EFFECT OF ACADEMIC MOTIVATION AND OTHER SELECTED CRITERIA ON ACHIEVEMENT OF FIRST AND SECOND SEMESTER SHORTHAND STUDENTS

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ABSTRACT

EFFECT OF ACADEMIC MOTIVATION
AND OTHER SELECTED CRITERIA ON ACHIEVEMENT
OF FIRST AND SECOND SEMESTER SHORTHAND STUDENTS

by Leonard J. Varah

Purpose of the Study:

The purpose of the study was to determine the predictive value, if any, of the Michigan M-Scales, a test of academic motivation, total score or subscores for predicting achievement of eleventh grade girls in first and second semester of Gregg Shorthand when used individually or in combination with the total score or a subscore of an estimate of mental ability. This predictive value was then compared with the predictive value of academic grade point average, ninth grade English grades, and tenth grade English grades to determine the most accurate predictor of shorthand achievement.

Procedures and Analysis of the Data:

The information for the present study came from the first and second semester shorthand classes of eight senior high schools in Central and Southern Michigan. The population of the present study was eleventh grade girls in beginning Gregg Shorthand. The three types of data

concerning the population collected were: (1) an estimate of mental ability, (2) grades for ninth and tenth grade English and overall academic grade point average, and (3) a motivation score as measured by the Michigan M-Scales. Shorthand achievement was measured by teacher grades at the end of the first and second semesters and by a uniform shorthand examination at the end of the first and second semesters. The data was processed by the Control Data Corporation 3600 Computer through the use of the CORE program. The three statistical procedures that were used in the analysis of the data were: (1) estimate of reliability of the motivation score; (2) mean test of significance; and (3) correlation analysis.

The Major Findings of the Study:

The major findings of the study were:

(1) Academic motivation as measured by the Michigan M-Scales is a factor in learning in first semester Gregg Shorthand but is not a factor in learning in second semester Gregg Shorthand.

(2) The Michigan M-Scales when used in combination with an estimate of mental ability did significantly increase the precision of prediction by an estimate of mental ability in predicting the achievement of eleventh grade girls in first semester Gregg Shorthand.

(3) The Word Rating List, a subtest of the Michigan M-Scales, was found to be a significant predictor and a

consistently significant predictor of shorthand achievement for both first and second semester of Gregg Shorthand. It was concluded that the academic self-concept of the student as measured by the Word Rating List is a factor in learning in first and second semesters of Gregg Shorthand.

(4) The best single predictors of first semester Gregg Shorthand were: (a) grade point average; (b) ninth grade English grades; (c) tenth grade English grades; (d) estimate of mental ability.

(5) The best single predictors of second semester Gregg Shorthand were: (a) Shorthand I teacher grades; (b) grade point average; (c) tenth grade English grades; and (d) mental ability.

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by

Leonard J. Varah

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(Appearing in the Appendix)

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CHAPTER I

INTRODUCTION

Why do some students with low mental ability do well in shorthand while some students with high mental ability do very poor work in shorthand? This is a question that shorthand teachers continue to ask.

Researchers and scholars have studied this problem. Through research, the conclusion has been made that grade point average, English grades, and mental ability are the best predictors of shorthand achievement even though these predictors are not sufficiently accurate to make prediction reliable. As a result, researchers have hypothesized that motivation might possibly be a factor in the shorthand success; and if an instrument could be devised to accurately measure motivation, more accurate prediction of shorthand success might result through its use in combination with other predictors.

Statement of the Problem:

This study was an attempt to determine a partial answer to the question: "What part does motivation play in the student's shorthand achievement?" By using an experimental test of academic motivation--the Michigan M-Scales--and an estimate of mental ability as measured by the American

Council on Education Psychological Examination for high school students, this study attempted to determine the value of academic motivation as measured by the Michigan M-Scales, in combination with the estimates of mental ability, in predicting achievement in first and second semester shorthand.

This study was particularly concerned with the relationship of motivation to shorthand achievement, with identifying degrees of motivation, and of determining the extent to which measurement of motivation might add to precision in predicting shorthand achievement.

Purpose of the Study:

The purpose of this specific study was to determine the predictive value, if any, of the Michigan M-Scales total score or subscores for predicting achievement of eleventh grade girls in first and second semester of Gregg Shorthand when used individually or in combination with the total score or a subscore of an estimate of mental ability. This predictive value was then compared with the predictive value of academic grade point average and ninth and tenth grade English grades to determine the most accurate predictor of shorthand achievement.

Specific purposes of the investigation were:

1. To determine whether each predictor variable by itself significantly predicted achievement of eleventh grade girls in first and second semester of Gregg Shorthand.

2. To determine whether the predictor variables as a group significantly predicted achievement of eleventh grade girls in first and second semester of Gregg Shorthand.

3. To determine whether the total score of the Michigan M-Scales or each subscore when combined with an estimate of mental ability significantly increased the precision of prediction of achievement for eleventh grade girls in first and second semester Gregg Shorthand.

Hypotheses:

The research hypotheses tested in this study were:

1. Each predictor variable will predict achievement of eleventh grade girls in first and second semester of Gregg Shorthand.

2. The predictor variables as a group will predict achievement of eleventh grade girls in first and second semester of Gregg Shorthand.

3. The Michigan M-Scales when combined with an aptitude measure will increase the precision of prediction of achievement for eleventh grade girls in first and second semester of Gregg Shorthand.

Need for the Study:

An informal review of studies completed in shorthand prognosis indicated there is no known reliable predictor

of success in beginning shorthand.[1,2,3,4,5,6]

Osborne in 1943 summarized all studies in shorthand prognosis when she said:

> . . . none of the correlations between the shorthand criterion and single tests or between the criterion and combinations of tests is high enough to make prediction valuable except in the negative sense.[7]

Leslie states:

> The problem in prognosis for shorthand (not for transcription) is to determine on the one hand the intensity or willingness and extent of cooperation that may be expected in the learning of shorthand and on the other hand the general mental

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[1]Ruth Irene Anderson, "An Analysis and Classification of Research in Shorthand Transcription" (unpublished Doctoral dissertation, Indiana University, 1946).

[2]Edward E. Byers, "Construction of Tests Predictive of Success in First Year Shorthand" (unpublished Doctoral dissertation, Boston University, 1959).

[3]Inez Frink, "A Comprehensive Analysis and Synthesis of Research and Thought Pertaining to Shorthand and Transcription, 1946-1957" (unpublished Doctoral dissertation, Indiana University, 1961).

[4]Billy T. Hutson, "Prognosis of Achievement in First-Year Gregg Shorthand Simplified" (unpublished Master's thesis, University of Tennessee, 1951).

[5]Agnes E. Osborne, The Relationship Between Certain Psychological Tests and Shorthand Achievement (New York: Bureau of Publication, Teachers College, Columbia University, 1943).

[6]Dorothy Veon, The Relationship of Learning Factors Found in Certain Modern Foreign-Language Aptitude Tests to the Prediction of Shorthand Achievement in College (Stillwater, Oklahoma: Oklahoma Agricultural and Mechanical College; Delta Pi Epsilon Research Award Series, 1950).

[7]Osborne, op. cit., p. 53.

> ability and the work and study habits of the prospective pupil.
> . . . . . .
> It is also true, . . . , that there are degrees of success or failure. All other things being equal (such as intensity of desire and extent of cooperation), the student with the greater degree of general ability and with the better study and work habits will achieve a higher degree of skill and success than the student with a lower general mental ability, and with less well-developed work habits.[8]

Studies[9,10] have shown that a student with a high mental ability will tend to do better work in shorthand than a student with low mental ability; however, variations in achievement exist for unknown reasons. Researchers and scholars have theorized that motivation is a major factor in the academic achievements of an individual. High motivation to learn will result in a student with average mental ability achieving a better grade than that achieved by a student with high mental ability but no motivation.

The Byers study of shorthand prognosis concluded that

> Motivation, interest, desire, and need are present in every student in varying degrees. A method of measuring these factors might prove to be the conclusive answer to future prognosis in shorthand. Existing shorthand aptitude tests do not include measures of them.[11]

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[8] Louis A. Leslie, Methods of Teaching Gregg Shorthand (New York: Gregg Division, McGraw-Hill Book Company, 1953), p. 287.

[9] Veon, op. cit.

[10] Osborne, op. cit.

[11] Byers, op. cit., p. 82.

Hutson concluded in 1957 that

> . . . at the present time predicting individual success in shorthand or in other school subjects merely by the use of tests has not been demonstrated where real achievement is demanded. The inability to ascertain or control motivation appears to restrict the success of tests in prognosis.
>
> It is evident that motivation or the determination to succeed cannot be measured. Since motivation cannot be measured, little can be expected from the use of tests to predict success in shorthand for level of motivation appears to affect performance significantly when other conditions are equal.[12]

Researchers and scholars such as Atkinson and McClelland,[13] Bindra,[14] and Kagan[15] have studied the problem of measuring motivation but have not been able to produce an instrument that is usable for the classroom teacher; however, an instrument, known as the Michigan M-Scales, was recently created by Dr. W. W. Farquhar[16] and his associates of the Michigan State University College of Education faculty.

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[12]Hutson, op. cit.

[13]David C. McClelland, et al., The Achievement Motive (New York: Appleton-Century-Crofts, Inc., 1953).

[14]Dalbir Bindra, Motivation: A Systematic Reinterpretation (New York: The Ronald Press Company, 1959).

[15]Jerome Kagan and Gerald S. Lesser, Contemporary Issues in Thematic Apperceptive Methods (Springfield, Illinois: Charles C. Thomas, Publisher, 1961).

[16]William W. Farquhar, Motivation Factors Related to Academic Achievement, A Final Report of Cooperative Research Project No. 846 entitled "A Comprehensive Study of the Motivational Factors Underlying Achievement of Eleventh Grade High School Students" supported by the U.S. Office of Education in cooperation with Michigan State University, 1963.

Their research effort was to identify the factors of academic motivation and produce an instrument that would measure academic motivation on the high school level. This instrument has proven useful in predicting grade point average.

Theory for Using the M-Scales:

The Michigan M-Scales have proven useful in predicting grade point average by means of measuring certain personal factors. These factors are emotionality, conformity, unreliability, compulsivity, fantasy, conservatism, social distance, emotional stability, long-term versus short-term involvement in relation to time, independence versus dependence in solving complex problems, unique accomplishment versus avoidance of education, long-term versus short-term involvement, and high versus low job interests.

