A STUDY TO DETERMINE THE RELATIONSHIP OF THE OCCUPATIONAL
APTITUDE SCORES AND ACADEMIC GRADES OF STUDENTS
ENROLLED IN BEGINNING AND ADVANCED TYPING
AND SHORTHAND COURSES AND IN SECRETARIAL
PRACTICE IN THE SCHOOL OF BUSINESS
ADMINISTRATION AT NORTH TEXAS
STATE COLLEGE, DENTON,
TEXAS

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ADMINISTRATION AT NORTH TEXAS
STATE COLLEGE, DENTON,
TEXAS

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

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By
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CHAPTER I

INTRODUCTION

Progress has been made in the better use of the old and the development of new psychological aptitude tests. Much work has been done by the Division of Occupational Analysis of the United States Employment Commission. In its work, the Commission has studied the various occupations and the workers employed in these occupations in different sections of the United States. Numerous combinations of tests in the form of batteries have been developed and experimented with in an effort to improve the various test programs. The most recent of these combinations is the General Aptitude Test Battery which has been in use since 1947. Prior to its use, the United States Employment Commission did much research in developing and establishing the validity and reliability of this battery of tests.

Statement of Problem

The purpose of the study was to compare the occupational aptitude scores of students enrolled in beginning and advanced clerical courses in the School of Business Administration at North Texas State College, Denton, Texas, with the academic grades of these same students to determine the relationship between the academic grades received and
the occupational aptitude scores indicated by the General Aptitude Test Battery. The study seeks answers to the following questions:

1. How do the occupational aptitude scores of students just beginning in clerical courses compare with those of students enrolled in advanced clerical courses?

2. What is the relationship between the academic grades and aptitude scores?

3. What is the relationship between the academic grades made by students enrolled in beginning typing courses and the occupational aptitude scores of these same students?

4. What is the relationship between the academic grades made by students enrolled in beginning shorthand courses and the occupational aptitude scores of these same students?

5. What is the relationship between the academic grades made by students enrolled in advanced typing courses and the occupational aptitude scores of these same students?

6. What is the relationship between the academic grades made by students enrolled in advanced shorthand courses and the occupational aptitude scores of these same students?

7. What is the relationship between the academic grades made by students enrolled in secretarial practice and the occupational aptitude scores of these same students?
8. What is the relationship of the occupational aptitude scores of students enrolled in beginning typing courses and students enrolled in advanced typing courses?

9. What is the relationship of the occupational aptitude scores of students enrolled in beginning shorthand courses and students enrolled in advanced shorthand courses?

Limitations of the Problem

The grades and occupational aptitude scores of 155 students enrolled in beginning and advanced typing courses, beginning and advanced shorthand courses, and secretarial practice in the School of Business Administration at North Texas State College, Denton, Texas, were included in the study. Only those students enrolled at North Texas State College during the Fall and Spring Sessions of 1950 and 1951 were included.

Definitions of Terms

In the study certain terms are used in analyzing the data and are defined as follows:

Correlation indicates relations between two or more series of measures of the same individuals or items.¹ In the study, the term "correlation" will be used interchangeably

¹L. V. Newkirk and Harry A. Greene, Measurement in Industrial Education, p. 247.
with the term "relationship" which means a connection or mutual influence between data.²

Aptitude means "a condition or set of characteristics regarded as symptomatic of an individual's ability to acquire, with training, some (usually specified) knowledge, skill, or set of responses, such as the ability to speak a language, to produce music, etc."³

Academic grades has been defined as follows: "A rating or evaluation of a pupil's achievement (and sometimes of his character traits or behavior) often expressed on a letter scale or in percentages."⁴

Test refers to "a routine examination administered to individuals belonging to the same group in order to determine the position of a given individual in the group with respect to the one or more mental traits, motor abilities, etc., or in order to compare one group with another in these characteristics."⁵

Test record card refers to the form on which scores for the fifteen tests of the Battery are recorded and converted. It also has a space for recording the occupational aptitude profile of the examinee.

³Ibid., p. 18.
⁵Warren, op. cit., p. 275.
Individual aptitude profile indicates "totals of the aptitude scores as a group." 6

Occupational aptitude pattern represents "the combination or pattern of aptitudes that is required to perform satisfactorily the major tasks of the occupations identified with each pattern." 7

Clerical courses refers to the courses concerning clerical work such as typing and shorthand.

Aptitude test is "a test designed to indicate the intrinsic, constitutional, and/or dispositional fitness of a testee for undertaking successfully a specific kind of activity." 8

Standard deviation indicates the spread or variability of the measures of a distribution with reference to any given point. 9

Source of Data

Data for the study were obtained from the results of the General Aptitude Test Battery administered to 155 students and the permanent records of the students filed in the


7Ibid., p. 11.

8Warren, op. cit., p. 18.

9H. A. Green, Workbook in Educational Measurement, p. 57.
Registrar's Office of North Texas State College. Other data were obtained from professional magazines, books, and pamphlets.

Origin and Scope of Test Used in the Study

For many years research has been lacking in the field of vocational guidance and public employment work. Such research was, and still is, needed to develop better tests designed to help the examinee as well as the examiner in the wise choice of an occupation.

In 1934 a very important step toward meeting this need was made by the United States Employment Service when the Occupational Research Program was instituted. This program was an experiment in the area of cooperative research. Actually, though, the program of research in vocational aptitude testing originated in the Employment Stabilization Research Institute of the University of Minnesota. Many tests and test batteries were experimented with. Then, after more than ten years of research in the area of the characteristics of workers and in test development, the General Aptitude Test Battery was produced by the Occupational Analysis Division of the United States Employment Service.10

This battery of tests is actually a combination of many tests. By measuring a number of aptitudes the test gives information concerning the individual's potentialities for learning job performance in a number of occupations which have been grouped into areas of work.\(^{11}\) Originally, the Battery was developed for use with adults seeking employment and adolescents just recently out of school who were in need of vocational counseling. This test is used when other aptitude tests have proved unsatisfactory or when more information concerning the applicant is desired in order to help him choose an occupation or understand his vocational weaknesses or strengths.\(^{12}\) Its use so far, however, has been limited to state and federal employment offices.

In determining norms and aptitude patterns, the battery of tests was given to employees in many different occupations throughout the United States. This testing was made possible through the mutual desire and cooperation of the United States Employment Service and various state employment agencies, thus enabling the standardization of the test. Each job in which testing was done was analyzed to determine the aptitudes and abilities required in performing the operations of the particular job. Next, experimental samples were selected and the entire test battery was administered.


\(^{12}\)Super, op. cit., p. 359.
to each occupational sample. From the results of these tests, norms and aptitude patterns were determined according to similarities in abilities.

Occupations which were found to require similar aptitudes were grouped together into the same field of work. Certain occupations were found to require similar minimum amounts of the same combination of aptitudes. Eventually the jobs were narrowed down to twenty separate fields of work including 2,000 different occupations.\textsuperscript{13} Norms and minimum aptitude scores were established for each occupation and grouped according to the Part IV of the \textit{Dictionary of Occupational Titles}.\textsuperscript{14} These norms are expressed as "Occupational Aptitude Patterns." Only the most significant aptitudes required for the groups of occupations constitute these patterns. The other aptitudes measured by the Battery were not found to add anything to the predictive value of a given pattern.\textsuperscript{15}

The test battery itself consists of fifteen tests which were selected because they yield good measures of certain aptitudes found important to successful job performance on a large number of jobs. Eleven of these tests are paper and

\textsuperscript{13}Dvorak, \textit{op. cit.}, p. 372.


\textsuperscript{15}Dvorak, \textit{op. cit.}, pp. 372-373.
pencil tests, and the remaining four are apparatus tests.

The Battery includes tests in:

Part A: Tool Matching. Consists of a series of exercises containing a stimulus drawing and four black-and-white drawings of simple shop tools. The examinee indicates which of the four black-and-white drawings is the same as the stimulus drawing. Variations exist only in the distribution of black and white in each drawing.

Part B: Name Comparison. Consists of two columns of names. The examinee inspects each pair of names, one in each column, and indicates whether the names are the same or different.

Part C: H Markings. Consists of a series of large capital H's. The examinee draws a short vertical line through the bar of each H without touching the sides, working rapidly to draw as many lines as possible during the time allowed.

