means for the two groups is 27.3. The standard error of this difference is 11.66. The critical ratio for the difference in the means of the two groups is 2.34. The critical ratio of 2.34 is 1.19 times as large as necessary to be considered significant at the .05 level of accuracy. Therefore, this difference is considered significant to distinguish the undergraduate men majors and the non-majors of the present study for the mean scores made on the B4-D Scale of the Bernreuter Personality Test.

The variability of the scores on the B4-D Scale of the Bernreuter Personality Test is shown in Table 14 on page 91. Quartile one for the major group is 29.0. Quartile three is 117.7. The inter-quartile range is 88.7. Quartile one for the non-major group is -7.37. Quartile three is 78.87. The inter-quartile range is 86.24. Quartile one for the major group is 36.37 higher than quartile one for the non-major group.



Quartile three for the major group is 38.83 higher than quartile three for the non-major group.

The standard deviation for the major group is 58.9. The standard deviation for the non-major group is 57.7. The variability of scores for the B4-D Scale of the Bernreuter Personality Test is less for the non-major group than for the major group when measured by the inter-quartile range and the standard deviation.

The reliability of the standard deviation for the major group was determined by computing the standard error which is 5.89. The significance of the standard error of the standard deviation for the major group at the .05 level of accuracy is 11.54. At this level the probability is ninety-five chances out of one hundred that the standard deviation of 58.95 obtained for the major group on the B4-D Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 11.54$ . That is, the true standard deviation falls between 47.41 and 70.49. The investigator concludes that the obtained standard deviation of 58.95 for the majors has a desirable degree of reliability.

The reliability of the standard deviation for the non-major group was determined by computing the standard error of the standard deviation which is 5.77. The significance of the standard error of the standard deviation for the non-major group at the .05 level of accuracy is 11.3. It may be stated with confidence that the standard deviation for

the non-major group on the B4-D Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 11.3$ . That is, the true standard deviation falls between 46.45 and 69.05. The obtained standard deviation of 57.75 for the non-major group has a desirable degree of reliability.

The difference in the standard deviations for the two groups is 1.2. The standard error of this difference is 8.25. The critical ratio of the difference of the standard deviations of the two groups is .15. The critical ratio is only .07 as large as necessary to be considered significant at the .05 level of accuracy. The difference in standard deviations is not significant to distinguish the undergraduate men majors and non-majors of the present study for the variability of scores made on the B4-D Scale of the Bernreuter Personality Test.

In summary, it is concluded on the basis of the statistical confirmation of the reliability of the mean scores and of the significance of the difference in the mean scores of the two groups, that the major group of the present study is positively more domineering than the non-major group as measured by the B4-D Scale of the Bernreuter Personality Test. A similar finding is reported by Walke<sup>14</sup> for major and non-major undergraduate men. The finding also parallels

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<sup>14</sup>Ibid.

that reported by Duggan<sup>15</sup> in her study dealing with women majors in physical education.

F1-C Scale.--This is a measure of confidence in one's self. Persons scoring high on this scale tend to be hamperingly self-conscious and to have feelings of inferiority. Those scoring low tend to be wholesomely self-confident and to be very well adjusted to their environment. The scores on the F1-C Scale of the Bernreuter Personality Test made by fifty undergraduate men majors and fifty non-majors in physical education at North Texas State College are presented in Table 18.

TABLE 18

DISTRIBUTION OF SCORES FOR THE F1-C SCALE OF THE BERNREUTER PERSONALITY TEST FOR FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Scores in Terms of Points	Number of Students	
	Majors	Non-Majors
150 - 174	1	1
125 - 149	1	1
100 - 124	2	3
75 - 99	0	2
50 - 74	2	2
25 - 49	3	3
0 - 24	4	4
- 25 - (-1 )	2	4
- 50 - (-26)	6	9
- 75 - (-51)	6	11
-100 - (-76)	8	3
-125 - (-101)	5	4
-150 - (-126)	6	3
-175 - (-151)	3	0
-200 - (-176)	<u>1</u>	<u>0</u>
	N = 50	N = 50

<sup>15</sup>Duggan, op. cit., p. 96

The scores range from -190 to +157 for the major group and from -148 to +165 for the non-major group. One person of the major group made a low score of -190, whereas one person of the non-major group made a low score of -148. One person of the major group made a high score of +157, whereas one person of the non-major group made a high score of +165.