It was theorized that the Michigan M-Scales battery will aid in predicting achievement of eleventh grade girls in first and second semester Gregg Shorthand for the reason that several of the factors being measured by the M-Scales (emotional stability, responsibility, unreliability, long-term involvement, and unique accomplishment) are factors that research has identified as being present in significantly greater quantity in the successful shorthand student than in the unsuccessful shorthand student.[17]

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[17]Georgia Faye Powell, "An Analysis of Shorthand Dropouts at Ottawa Township High School" (unpublished Master's thesis, Illinois State Normal University, 1961), p. 48.

Delimitations:

The scope of this study had the following delimitations:

1. Subjects: The study was limited to girls in the eleventh grade who were enrolled in first and second semester of Gregg Shorthand in the eight high schools participating in this study. All boys were excluded for the reason that only a small number of boys were enrolled in shorthand in the participating schools; and as the M-Scales were created for each sex, the small number of boys precluded any statistical analysis of the male population as measured by the M-Scales.

2. Schools: The participating schools were limited to the eight senior high schools located in seven cities and towns in central and southern Michigan.

3. Time: The study was conducted during the first and second semesters of the 1964-1965 school year.

4. Teaching Method: The study did not include an analysis of the teaching methods, motivation devices used in the classroom, equipment for teaching, objectives of the courses for each teacher, standards of the course, standards for grades by the teachers, professional preparation of the teachers, or the teacher's personality for the reason of generalizability. (See Appendix, page 178, for explanation).

5. Subject Matter: The Gregg Shorthand systems being taught in the schools were utilized, but not analyzed, for this study.

6. Personal Data: The subject's age, race, the distance he traveled to school, other classes taken by him during time of this study, his study habits, school attendance, participation in extra-curricular activities, home and family membership, parent's occupation or occupations, parents' marital status, socio-economic factors, or hour of the day of the shorthand class were not analyzed as this information was considered beyond the scope of this study.

Limitation:

This study had the following limitation:

Teacher Grades: The teacher grades were used as the criteria of achievement in shorthand in this study for two reasons:

1. The Michigan M-Scales were created for use with teacher grades from a number of different schools. In order to utilize the M-Scales, such teacher grades were essential to the study.

2. The teacher grades represented the achievement of an individual in a particular group or class. Teacher grades were the determinants of achievement or nonachievement. Teacher judgments were valued in this case for the reason that the teachers were certified, experienced teachers of Gregg Shorthand and were able to judge degrees of achievement.

Definition of Terms:

The following definitions of terms were used in this study:

1. Academic Motivation: Academic Motivation is a combination of forces which initiate, direct, and sustain behavior toward a scholarly goal.[18]

2. Shorthand Achievement: Shorthand Achievement includes a, b, and c below:

a. Shorthand I Achievement is the grade given by the teacher to the specific pupil for first semester accomplishment in shorthand. The grade may include whatever the teacher may consider important--speed of reading, knowledge of theory, speed of taking dictation, and general subjective evaluation that enters teacher grades.

b. Shorthand II Achievement is the grade given by the teacher to the specific pupil for second semester accomplishment in shorthand. The grade may include whatever the teacher may consider important--speed of reading, knowledge of theory, speed of taking dictation, and general subjective evaluation that enters teacher grades.

c. Shorthand achievement and shorthand success are used interchangeably in this study.

3. Grade Point Average: Grade Point Average is a score computed by assigning five points to each grade of A,

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[18]Farquhar, op. cit., p. 3.

four points to each grade of B, three points to each grade of C, two points to each grade of D, and one point to each grade of E or F received in each academic subject; i.e., each subject requiring homework taken during the ninth and tenth grades. These points were summed and divided by the number of academic courses taken during the ninth and tenth grades. The quotient thus derived was carried two placed beyond the decimal point in order to provide precision in assigning categories in the computation of the regression equation.

4. ACE Test: The American Council on Education Psychological Examination for high school students (ACE) is a test of mental ability which contains four tests--same-opposite, completion, arithmetic reasoning, and number series.[19] Results are subdivided into Linguistic and Quantitative subscores primarily aimed at determining mental ability to do reasoning in a verbal setting.[20]

5. M-Scales: Four functioning measures (The Generalized Situational Choice Inventory, Preferred Job Characteristics Scale, Word Rating List, and Human Trait Inventory), which were designed to measure academic motivation, were combined and labeled the Michigan M-Scales.[21] The scales were

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[19]Burros 4th Yearbook of Mental Measurements (Highland Park, New Jersey: The Gyphon Press, 1949), p. 218.

[20]Burros 5th Yearbook of Mental Measurements (Highland Park, New Jersey: The Gyphon Press, 1959), p. 309.

[21]Farquhar, op. cit., p. 96.

authored by Dr. W. W. Farquhar and his associates of Michigan State University College of Education in January, 1963.

6. Gregg Diamond Jubilee Shorthand System: Gregg Diamond Jubilee Shorthand System is a revised edition, published in 1963, of the shorthand system created by the late John Robert Gregg.

7. Gregg Shorthand Simplified: Gregg Shorthand Simplified is a revised edition, published in 1950, of the shorthand system created by the late John Robert Gregg.

8. Predictor Variables: Predictor Variables are the factors that were introduced into the experimental situation.[22] These variables consisted of (1) grade point average computed from ninth and tenth grades in academic courses, (2) English grades in the ninth and tenth grades, (3) an estimate of mental ability as measured by the American Council on Education Psychological Examination for high school students, (4) Linguistic subscore of the estimate of mental ability, (5) Quantitative subscore of the estimate of mental ability, and (6) motivation as measured by the Michigan M-Scales. Predictor variables and independent variables are used synonymously in this study.

9. Dependent Variable: "Dependent variable is the

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[22]Allen L. Edwards, Statistical Methods for the Behavioral Sciences (New York: Holt, Rinehart and Winston, 1961), pp. 8-9.

variable for which we observe changes."[23] The dependent variable was the achievement in Gregg Shorthand as measured by the grades assigned each individual by the teacher at the end of the first semester and at the end of the second semester of Gregg Shorthand. Teacher grades were validated by a uniform shorthand test created by the researcher. The tests were administered at the end of the first semester and at the end of the second semester. The first semester test was administered to shorthand classes in three participating schools and the second semester test was administered to shorthand classes in all eight participating schools.

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[23] Ibid.

CHAPTER II

REVIEW OF LITERATURE

A review of DISSERTATION ABSTRACTS, BUSINESS EDUCATION INDEX, and EDUCATION INDEX was made; also articles appearing in the professional journals and magazines concerning research studies were examined. From this review, a bibliography was constructed; and theses and dissertations that were not in the Michigan State University Microfilm Library or Main Library were requested on interlibrary loan. A number of universities have adopted the policy that no thesis, master's or doctoral, is now available on interlibrary loan although such studies were formerly available through interlibrary loan. Some universities do not microfilm dissertations. In spite of the unavailability of certain pieces of research, secondary sources such as the Anderson Study,[1] the Frink Study,[2] and the Byers Study[3] provided excellent information to make a review of

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[1]Ruth Irene Anderson, "An Analysis and Classification of Research in Shorthand Transcription" (unpublished Doctoral dissertation, Indiana University, 1946).

[2]Inez Frink, "A Comprehensive Analysis and Synthesis of Research and Thought Pertaining to Shorthand and Transcription 1946-1957" (unpublished Doctoral dissertation, Indiana University, 1961).

[3]Edward E. Byers, "Construction of Tests Predictive of Success in First Year Shorthand" (unpublished Doctoral dissertation, Boston University, 1959).

literature in shorthand prognosis possible for this study.

This chapter is divided into two sections: Section I is a review of literature on Shorthand Prognosis, and Section II is a review of literature on Academic Motivation.

Section I is subdivided into two parts: Part I is a review of specific studies in shorthand concerned with prognosis; Part II is a synthesis of some of the research on shorthand prognosis. This synthesis is from primary and secondary sources and is divided into two parts: (1) research concerning mental ability as a predictive factor and (2) research concerning school grades as possible predictors. Tables are used to supplement this part of the review.

In Section II, which deals with academic motivation, the Farquhar Study[4] on academic motivation was especially helpful for the reason that it reviewed much of the literature on motivation. The Farquhar Study, therefore, will be reviewed in detail in Section II of this chapter.

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[4]William W. Farquhar, Motivation Factors Related to Academic Achievement, a Final Report of Cooperative Research Project No. 846 entitled "A Comprehensive Study of Motivational Factors Underlying Achievement of Eleventh Grade High School Students" supported by the U.S. Office of Education in Cooperation with Michigan State University, 1963.

SECTION I

Review of Literature on Shorthand Prognosis

The review of literature on shorthand prognosis revealed a number of studies that dealt with shorthand prognosis; however, three were significantly helpful in making possible a review of literature on shorthand prognosis.

The first two studies were the Anderson Study,[5] and the Frink Study[6] which were particularly helpful for the reason that they were reviews of the literature and research concerning Gregg Shorthand. The Anderson Study,[7] which will be reviewed in detail later in this chapter, reviewed shorthand literature and research from the beginning of shorthand literature and research in the United States to 1946. The Frink Study,[8] also to be reviewed in detail later in this chapter, reviewed shorthand literature and research from 1946 to 1957. The third study was the Byers Study[9] which was helpful for the reason that it reviewed shorthand prognostic tests. The Byers Study[10] will also be reviewed in detail later

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[5]Anderson, op. cit.

[6]Frink, op. cit.

[7]Anderson, op. cit.

[8]Frink, op. cit.

[9]Byers, op. cit.

[10]Ibid.

in this chapter.

Other dissertations and theses that were found helpful will be reviewed in lesser detail later in this chapter after the Anderson, Frink, and Byers Studies have been reviewed.

Review of Specific Studies Relating to Shorthand Prognosis:

The Anderson Study:[11] The Anderson Study, completed in 1946, was an analysis and classification of all available literature and research in shorthand and transcription through 1945--a total of 298 research studies and articles in professional journals. The study was restricted to the topic of Gregg Shorthand since its introduction into the United States.

One of the classifications in the Anderson Study was Prognosis. The study reviewed 44 research studies dealing with prognosis in shorthand and transcription. An abstract of each research project was made. The abstract contained a statement of the problem, purpose of the study, procedures, and findings. Following the abstract, Anderson commented on selected research projects. The comments point out conflicts in the reporting of the data, implications of the findings, or lack of information in the original report.

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[11]Ruth Irene Anderson, "An Analysis and Classification of Research in Shorthand Transcription" (unpublished Doctoral dissertation, Indiana University, 1946).