Part D: Computation. Consists of a number of arithmetic exercises requiring the addition, subtraction, multiplication, or division of whole numbers.

Part F: Two-Dimensional Space. Consists of a series of exercises containing a stimulus figure and five geometrical figures (two-dimensional line drawings). The examinee indicates which one of five geometrical figures is made by a rearrangement of the parts of the stimulus figure.

Part G: Speed. Consists of a series of large rectangles. The examinee taps with pencil to make three dots in each of the rectangles, working as rapidly as possible during the time allowed.

Part H: Three-Dimensional Space. Consists of a series of exercises containing a stimulus figure and four drawings of three-dimensional objects. The stimulus figure is pictured as a flat piece of metal which is to be either bent, or rolled, or both. Lines indicate where the stimulus figure is to be bent. The examinee indicates which of the four drawings corresponds to the stimulus figure.

Part I: Arithmetic Reason. Consists of a number of arithmetic problems expressed verbally.
Part J: **Vocabulary.** Consists of sets of four words. The examinee examines each set and indicates which two of the words are related by having either the same meaning or opposite meanings.

Part K: **Mark Making.** Consists of a series of squares in which examinee is to make three pencil marks, working as rapidly as possible. The marks to be made are short lines, two vertical and the third a horizontal line beneath them.

Part L: **Form Matching.** Consists of two groups of variously shaped line drawings. The examinee indicates which figure in the second group is exactly the same size and shape as each figure in the first or stimulus group.

Part M: **Place.** The equipment used for this test and for Part N consists of a rectangular wooden board (Pegboard) divided into two sections, each section containing 48 holes. The upper section contains 48 cylindrical wooden pegs. The examinee removes the wooden pegs from the holes in the upper part of the board and inserts them in the corresponding holes in the lower part of the board, moving two pegs simultaneously, one in each hand. This performance is repeated two more times, with the examinee working rapidly to move as many of the pegs as possible during the time allowed for each performance.

Part N: **Turn.** The equipment described under Part M is used for this test. In this case the lower section contains the 48 cylindrical pegs. The examinee removes a wooden peg from a hole using one hand, turns the peg over with the same hand so that the opposite end is up, and returns the peg to the hole from which it was taken. The examinee works rapidly to turn and replace as many of the 48 cylindrical pegs as possible during the time allowed. This performance is repeated two more times.

Part O: **Assemble.** The equipment used for this test consists of a small rectangular board (Finger Dexterity Board) containing 50 holes, and a supply of small metal rivets and washers. The examinee takes a small metal rivet from a hole in the upper part of the board and at the same time removes
a small metal washer from a vertical rod with the other hand; examinee puts the washer on the rivet, and inserts the assembled piece into the corresponding hole in the lower part of the board using only one hand. The examinee works rapidly to move and replace as many rivets and washers as possible during the time allowed.

Part P: Disassemble. The equipment used for this test is the same as that described for Part O. Examinee removes the small metal rivet of the assembly from a hole in the lower part of the board; slides the washer to the bottom of the board; puts the washer on the rod with one hand and the rivet into the corresponding hold in the upper part of the board with the other hand. The examinee works rapidly to move and replace as many rivets and washers as possible during the time allowed.  

Ten aptitude scores are obtained from the results of the test and include the following:

G Intelligence. General learning ability. The ability to "catch on" or understand instructions and underlying principles; the ability to reason and make judgments. Closely related to doing well in school. Factor "G" is made up of three parts of the Battery which are as follows: Part H (Three-Dimensional Space), Part I (Arithmetic Reason), and Part J (Vocabulary).

V Verbal Aptitude. The ability to understand meaning of words and ideas associated with them, and to use them effectively. The ability to comprehend language, to understand relationships between words and to understand meanings of whole sentences and paragraphs. The ability to present information or ideas clearly.

N Numerical Aptitude. Ability to perform arithmetic operations quickly and accurately.

S Spatial Aptitude. Ability to comprehend forms in space and understand relationships of plane and solid objects. May be used in such tasks as blueprint reading and in solving geometry problems. Frequently described as the ability.

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16Department of Labor, op. cit., pp. 1-3.
17Ibid., p. 5.
to "visualize" objects of two or three dimensions, or to think visually of geometric forms.

**P** Form Perception. Ability to perceive pertinent detail in objects or in pictorial or graphic material. Ability to make visual comparisons and discriminations and see slight differences in shapes and shadings of figures and widths and lengths of lines.

**Q** Clerical Perception. Ability to perceive pertinent detail in verbal or tabular material. Ability to observe differences in copy, to proofread words and numbers, and to avoid perceptual errors in arithmetic computation.

**A** Aiming or Eye-Hand Coordination. Ability to coordinate eyes and hands or fingers accurately so as to make precise movements with speed. Ability to control rapid movements of the hand in accordance with what the eyes see.

**T** Motor Speed. Ability to make hand movements, such as tapping, rapidly. Ability to make a movement response swiftly and quickly. Probably related to reaction time.

**F** Finger Dexterity. Ability to move the fingers, and manipulate small objects with the fingers, rapidly or accurately.

**M** Manual Dexterity. Ability to move the hands easily and skillfully. Ability to work with the hands in placing and turning motions.\(^{18}\)

Some of these aptitudes are measured by more than one of the tests.

It is believed that most of the aptitudes generally considered important in job performance are tested by this battery. The test is based on aptitude and experience and is not strictly an aptitude test. Donald E. Super stated that, though artistic and musical capacities are not measured by the test, it is probably a wise omission.\(^{19}\) Beatrice Dvorak, however, stated that this is a very definite limitation of the test. In her opinion, such aptitudes as artistic

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\(^{19}\) *Super, op. cit.*, p. 361.
aptitude, musical aptitude, and eye-hand-foot coordination are required to a certain extent in all occupations, and tests for these should be included in the Battery. Dvorak gave as a second limitation of the test the fact that it does not cover sufficient fields of work.\textsuperscript{20} The Department of Labor stated that the Battery has three main limitations. These limitations are:

1. Not all of the aptitudes that must be considered in counseling are measured by this Battery.
2. Only preliminary Occupational Aptitude Patterns and a limited number of Part IV classifications are included.
3. Only a small number of the many occupations identified in the Dictionary of Occupational Titles, which may be related to aptitudes measured by this Battery, have been listed.\textsuperscript{21}

Administration of the Test

The administration of the test takes about two and one-quarter hours. The answers for the first eleven tests are marked by the applicant in the two test booklets which consist of seventy pages. The scores as determined by the examiner are recorded on the front page of the first booklet. The scores for the apparatus tests are also recorded here. The raw scores are transferred to the Test Record Card and are converted by means of a conversion table. The converted scores are added in order to get the aptitude scores for each of the ten aptitudes measured. These aptitude scores

\textsuperscript{20}Dvorak, \textit{op. cit.}, pp. 375-376.

\textsuperscript{21}Department of Labor, \textit{op. cit.}, p. 17.
are standard scores with a mean of 100 and a standard deviation of twenty.\textsuperscript{22}

**Formulae Used in the Study**

In order to analyze the data in the study, certain formulae were used. They are as follows:

The most common measure of variability is standard deviation. It is calculated from the mean by using the following formula:\textsuperscript{23}

$$\text{Sigma} = (\sigma) = \left(\sqrt{\frac{\sum f d^2}{N} - c^2}\right) \times i$$

Where $f$ = frequency of scores in each class interval

$d$ = deviation of intervals from the mean

$N$ = number of scores

$c$ = correction applied to guessed mean

$i$ = class interval in steps

The Pearson Product-Moment Method of determining the coefficient of correlation was used to establish the degree of relationship between the variables of the study. The formula is:\textsuperscript{24}

$$r = \frac{\sum X'Y' - c_{xy}}{\sigma_x \sigma_y}$$

\textsuperscript{22}Super, op. cit., p. 360.

\textsuperscript{23}Henry E. Garrett, Statistics in Psychology and Education, p. 59.