In Table 13, page 88, measures of central tendency are presented for the F1-C Scale of the Bernreuter Personality Test for fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College. The median score for the major group is -67.25. The median score for the non-major group is -39.5. The mean score for the major group is -51.0. The mean score for the non-major group is -28.0. The major group showed more confidence in one's self than the non-major group on the F1-C Scale of the Bernreuter Personality Test as indicated by both measures of central tendency.

The reliability of the mean for the major group was determined by computing the standard error of the mean which is 11.06. The significance of the standard error of the mean for the major group at the .05 level of accuracy is 21.5. At this level the probability is ninety-five chances out of one hundred that the mean of -51.0 obtained for the major group on the F1-C Scale of the Bernreuter Personality Test does not vary from the true mean by more than  $\pm 21.5$ . That is, the true mean falls between -72.5 and -29.5. The

obtained mean of -51.0 for the major group has a fair degree of reliability.

The reliability of the mean for the non-major group on the F1-C Scale of the Bernreuter Personality Test was determined by computing the standard error of the mean which is 10.7. The significance of the standard error of the mean for the non-major group at the .05 level of accuracy is 20.9. At this level the probability is ninety-five chances out of one hundred that the mean of -28.0 obtained for the non-major group on the F1-C Scale of the Bernreuter Personality Test does not vary from the true mean by more than  $\pm 20.9$ . That is, the true mean falls between -48.9 and -7.1. The obtained mean of -28.0 for the non-major group has a fair degree of reliability.

The difference between the means for the two groups is -23.0. The standard error of this difference is 15.38. The critical ratio for the difference in the means of the two groups is -1.49. The critical ratio of -1.49 is only .76 as large as necessary to be considered significant at the .05 level of accuracy. Therefore, this difference is not considered significant to distinguish the undergraduate men majors and the non-majors of the present study for the mean scores made on the F1-C Scale of the Bernreuter Personality Test.

The variability of the scores on the F1-C Scale of the Bernreuter Personality Test is shown on Table 14 on page 91. Quartile one for the major group is -113.0.

Quartile three is 2.62. The inter-quartile range is 115.62. Quartile one for the non-major group is -69.82. Quartile three is 21.37. The inter-quartile range is 91.19. Quartile one for the major group is 43.18 lower than quartile one for the non-major group. Quartile three for the major group is 18.75 lower than quartile three for the non-major group.

The standard deviation for the major group is 79.2. The standard deviation for the non-major group is 75.7. The variability of scores for the F1-C Scale of the Bernreuter Personality Test is less for the non-major group than for the major group when measured by the inter-quartile range and the standard deviation.

The reliability of the standard deviation for the major group was determined by computing the standard error which is 7.92. The significance of the standard error of the standard deviation for the major group at the .05 level of accuracy is 15.5. At this level the probability is ninety-five chances out of one hundred that the standard deviation of 79.25 obtained for the major group on the F1-C Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 15.5$ . That is, the true standard deviation falls between 63.75 and 94.75. The investigator concludes that the obtained standard deviation of 79.25 for the majors has a desirable degree of reliability.

The reliability of the standard deviation for the non-major group was determined by computing the standard error of the standard deviation which is 7.57. The significance of the standard error of the standard deviation for the non-major group at the .05 level of accuracy is 14.8. It may be stated with confidence that the standard deviation for the non-major group on the F1-C Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 14.8$ . That is, the true standard deviation falls between 60.95 and 90.55. The obtained standard deviation of 75.75 for the non-major group has a desirable degree of reliability.