Summarization of findings from the prognosis section of the Anderson Study are listed below:

1. Three investigators reported that the correlation between intelligence scores and shorthand marks was very low.

Other persons reported that there was some relationship between the two factors.

In an investigation by Dodson, the best predictive measure used was the Terman Test of Mental Ability. The correlation between the scores on this test and marks in advanced shorthand was .71.

2. Phillips found that only two persons with intelligence quotients below 90 were doing passing work in transcription. None of the persons who failed or who dropped shorthand had intelligence quotients below (sic) 120.*

3. Mandell concluded that a high I.Q. was indicative of probable success in shorthand, but a low I.Q. did not necessarily preclude success.

4. Several researchers have concluded that intelligence tests and shorthand marks did not measure the same abilities but that the intelligence quotient might be useful in a battery of predictive tests.

5. Billeter found that the selection of candidates for stenographic training in the army on the basis of intelligence and clerical aptitude reduced the number of failures 25 per cent.

6. In four studies, the Hoke Prognostic Test of Stenographic Ability was found to be of practically no value.

7. In the investigations by Wood and Kessinger, the correlations between the scores on the Hoke Prognostic Test of Stenographic Ability and Shorthand marks were .464 and .559 respectively.

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*This researcher questioned the word "below." In the review of the Phillips thesis by Anderson, page 707-708, the word "above" appeared; thus, the researcher assumes that the word "below" in the summary should have been "above."

8. Whitley reported that the Hoke Prognostic Test of Stenographic Ability was the only test in the battery used in the study which differentiated in advance between those pupils who completed the shorthand course and those who dropped shorthand.

9. Davis and Dodson reported correlations of .525 and .79 between the scores on the Turse Shorthand Aptitude Test and shorthand marks. Cruzan found the test of little value for the prediction of success or failure in shorthand.

In a recent study by Phillips, it was found that 66 per cent of the students doing superior work in transcription made high scores on the Turse Shorthand Aptitude Test.

10. Tuckman concluded that the high correlation between the scores on the Turse Shorthand Aptitude Test and the American Council on Education Psychological Examination for high school students indicated that the use of both tests in the same battery might be questionable.

11. In five studies, correlations from .425 to .64 between marks in English and marks in shorthand were reported.

12. Four researchers found correlations between scores on English usage tests and shorthand marks ranging from .53 to .707.

13. In a study by Cruzan, it was reported that 84 per cent of the students who receive "A" in shorthand scored above the 50 percentile on the Cooperative English Test while a large portion of pupils with scores below the 50 percentile on the Cooperative English Test failed in shorthand.

14. The correlations obtained between the average of previous scholastic averages and shorthand marks have ranged from .594 to .70. Four investigators concluded that the previous scholastic average of the pupil was one of the best bases for prediction of success or failure in shorthand.

15. Correlations obtained between vocabulary test scores and shorthand marks ranged from .40 to .55.

16. In four studies, correlations from .55 to .759 between foreign language marks and shorthand marks have been reported.

17. Davis reported a low correlation between personality ratings and shorthand marks. Whitmore found personality ratings to be one of the best predictive measures of success in shorthand.

18. Other predictive measures which have been used with little or no success include speed of writing tests, memory tests, the Monroe Reading Comprehension Test, the Minnesota Vocational Test for Clerical Workers. Phillips reported that, of the students doing passing work in transcription, only 5 per cent were rated below average on the Detroit Clerical Aptitude Test.

19. Investigators have generally agreed that a battery of tests is more effective as a basis for the prediction of success or failure in shorthand than a single measure. The correlations between scores on batteries and marks in shorthand have ranged from .61 to .76.[12]

The Frink Study:[13] The Frink Study, completed in 1961, was an analysis and synthesis of research and thought pertaining to shorthand transcription. The Frink Study resembled the Anderson Study in that it was a review of literature and research in shorthand. The period of time covered by the Frink Study was from January 1, 1946, where the Anderson Study stopped, through December 31, 1956. A total of 258 references in professional journals were used to supplement 117 research projects. An abstract was prepared for each.

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[12] Ibid., pp. 733-737.

[13] Inez Frink, "A Comprehensive Analysis and Synthesis of Research and Thought Pertaining to Shorthand and Transcription 1946-1957" (unpublished Doctoral dissertation, Indiana University, 1961).

Following selected abstracts, the author commented on each research project. The comments pointed out conflicts in the reporting of the data, implications of the findings, or lack of information in the original report.

A summary of the findings of the Frink Study is listed below:

> 1. Low level ability of students, which may be interpreted as a need for guidance and selection--despite the fact that research reveals that dropouts and failures can be reduced by guidance and selection, apparently few schools practice either.
>
> 2. Need for improvement of instruction--there is some evidence that considerable improvement could be made in the quality of classroom instruction. Factors which seemingly influence the quality of instruction are confusion of objectives; failure to recognize the level of instruction at which certain techniques, practices, or procedures should be introduced or discontinued; need for greater emphasis on shorthand theory and the related learning; and need for less emphasis on dictation speeds and adjustment techniques.
>
> 3. Need for increased instruction time--although it is believed that additional instruction time is needed, studies of the relationship of increased instruction time to achievement in stenography are inconclusive.
>
> 4. Need for nonsymbol shorthand--there is some evidence that nonsymbol shorthand can be learned in less time than traditional shorthand and that it has a definite potential for vocational use.[14]

The Byers Study:[15] The Byers Study, completed in 1958, was a research project designed to construct a predictive test

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[14] Ibid., National Business Education Quarterly, XXXI (October, 1962), pp. 26-27.

[15] Edward E. Byers, "Construction of Tests Predictive of Success in First-Year Shorthand" (unpublished Doctoral dissertation, Boston University, 1958).

for success in first-year shorthand. As part of the research for the construction of the test, Byers analyzed previous tests that were designed to predict success in shorthand. He analyzed six different published tests.

The tests analyzed by Byers were the Hoke Prognostic Test, the Bennett Stenographic Aptitude Test, the Turse Shorthand Aptitude Test, the Educational Research Corporation Stenographic Aptitude Test, the Detroit Clerical Aptitude Examination, and the Vocational Aptitude Test for Shorthand Students. Byers' review of the tests is, in part, as follows:

> The Hoke Prognostic Test was created to provide the teacher with pupil data in order to tailor the shorthand course to the student. The test consisted of seven subtests which are as follows: (1) motor reaction; (2) speed of writing; (3) quality of writing; (4) speed of reading; (5) memory; (6) spelling; and (7) symbols. The test was not successful in predicting success or failure of shorthand students; thus, it was declared out of print in 1948 by the Gregg Publishing Company.[16]
>
> The Bennett Stenographic Aptitude Test was created to predict ability to acquire the skills of shorthand and typewriting. The test consisted of two subtests--transcription and spelling. Empirical studies have reported that the test is of little value for the reason that more information is needed to predict achievement in the areas of shorthand and typewriting.[17]
>
> The Turse Shorthand Aptitude Test was an attempt to find a valid method to eliminate unqualified pupils from shorthand courses before they made an effort to undertake work for which they were not suited. The test consisted of seven subtests which are as follows: (1) stroking; (2) spelling; (3)

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[16] Ibid., pp. 10-12.

[17] Ibid., p. 20.

phonetic association; (4) symbol transcription; (5) word discrimination; (6) dictation; and (7) word sense. Recent research findings are quite consistent on the Turse Test with correlations being reported consistently of .60 and .65.[18]

The Educational Research Corporation Stenographic Aptitude Test was constructed by Walter L. Deemer, Jr., to measure the student's ability to learn to write shorthand and to transcribe it. The test consisted of five subtests which are as follows: (1) speed of writing; (2) word discrimination; (3) phonetic spelling; (4) vocabulary; and (5) sentence dictation.

It is evident that second-year shorthand accomplishment measures predominate in the determination of the criterion measure for each testee. Since the functional factors, as measured by the subtests, include those prevailing for students of advanced shorthand, this choice of composite is probably justified. It is interesting to note that in this respect both Deemer and Turse are in complete agreement--both attempt to predict success in transcription rather than success in first-year shorthand.[19]

The Detroit Clerical Aptitude Examination was designed to identify pupils who have suitable abilities for high school business courses. The examination consisted of eight subtests which are as follows: (1) rate and quality of handwriting; (2) rate and accuracy in checking; (3) knowledge of simple arithmetic; (4) motor speed and accuracy; (5) knowledge of simple commercial terms; (6) visual imagery; (7) rate and accuracy in classification; and (8) alphabetical filing. Their value as predictors of success in shorthand and typewriting is questionable.[20]

The Vocational Aptitude Tests for Shorthand Students consisted of seven subtests designed to measure (1) ability to distinguish between vowel sounds and to indicate them by a particular

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[18] Ibid., pp. 24-26.

[19] Ibid., pp. 34-36.

[20] Ibid., pp. 38-40.

> notation; (2) substitution powers of the candidates; (3) retention powers and ability of the testee to form geometrical characters quickly and accurately; (4) ability to write a passage of ordinary dictation at a rapid rate and with correct spelling. The tests were devised for use in the military and reported studies showed good results.[21]

The Test of Shorthand Aptitude created in the Byers dissertation consisted of five subtests which were as follows: (1) phonetic perception; (2) retention ability; (3) observation aptitude; (4) pattern from parts; and (5) hand dexterity. The subtests correlated with the criterion measure as follows: .36; .44; .18; .28; and .68, respectively. The multiple correlation was reported as .62 for high school shorthand classes. Results of the Byers investigation indicate that the test results have a significant relationship with first-year shorthand achievement; however, difficulty of scoring reduces the value of the test.

In addition to the Anderson, Frink, and Byers Studies, the following studies were of interest in the area of prognosis.

The Pauk Study:[22] Pauk made use of the American Council on Education Psychological Examination which produces the Linguistic scores. He compared the correlations found from the Linguistic score and the Turse Test. Pauk found that

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[21] Ibid., pp. 43-44.

[22] Walter Pauk, "What's the Best Way to Predict Success in Shorthand?" Business Education World, LXIII (April, 1963), pp. 7-8, 34.

"The L-Score of the ACE predicted shorthand success as well as the total Turse Test (.63 versus .63)."

The Sanders Study:[23] Sanders reported in a study of college students in 1961 that " a significant relationship was found between the ACE percentile rank and achievement in college shorthand grades."

The Veon Study:[24] Veon reported in a study of 299 elementary shorthand students at George Washington University in 1948 that the completion section of the ACE correlated .4208 with a complete shorthand test. Other correlations to the complete shorthand test reported by the Veon Study were: Same-Opposite--.4923; Verbal Analogies--.5685. The correlation between the subtest, verbal analogies, and shorthand reading, .7129; between the subtest, verbal analogies, and shorthand transcription, .6313. Multiple correlation between the Linguistic sections of the ACE Test and complete shorthand test was not reported.