\textsuperscript{24}Ibid., p. 287.
X'Y' = the sum of the products of the deviations of each measure from the central tendency of the X and Y axes

N = number of cases

c_X = correction on X axis

c_Y = correction on Y axis

x = standard deviation of the distribution on the X axis

y = standard deviation of the distribution on the Y axis

After the standard deviation and the coefficient of correlation were calculated for the academic grades and the occupational aptitude scores, the results were tested to determine the significance of correlation. The following formula was used:

\[ t = \frac{r \sqrt{N - 2}}{\sqrt{1 - r^2}} \]

r = the obtained coefficient

N = the number of cases

In determining the relationship between the aptitude scores made by students enrolled in beginning typing and shorthand courses and the aptitude scores of students enrolled in advanced typing and shorthand courses, Formula 29 was used. The formula is:

\[ \sigma_D \text{ or } \sigma_{M1} - \sigma_{M2} = \sqrt{\sigma_{M1}^2 + \sigma_{M2}^2} \]

25Ibid., p. 298. 26Ibid., p. 207.
When the formula was corrected for use in determining the differences between two means, the formula was as follows:

\[ \sigma_D \text{ or } \sigma_{M1} - \sigma_{M2} = \sqrt{\frac{\sigma^2_{M1} + \sigma^2_{M2}}{(n-1) + (N-1)}} \]

Recent and Related Studies

In a study made by Joseph Jackson, the commercial students of Grade 12B of Fordson High School were given the Minnesota Vocational Test for Clerical Workers in an attempt to evaluate the aptitude factors of the test as related to the success of the students in the high school program.

On the basis of the author's norms, the commercial majors attain or surpass the author's median achievement of clerical workers in 29 per cent of the cases on Test 1, number concepts, and in 25 per cent of the cases on Test 2, name concepts. A study of clerical concomitants such as filing, typing, bookkeeping, shorthand, office practice, and the overall academic average in the light of scores on the Minnesota Vocational Test for Clerical Workers failed to reveal significant relationships.\(^{27}\)

In the Spring quarter of 1948, the General Aptitude Test Battery was administered to 479 seniors at the University of Utah. In addition, 49 second-year students in the College of Medicine and 101 sophomores in the newly created

College of Pharmacy were given the test. In the study the battery of aptitude tests was evaluated separately across nearly all the major academic areas.

In analyzing the data in each area a multiple evaluation of the aptitude scores was undertaken. It was found that, if a particular aptitude was important in a certain academic area, it might be expected that with a sample of successful seniors (1) the mean score in the aptitude would be well above the mean of 100 for the general worker population; (2) the standard deviation would be somewhat smaller than the population standard deviation of twenty, thus indicating that the sample was highly selected; (3) the correlation of aptitude scores with the criterion of success would be significant; and (4) the identification of the aptitude as valid for the area would make good sense from the point of view of both the job analyst and the psychologist.

By setting a "cutoff" score on each selected aptitude, an occupational pattern for each area was formed and suitable norms were established. The results of such a study will depend, however, on the present system by which students, in some manner or other, finally choose a major field of specialization.28

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28G.A.T.B. Senior Project Staff, University of Utah, et. al., "General Aptitude Test Battery Patterns for College Areas," Occupations, XXIX (April, 1951), 518-525.
Mary Virginia Howell conducted a study to determine whether any relationship existed between training in business subjects and scores made on basic clerical tests. If a relationship was found, it was believed that the test and training requirements were overlapping measures in the selection of the employee; if no relationship was found, it was believed that the training requirements were not justifiable measures of job aptitude.

In this particular study it was found that no consistent relationship existed between training in high school business subjects and the total scores on the basic clerical tests. There was a slight positive relationship between the spelling score and the number of hours of shorthand and typing the student had taken. Also, a slight relationship was found to exist between the scores on punctuation and the total number of business credits. 29

The General Aptitude Test Battery was given to a group of 439 high school seniors in Ohio. The study, which was conducted for the purpose of determining the significance and considerations of the use of the test in a high school counseling program, included five Ohio schools.

The treatment of the data revealed an all-school, all-aptitude mean of 110 with a standard deviation of sixteen.

This mean is one half of a standard deviation higher than the mean of the population upon which the Battery is standardized. This may have been due to the academic background of the group tested. The mean of the number of years of public school education of the working population used in the Battery was eleven years; the mean of the high school population was twelve years. The standard deviation of sixteen for the high school group was expected, since high school seniors would be a more homogeneous group than the working population whose education ranged from six years through college graduation.

The study found little variability in the mean of the aptitude scores or in standard deviations among the schools when the mean of the aptitude scores of each school were compared with the all-school, all-aptitude mean. Senior students in commercial courses were found to have Clerical Perception and Form Perception as their highest mean aptitude.30

In Hunter College, New York City, New York, the Bennett Stenographic Aptitude Test, the Kuder Preference Record, the MacQuarrie Test for Mechanical Ability, the Minnesota Vocational Test for Clerical Workers, the Strong Vocational Interest Blank for Women, the Thurstone Vocational Interest

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Schedule, and the Turse Shorthand Aptitude Test were given in a study conducted with ninety-six students registered in typing and seventy-five students registered in shorthand before they had taken the courses. Final grades in each course were taken as criteria of success.

The test of number comparison differentiated between good and poor students more accurately than any of the other tests included in the study. The pursuit, tracing, and dotting parts of the MacQuarrie Test for Mechanical Ability differentiated between good and poor typists. Other parts of that test differentiated poorly or not at all. The Turse Shorthand Aptitude Test differentiated to a fair degree between good and poor typists. For the group of ninety-six students taking typing, no relationship to grades was found between the two scores on the Bennett Stenographic Aptitude Test, the commercial factor on the Thurstone Vocational Interest Schedule, the ratings for clerical interest on the Kuder Preference Record, nor for the remaining parts of the MacQuarrie Test for Mechanical Ability.

In an attempt to increase the effectiveness of the study, some of the tests were combined. It was found that the administration of the Minnesota Vocational Test for Clerical Workers and the tracing, dotting, and pursuit parts of the MacQuarrie Test for Mechanical Ability represented an effective combination of tests which provided a fairly good estimate of aptitude for typing as taught at Hunter College.
The transcription scores on the Turse Shorthand Aptitude Test, the pursuit and block scores of the MacQuarrie Test for Mechanical Ability, and the number comparison scores for the Minnesota Vocational Test for Clerical Workers differentiated most clearly between those students who did well in stenography and those students who did only average or poor work. The scores for the remaining parts of the Turse Stenographic Aptitude Test and the MacQuarrie Test for Mechanical Ability, as well as the scores for the stenographer-secretary on the Strong Vocational Interest Blank for Women and the scores for commercial interest on the Thurstone Vocational Interest Schedule, failed to show any significant relationship between the grades in stenography for the group of students studied.\(^3\)

In the Fall of 1944 Frances French conducted a study using the Turse Shorthand Aptitude Test and the E.R.C. Stenographer Aptitude Test in the high school of Port Huron, Michigan, to determine:

1. The relationship between the scores made by 75 beginning shorthand students on the Turse Shorthand Aptitude Test and the scores made on the E.R.C. Stenographic Aptitude Test when correlated with each other.

2. To what extent these two aptitude tests scores correlated with intelligence quotients as measured by the Hemmon-Nelson Test of Mental Ability.

\(^3\)Dorothy M. Barrett, "Prediction of Achievement in Typewriting and Stenography in a Liberal Arts College," *Journal of Applied Psychology*, XXX (December, 1946), 624-629.
3. The relationship between the scores made on the Turse and the E.R.C. tests and the scores made on achievement tests in shorthand at the end of two years training, and

4. The relationship between intelligence quotients and achievement in shorthand.\(^{32}\)

The study found that, while both the Turse Shorthand Aptitude Test and the E.R.C. Stenographic Aptitude Test showed practically the same relationship to the factors considered in the study, the coefficients of correlation were not sufficiently high to be used as a sole determining instrument in predicting shorthand success. An indication of a marked relationship was found, though, between success in shorthand and scores made on either or both of the aptitude tests.\(^{33}\)

The results of the recent and related studies presented indicate that in most instances the tests revealed high correlation between the scores made on the various aptitude tests and the training received in clerical courses. Students with the most training in shorthand and typing consistently made higher scores on those parts of the tests denoting high clerical aptitude. The studies showed that in almost every instance the mean of the aptitude scores of the students tested surpassed the means of the various tests. The studies also revealed that combinations of tests into


\(^{33}\)Ibid., p. 25.
batteries presented a most effective means of testing for various aptitudes.
CHAPTER II

THE RELATIONSHIP BETWEEN THE ACADEMIC GRADES AND OCCUPATIONAL APTITUDE SCORES OF SEVENTY-FIVE STUDENTS ENROLLED IN BEGINNING CLERICAL COURSES IN THE SCHOOL OF BUSINESS ADMINISTRATION

In order to calculate the correlation of coefficient of the academic grades and the occupational aptitude scores, it was necessary to convert the letter or academic grade made by the students enrolled in shorthand courses, typing courses, and secretarial practice to numerical figures. The system used by North Texas State College for indicating and recording a student's grades is as follows:

A indicates a numerical average of 90-100.
B indicates a numerical average of 80-90.
C indicates a numerical average of 70-80.
D indicates a numerical average of 60-70.
F indicates failure. ¹

The letter grades used in the study were converted to numerical figures.