The difference in the standard deviations for the two groups is 3.5. The standard error of this difference is 10.96. The critical ratio of the difference of the standard deviations of the two groups is .32. The critical ratio is only .16 as large as necessary to be considered significant at the .05 level of accuracy. The difference in standard deviations is not significant to distinguish the undergraduate men majors and undergraduate men non-majors of the present study for the variability of scores made on the F1-C Scale of the Bernreuter Personality Test.

In summary, the conclusion is reached after consideration of the statistical confirmation of the reliability of the mean and the difference of the means and

of the significance of the difference of the means that the fifty undergraduate men majors and the fifty undergraduate men non-majors in physical education of the present study cannot be distinguished in self-confidence as measured by the F1-C Scale of the Bernreuter Personality Test. A similar finding is reported by Walke<sup>16</sup> for major and non-major undergraduate men.

F2-S Scale.--This is a measure of sociability. Persons scoring high on this scale tend to be nonsocial, solitary, or independent. Those scoring low tend to be sociable and gregarious. The scores on the F2-S Scale of the Bernreuter Personality Test made by fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College are presented in Table 19.

The scores range from -182 to +44 for the major group and from -118 to +119 for the non-major group. One person of the major group made a low score of -182, whereas one person of the non-major group made a low score of -118. One person of the major group made a high score of +44, whereas one person of the non-major group made a high score of +119.

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<sup>16</sup>Walke, op. cit., p. 40



TABLE 19

DISTRIBUTION OF SCORES FOR THE F2-S SCALE OF THE BERNREUTER PERSONALITY TEST FOR FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE.

Scores in Terms of Points	Number of Students	
	Majors	Non-Majors
115 - 129	0	1
100 - 114	0	1
85 - 99	0	1
70 - 84	0	0
55 - 69	0	0
40 - 54	1	2
25 - 39	0	1
10 - 24	1	1
- 5 - 9	2	3
- 20 - (-6 )	1	6
- 35 - (-21)	7	7
- 50 - (-36)	5	6
- 65 - (-51)	10	8
- 80 - (-66)	7	4
- 95 - (-81)	9	2
-110 - (-96)	2	6
-125 - (-111)	2	1
-140 - (-126)	1	0
-155 - (-141)	0	0
-170 - (-156)	1	0
-185 - (-171)	1	0
	<u>1</u>	<u>0</u>
	N = 50	N = 50

In Table 13, page 88, measures of central tendency are presented for the F2-S Scale of the Bernreuter Personality Test for fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College. The median score for the major group is -62.5. The median score for the non-major group is -40.6. The mean score for the major group is -63.1. The mean score for the non-major group is -34.6. The major group shows

more sociability than the non-major group on the F2-S Scale of the Bernreuter Personality Test as indicated by both measures of central tendency.

The reliability of the mean for the major group was determined by computing the standard error of the mean which is 5.79. The significance of the standard error of the mean for the major group at the .05 level of accuracy is 11.4. At this level the probability is ninety-five chances out of one hundred that the mean of -63.1 obtained for the major group on the F2-S Scale of the Bernreuter Personality Test does not vary from the true mean by more than  $\pm$  11.4. That is, the true mean falls between -74.5 and -51.7. The obtained mean of -63.1 for the major group has a fair degree of reliability.

The reliability of the mean for the non-major group on the F2-S Scale of the Bernreuter Personality Test was determined by computing the standard error of the mean, which is 7.46. The significance of the standard error of the mean for the non-major group at the .05 level of accuracy is 14.6. At this level the probability is ninety-five chances out of one hundred that the mean of -34.6 obtained for the non-major group on the F2-S Scale of the Bernreuter Personality Test does not vary from the true mean by more than  $\pm$  14.6. That is, the true mean falls between -49.2 and -20.0. The obtained mean of -34.6 for the non-major group has a fair degree of reliability.