The correlations found in the Veon Study were high but

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[23]Celene Honeycutt Sanders, "A Study of the Relationship Between Certain Radford College Students' ACE Scores, Years of Shorthand in High School, and Achievement in Shorthand" National Business Education Quarterly, XXXI (October, 1962).

[24]Dorothy Veon, The Relationship of Learning Factors Found in Certain Modern Foreign-Language Aptitude Tests to the Prediction of Shorthand Achievement in College. Delta Pi Epsilon Research Award Series. Stillwater, Oklahoma: Oklahoma Agricultural and Mechanical College, 1950.

still not high enough to make the ACE Tests useful individually or collectively in predicting shorthand achievement.

The Powell Study:[25] The Powell Study, in 1961, of shorthand enrollments in Ottawa Township High School, Illinois, attempted to determine if in a two-year study significant differences did exist between shorthand dropouts-failures and continuants. The report analyzed national test scores, personality factor ratings by teachers, English grades, foreign language grades, typewriting grades, shorthand grades, attendance, part-time work activities of the students, educational and vocational plans, reasons students gave for dropping shorthand, and teacher opinions of why students dropped shorthand.

The study concluded that several differences do exist between shorthand dropouts and continuants as evidenced by the testing program of a particular school. The scores received by the continuants were higher than those of the dropouts in each case. The areas of difference in the testing program are as follows:

a) Of all the tests, the Science Research Associates Reading Record was the most significantly different. The dropouts-failures received a significantly lower score here than did the continuants.

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[25]Georgia Faye Powell, "An Analysis of Shorthand Dropouts at Ottawa Township High School" (unpublished Master's thesis, Illinois State Normal University, 1961).

b) The total score from the Reading Record has the greatest degree of statistical significance of any of the test scores used in the study with the dropouts-discontinuants receiving the lower scores.

c) Other Reading Record test scores of marked statistical significance were the sentence meaning score and the vocabulary score.

d) The national test score from the Science Research Associates Primary Mental Abilities Tests having the greatest statistical significance for shorthand success was the verbal meaning score.

e) The correctness in writing score on the Iowa Tests of Educational Development was the one found to have the greatest statistical significance from that group of tests.

f) Eight of the fourteen dropout means were below the national means, while twelve of the fourteen continuant means were above the national means.[26]

Thus, it is evident from such findings that the national testing program of this particular school reveals certain differences in existence between continuants and failures and dropouts.

The Powell Study confirms previous research findings which illustrate the relationship between verbal abilities and shorthand achievement.

A second conclusion of the Powell Study was:

> . . . Students continuing shorthand tend to rate higher than the dropouts on all personality factors used in the study. The three factors of greatest significance were industry, initiative, and responsibility.[27]

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[26] Ibid., p. 78.

[27] Ibid., p. 79.

Teachers were asked to rate the student on a five-point scale. A comparison of the dropouts and continuants showed a difference in means for Industry, Initiative, and Responsibility of .550, .500, and .500, respectively; however, Seriousness of Purpose and Emotional Stability each showed differences in means of .450.[28] The continuants received the favorable rating in each comparison.

A third conclusion of the Powell Study was:

> The average grades for the continuants for the courses analyzed were: English, 2.39; foreign language, 2.39; typewriting, 2.56; shorthand, 2.74. The average grades for the dropouts for the courses analyzed were: English, 1.94; foreign language, 1.87; typewriting, 1.63; shorthand, 1.42.[29]

It is apparent that grades tend to be higher for the continuants than for the discontinuants.

A list of frequent reasons for dropping shorthand as checked by forty-five students was compiled in the study and is reproduced in Table II on page 123 of the appendix. This compilation illustrates student reasons for discontinuing shorthand class.

Analysis of the list shows that classwork--the students lack of effort and/or desire to learn the subject matter and quality of performance--is the most frequently given reason

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[28] Ibid., p. 48.

[29] Ibid., pp. 79-80.

for dropping shorthand. The other reasons given could be grouped into a classification of a change in vocational plans.

The Osborne Study:[30] The purpose of the study, completed in 1943, was to determine the value of certain psychological tests in predicting success of secondary school students in the study of shorthand.

The psychological tests administered for the project were the Otis Self-Administering Test of Mental Ability, Iowa Silent Reading Test--New Edition, I. E. R. Clerical Test Form C-1, Revised Minnesota Paper Formboard, Shorthand Learning Test--Semester I, and Gates Visual Perception Test. The Carmichael Shorthand Learning Test was used for the criterion of shorthand achievement. Correlations were computed among all variables.

The study concluded that none of the correlations between the score on the shorthand criterion and scores on single tests or between the score on the criterion and scores on combinations of tests was high enough to make prediction valuable.

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[30]Agnes E. Osborne, "The Relationship Between Certain Psychological Tests and Shorthand Achievement" (New York: Bureau of Publications, Teachers College, Columbia University, 1943).

The Dodson Study:[31] The study, completed in 1943, was an attempt to determine what means are available for predicting success in the study of shorthand and typewriting and to evaluate these means in the light of experiments conducted.

Coefficients of correlation were computed between the variables which were marks in high school subjects, mental ability, shorthand and typewriting grades, and the grades received in shorthand and typewriting in college. Eighty subjects in the study came from three high schools.

The Hutson Study:[32] The study, completed in 1951, determined the relationship between the Germane Vocabulary Test, a teacher-prepared spelling test, the Otis Quick-Scoring Mental Ability Test, the Lee-Thorpe Occupational Interest Test, the Educational Research Corporation Stenographic Aptitude Test, and achievement in first year of high school instruction in Gregg Shorthand. Beginning shorthand classes in five eastern Tennessee high schools were used for the study. Semester achievement tests and final achievement records were correlated with the predictors.

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[31]Mary H. Dodson, "A Study of Typewriting and Shorthand Prognosis" (unpublished Master's thesis, University of Kentucky, 1943).

[32]Billy T. Hutson, "Prognosis of Achievement in First-Year Gregg Shorthand Simplified" (unpublished Master's thesis, University of Tennessee, 1951).

The study concluded that none of the correlations were considered to be of value in prognosis.

The Goodenow Study:[33] The purpose of the study, completed in 1948, was to review the thought and practices as expressed in the literature and of the findings and conclusions of research pertaining to stenographic prognosis.

The data was collected from literature pertaining to prognosis which included books, professional articles, theses, and prognostic tests.

The findings were divided into two parts--present status of stenographic prognosis and the future of stenographic prognosis.

Synthesis of Research Relating to Shorthand Prognosis:

Reported Research Using Mental Ability: The literature showed that general mental ability was frequently used in studies of shorthand prognosis. A partial summary of studies reporting correlations of mental ability to shorthand achievement is compiled in Table III, Appendix, page 124. The table, compiled by this researcher from the studies reviewed, shows correlations reported, year, level, and criteria used for determining shorthand achievement.

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[33]Jean E. Goodenow, "A Review of Professional Literature Relating to Stenographic Prognosis" (unpublished Master's thesis, State University of Iowa, 1948).

The range of correlations between mental ability and shorthand achievement is from a .218 reported by the Sherman Study to a .75 reported by the Dodson Study. These correlations cannot be compared for the reason that a variety of mental ability tests was used and a variety of criteria for shorthand achievement was used. The median correlation in Table III, Appendix, page 124, is .36 reported by the Beal Study of 1929. The researchers reported in the original studies that intelligence tended to predict failure better than it predicted average or superior achievement.[34] Frink pointed out:

> . . . There was general agreement that intelligence is not a good predictor of success in beginning shorthand although it is as closely related to shorthand as to most academic subjects.[35]

Even though there is great variance in the use of intelligence as a predictor of shorthand achievement, there is consensus that intelligence criterion forecasts shorthand achievement as efficiently as it forecasts achievement in other academic subjects.

Reported Research Using English Grades: English grades and English tests of various types were frequently used criteria for predicting achievement in shorthand. The investigations involving such criteria have produced a variety of

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[34]Frink, op. cit., p. 34.

[35]Ibid.

findings. A review of the literature indicates that English grades were defined in different ways. Some investigations defined English grades as all courses in English taken prior to enrolling in shorthand while others used a specific course or year. This difference in definition of English grades was in part responsible for the variation in findings.

Table IV, Appendix, page 128, is a partial summary of findings of studies as reported by researchers of studies that used English grades and/or tests as one of the variables. This table, also compiled by the researcher from the studies reviewed, shows correlations reported, year, level, and criteria used for determining shorthand achievement.

The 14 studies reported 23 correlations with English grades and/or tests. The studies reported four correlations of .70 or higher; five correlations of .60 to .69; six correlations of .50 to .59; three correlations of .40 to .49; two correlations of .30 to .39; two correlations of .20 to .29; and one correlation of .01 was reported by the Mandell study. The .01 correlation was the relationship between grammar grades and shorthand grades.

The correlations listed in Table IV, Appendix, page 128, were .50 or higher in 15 of the 23 correlations. It is apparent from this review of studies using English grades and/or tests that achievement in English is one of the better factors in predicting shorthand achievement.

Reported Research Using Overall Grade Point Average: Grade Point Average has been studied for its potential in predicting shorthand achievement. Table V, Appendix, page 132, is a partial summary of findings reported by research projects that used grade point average as one of the variables in predicting shorthand achievement. The table shows the correlations of six research studies, the year each study was completed, the level of the investigation, and the criteria used to predict shorthand achievement.

The lowest correlation reported was .381 in the Hutson Study. The highest correlation was found in the Kortendick Study which reported a correlation of .7947 between grade point average and first semester shorthand grades. Of the 10 correlations reported in the studies of Table V, Appendix, page 132, five were .70 or higher.

Even though there is disagreement among researchers as to the degree of value of grade point average in predicting achievement in shorthand, it is apparent from the preceding table that grade point average is of value in forecasting shorthand grades.

Summary of Shorthand Prognosis:

A review of the literature on predicting achievement in shorthand indicates that there is a definite need for a means of forecasting shorthand achievement. The high rate

of failure is a waste of time, effort, and money. Researchers have not been able to produce a means of predicting achievement even though a large number of investigations have been done in shorthand prognosis. Some of the predictors of shorthand ability that have been studied are summarized below:

1. General Mental Ability tests are commonly used criteria for predicting shorthand achievement. Research shows, however, that mental ability does no better in predicting shorthand achievement than in predicting achievement in other academic subjects.