Scattergrams and correlation tables were used to present the data which were statistically treated to determine the relationship between academic grades and aptitude scores made by 155 students on the **General Aptitude Test Battery** and enrolled in the School of Business Administration. Only four of the ten aptitudes tested by the Battery are considered to be significant in clerical work. These are Aptitude "V" (Verbal Aptitude), Aptitude "Q" (Clerical Perception), Aptitude "T" (Motor Speed), and Aptitude "F" (Finger Dexterity). The means and standard deviations were computed for the scores made on each of these four aptitudes and the academic grades of the same students in typing, shorthand, and secretarial practice. The students in these three areas were divided into five groups which include beginning typing, beginning shorthand, advanced typing, advanced shorthand, and secretarial practice. The means and standard deviations of the academic grades and aptitude scores were computed to determine the coefficient of correlation between the scores. The coefficient of correlation obtained in each set of scores was further treated to determine the significance of \( r \).

Those cases which are to the left of the vertical red line in Figures 1 through 20 are the number of cases which are below the minimum score as established by the **General**

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Aptitude Test Battery. Those cases which are below the horizontal red line represent the number of cases which are below the academic grade of "C." The vertical red line is not an exact measure but only an approximation because the extremes of the class intervals which were used in the distribution were different from the minimum scores in some cases.

The Relationship between Academic Grades and the Occupational Aptitude Scores Made by Forty-three Students Enrolled in Beginning Typing Courses

Figures 1 through 4, inclusive, show the correlation of the paired academic grades made in beginning typing courses and the scores made on the four aptitudes of the General Aptitude Test Battery for forty-three students. The figures are arranged in the same order in which the four aptitudes appear in the Battery.

In Figure 1 the distribution of the academic grades made by forty-three students enrolled in beginning typing courses and the scores made on Aptitude "V" of the General Aptitude Test Battery are shown. The mean of the scores of the academic grades when converted to numerical figures was 82.2. The standard deviation of this group of scores was 8.5. The mean of the scores of the forty-three students on Aptitude "V" was 109.4 and the standard deviation was 13.6. The coefficient of correlation of the academic grades and the aptitude scores made by these students by the Pearson-Product
Fig. 1--Scattergram and correlation table showing the paired academic grades made in beginning typing courses and scores on Aptitude "V" of the General Aptitude Test Battery by forty-three students.

Moment method was $r = .11$. When tested for significance by Formula 533 (see page 14) and Table 29, "Table of t,"4 in Garrett's Statistics in Psychology and Education, the correlation was found to be of no significance at the .01, .05, or .10 levels.

Examination of Figure 1 shows that one student who made an academic grade of "A" made a score on Aptitude "V" which fell in the class interval of 86-90 of the distribution.
Two students who made an academic grade of "D" made aptitude scores which fell in the class interval of 131-135 on the

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4Ibid., p. 190.
aptitude test. These two examples illustrate the inconsistency of academic grades made in beginning typing courses and the scores made by the same students on Aptitude "V" of the General Aptitude Test Battery.

The distribution of the academic grades made by forty-three students enrolled in beginning typing courses and the scores made on Aptitude "Q" of the General Aptitude Test Battery are shown in Figure 2, below. When the academic

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Fig. 2--Scattergram and correlation table showing the paired academic grades made in beginning typing courses and scores on Aptitude "Q" of the General Aptitude Test Battery by forty-three students.

grades for this group of students were converted to numerical figures the mean of the scores was 82.2. The standard deviation of this group of scores was 8.5. The mean of the
score made by the forty-three students tested on Aptitude "Q" of the Battery was 103.92 and the standard deviation was 14. When treated by the Pearson-Product Moment method, these scores were found to have a coefficient of correlation of .006. The correlation of .006 was found to be of no significance at the .01, .05, or .10 levels.

The range of the scores made on the aptitude was from 62-131. The range of the academic grades was from 60-99 or from the letter grades "D" through "A." One student who made an academic grade of "A" made a score on the aptitude test which fell in the class interval of 76-82. Two students who made academic grades of "C" made scores on the aptitude test which fell between the class interval of 125-131.

Figure 3, page 30, presents the data concerning the academic grades made by forty-three students enrolled in beginning typing courses and the scores made on Aptitude "T" of the General Aptitude Test Battery. The academic grades were converted to numerical figures, and the mean of the scores was 82.2. The standard deviation of these scores was 8.5. The mean of the scores of the forty-three students on Aptitude "T" was 106.3 and the standard deviation was 20.7. A coefficient of correlation of .32 was found when the scores were treated by the Pearson-Product Moment method. When tested by Formula 53, the coefficient of correlation of .32 was found to be significant at the .05 and .10 levels but not at the .01 level.
Figure 3, below, shows that one student who made a low academic grade also made a low score on Aptitude "T" of the Battery, while another student who made a high academic grade scored high on the aptitude test. Further study of the distribution of the academic grades and aptitude scores of the forty-three students presented in Figure 3 shows

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\[ fy = 10 \]

\[ fx = 1 \quad 1 \quad 2 \quad 3 \quad 5 \quad 12 \quad 8 \quad 4 \quad 5 \quad 2 \]

\[ My = 82.2 \quad \sigma y = 8.5 \quad Mx = 106.3 \quad \sigma x = 20.7 \quad r = .32 \]

Fig. 3--Scattergram and correlation table showing the paired academic grades made in beginning typing courses and scores on Aptitude "T" of the General Aptitude Test Battery by forty-three students.

that thirty-two of the forty-three grades made on the aptitude test fall within one standard deviation of the mean. Likewise, thirty-one of the forty-three students tested made academic grades which fell within one standard deviation of the mean of the academic grade which was 82.2.
In Figure 4, below, the distribution of the academic grades made by forty-three students enrolled in beginning typing courses and the scores made on Aptitude "F" of the General Aptitude Test Battery are presented. The mean of the academic grades was 82.2. The standard deviation of this group of scores was 3.5. The mean of the scores made on Aptitude "F" by the forty-three students was 106.8. The standard deviation of the scores was 18.5. The coefficient of correlation of these two sets of scores was .15 by the Pearson-Product Moment method. The correlation was found
to be insignificant at the .01, .05, and .10 levels when tested by Formula 53.

The range of the aptitude scores made on Aptitude "F" was from 60-169. The range of the academic grades was from 60-99 or from the letter grade "D" through "A." Both the lowest and the highest scores made on the aptitude test were made by students whose academic grades fell in the class interval 70-79. Of three students whose aptitude scores fell in the class interval 70-79, one made an academic grade which fell in the class interval 80-89, one made an academic grade which fell in the class interval 70-79, and the third made an academic grade which fell in the class interval 60-69.

The Relationship Between Academic Grades and the Occupational Aptitude Scores Made by Thirty-two Students Enrolled in Beginning Shorthand Courses

The correlation between the paired academic grades made in beginning shorthand courses and the scores made on the four aptitudes of the General Aptitude Test Battery by thirty-two students is shown in Figures 5 through 8, inclusive. The figures are arranged in the same order in which the four aptitudes appear in the Battery.