The difference between the means for the two groups is -28.5. The standard error of this difference is 9.44. The critical ratio for the difference in the means of the two groups is -3.02. The critical ratio of -3.02 is 1.54 times as large as necessary to be considered significant at the .05 level of accuracy. Therefore, this difference is considered significant to distinguish the undergraduate men majors and the non-majors of the present study for the mean scores made on the F2-S Scale of the Bernreuter Personality Test.

The variability of the scores on the F2-S Scale of the Bernreuter Personality Test is shown in Table 14 on page 91. Quartile one for the major group is -86.33. Quartile three is -37.0. The inter-quartile range is 49.33. Quartile one for the non-major group is -67.37. Quartile three is -11.75. The inter-quartile range is 56.62. Quartile one for the major group is 18.96 lower than quartile one for the non-major group. Quartile three for the major group is 25.25 lower than quartile three for the non-major group.

The standard deviation for the major group is 40.9. The standard deviation for the non-major group is 52.8. The variability of scores for the F2-S Scale of the Bernreuter Personality Test is less for the major group than for the non-major group when measured by the inter-quartile range and the standard deviation.

The reliability of the standard deviation for the major group was determined by computing the standard error which is 4.09. The significance of the standard error of the standard deviation for the major group at the .05 level of accuracy is 8.01. At this level the probability is ninety-five chances out of one hundred that the standard deviation of 40.95 obtained for the major group on the F2-S Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 8.01$ . That is, the true standard deviation falls between 32.94 and 48.96. The investigator concludes that the obtained standard deviation of 40.95 for the majors has a desirable degree of reliability.

The reliability of the standard deviation for the non-major group was determined by computing the standard error of the standard deviation which is 52.8. The significance of the standard error of the standard deviation for the non-major group at the .05 level of accuracy is 10.34. It may be stated with confidence that the standard deviation for the non-major group on the F2-S Scale of the Bernreuter Personality Test does not vary from the true standard deviation by more than  $\pm 10.34$ . That is, the true standard deviation falls between 42.46 and 63.14. The obtained standard deviation of 52.8 for the non-major group has a desirable degree of reliability.

The difference in the standard deviations for the two groups is 11.85. The standard error of this difference is

6.68. The critical ratio of the difference of the standard deviations of the two groups is 1.77. The critical ratio is only .90 as large as necessary to be considered significant at the .05 level of accuracy. The difference in standard deviations is not significant to distinguish the undergraduate men majors and non-majors of the present study for the variability of scores made on the F2-S Scale of the Bernreuter Personality Test.

In summary, it is concluded on the basis of the statistical confirmation of the reliability of the mean scores and of the significance of the difference in the mean scores of the two groups, that the major group of the present study is positively more sociable than the non-major group as measured by the F2-S Scale of the Bernreuter Personality Test.

#### Yeager Leadership Test

The scores on the Yeager Leadership Test made by fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College are presented in Table 20.

The scores range from 0 to 58.5 for the major group and from 0 to 55.9 for the non-major group. One person of the major group made a high score of 58.5, whereas one person of the non-major group made a high score of 55.9. Seven persons of the major group made a low score of 0,

whereas twenty-seven persons of the non-major group made a low score of 0.

TABLE 20

DISTRIBUTION OF SCORES FOR THE YEAGER LEADERSHIP TEST FOR FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Scores in Terms of Points	Number of Students	
	Majors	Non-Majors
55 - 59	2	1
50 - 54	0	1
45 - 49	0	0
40 - 44	3	0
35 - 39	2	0
30 - 34	4	0
25 - 29	5	0
20 - 24	1	3
15 - 19	3	2
10 - 14	5	4
5 - 9	13	5
0 - 4	<u>12</u>	<u>34</u>
	N = 50	N = 50

In Table 21 measures of central tendency are presented for the Yeager Leadership Test for fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College. The median score for the major group is 9.5. The median score for the non-major group is 3.17. The mean score for the major group is 16.5. The mean score for the non-major group is 7.20. The major group surpasses the non-major group on the Yeager Leadership Test as indicated by both measures of central tendency.