2. Special Aptitude Tests have been only partially successful as predictors of shorthand success. The Turse Shorthand Aptitude Test is the most successful; however, research indicates there are other tests (the ACE Linguistic score, for example) which will do as well as the Turse and require less time to administer.

3. English Grades have frequently been used in studies to predict shorthand success. The studies have concluded that English grades are of value in predicting shorthand achievement.

4. Grade Point Average has frequently been used by researchers who have agreed that it is of value in predicting shorthand achievement, but they have disagreed as

to the degree of value.

SECTION II

Review of Literature on Academic Motivation

Motivation has been studied by a number of researchers and scholars[36,37,38,39] as is evident by a review of literature and indices. None of the discoveries has produced a usable measure of motivation--one that could be utilized by a classroom teacher and interpreted by the classroom teacher--until the objective test created by Dr. W. W. Farquhar and his associates[40] in 1963.

Review of a Specific Study Relating to Academic Motivation:

The Farquhar Study: Farquhar and associates[41] polarized the McClelland Theory[42] which was that achievement motivation is composed of (1) long-term involvement,

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[36]Dalbir Bindra, Motivation: A Systematic Reinterpretation (New York: The Ronald Press Company, 1959).

[37]Jerome Kagan, and Gerald S. Lesser, Contemporary Issues in Thematic Apperceptive Methods (Springfield, Illinois: Charles C. Thomas, Publisher, 1961).

[38]K. B. Madsen, Theories of Motivation (Copenhagen, Denmark: Munksgaard, 1959).

[39]David C. McClelland, et al. The Achievement Motive (New York: Appleton-Century-Crofts, Inc., 1953).

[40]Farquhar, op. cit.

[41]Ibid.

[42]McClelland, op. cit.

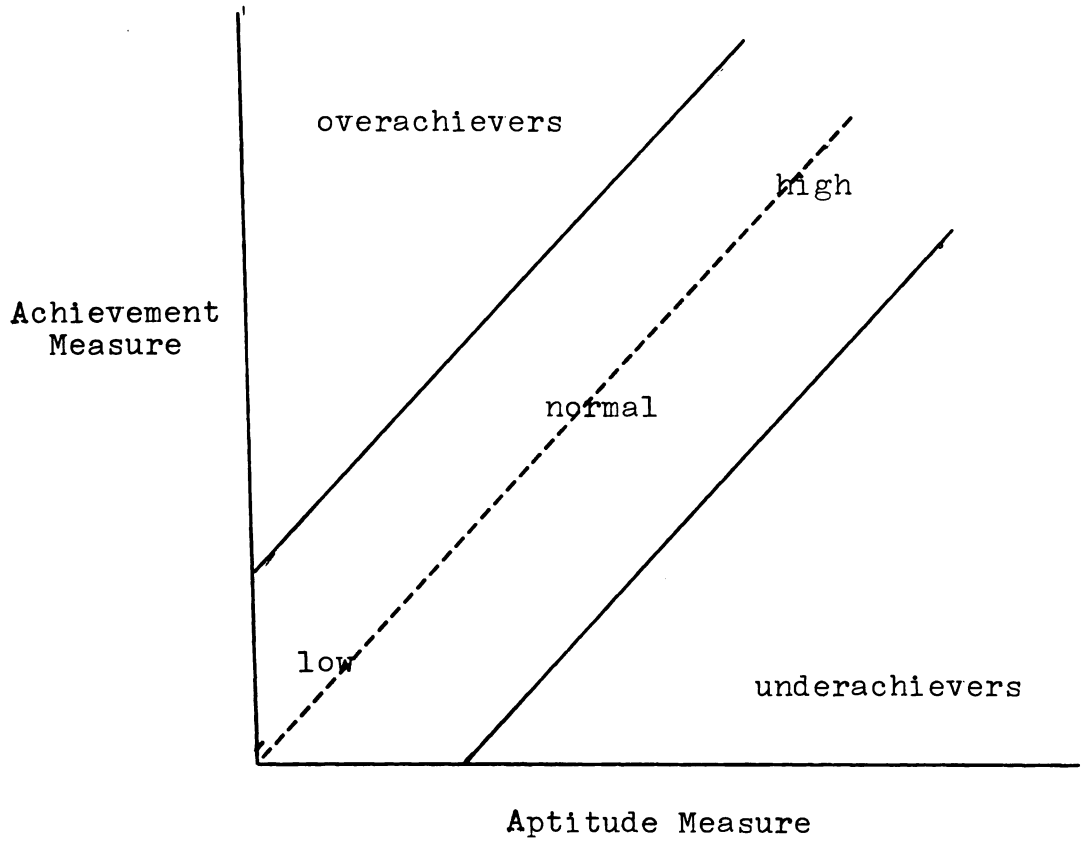
(2) unique accomplishment, and (3) competition with a standard of excellence. Their assumption was that there existed a continuum of achievement motivation. At one pole of the continuum would be found (1) short-term involvement, (2) common accomplishment, and (3) competition with a minimal standard of excellence. Along the continuum they assumed that highly motivated students would be found at the top with less motivated students falling somewhere below that level but above failure. By utilizing an aptitude base, Farquhar and associates identified those students who exceeded an aptitude based expectation of academic performance as overachievers and those students falling below expectation as underachievers. By dividing the students into male and female overachievers and underachievers and placing them on a regression diagram, the population was divided into subgroups of achievers as illustrated in Figure 1 (page 38).

Farquhar and associates theorized that significant and identifiable differences could be found in student responses and attitudes of over- and underachievers.

After identifying the over- and underachiever, six general areas of investigation were identified and researched. The areas were (1) Word Rating List--"Looking-glass-self;" (2) Preferred Teacher Characteristics Scale--measure of non-intellectual personality factors important to academic success; (3) Human Trait Inventory--measure to

FIGURE I

REGRESSION EQUATION DIAGRAM SHOWNNG OVER- AND UNDERACHIEVERS[a]



[a]Farquhar, op. cit., p. 12.

differentiate between discrepant achievers; (4) Perceived Parental Attitudes Inventory--measure of student views of his parents' child rearing practices; (5) Generalized Situational Choice Inventory--measurement of subject's need for long-term involvement, unique accomplishment, and competition with a standard of excellence; (6) Preferred Job Characteristics Scale--measurement of extremes in occupational motivation.

After factor analysis and validating and cross-validating the test items, 136 questions remained in the female form. The Preferred Teacher Characteristics Scale and Perceived Parental Attitudes Inventory did not withstand the factor analysis and cross validation process; therefore, these two measures were dropped from the project.

The Word Rating List:[43] The Word Rating List measures the student's perception of how her teachers perceive her. Four factors met the requirement of the research. The factors are (1) academician; (2) emotionality; (3) conformity; and (4) unreliability.

The academician factors are items in which the highly motivated girl believes that the teacher views her as "bright, effective, goal oriented, and amenable to learning".[44]

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[43] Farquhar, op. cit., p. 135.

[44] Ibid., p. 138.

The emotionality factors are items in which the "underachieving student sees herself as distracted, impatient, bold, and resistant."[45]

The conformity factors are items in which the "achieving student sees herself meeting the expectancies of the school role."[46]

The unreliability factors are items in which the "underachieving student sees herself as having a tendency not to meet the expectancies of the school."[47]

The Human Trait Inventory:[48] The Human Trait Inventory measures personal characteristics of the individual. Five female factors met the requirements of the research. The factors are (1) academic compulsivity; (2) fantasy; (3) conservatism; (4) social distance; and (5) emotional instability.

Academic compulsivity "describes high motivated dimensions related to high organizational needs which are fulfilled in school activities."[49]

The second factor was labeled fantasy and is "related to withdrawing into a non-academic dream world which lacks stress

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[45] Ibid.

[46] Ibid.

[47] Ibid.

[48] Ibid., p. 137.

[49] Ibid., pp. 146-147.

norms."[50] This factor describes the low motivated person.

The third factor, conservatism, was interpreted as measuring high motivation. The factor "is related to a strain towards consistency in conforming to established norms, whether they are her own or others."[51]

The fourth factor, social distance, was interpreted as measuring low motivation. The factor "is related to lack of desire for or understanding of social interaction beyond a superficial level."[52]

Generalized Situational Choice Inventory:[53] The Generalized Situational Choice Inventory measures what the individual would like to do in a given situation. Five female factors met the requirements of the research. The factors are (1) long-term versus short-term educational involvement; (2) high versus low task commitment; (3) unique versus common accomplishment; (4) long-term versus short-term involvement; and (5) independence versus dependence in problem solving.

The long-term versus short-term educational involvement factor consists of items describing highly motivated girls

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[50] Ibid., pp. 147-148.

[51] Ibid.

[52] Ibid.

[53] Ibid., p. 146.

desirous of "further education with a delay in immediate rewards as opposed to the low motivated female whose responses were typified by desire for immediate reward with little extended involvement in education."[54]

The high versus low task commitment factor was the second factor in the analysis. It is described as follows:

> The high motivated individual chooses the responses directed towards high effort with intellectual productivity, the low motivated individual chooses the responses which demand little immediate effort but might produce monetary returns.[55]

The third factor was labeled unique versus common accomplishment. It is described as follows:

> The high motivated female chooses responses concerned with doing outstanding tasks, the low motivated female wants to do things like everyone else.[56]

The fourth factor was labeled long-term versus short-term involvement. It is described as follows:

> The high motivated female chooses responses indicating a tolerance for waiting for rewards, the low motivated female wants immediate and certain rewards.[57]

The fifth factor was labeled independence versus dependence in problem solving. It is described as follows:

> The high motivated female chooses responses which

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[54] Ibid., p. 152.

[55] Ibid.

[56] Ibid., p. 158.

[57] Ibid.

> indicate a reliance on self for solving problems; the low motivated female looks to other's support.[58]

Preferred Job Characteristics Scale:[59] The Preferred Job Characteristics Scale measures vocational choices after the completion of education. Three female factors met the requirements of the research. The three factors were

(1) unique accomplishment versus avoidance of education;

(2) long-term versus short-term job involvement; and

(3) high versus low job interests.

The first factor was labeled unique accomplishment versus avoidance of education. It is described as follows:

> The high motivated individual solves problems no one else can thereby gains respect at job tasks to which she is committed. The low motivated individual avoids personal decisions and ties with a job lacking demand of college education.[60]

The second factor was labeled long-term versus short-term job involvement. It is described as follows:

> The high motivated individual wants a job requiring extended commitment. The low motivated individual wants little personal involvement with the job, but wants the security of knowing that job will be there for her when she wants it.[61]

The third factor was labeled high versus low job interests. It is described as follows:

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[58] Ibid.