Figure 5, page 33, shows the distribution of the academic grades made by thirty-two students enrolled in beginning shorthand courses and the scores made on Aptitude "V" of the General Aptitude Test Battery. The academic grades were converted
to numerical figures and the mean of the scores was 83.9. The standard deviation of these scores was 11.7. The mean of the scores of the thirty-two students on Aptitude "Y" was 109.3 and the standard deviation was 10.1. These scores were found to have a coefficient of correlation of .35.

\[
\begin{array}{cccccccccccc}
\hline
90-99 & 2 & 1 & 3 & 4 & 2 & 1 & 2 & 15 \\
80-89 & 2 & 2 & 2 & 6 \\
70-79 & 1 & 3 & 1 & 5 \\
60-69 & 1 & 2 & 1 & 1 & 6 \\
50-59 & 1 & 4 & 3 & 5 & 5 & 5 & 6 & 1 & 2 \\
\end{array}
\]

\[M_y = 83.9 \quad \sigma_y = 11.7 \quad M_x = 109.3 \quad \sigma_x = 10.1 \quad r = .35\]

Fig. 5--Scattergram and correlation table showing the paired academic grades made in beginning shorthand courses and scores on Aptitude "Y" of the General Aptitude Test Battery by thirty-two students.

The correlation was found to be significant at the .10 level only when tested by Formula 53. No significance was found to exist at the .05 or .01 levels.

The student making the lowest academic grade also made the lowest score on Aptitude "Y" of the General Aptitude
Test Battery. The two students making the highest academic grades made the highest scores on Aptitude "V" of the Battery.

In Figure 6, below, the distribution of the academic grades made by thirty-two students enrolled in beginning shorthand courses and the scores made on Aptitude "Q" of the General Aptitude Test Battery are shown. The mean of the score of the academic grades was 83.9. The standard deviation of this group of scores was 11.7. The mean of the scores of the thirty-two students on Aptitude "Q" was 111.7, and the standard deviation was 11.05. A coefficient of
correlation of .19 was obtained when the scores were treated by the Pearson-Product Moment method. The correlation of .19 was found to have no significance at the .01, .05, or .10 levels when tested by Formula 53.

Examination of Figure 6 shows that the lowest score made on Aptitude "Q" of the Battery was made by a student who made an academic grade of "B." The highest aptitude scores were made by two students who made academic grades which fell in the class intervals of 90-99 and 80-89, respectively.

Figure 7, page 36, presents the data concerning the academic grades made by thirty-two students enrolled in beginning shorthand courses and the scores made on Aptitude "T" of the General Aptitude Test Battery. A mean score of 83.9 was obtained when the academic grades were converted to numerical figures and treated statistically. The standard deviation of this group was 11.7. The mean of the scores made by the thirty-two students tested on Aptitude "T" of the Battery was 114.22 and the standard deviation was 15.44. By the Pearson-Product Moment method these two groups of scores showed a coefficient of correlation of .64. When tested by Formula 53 the correlation was found to be significant at the .01, .05, and .10 levels.

The range of scores made on the aptitude test was from 78-165. The range of the academic grades was from 60-99 or from the letter grade "D" through "A." Examination of
Figure 7 shows that the student who made the lowest score on Aptitude "T" of the General Aptitude Test Battery made an academic grade which fell in the class interval from 70-79. The student who made the highest aptitude score also

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My = 83.9  σy = 11.7  Mx = 114.22  σx = 15.44  r = .64

Fig. 7--Scattergram and correlation table showing the paired academic grades made in beginning shorthand courses and scores on Aptitude "T" of the General Aptitude Test Battery by thirty-two students.

made the highest academic grade. Of the fifteen students who made academic grades falling in the class interval of 90-99, one made an aptitude score which fell in the class interval of 86-93, while another made an aptitude score which fell in the class interval 158-165.

In Figure 8, page 37, the distribution of the academic grades made by thirty-two students enrolled in beginning
shorthand courses and the scores made on Aptitude "F" of the General Aptitude Test Battery are presented. When the academic grades for this group of students were converted to numerical figures the mean score was 83.9. The standard deviation of this group of scores was 11.7. The mean of the scores of the thirty-two students on Aptitude "F" was 106.3 and the standard deviation was 15.8. The coefficient

\[
\begin{array}{cccccccc}
90-99 & 1 & 4 & 4 & 2 & 2 & 2 & 15 & & \ \\
80-89 & & 1 & 3 & 2 & 6 & & & & & \ \\
70-79 & & & 1 & 1 & 3 & & & & & & 5 & \ \\
60-69 & 1 & & 1 & 2 & 1 & 1 & & & & & 6 & & \ \\
50-59 & & 1 & 2 & 5 & 6 & 10 & 5 & 3 & & & & & & \ \\
\end{array}
\]

My = 83.9 \hspace{0.5cm} \sigma y = 11.7 \hspace{0.5cm} Mx = 108.8 \hspace{0.5cm} \sigma x = 15.8 \hspace{0.5cm} r = -.03

Fig. 8--Scattergram and correlation table showing the paired academic grades made in beginning shorthand courses and scores on Aptitude "F" of the General Aptitude Test Battery by thirty-two students.

of correlation of the academic grades made by these students and the aptitude scores by the Pearson-Product Moment method was: \( r = -.03 \). The correlation was found to be insignificant at the .01, .05, and .10 levels when tested by Formula 53.
Figure 8 further shows that of two students who made academic grades which fell in the class interval of 60-69, one made an aptitude score which fell in the class interval of 59-68 and another made an aptitude score which fell in the class interval of 129-138. Two students who made academic grades of "A" made scores on Aptitude "F" which fell in the class interval of 129-138.

The academic grades made by students enrolled in beginning typing and shorthand courses revealed little relationship with the scores made on Aptitudes "V," "Q," "T," and "F" of the General Aptitude Test Battery. The academic grades and aptitude scores made by forty-three students enrolled in beginning typing courses on the Battery showed no significant coefficient of correlation on Aptitude "V" (Verbal Aptitude), Aptitude "Q" (Clerical Perception), or Aptitude "F" (Finger Dexterity). The only aptitude in which a significant coefficient of correlation was found to exist between academic grades and aptitude scores made by the forty-three students enrolled in beginning typing courses was Aptitude "T" (Motor Speed). These scores on this aptitude and the academic grades showed a coefficient of correlation of .32 which was found to be significant at both the .05 and .10 levels by Table 29 in Garrett's Statistics in Psychology and Education. The academic grades made by thirty-two students enrolled in beginning shorthand courses and the aptitude scores made by the same students on Aptitudes
"Q" (Clerical Perception) and "F" (Finger Dexterity) of the General Aptitude Test Battery did not reveal any correlation of any significance. Aptitude "V" (Verbal Aptitude) and Aptitude "T" (Motor Speed), however, were found to have a coefficient of correlation of .35 and .64, respectively, and when tested by Formula 53 were found to be significant. When treated by Table 29 the coefficient of correlation between Aptitude "V" and the academic grades was .35 which was found to be significant at the .10 level, while the coefficient of correlation of .64 for Aptitude "T" and academic grades was found to be significant at the .01, .05, and .10 levels.

Chapter II has presented the data concerning the academic grades and aptitude scores made by the students enrolled in beginning courses. Chapter III will treat the academic grades and aptitude scores made by students enrolled in advanced typing courses, advanced shorthand courses, and secretarial practice.
CHAPTER III

THE RELATIONSHIP BETWEEN THE ACADEMIC GRADES AND
OCCUPATIONAL APTITUDE SCORES OF EIGHTY STUDENTS
ENROLLED IN ADVANCED CLERICAL COURSES IN
THE SCHOOL OF BUSINESS ADMINISTRATION

This part of the study was concerned with the relationship of academic grades made by eighty students enrolled in advanced clerical courses in the School of Business Administration and the occupational aptitude scores made by these same students on the General Aptitude Test Battery. These students were enrolled in three different courses which were advanced typing, advanced shorthand, and secretarial practice. The same four aptitudes of the Battery which were considered as significant clerical aptitudes and presented in Chapter II were considered as significant aptitudes for the students of the advanced courses. These were Aptitude "V" (Verbal Aptitude), Aptitude "Q" (Clerical Perception), Aptitude "T" (Motor Speed), and Aptitude "F" (Finger Dexterity) which are a part of the aptitudes tested by the General Aptitude Test Battery.