TABLE 21

COMPARISON OF MEASURES OF CENTRAL TENDENCY ON THE YEAGER LEADERSHIP TEST ADMINISTERED TO FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Test	Majors N = 50			Non-Majors N = 50			$\frac{D_{M_1, M_2}}{s_D}$
	Md	Me	$s_M$	Md	Me	$s_M$	
Yeager Leadership Test	9.5	16.5	2.17	3.17	7.20	1.59	3.46

The reliability of the mean for the major group was determined by computing the standard error of the mean which is 2.17. The significance of the standard error of the mean for the major group at the .05 level of accuracy is 4.25. At this level the probability is ninety-five chances out of one hundred that the mean of 16.5 obtained for the major group on the Yeager Leadership Test does not vary from the true mean by more than  $\pm 4.25$ . That is, the true mean falls between 12.25 and 20.75. The obtained mean of 16.5 for the major group has a desirable degree of reliability.

The reliability of the mean for the non-major group on the Yeager Leadership Test was determined by computing the standard error of the mean which is 1.59. The significance of the standard error of the mean for the non-major group at the .05 level of accuracy is 3.11. At this level the probability is ninety-five chances out of one hundred that the mean of 7.2 obtained for the non-major group on

the Yeager Leadership Test does not vary from the true mean by more than  $\pm 3.11$ . That is, the true mean falls between 4.09 and 10.31. The obtained mean of 7.2 for the non-major group has a desirable degree of reliability.

The difference between the means for the two groups is 9.3. The standard error of this difference is 2.69. The critical ratio for the difference in the means of the two groups is 3.46. The critical ratio of 3.46 is 1.76 times as large as necessary to be considered significant at the .05 level of accuracy. Therefore, this difference is considered significant to distinguish the undergraduate men majors and the non-majors of the present study for the mean scores made on the Yeager Leadership Test.

A comparison of the variability of scores on the Yeager Leadership Test administered to fifty undergraduate men majors and fifty undergraduate men non-majors in physical education at North Texas State College is presented in Table 22.

TABLE 22

COMPARISON OF THE VARIABILITY OF SCORES ON THE YEAGER LEADERSHIP TEST ADMINISTERED TO FIFTY UNDERGRADUATE MEN MAJORS AND FIFTY UNDERGRADUATE MEN NON-MAJORS IN PHYSICAL EDUCATION AT NORTH TEXAS STATE COLLEGE

Test	Majors N = 50			Non-Majors N = 50			$\frac{D_{b_1} - b_2}{b_{DB}}$
	Q <sub>1</sub>	Q <sub>3</sub>	S.D.	Q <sub>1</sub>	Q <sub>3</sub>	S.D.	
Yeager Leadership Test	6.42	28.0	15.4	1.34	5.01	11.25	2.13



The variability of the scores on the Yeager Leadership Test was obtained by computing the quartiles and the standard deviation. Quartile one for the major group is 6.42. Quartile three is 28.0. The inter-quartile range is 21.58. Quartile one for the non-major group is 1.34. Quartile three is 5.01. The inter-quartile range is 3.67. Quartile one for the major group is 5.08 higher than quartile one for the non-major group. Quartile three for the major group is 22.99 higher than quartile three for the non-major group.

The standard deviation for the major group is 15.4. The standard deviation for the non-major group is 11.25. The variability of scores for the Yeager Leadership Test is less for the non-major group than for the major group when measured by the inter-quartile range and the standard deviation.

The reliability of the standard deviation for the major group was determined by computing the standard error which is 1.54. The significance of the standard error of the standard deviation for the major group at the .05 level of accuracy is 3.01. At this level the probability is ninety-five chances out of one hundred that the standard deviation of 15.4 obtained for the major group on the Yeager Leadership Test does not vary from the true standard deviation by more than  $\pm 3.01$ . That is, the true standard deviation falls between 12.39 and 18.41. The investigator concludes that the obtained standard deviation of 15.4 for the majors has a desirable degree of reliability.