[59] Ibid., p. 156.

[60] Ibid., p. 168.

[61] Ibid.

> The high motivated individual wants job which absorbs interests. The low motivated individual wants job with few demands, but one that will be available when it is needed.[62]

Multiple regression equations were constructed to determine the grade point average from the four subtests, total test score, and the Differential Aptitude Test of Verbal Reasoning which served as an aptitude base for the study. The multiple regression equation produced a correlation of .64 and .63 for females after cross validation.

The study concluded that:

1. High and low motivated eleventh grade students do respond with significant differences to a number of items designed to measure reflected self-concept personality traits, and preference for certain types of occupational characteristics.
2. Scores based on the valid items (labeled the M-Scales) estimate grade point average better than chance.
3. When the scores of either the sub- or total test are added to the DAT-VR the precision of estimating the grade point criterion is significantly increased.[63]

From these conclusions, an objective test was devised to measure factors related to academic achievement.

Implications of Related Literature for the Present Study:

The literature on prognosis demonstrates that English grades, grade point average, and mental ability, in order,

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[62] Ibid.

[63] Ibid., p. 179.

are the three most reliable predictors of shorthand achievement. Unfortunately, the correlations are not sufficient to warrant any one item or combination of items to be used as predictors of achievement.

The literature on dropouts and failures reaffirms the findings of the studies on prognosis. The reports on failures and dropouts show that the persons who drop out or fail shorthand differ significantly in several ways from those who are successful. The personality factors of significant differences are industry, initiative, and responsibility. Previous grades and scores on standard tests show there are significant differences with the achievers receiving more favorable scores each time.

The Farquhar Study shows that some of the variance between aptitude and actual achievement as indicated by grade point average can be measured to increase the predictability of achievement. The factors of the sub-tests of the Farquhar Study include nearly all the elements of differences found between shorthand achievers and failures.

The postulate is made that the Michigan M-Scales when used in combination with an estimate of mental ability will increase the precision of prediction of achievement of eleventh grade girls in first semester and second semester of Gregg Shorthand.

CHAPTER III

PROCEDURES

This chapter describes the procedures for the study and is divided into three parts: Part I contains the procedures used to collect the data; Part II contains the procedures used to process the data; and Part III contains the procedures used to statistically analyze the data.

Part I

Collection of Data

Sources of Information:

Schools: The information for this study came from two parochial high schools and six public senior high schools located in seven different cities and towns in central and southern Michigan. The participating schools had student enrollments ranging from 452 students to 1,619 students. These enrollment figures are presented in Table VI, Appendix, page 134.

The school administrators were contacted in June and July, 1964, to ascertain their willingness to participate in the study; the administrators of each school were contacted in person by the researcher, then each was sent a letter (Appendix, page 122) explaining the experiment and

identifying the data that were needed. After permission was granted by the administrators, the shorthand teachers were contacted in August and September, 1964, to ascertain their willingness to participate in the project. If the teacher expressed willingness to participate in the study, arrangements were made to administer the tests to his students.

Students: The subjects for this study were enrolled in beginning Gregg Shorthand classes in the eight participating schools. The sample consisted of eleventh grade girls only who were present for the administration of the two tests, who had a complete transcript in the school office, and who completed the first and/or second semesters of Gregg Shorthand. No other criteria were used for selecting the sample population. This produced a sample of 177 subjects for the first semester and 171 subjects for the second semester.

Nature of the Data Collected:

Three types of data were gathered concerning each student: (1) an estimate of mental ability, (2) grades for ninth and tenth grade English and an overall academic grade point average, and (3) a motivation score.

Estimate of Mental Ability: The instrument used to measure mental ability was the American Council on Education Psychological Examination for high school students,

1953 edition.[1] The test contained four sections: sections one and two produced a linguistic score, and sections three and four produced a quantitative score. The total score, the sum of the four sections, represented the estimate of mental ability. The researcher administered the test between September 18, 1964, and October 22, 1964. Each section of the test was timed with a stop watch according to the published directions. The subjects indicated their responses on special scoring sheets.

Scoring of the examination was done by hand. The researcher first examined each answer sheet for multiple responses to a single item; the company-prepared key was then used to determine the number of correct items for each test. Each sheet was scored twice by the researcher and then double checked by a second person.

Grades: To carry out the purposes of this investigation, it was necessary to obtain grades from the schools' permanent student records. The grades collected were the ninth grade English grades, tenth grade English grades, and grades from other academic subjects for the ninth and tenth grades.

To provide a composite English grade for each student, an average was derived from the four semester grades each

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[1]Burros, loc. cit.

student had in English.

Grade Point Average was determined from all academic courses each student had taken during the ninth and tenth grades. A list of the academic courses included in the grade point average is found in Table VII, Appendix, page 135, a list of the non-academic subjects not included in the grade point average is found in Table VIII, Appendix, page 136.

Assignment of a point value was made to each letter grade. A value of 5 points was assigned to a grade of A, 4 points to B, 3 points to C, 2 points to D, and 1 point to E and F. The point values were summed and divided by the number of academic courses taken during the ninth and tenth grades. The number of academic courses ranged from 16 to 21.

Shorthand grades were collected from the teachers at the end of the first and second semester.

Motivation Score: The motivation score was obtained from the student's responses to the Michigan M-Scales, an experimental objective test of academic motivation devised by Dr. W. W. Farquhar and his associates. The scale is composed of four sub-tests: (1) Generalized Situational Choice Inventory (GSCI), (2) Preferred Job Characteristics Scale (PJCS), (3) Word Rating List (WRL), and (4) Human Trait Inventory (HTI). An abridged description of

Farquhar's tests as given by Kipfmueller[2] follows.

> The Generalized Situational Choice Inventory was constructed to describe the academic motivation situation. Students are required to make a forced choice between two types of situations, one which depicts a high and one which depicts a low academic motivation situation. A high score on this scale indicates an individual who has a high need for academic achievement. A low score indicates an individual who chooses activities disassociated from the school's program.
>
> The Preferred Job Characteristics Scale was designed to differentiate between the job aspirations of high-low motivated students. Students are required to make a forced choice between two types of jobs, one which depicts high and one which depicts low job aspiration. Students who score high on the scale tend to want jobs where their individuality is recognized, where their talents and skills are used, and where opportunities exist for change and advancement. Students who score low on this scale tend to prefer jobs where entry is easy, requirements are low, time restrictions are absent, and where one is "discovered" rather than worked into a position.
>
> The Word Rating List was designed to measure the academic self-concept of the student. Students are asked to rate themselves on a series of descriptive phrases and words describing high and low motivated and achieving students. A high score indicates an individual with academic self-concept oriented towards the school environment. An individual who scores low on this scale has a fairly clear-cut picture that he is not academic.
>
> The Human Trait Inventory consists of items from past personality tests that have been found to differentiate between high and low achieving and motivated students. Students are asked to rate how they feel about these statements. Individuals who score high on this scale tend to have personalities

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[2]Mark K. Kipfmueller, "The Predictibility (sic) and Factored Dimensions of the M-Scales for Eleventh Grade Parochial School Students" (unpublished Doctoral dissertation, Michigan State University, 1963), pp. 19-21.

more similar to highly motivated students and those scoring low tend to have personalities similar to low motivated students.

The researcher read the test directions to the students. After allowing time for questions from the students, the subjects were allowed to mark their responses at their own speed on a scoring sheet with machine scoring pencils. The test was administered between September 19, 1964, and November 10, 1964. Scoring of the M-Scales was done by the Office of Evaluation Services on the campus of Michigan State University.

Part II

Processing of Data

Preparation:

After the tests were scored and grades were collected, the data were placed on worksheets in preparation for key-punching.

The worksheet was taken to the Computer Center on Michigan State University Campus where the data was placed on punch cards and verified. The cards were processed through the line printer which transferred the information on the cards to printout paper. From this printout, the data on the cards were checked against the original data to determine accuracy of the cards. No errors were found.

Processing:

The data was processed by the Control Data Corporation 3600 Computer on Michigan State University Campus. The CORE[3] program was used and provided the necessary correlations for this study.

Part III

Analysis of Data*

Three statistical procedures were used in the analysis of the data: (1) estimate of reliability of motivation score; (2) mean test of significance; and (3) correlation analysis.

Reliability Estimate:

The Farquhar Study used Hoyt's Analysis of Variance to obtain an estimate of reliability to measure internal consistency of the M-Scales. Since this study attempted to follow the Farquhar Study as closely as possible, Hoyt's procedure for reliability estimate was in the original design for the present study; however, as the data for the

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[3]D. F. Kiel and W. L. Ruble, "Calculation of More Than One Regression From a Set of Data (CORE)" Michigan State University Agricultural Experiment Station #6, September 30, 1963.

*Help with the statistical design and the use of the computer program was secured from Dr. W. W. Farquhar, Miss Jean Dyer, and Mr. Bruce Rogers.

present study were analyzed, it was found that the responses of the subjects to the M-Scales were scored in a right or wrong category. Lindquist points out that

> The analysis of variance approach, however, appears useful for obtaining reliability estimates from items or trials which are scored with a range of scores, and not merely as 'passed' or 'failed'.[4]

For the reason that the subjects' responses were in passed or failed form, and for the reason that the researcher found it more economically feasible, the decision was made to substitute Kuder-Richardson #20 formula for the Hoyt's Analysis of Variance procedure to obtain an estimate of internal consistency of the M-Scales. Lindquist points out that

> It has been indicated that the result obtained by Hoyt's procedure is identical with that from Kuder-Richardson #20, so nothing new has been added so far as analysis of items of a test is concerned.[5]

The Kuder-Richardson #20[6] formula is

$$r_{tt} = \left(\frac{n}{n-1}\right)\left(\frac{s_t^2 - p_i q_i}{s_t^2}\right)$$

where r_{tt} = reliability of the total test

n = number of items in the test

s_t^2 = variance of the total test

p_i = proportion passing item i

q_i = $1 - p_i$.

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[4] E. F. Lindquist, Design and Analysis of Experiments in Psychology and Education (Boston: Houghton Mifflin, 1953), 591.

[5] Ibid.

[6] Ibid.