Figures 9 through 20 consist of scattergrams and correlation tables which present data showing the relationship of the paired academic grades made in the advanced courses and
the aptitude scores made on the General Aptitude Test Battery by the eighty students. The means and standard deviations were computed for the four sets of scores made on the four aptitudes and the academic grades. In order to determine the relationship between the academic grades and the aptitude scores, the means and standard deviations were treated to determine the coefficient of correlation by the Pearson-Product Moment method. Significance of $r$ was determined by Formula 53 and Table 29.

The Relationship Between Academic Grades and the Occupational Aptitude Scores Made by Thirty-six Students Enrolled in Advanced Typing Courses

Figures 9, 10, 11, and 12 are scattergrams and correlation tables showing the paired academic grades made in advanced typing courses and the scores made on Aptitudes "V," "Q," "T," and "F," respectively, of the General Aptitude Test Battery by thirty-six students enrolled in advanced typing courses. The academic grades were converted to numerical figures and the mean and standard deviation were obtained. The mean and standard deviation for each set of scores made by the same students on each of the four aptitudes were also calculated.

The mean of the academic grades made by the thirty-six students was 79.5, and the standard deviation was 9.3. The mean of the scores made on Aptitude "V" by these same students was 110.2 and the standard deviation of the scores was 11.1.
Fig. 9--Scattergram and correlation table showing the paired academic grades made in advanced typing courses and scores on Aptitude "V" of the General Aptitude Test Battery by thirty-six students.

The $r$ obtained by the Pearson-Product Moment method was .17 and was found to be insignificant at the .01, .05, and .10

Fig. 10--Scattergram and correlation table showing the paired academic grades made in advanced typing courses and scores on Aptitude "Q" of the General Aptitude Test Battery by thirty-six students.
levels of Table 29. The mean of the scores on Aptitude "Q" was 117.7 and the standard deviation was 18.2. The $r$ was found to be .02 and was also insignificant at the three

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<td></td>
<td></td>
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<td>4</td>
<td>11</td>
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<tr>
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<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
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</table>

$\text{My} = 79.5 \quad \sigma_y = 9.3 \quad \text{Mx} = 111.34 \quad \sigma_x = 17.93 \quad r = -.09$

![Fig. 11--Scattergram and correlation table showing the paired academic grades made in advanced typing courses and scores on Aptitude "T" of the General Aptitude Test Battery by thirty-six students.]

levels. When the mean of the scores made on Aptitude "T" was computed it was found to be 111.34 and the standard deviation was 17.93. The coefficient of correlation between the academic grades and aptitude scores was -.09. This correlation was also found to be insignificant when tested for significance. The mean of the scores made on Aptitude "F" was 113.7 and the standard deviation was 20.4. By the
Pearson-Product Moment method the \( r \) obtained was \(-0.95\). This correlation was high but negative.

\[
\begin{array}{cccccccc}
75-84 & 95-104 & 115-124 & 135-144 & 155-164 \\
90-99 & 1 & 1 & 1 & 3 \\
80-89 & 1 & 3 & 4 & 1 & 3 & 1 & 18 \\
70-79 & 1 & 2 & 2 & 2 & 1 & 1 & 2 & 11 \\
60-69 & 1 & 1 & 1 & 2 \\
50-59 & 1 & 1 & 2 \\
\text{fx} & 1 & 4 & 10 & 7 & 5 & 3 & 2 & 1 & 3 \\
\end{array}
\]

\( My = 79.5 \quad \sigma y = 9.3 \quad Mx = 113.7 \quad \sigma x = 20.4 \quad r = -0.95 \)

Fig. 12--Scattergram and correlation table showing the paired academic grades made in advanced typing courses and scores on Aptitude "F" of the General Aptitude Test Battery by thirty-six students.

The range of the aptitude scores made on Aptitude "F" (Figure 12, above) was from 75-164. The range of the academic grades was from 50-99 or from the letter grade "F" through "A." Of the three students who made academic grades of "A," one made an aptitude score which fell in the class interval 85-94, another made an aptitude score which fell in the class interval 115-124, and the third made an aptitude score which fell in the class interval of 155-164. The
lowest score on Aptitude "F" of the General Aptitude Test Battery was made by a student who made an academic grade of "C." The two students who received academic grades of "F" made aptitude scores which fell in the class intervals of 105-114 and 115-124, respectively.

The Relationship Between Academic Grades and the Occupational Aptitude Scores Made by Thirty-two Students Enrolled in Advanced Shorthand Courses

The paired academic grades made in advanced shorthand courses and the scores made on Aptitudes "V," "Q," "T," and "F," respectively, of the General Aptitude Test Battery by

<table>
<thead>
<tr>
<th>95-100</th>
<th>100-105</th>
<th>105-110</th>
<th>110-115</th>
<th>115-120</th>
<th>120-125</th>
<th>125-130</th>
<th>130-135</th>
<th>135-140</th>
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<td>124</td>
<td>129</td>
<td>134</td>
<td>139</td>
<td>144</td>
</tr>
</tbody>
</table>

\[ \begin{array}{cccccccccccc}
90-99 & 1 & 1 & 4 & 1 & 3 & & & & & & fy \\
80-89 & 1 & 1 & 4 & 1 & 3 & 1 & 1 & 1 & & & 13 \\
70-79 & 2 & 4 & 1 & 1 & & & & & & & 8 \\
60-69 & & & & & & & & & & & \\
50-59 & & & & & & & & & & & \\
\end{array} \]

\[ \begin{array}{cccccccccccc}
fx & 2 & 3 & 5 & 5 & 1 & 8 & 2 & 4 & 1 & 1 & 10 \\
\end{array} \]

\[ M_y = 84.5 \quad \sigma_y = 5.9 \quad Mx = 117.16 \quad \sigma_x = 11.75 \quad r = .56 \]

Fig. 13--Scattergram and correlation table showing the paired academic grades made in advanced shorthand courses and scores on Aptitude "V" of the General Aptitude Test Battery by thirty-two students.
thirty-two students enrolled in advanced shorthand courses are shown in the scattergrams and correlation tables of Figures 13, 14, 15, and 16. After the academic grades were converted to numerical figures, the mean and standard deviation for each set of scores made by the same students on each of the four aptitudes were calculated.

\[
\begin{array}{|c|c|c|c|c|c|}
\hline
\text{fy} & 1 & 2 & 4 & 2 & 1 \\
\hline
\text{10} & & & & & \\
\hline
\end{array}
\]

\[
\begin{array}{|c|c|c|c|c|}
\hline
\text{fx} & 1 & 4 & 7 & 13 & 5 & 1 \\
\hline
\end{array}
\]

\[
\begin{array}{c}
\text{My} = 84.5 \quad \sigma_y = 5.9 \quad Mx = 120.14 \quad \sigma_x = 19.68 \quad r = .06
\end{array}
\]

Fig. 14--Scattergram and correlation table showing the paired academic grades made in advanced shorthand courses and scores on Aptitude "Q" of the General Aptitude Test Battery by thirty-two students.

The mean of the scores of the academic grades made in shorthand by thirty-two students was 84.5 and the standard deviation was 5.9. The mean of the scores made on Aptitude "V" by these same thirty-two students enrolled in advanced shorthand courses was 117.16. The standard deviation was
11.75. The coefficient of correlation obtained by the Pearson-Product Moment method was .56. This correlation was found to be significant at the .01, .05, and .10 levels when tested by Table 29. On Aptitude "Q" the mean of the scores was found to be 120.14 and the standard deviation was 19.68. The r obtained by the Pearson-Product Moment method was .06 and was insignificant at the three levels.

\[ \begin{array}{ccccccccccc}
85-90 & 90-95 & 100-105 & 105-110 & 110-115 & 120-125 & 125-130 & 130-135 & 135-140 & 140-144 \\
89 & 94 & 99 & 104 & 109 & 114 & 119 & 124 & 129 & 134 & 139 & 144 \\
\end{array} \]

\[ \begin{array}{ccccccccc}
90-99 & 1 & 1 & 1 & 2 & 1 & 2 & 1 & 1 \\
80-89 & & & & 1 & 3 & 3 & 1 & 2 & 3 \\
70-79 & 1 & & 3 & 2 & 1 & & 1 & & \\
60-69 & & & 1 & & & & & & \\
50-59 & & & & & & & & & \\
\end{array} \]

\[ f_x = 2 \quad 1 \quad 4 \quad 4 \quad 3 \quad 3 \quad 6 \quad 2 \quad 2 \quad 4 \quad 1 \]

\[ M_y = 84.5 \quad \sigma_y = 5.9 \quad M_x = 121.5 \quad \sigma_x = 14.6 \quad r = .10 \]

Fig. 15--Scattergram and correlation table showing the paired academic grades made in advanced shorthand courses and scores on Aptitude "T" of the General Aptitude Test Battery by thirty-two students.