The reliability of the standard deviation for the non-major group was determined by computing the standard error of the standard deviation which is 1.13. The significance of the standard error of the standard deviation for the non-major group at the .05 level of accuracy is 2.21. It may be stated with confidence that the standard deviation for the non-major group on the Yeager Leadership Test does not vary from the true standard deviation by more than  $\pm 2.2$ . That is, the true standard deviation falls between 9.04 and 13.46. The obtained standard deviation of 11.25 for the non-major group has a desirable degree of reliability.

The difference in the standard deviations for the two groups is 4.15. The standard error of this difference is 1.9. The critical ratio of the difference of the standard deviations of the two groups is 2.13. The critical ratio is 1.08 times as large as necessary to be considered significant at the .05 level of accuracy. The difference in standard deviations is significant to distinguish the undergraduate men majors and non-majors of the present study for the variability of scores made on the Yeager Leadership Test.

In summary, it is concluded on the basis of the statistical confirmation of the reliability of the mean scores and of the significance of the difference in the mean scores of the two groups, that the major group of the present study is distinctly superior to the non-major group

in leadership. A similar finding is reported by Walke<sup>17</sup>  
for major and non-major undergraduate men.

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<sup>17</sup>  
Ibid., p. 42.

## CHAPTER IV

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

#### Summary of the Study

The investigator made a comparative study of fifty undergraduate men majors in physical education and fifty undergraduate men majors in other fields at North Texas State College with respect to selected personal traits during the spring semester of the 1947-1948 session. The term, personal traits, as applied to the present study, means the qualities possessed by an individual which tend to characterize or identify him. The present study was undertaken to determine:

1. What were the general characteristics of the undergraduate men majors in the field of physical education and undergraduate men majors in other fields at North Texas State College.

2. If the undergraduate men majors in physical education could be distinguished from the undergraduate men majors in other fields at North Texas State College on the basis of these characteristics.

3. How the undergraduate men majors in physical education compared with the majors in other fields at North Texas State College with respect to these characteristics.

The subjects for the present study were all of the men majors and non-majors in physical education classified as sophomores, juniors, and seniors who were enrolled in three of the required physical education classes for the spring semester of the 1947-1948 session. Because of the small enrollment of upperclassmen in required physical education classes, especially of the major group, the investigator selected the remaining subjects from all of the majors and non-majors in physical education classified as sophomores, juniors, and seniors who were enrolled in three advanced classes in the Department of Health, Physical Education, and Recreation.

The instruments used to collect the data for the study were: The Iowa-Brace Motor Ability Test, Otis Intelligence Test, Duggan Interest Questionnaire, Bernreuter Personality Test, and Yeager Leadership Test. The data were treated statistically to determine the range, median, mean, quartile one and quartile three, standard deviation, standard error of the mean, standard error of the standard deviation, difference between the means of the major and non-major groups, difference between the standard deviations of the major and non-major groups, standard error of the difference between the means of the major and non-major groups, standard error of the difference between the standard deviations of the major and non-major groups, critical ratio of the means and the critical ratio of the standard deviations. The data

were analyzed and interpreted and conclusions of the study were drawn.

#### Summary of the Findings

Important findings of the study are:

1. The major group surpasses the non-major group in motor ability as indicated by the measures of central tendency. The mean of each group on the Iowa-Brace Motor Ability Test has a desirable degree of reliability. The difference in the means of the two groups is significant at the .05 level of accuracy. The non-major group shows greater variability in scores as indicated by the quartile range and standard deviation. The standard deviation for each group has a desirable degree of reliability. The difference in standard deviations of the two groups is not significant at the .05 level of accuracy to distinguish the major group from the non-major group

2. The mean score for the non-major group is slightly higher than the mean score for the major group on the Otis Intelligence Test. There is a fair degree of reliability of the mean for each group. The difference in the means of the two groups is not significant at the .05 level of accuracy. The non-major group shows greater variability in scores on the Otis Intelligence Test as indicated by the quartile range and the standard deviation. The standard deviation for each group has a desirable degree of reliability. The difference in standard deviations of the

two groups is not significant at the .05 level of accuracy to distinguish the major group from the non-major group.