Mean Tests of Significance:

The Student "t" was used to test the differences in uncorrelated means between the responses of the subjects in the present study and the responses of the subjects in the Farquhar Study to the Michigan M-Scales, and the difference in uncorrelated means between the grade point average of the subjects in the present study and the grade point average of the subjects in the Farquhar Study. It was assumed that the means were uncorrelated for the following reasons: there were no common factors between the population samples; and the samples were independent. The formula[7] used is as follows:

$$t = \left(\frac{\bar{X}_1 - \bar{X}_2}{s_{\bar{x}_1 - \bar{x}_2}}\right)$$

where t = the t ratio with n_1 plus n_2 minus 2 degrees of freedom (177 + 261 - 2 = 436).

$\bar{X}_1$ = the mean of group 1 (population of the present study).

$\bar{X}_2$ = the mean of group 2 (female population of the Farquhar Study).

$s_{\bar{x}_1 - \bar{x}_2}$ = the standard error of difference.

In order to perform the t test, it was necessary to test the equality of the variance between the population in the present study and the female population of the Farquhar Study. The F (Fisher F) test was used to test the

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[7]Edwards, op. cit., p. 254.

equality of variance of the four sub-tests and the total M-Scales as well as the grade point average for the two populations. The formula[8] used is as follows:

$$F = \frac{S_1^2}{S_2^2}$$

where S_1^2 = larger variance of the two populations

S_2^2 = smaller variance of the two populations

F = the F ratio with n_1 degrees of freedom for the numerator and n_2 degrees of freedom for the denominator (261, 177).

Correlation Analysis:

A zero order and multiple correlation analysis was performed to predict shorthand grades from raw scores of the (1) General Situational Choice Inventory (GSCI), (2) Preferred Job Characteristics Scale (PJCS), (3) Word Rating List (WRL), (4) Human Trait Inventory (HTI), (5) Total M-Scales Score, (6) American Council on Education Psychological Examination (ACE), (7) English grades, and (8) Overall Grade Point Average (GPA).

The zero order and multiple correlation equations were solved using the general linear hypothesis which means that "if the Y values are plotted against the X values in a graph, the resulting trend of the plotted points can be

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[8] Ibid., p. 272.

represented by a straight line."[9] The Michigan State University Computer, CDC 3600, with CORE program was used in the analysis.

The zero order correlations were tested to determine whether they were significantly different from zero. The tabled values of r were used with confidence limits of .05.[10] The .01 level of confidence was also examined. The degrees of freedom used was determined by N - 2 where N = number of paired observations.[11] In the present study, N equals 177 which produced 175 degrees of freedom for the zero order test.

The multiple correlations were of two types. The first type multiple correlation was computed by using all the predictor variables. The second multiple was computed by combining a subscore of the M-Scales with the estimate of mental ability or with a subscore of the estimate of mental ability.

The first type multiple was tested to determine the significant difference from zero. The test used was an F test[12] which is as follows:

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[9] Ibid., p. 116.

[10] Ibid., p. 502.

[11] Ibid., p. 303.

[12] W. L. Hays, Statistics for Psychologists (New York: Holt, Rinehart and Winston, 1963), p. 573.

$$F = \frac{\left(\frac{R^2}{(1 - R^2)}\right)(N - K)}{(K - 1)}$$

where N = number of subjects (177)

K = number of predictor variables (11)

F = ratio with N - K (177 - 11 = 166) degrees of freedom for the numerator and K - 1 (11 - 1 = 10) degrees of freedom for the denominator.

The assumption was made that a multivariate normal population had been sampled.

The second type multiple was tested to determine the increase in multiple R resulting from an increase in the number of variables. An increase in multiple R is equivalent to an increase in predictive value or precision.[13] It was tested by using an F test advocated by Guilford. The formula[14] is as follows:

$$F = \frac{\left(\frac{R_1^2 - R_2^2}{(1 - R_1^2)}\right)(N - m_1 - 1)}{(m_1 - m_2)}$$

where R_1 = multiple R with larger number of independent variables

R_2 = multiple R with one or more variables omitted

m_1 = larger number of the independent variables (2)

m_2 = smaller number of independent variables (1)

F = the F ratio with $m_1 - m_2$ (2 - 1) degrees of freedom for the numerator and N - m_1 - 1 (177 - 2 - 1 = 174) degrees of freedom for the denominator.

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[13] J. P. Guilford, Fundamental Statistics in Psychology and Education (New York: McGraw-Hill Book Company, Inc., 1956), p. 400.

[14] Ibid.

Null Hypotheses:

The following hypotheses are restatements of the hypotheses* in null form:

Ho_1: Each predictor variable will not significantly predict achievement of eleventh grade girls in first and second semesters of Gregg Shorthand.

Ho_2: The predictor variables as a group will not significantly predict achievement of eleventh grade girls in first and second semesters of Gregg Shorthand.

Ho_3: The Michigan M-Scales when combined with an estimate of mental ability will not increase the precision of prediction of achievement for eleventh grade girls in first and second semesters of Gregg Shorthand.

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*See page 3 for statement of research hypotheses.

CHAPTER IV

FINDINGS

This chapter reports the findings of the investigation. The findings are divided into three parts. Part I contains the findings regarding the reliability test of the motivation score; Part II contains the findings regarding the comparison of the data in the present study to that of corresponding data from the Farquhar Study; and Part III is divided into two sections: Section I is a test of hypotheses for first semester findings, and Section II is a test of hypotheses for second semester findings.

Part I

Reliability

The reliability estimates for all subscores of the Michigan M-Scales are reproduced in Table IX, Appendix, page 137. Kuder-Richardson #20 formula produced an estimate of reliability of the subscores of the Michigan M-Scales for the 177 subjects in the first semester analysis. The estimates of reliability for the subscores were .73 for the General Situational Choice Inventory (GSCI) and for the Human Trait Inventory (HTI), and were .89 for the Preferred Job Characteristics Scale (PJCS) and for the Word Rating

List (WRL).

A comparison of the reliability estimates for the present study with the reliability estimates of the Farquhar Study reveals that the responses of the population of the present study were more reliable on one test, the Preferred Job Characteristics Scale (PJCS) (.89 vs. .83), and less reliable on three tests, the General Situational Choice Inventory (GSCI) (.73 vs. .90); the Word Rating List (WRL) (.89 vs. .93); and the Human Trait Inventory (HTI) (.73 vs. .93).

Part II

Mean Differences Between Farquhar Findings and the Present Study

The mean scores of the female population of the Farquhar Study on the sub-tests of the Michigan M-Scales and on the total score of the Michigan M-Scales were higher than the mean score of the female population of the present study on the same tests. However, the mean grade point average of the female population of the present study was higher than the mean grade point average of the female population of the Farquhar Study. In order to determine whether or not these differences were significant, the data were treated statistically.

Standard deviations and F (Fisher F) ratios for the comparison of the female population of the Farquhar Study to the

female population in the present study are presented in Table X, Appendix, page 138. The F ratios ranged from 1.01 for the Word Rating List (WRL) to 1.32 for the General Situational Choice Inventory (GSCI). For the reason that all the obtained F values were less than the tabled value, (1.43[1]) at the .01 confidence level with 200 degrees of freedom in the numerator and 150 degrees of freedom in the denominator, the assumption was made that no significant differences existed in the variances of the subscores and the total score on the Michigan M-Scales and the grade point average between the female population of the Farquhar Study and the population of the present study. This statistical analysis of the distribution of the scores indicated that the scores on the Michigan M-Scales and grade point average were distributed in a manner sufficiently similar to warrant the researcher's safely assuming that the distribution of scores and grades were similar in the two populations. This statistical analysis was necessary in order to make the t tests to determine differences, if any, in the mean scores of the Michigan M-Scales and grade point average of the female population of the Farquhar Study and the population of the present study.

Mean scores and t ratios with assumed equal variances for the female population of the Farquhar Study and the

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[1]Edwards, op. cit., pp. 504-507.

population of the present study are presented in Table XI, Appendix, page 139.

By using a series of two-tailed tests at the .01 confidence level, the following significant differences were found between the means of the female population of the Farquhar Study and the means of the population of the present study:

(1) There was a significant difference between the mean score of the female population of the Farquhar Study and the mean score of the population of the present study on the total score of the Michigan M-Scales ($t = -4.0530$; tabled value, 2.588[2] at the .01 confidence level).

(2) There was a significant difference between the mean score of the female population of the Farquhar Study and the mean score of the population of the present study on the Preferred Job Characteristics Scale (PJCS) ($t = -6.1943$; tabled value, 2.588[3] at the .01 confidence level).

By using a series of two-tailed tests at the .05 confidence level, the following significant differences were found between the means of the female population of the Farquhar Study and the means of the population of the present study:

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[2] Ibid., p. 501.

[3] Ibid.

(1) There was a significant difference between the mean score of the female population of the Farquhar Study and the mean score of the population of the present study on Grade Point Average (GPA) (t = 2.4878; tabled value, 1.966[4] at the .05 confidence level).

(2) There was a significant difference between the mean score of the female population of the Farquhar Study and the mean score of the population of the present study on the Word Rating List (WRL) (t = -2.3957; tabled value, 1.966[5] at the .05 confidence level).

(3) There was a significant difference between the mean score of the female population of the Farquhar Study and the mean score of the population of the present study on the General Situational Choice Inventory (GSCI) (t = -2.0704; tabled value, 1.966[6] at the .05 confidence level).

There was no significant difference between the mean score of the female population of the Farquhar Study and the mean score of the population of the present study at either the .05 or at the .01 confidence levels on the Human Trait Inventory (HTI) (t = -.2564; tabled value, 1.966[7]

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[4] Ibid.

[5] Ibid.

[6] Ibid.

[7] Ibid.

at the .05 confidence level).

The distribution of the responses of the population of the present study to the Michigan M-Scales was similar to the distribution of the responses of the population of the Farquhar Study to the Michigan M-Scales; however, the mean scores of the total score and subscores of the Michigan M-Scales of the population of the present study were significantly lower than the mean scores of the total score and subscores of the Michigan M-Scales of the population of the Farquhar Study, which indicates that, according to the results of this test, the population of the present study was not as academically motivated as the population of the Farquhar Study. However, the mean score of the Grade Point Average of the population of the present study was significantly higher than the mean score of the Grade Point Average of the female population of the Farquhar Study which indicates that the population of the present study had a better academic record than the female population of the Farquhar Study.

Part III

Test of Hypotheses

Section I--First Semester:

The first null hypothesis test was:

> Each predictor variable will not significantly predict achievement of eleventh grade girls in first semester of Gregg Shorthand (r = 0).