When the mean of the scores made on Aptitude "T" was computed it was found to be 121.5. The standard deviation was 14.6. The r was .10 and showed no significance when tested for significance. The mean of the scores made on Aptitude "F"
was 111.5 and the standard deviation was 25.1. An r of -.32
was obtained by the Pearson-Product Moment method.

Figure 13, page 45, shows that the range of aptitude
scores made by the thirty-two students tested on Aptitude
"V" was from 95-144. The academic grades of the same stu-
dents ranged from 60-99. The student making the lowest

| 57- 67- 77- 87- 97- 107- 117- 127- 137- 147- 157- |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 66 76 86 96 106 116 126 136 146 156 166 |

<table>
<thead>
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<th>2</th>
<th>2</th>
<th>2</th>
<th>1</th>
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<tr>
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<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td></td>
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<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

| My = 84.5  σy = 5.9  Mx = 111.5  σx = 25.1  r = -.32 |

Fig. 16--Scattergram and correlation table showing
the paired academic grades made in advanced shorthand
courses and scores on Aptitude "F" of the General Aptitude
Test Battery by thirty-two students.

score on Aptitude "V" of the General Aptitude Test Battery
made an academic grade which fell in the class interval of
90-99. The student who made the highest aptitude score made
an academic grade of "B." One student who made an academic
grade which fell in the class interval 60-69 made an aptitude score which fell in the class interval 105-109.

The range of the aptitude scores for Aptitude "F," Figure 16, page 48, of the General Aptitude Test Battery was from 57-166. The academic grades ranged from 60-99 or letter grades "D" through "A." One student who made an academic grade of "A" made the lowest aptitude score which fell in the class interval of 57-66. The student who made the lowest academic grade made an aptitude score which fell in the class interval from 97-106. Of the three students who made the highest aptitude scores, one made an academic grade which fell in the class interval from 80-89 and the other two made academic grades which fell in the class interval from 70-79.

The Relationship Between Academic Grades and the Occupational Aptitude Scores Made by Twelve Students Enrolled in Secretarial Practice

Scattergrams and correlation tables presented in Figures 17, 18, 19, and 20 show the relationship of the paired academic grades made by twelve students enrolled in secretarial practice and the scores made by these students on Aptitudes "V," "Q," "T," and "F," respectively, of the General Aptitude Test Battery. The academic grades were converted to numerical figures, and the mean and standard deviation were calculated. The means and standard deviations of each set of scores made by the same students on each of the four aptitudes
were computed. The same procedure used in treating the scores made on aptitudes and academic grades in typing and shorthand was followed in determining the relationship between occupational aptitude and academic grades in secretarial practice.

The mean of the academic grades made by twelve students in secretarial practice was 87.8 and the standard deviation was 9.5. On Aptitude "V" of the Battery the mean of the scores made by the twelve students was 123.65 and the standard deviation was 11.05. The \( r \) obtained was .28 and was insignificant at the .01, .05, and .10 levels. The mean of

\[
\begin{array}{cccccccccc}
95-100 & 105-110 & 115-120 & 125-130 & 135-140 & 145-150 & 99 \\
104 & 109 & 114 & 119 & 124 & 129 & 134 & 139 & 144 & 149 & 154 \\
\end{array}
\]

\[
\begin{array}{cccccccc}
90-99 & 1 & 2 & 1 & 2 & 1 & 7 \\
80-89 & 1 & 1 & 1 & 3 \\
70-79 & 1 & 1 \\
60-69 & 1 \\
50-59 & 1 \\
\end{array}
\]

\[
M_Y = 87.8 \quad \sigma_Y = 9.5 \quad M_X = 123.65 \quad \sigma_X = 11.05 \quad r = .28
\]

Fig. 17--Scattergram and correlation table showing the paired academic grades made in secretarial practice and scores on Aptitude "V" of the General Aptitude Test Battery by twelve students.
the scores obtained for Aptitude "Q" was 132.15 and the standard deviation was 13. A coefficient of correlation of .63 was found to exist between these two sets of scores. When tested for significance by Table 29, the $r$ was found to be insignificant at all three levels. The mean of the scores made on Aptitude "T" was found to be 115.5 with a standard deviation of 9.08. The coefficient of correlation existing between the scores on Aptitude "T" and the academic grades was .14 and was insignificant. When the mean of the scores made on Aptitude "F" was computed it was found to be 116.14 and the standard deviation was 20.95. The $r$ was

\[
\begin{array}{|c|c|c|c|c|c|c|c|c|c|}
\hline
& 106-111 & 116-121 & 126-131 & 136-141 & 146-150 \\
90-99 & 1 & 1 & 1 & 1 & 3 & 7 \\
80-89 & 2 & 1 & 3 \\
70-79 & 1 \\
60-69 & 1 \\
50-59 & 1 \\
\hline
\end{array}
\]

$M_y = 87.8$ $\sigma_y = 9.5$ $M_x = 132.15$ $\sigma_x = 13$ $r = .63$

Fig. 18--Scattergram and correlation table showing the paired academic grades made in secretarial practice and scores on Aptitude "Q" of the General Aptitude Test Battery by twelve students.
found to be \(-.01\). The correlation was negative and revealed no significance at the three levels. None of the coefficients of correlation between aptitude scores made on the General Aptitude Test Battery and the academic grades made by the twelve students enrolled in secretarial practice prove significant when treated by Table 29.

\[
\begin{array}{cccccccccccc}
90-99 & 1 & 1 & 2 & 1 & 1 & & & & & & & & & \\
80-89 & & & & & & & & & & & & & & & \\
70-79 & & & & & & & & & & & & & 1 & \\
60-69 & & & & & & & & & & & & & & & \\
\end{array}
\]

\[
f_x = 1, 2, 2, 1, 3, 1, 1, 1
\]

\[
f_y = 87.8 \quad \sigma_y = 9.5 \quad M_x = 115.5 \quad \sigma_x = 9.08 \quad r = .14
\]

Fig. 19--Scattergram and correlation table showing the paired academic grades made in secretarial practice and scores on Aptitude "T" of the General Aptitude Test Battery by twelve students.

Little relationship was found to exist between the academic grades made by the eighty students enrolled in advanced courses and the scores made by these same students on Aptitudes "V," "Q," "T," and "F" of the General Aptitude Test Battery. In the first group which consisted of thirty-six
My = 87.8  \( \sigma y = 9.5 \)  \( Mx = 116.14 \)  \( \sigma x = 20.96 \)  
\( r = -.01 \)

Fig. 20 -- Scattergram and correlation table showing the paired academic grades made in secretarial practice and scores on Aptitude "F" of the General Aptitude Test Battery by twelve students.

students enrolled in advanced typing the scores made on Aptitude "F" only of the Battery were found to have a high negative coefficient of correlation to the academic grades made by these students. The \( r \) for this aptitude was -.95. The second group consisted of thirty-two students enrolled in advanced shorthand. The \( r \) obtained for Aptitude "V" and the academic grades was .17. When tested for significance it was found to be significant at the .01, .05, and .10 levels. The coefficient of correlation between the academic grades and aptitude scores made by these students was found to be significant in Aptitude "V" only. The \( r \) of Aptitude
"V" which was .56 was significant at all three levels, and a negative r of -.32 for Aptitude "F" was obtained. The academic grades and aptitude scores of the third group which consisted of twelve students enrolled in secretarial practice showed little relationship because the coefficients of correlation obtained were not significant at any of the levels.