3. The mean score for the major group is slightly higher than the mean score for the non-major group on the Duggan Interest Questionnaire. There is a desirable degree of reliability of the mean for the major and for the non-major groups. The difference in the means of the two groups is significant at the .05 level of accuracy. The non-major group shows greater variability in scores as indicated by the standard deviation, and the major group shows greater variability in scores as indicated by the quartile range. The standard deviation for each group has a desirable degree of reliability. The difference in the standard deviations of the two groups is significant at the .05 level of accuracy. In recreations and amusements the men of the major group show preference for exciting, competitive and outdoor activities such as basketball, baseball, swimming, amusement parks, and picnics, whereas, the men of the non-major group show preference for quiet, less vigorous, and non-competitive activities such as movies, automobiling, radio programs, and musical comedies. In extracurricular activities the major group prefers activities along the line of the physical education profession, whereas the non-major group prefers activities along the line of athletics and literature clubs. In characteristics of work the non-major group shows preference for working with other people and for original, enthusiastic

work, whereas the major group shows preference for working with other people and for active outdoor work. The members of the major group show preference in the line of literature and magazines for literature associated with their field of professional interest and for literature of a light, popular nature, whereas the members of the non-major group show preference for literature along the line of world events and science. In characteristics of people the major and non-major groups both show preference for good sports, loyal people, people with self-control, and well-groomed people. In school subjects the major and non-major groups show similar preference in that they both selected physical education, personal hygiene, and psychology as the top ranking items.

4. The major group shows greater emotional stability than the non-major group on the E1-N Scale of the Bernreuter Personality Test as indicated by both measures of central tendency. There is a desirable degree of reliability of the mean for each group. The difference in the means of the two groups is significant at the .05 level of accuracy. The major group shows greater variability in scores as indicated by the quartile range and standard deviation. The standard deviation for each group has a desirable degree of reliability. The difference in standard deviations of the two groups is not significant to distinguish the major group from the non-major group.



5. The non-major group shows greater self-sufficiency than the major group on the B2-S Scale of the Bernreuter Personality Test as indicated by both measures of central tendency. There is a desirable degree of reliability of the mean for each group. The difference in the means of the two groups is not significant at the .05 level of accuracy. The major group shows greater variability in scores as indicated by the quartile range, and the non-major group shows greater variability in scores as indicated by the standard deviation. The standard deviation for each group has a desirable degree of reliability. The difference in standard deviations of the two groups is significant at the .05 level of accuracy to distinguish the major group from the non-major group.

6. The major group tends to be more extroverted than the non-major group on the B3-I Scale of the Bernreuter Personality Test as indicated by both measures of central tendency. There is a desirable degree of reliability of the mean for each group. The difference in the means of the two groups is significant at the .05 level of accuracy. The major group shows greater variability in scores as indicated by the quartile range and standard deviation. The standard deviation for each group has a desirable degree of reliability. The difference in standard deviations of the two groups is significant at the .05 level of accuracy to distinguish the major group from the non-major group.

7. The major group tends to be more domineering than the non-major group on the B4-D Scale of the Bernreuter Personality Test as indicated by both measures of central tendency. A desirable degree of reliability of the mean for each group exists. The difference in the means for the two groups is significant at the .05 level of accuracy. The major group shows greater variability in scores as indicated by the quartile range and the standard deviation. The standard deviation for each group has a desirable degree of reliability. The difference in standard deviations of the two groups is not significant at the .05 level of accuracy to distinguish the major group from the non-major group.

8. The major group shows more self-confidence than the non-major group on the F1-C Scale of the Bernreuter Personality Test as indicated by both measures of central tendency. A fair degree of reliability of the mean for each group exists. The difference in the means of the two groups is not significant at the .05 level of accuracy. The major group shows greater variability in scores as indicated by the quartile range and standard deviation. The standard deviation for each group has a desirable degree of reliability. The difference in standard deviations of the two groups is not significant at the .05 level of accuracy to distinguish the major group from the non-major group.