Data concerning the relationship between the academic grades and aptitude scores made by eighty students enrolled in advanced courses have been presented in Chapter III. Chapter IV will determine the relationship of the occupational aptitude scores of seventy-five students enrolled in beginning typing and shorthand courses and sixty-four students enrolled in advanced typing and shorthand courses.
CHAPTER IV

THE RELATIONSHIP OF THE OCCUPATIONAL APTITUDE SCORES
OF SEVENTY-FIVE STUDENTS ENROLLED IN BEGINNING
COURSES VERSUS SIXTY-FOUR STUDENTS
ENROLLED IN ADVANCED COURSES

One of the purposes of the study was to determine the relationship of the occupational aptitude scores made by students enrolled in beginning and advanced courses. The relationship was determined by statistically treating the differences of the means of the scores made by these students on the four aptitudes. In order to determine whether or not the differences of the means of the scores on the various aptitudes made by the students enrolled in these courses were significant, the following procedure was used: First, the same four aptitudes of the General Aptitude Test Battery which were treated in Chapters II and III were used. These included Aptitudes "V," "Q," "T," and "F." Second, Formula 29\(^1\) was used to calculate the critical ratio of the scores. Third, Table 29 or "Table of t" was used to determine the significance of the critical ratios obtained.

\(^1\)Henry E. Garrett, *Statistics in Psychology and Education*, p. 207.
The Relationship of Forty-three Students Enrolled in Beginning Typing Courses Versus Thirty-six Students Enrolled in Advanced Typing Courses

The mean of the scores made by forty-three students enrolled in beginning typing courses on Aptitude "V" of the Battery was 109.4 and the standard deviation was 13.6. The mean of the scores on Aptitude "V" made by thirty-six students enrolled in advanced typing courses was 110.2 and the standard deviation was 11.1. When calculated by Formula 29 the critical ratio obtained was 3.51. By Table 29 a t of ± 1.99 may be expected at the .05 level with 77 degrees of freedom. Therefore, the difference between the means of the scores made on Aptitude "V" by the students enrolled in beginning and advanced typing courses was significant. Aptitudes "Q," "T," and "F" were also treated by the same procedure and critical ratios of .27, .05, and .68, respectively, were obtained. Aptitude "V," however, was the only aptitude in which the difference between the means of the aptitude scores made by students enrolled in beginning and advanced typing courses was found to be significant.

The Relationship of Thirty-two Students Enrolled in Beginning Shorthand Courses Versus Thirty-two Students Enrolled in Advanced Shorthand Courses

The differences of the means of the scores made on Aptitudes "V," "Q," "T," and "F" by thirty-two students enrolled in beginning shorthand courses and by thirty-two
students enrolled in advanced shorthand courses were calculated by Formula 29 to obtain the critical ratios in order to determine whether or not the differences of the means of the scores were significant. The critical ratios obtained for Aptitudes "V," "Q," "T," and "F" were .35, 1.49, .52, and 1.93, respectively. By the use of Table 29 the critical ratios obtained for Aptitudes "V," "Q," and "T" were found to be non-significant at the .01, .05, and .10 levels. The critical ratio of Aptitude "F" was non-significant at the .01 level and the .05 level but was significant at the .10 level.

The foregoing data indicated that the differences of the means of the scores made on Aptitudes "V," "Q," and "T" by students enrolled in beginning and advanced courses were non-significant. These data also indicated that there was no significant relationship existing between the scores made on Aptitude "F" by students enrolled in beginning and advanced courses except at the .10 level.
CHAPTER V

SUMMARY

It was the purpose of the study to analyze the academic grades made by students enrolled in beginning and advanced clerical courses in the School of Business Administration at North Texas State College, Denton, Texas, with the occupational aptitude scores made by these same students on Aptitudes "V," "Q," "T," and "F" of the General Aptitude Test Battery to determine whether or not there was any relationship. The study also sought to find if there was any significant relationship between the occupational aptitude scores made by students enrolled in beginning courses and the occupational aptitude scores made by students enrolled in advanced courses.

In Chapter II the academic grades and aptitude scores made by students enrolled in beginning typing and shorthand courses were treated statistically in order to obtain the coefficients of correlation between the academic grades and aptitude scores of each group and the results were presented. The study revealed that the coefficients of correlation obtained for each of the eight sets of paired scores were low. Only one set of aptitude scores was found to have a coefficient of correlation which was significant. This
correlation existed between the academic grades made in beginning typing courses and the aptitude scores made on Aptitude "T" by forty-three students. The r obtained was .32.

Some relationship between academic grades and occupational aptitude scores was found to exist between the academic grades made by thirty-six students enrolled in beginning shorthand courses and scores made on some of the aptitudes by these same students. An r of .35 was obtained for Aptitude "V." When treated for significance the r was found to be significant at the .10 level. An r of .64 was obtained for the academic grades and scores made on Aptitude "T." This r was found to be significant at the .01, .05, and .10 levels.

The academic grades made by eighty students enrolled in advanced typing courses, advanced shorthand courses, and secretarial practice and the scores made by these same students on the four aptitudes were treated in Chapter III to determine the relationship between the academic grades and occupational aptitudes as indicated by the General Aptitude Test Battery. The academic grades and the scores made on each of the aptitudes were paired and placed in scattergrams in order to calculate the coefficient of correlation. A coefficient of correlation of -.95 was obtained for the paired academic grades and the scores made on Aptitude "F" by
students enrolled in advanced typing courses thus indicating a high negative correlation.

A negative correlation of -.32 was also obtained when the paired academic grades made in advanced shorthand courses and the scores made on Aptitude "F" were treated. A positive correlation of .56 was obtained when the paired academic grades and the scores on Aptitude "V" made by thirty-two students were treated.

The coefficients of correlation of the academic grades and the scores made on each of the aptitudes by twelve students enrolled in secretarial practice which were obtained were low. None of the coefficients were significant when tested for significance by Table 29.

The aptitude scores made by students enrolled in beginning courses and the aptitude scores made by students enrolled in advanced courses were treated to determine if any relationship existed between the scores. The results were presented in Chapter IV. The difference of the means of the sets of scores made on each of the aptitudes by students enrolled in beginning courses and students enrolled in advanced courses were calculated by the use of Formula 29 to obtain the critical ratio. When treated to determine the significance of the difference of the means of each set of scores, only one set of scores made by the students in advanced and beginning courses was found to be significant. These were the scores made on Aptitude "V."
The results of the recent and related studies presented indicated that in most instances the tests revealed high correlation between the scores made on the various aptitude tests and the training received in clerical courses. The results of this study revealed that the correlation which existed between the scores made on the General Aptitude Test Battery and the academic grades was low and insignificant in the majority of the cases.

Conclusions

The following conclusions are based upon the results obtained when the data included in the study were treated.

1. No significant relationship was found between the academic grades made by students enrolled in beginning typing courses and the scores made on Aptitudes "V," "Q," and "F" by the same students.

2. Some relationship was found to exist between the academic grades and the scores made on Aptitude "T" by students enrolled in beginning typing courses.

3. There was no significant relationship between the academic grades and scores made on Aptitudes "Q" and "F" by students enrolled in beginning shorthand courses.

4. Some relationship was found to exist between the academic grades and the scores made on Aptitudes "V" and "T" by students enrolled in beginning shorthand courses.
5. There was no significant relationship between the academic grades and the scores made on Aptitudes "V," "Q," and "T" by students enrolled in advanced typing courses; however, a relationship of some significance was found to exist between academic grades and the scores made on Aptitude "F" by these same students.

6. No relationship of any significance was found to exist between academic grades and the scores made on Aptitudes "Q" and "T" by students enrolled in advanced shorthand courses.

7. Some relationship was found to exist between the scores made on Aptitudes "V" and "F" and the academic grades made by the same students.

8. The data indicated that there was no relationship between the academic grades and the scores made on the four aptitudes by students enrolled in secretarial practice.

9. There was no significant relationship between the scores made by students enrolled in beginning courses and students enrolled in advanced courses on Aptitudes "Q," "T," and "F."

10. The data indicated that a significant relationship did exist between the scores made on Aptitude "V" by students enrolled in beginning and advanced courses.
Recommendations

1. A similar study should be made using a larger number of cases.

2. A similar study should be made in which the academic grades of students enrolled in other departments and the occupational aptitudes scores are studied to determine whether or not any relationship exists, and the results of the studies should be compared and studied for further action.
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