9. The major group shows more sociability than the non-major group on the F2-S Scale of the Bernreuter

Personality Test as indicated by both measures of central tendency. There is a fair degree of reliability of the mean for each group. The difference in the means of the two groups is significant at the .05 level of accuracy. The non-major group shows greater variability in scores as indicated by the quartile range and the standard deviation. The standard deviation for each group has a desirable degree of reliability. The difference in standard deviations of the two groups is not significant at the .05 level of accuracy to distinguish the major group from the non-major group.

10. The major group surpasses the non-major group in leadership as indicated by both measures of central tendency. There is a desirable degree of reliability of the mean for each group for the Yeager Leadership Test. The difference in the means of the two groups was found to be significant at the .05 level of accuracy. The major group shows greater variability in scores as indicated by the quartile range and the standard deviation. The standard deviation for each group has a desirable degree of reliability. The difference in standard deviations of the two groups is significant at the .05 level of accuracy to distinguish the major group from the non-major group.

#### Conclusions of the Study

1. The undergraduate men majors in physical education of the present study are characterized by a high degree of

motor ability, average intelligence, and a high degree of leadership. The undergraduate men majors tend to be very well balanced emotionally, better than average in self-sufficiency, highly extroverted, very domineering, better than average in self-confidence, and highly sociable. The interests of the undergraduate men majors of the present study show their preference for daring, exciting, vigorous, competitive and outdoor work and play. In extracurricular activities the majors prefer activities which are along the line of the physical education profession. The tastes of the majors in literature and magazines are associated with their field of professional interest or with literature of a light, popular nature. The majors indicate a preference for good sports and loyal people. Distinguishing preferences in school subjects reflect primarily the professional course of study offered for majors in physical education.

2. The undergraduate men non-majors of the present study are characterized by an average degree of motor ability, average intelligence, and a fair degree of leadership. The undergraduate men non-majors tend to be fairly well-balanced emotionally, better than average in self-sufficiency, extroverted, slightly submissive, slightly self-conscious, and above average in sociability. The interests of the undergraduate men non-majors of the present study show their preference for comparatively safe, quiet, less vigorous, non-competitive work and play. In

extracurricular activities the non-majors prefer activities along the line of athletics and literature clubs. The tastes of the non-majors in literature and magazines are along the line of world events and science. The non-majors indicate a preference for loyal people, frank people, and people with self-control. In school subjects the non-majors show an unusual preference in favoring physical education, personal hygiene, psychology, and history.

3. The undergraduate men majors in physical education of the present study rate significantly higher than the undergraduate men non-majors and, therefore, can be distinguished in motor ability, leadership, emotional stability, dominance, and sociability. The undergraduate men majors and non-majors of the present study cannot be significantly distinguished in intelligence, self-sufficiency, introversion-extroversion, and self-confidence.

#### Recommendations for Future Studies

The investigator recommends that the following studies be made:

1. A comparative study similar to the present study for undergraduate women majors in physical education and undergraduate women non-majors in other fields at North Texas State College.

2. A study to develop a more accurate measure of other personality traits deemed desirable for physical educators.

APPENDIX

SCORING SHEET, IOWA REVISION OF THE BRACE TEST

You will be given two trials on each stunt. On this blank you will find two spaces after each number. If your partner does the stunt correctly the first time, put an X in the first square. If he fails to do it, put a 0 in the first square. If he fails, he may try again. If he succeeds the second time, put an X in the second square. If he fails, put a 0 in the second square. Do not permit your partner to practice the stunt. When you are scoring your partner, do not practice the stunt, but sit or lie on the floor. Watch the person you are scoring and pay no attention to anyone else. Do not talk to the others.

Stunt Number	1st Trial	2nd Trial	Score
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Total score \_\_\_\_\_

T-score \_\_\_\_\_

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