The zero order correlations between the predictor variables and shorthand grades were used to test this hypothesis and are summarized in Table XII, Appendix, page 140. The Table "Value of the Correlation Coefficient for Different Levels of Significance"[8] was used to determine significance of the zero order correlations. The tabled values of r for 175 degrees of freedom at .05 confidence level are .148 and at the .01 confidence level, .193. All but two of the zero order correlations between first semester shorthand grades and the predictor variables were found to be significant at the .01 confidence level since all were found to be equal to or greater than .193. The correlation between General Situational Choice Inventory (GSCI) and the shorthand grades and the correlation between the Preferred Job Characteristics Scale (PJCS) and shorthand grades were the only zero order correlations that were not significant at the .01 confidence level. The correlation between General Situational Choice Inventory (GSCI) and shorthand grades was significant at the .05 confidence level (r = .1627; tabled value, .143[9] at the .05 confidence level) although it had not been significant at the .01 confidence level. The correlation between Preferred Job Characteristics Scale (PJCS)

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[8] Ibid., p. 502.

[9] Ibid.

and shorthand grades was not significant at the .05 confidence level (r = .0592; tabled value, .143[10] at the .05 confidence level).

Table XIII, Appendix, page 141, presents a summary of the inter-correlations of the Michigan M-Scales, American Council on Education Psychological Examination for high school students, and first semester shorthand grades. The table shows that the Word Rating List (WRL) correlated with the American Council on Education Psychological Examination (.2290) higher than the total Michigan M-Scales correlated with the American Council on Education Psychological Examination (.1702). Correlations also show that the relationship between shorthand achievement and the Word Rating List (WRL) (.2280), and the Human Trait Inventory (HTI) (.2235), and the total score of the Michigan M-Scales (.2219) was significantly different from zero at the .01 confidence level (tabled value of r is .193[11] at .01 confidence level with 175 degrees of freedom).

The correlations between subtests and total score of the Michigan M-Scales and American Council on Education Psychological Examination are relatively low (.10 or less) with the exception of the Word Rating List (WRL) which correlated .2290 with American Council on Education

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[10] Ibid.

[11] Ibid.

Psychological Examination. The correlation between the Human Trait Inventory (HTI) and American Council on Education Psychological Examination is .0943; however, the correlation between Human Trait Inventory (HTI) and shorthand grades was .2235 which is slightly higher than the correlation between Michigan M-Scales total score and shorthand grades (.2219).

The Word Rating List (WRL) was found to correlate significantly different from zero with shorthand achievement (.2280) and was slightly higher than the correlation between Human Trait Inventory (HTI) and shorthand grades (.2235). The correlation between the Word Rating List (WRL) and the Human Trait Inventory (HTI) was .5535; between the Human Trait Inventory (HTI) and the General Situational Choice Inventory (GSCI) was .5112; and between the General Situational Choice Inventory (GSCI) and the Preferred Job Characteristics Scale (PJCS) was .6226. These correlations indicate that there is a considerable amount of commonalty between the subtests and total score of the Michigan M-Scales but that there is a relatively small amount of commonalty between the American Council on Education Psychological Examination and the Michigan M-Scales.

The correlations indicate that the relationship between the predictor variables and shorthand grades was significantly different from zero; thus, the null hypothesis was rejected except for the part that pertained to the Preferred Job

Characteristics Scale for which the null hypothesis was accepted.

The second null hypothesis tested was:

> The predictor variables as a group will not significantly predict achievement of eleventh grade girls in first semester Gregg Shorthand (R = 0).

The multiple correlation computed from grade point average, tenth grade English grades, ninth grade English grades, American Council on Education Psychological Examination subscores, and subscores of the Michigan M-Scales was .6984. For the reason that the obtained value from the test, (16.8098)[12] was greater than the tabled value ($F_{100,7}$= 5.70 at the .01 confidence level[13]), the assumption was made that the multiple correlation obtained in the present study was significantly greater than zero; thus, the null hypothesis was rejected.

The third null hypothesis tested was:

> The Michigan M-Scales subscores or total score when combined with an estimate of mental ability will not significantly increase the precision of prediction of achievement for eleventh grade girls in first semester Gregg Shorthand.

Tables XIV, XV, and XVI, Appendix, pages 142, 143, and 144, present a summary of the zero order correlations, multiple order correlations, and results of the F tests made to statistically test the third hypothesis.

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[12] Formula used: $F = \frac{(R^2)}{(1 - R^2)} \frac{(N - K)}{(K - 1)}$ Hays, op. cit.

[13] Edwards, op. cit., pp. 504-507.

To test this hypothesis, a multiple correlation was computed by combining the total score or a subscore of the Michigan M-Scales with the total score or a subscore of the American Council on Education Psychological Examination.

The computed multiple correlation between the two independent variables and the dependent variable was then statistically compared, by means of an F test,[14] with the zero order correlation between the total score or a subscore of the American Council on Education Psychological Examination and first semester shorthand grades to determine the significance of increase in predictive value.

The F values obtained by the statistical tests were compared with the tabled values of F for 1 and 174 degrees of freedom at the .01 and .05 confidence levels. Obtained F values greater than 6.785,[15] the tabled value of F for 1 and 174 degrees of freedom at the .01 confidence level, were considered significant at the .01 confidence level. Obtained F values greater than 3.90, the tabled value of F for 1 and 174 degrees of freedom at the .05 confidence level, but less than 6.785,[16] the tabled value of F for 1 and 174 degrees of freedom at the .01 confidence level, were considered significant at the .05 confidence level.

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[14] Formula used: $$F = \frac{(R_1^2 - R_2^2)}{(1 - R_1^2)} \frac{(N - m_1 - 1)}{(m_1 - m_2)}$$

[15] Ibid.

[16] Ibid.

Obtained F values less than 3.90,[17] the tabled value of F for 1 and 174 degrees of freedom at the .05 confidence level, were considered not significant.

F Tests at the .01 Confidence Level:

By using a series of F tests at the .01 confidence level, the following significant increases in predictive value were found when the total score or a subscore of the Michigan M-Scales was used in combination with the total score or a subscore of the American Council on Education Psychological Examination to predict achievement of eleventh grade girls in first semester Gregg Shorthand (Tables XIV, XV, and XVI, Appendix, pages 142, 143, and 144).

(1) There was a significant increase in predictive value when the Human Trait Inventory (HTI) was combined with the American Council on Education Psychological Examination (ACE) (r_{ACE} = .4190, $R_{ACE + HTI}$ = .4621; F = 8.1856, Table XIV, Appendix, page 142, tabled value, 6.785 with 1 and 175 degrees of freedom at .01 confidence level[18]); thus, this part of the null hypothesis was rejected at the .01 confidence level.

(2) There was a significant increase in predictive value when the total score of the Michigan M-Scales was combined with the American Council on Education Psychological

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[17] Ibid.

[18] Ibid.

Examination (ACE) (r_{ACE} = .4190, $R_{ACE + \text{total M-Scales}}$ = .4945; F = 17.3826, Table XIV, Appendix, page 142, tabled value, 6.785 at .01 confidence level[19]); thus, this part of the null hypothesis was rejected at the .01 confidence level.

(3) There was a significant increase in predictive value when the Human Trait Inventory (HTI) was combined with the Linguistic score, a subscore of the American Council on Education Psychological Examination, (L-ACE) ($r_{L\text{-}ACE}$ = .3454, $R_{L\text{-}ACE + HTI}$ = .4033; F = 7.6944, Table XV, Appendix, page 143, tabled value, 6.785 at .01 confidence level[20]); thus, this part of the null hypothesis was rejected at the .01 confidence level.

(4) There was a significant increase in predictive value when the total score of the Michigan M-Scales was combined with the Linguistic score, a subscore of the American Council on Education Psychological Examination, (L-ACE) ($r_{L\text{-}ACE}$ = .3454, $R_{L\text{-}ACE + \text{total M-Scales}}$ = .4091; F = 10.0361, Table XV, Appendix, page 143, tabled value, 6.785 at .01 confidence level[21]); thus, this part of the null hypothesis was rejected at the .01 confidence level.

(5) There was a significant increase in predictive value when the total score of the Michigan M-Scales was

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[19] Ibid.

[20] Ibid.

[21] Ibid.

combined with the Quantitative score, a subscore of the American Council on Education Psychological Examination, (Q-ACE) ($r_{Q\text{-}ACE}$ = .4032, $R_{Q\text{-}ACE + \text{total M-Scales}}$ = .4517; F = 9.0736, Table XVI, Appendix, page 144, tabled value, 6.785 at .01 confidence level[22]); thus, this part of the null hypothesis was rejected at the .01 confidence level.

F tests at the .05 Confidence Level:

By using a series of F tests at the .05 confidence level, the following significant increases in predictive value were found when the total score or a subscore of the Michigan M-Scales was used in combination with the total score or a subscore of the American Council on Education Psychological Examination to predict achievement of eleventh grade girls in first semester Gregg Shorthand (Tables XIV, XV, and XVI, Appendix, pages 142, 143, and 144).

(1) There was a significant increase in predictive value when the Word Rating List (WRL) was combined with the American Council on Education Psychological Examination, (ACE) (r_{ACE} = .4190, $R_{ACE + WRL}$ = .4443; F = 4.7261, Table XIV, Appendix, page 144, tabled value, 3.90 at .05 confidence level[23]); thus, this part of the null hypothesis was rejected at the .05 confidence level.

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[22] Ibid.

[23] Ibid.

(2) There was a significant increase in predictive value when the Word Rating List (WRL) was combined with the Linguistic score, a subscore of the American Council on Education Psychological Examination, (L-ACE) ($r_{L\text{-}ACE}$ = .3454, $R_{L\text{-}ACE + WRL}$ = .3787; F = 4.8954, Table XV, Appendix, page 143, tabled value, 3.90 at .05 confidence level[24]); thus, this part of the null hypothesis was rejected at the .05 confidence level.

(3) There was a significant increase in predictive value when the Word Rating List (WRL) was combined with the Quantitative score, a subscore of the American Council on Education Psychological Examination, (Q-ACE) ($r_{Q\text{-}ACE}$ = .4032, $R_{Q\text{-}ACE + WRL}$ = .4403; F = 6.7562, Table XVI, Appendix, page 144, tabled value, 3.90 at .05 confidence level[25]); thus, this part of the null hypothesis was rejected at the .05 confidence level even though this F value was close to the significant value at the .01 confidence level (6.785).

(4) There was a significant increase in predictive value when the Human Trait Inventory (HTI) was combined with the Quantitative score, a subscore of the American Council on Education Psychological Examination, (Q-ACE) ($r_{Q\text{-}ACE}$ = .4032, $R_{Q\text{-}ACE + HTI}$ = .4312; F = 5.0013, Table XVI, Appendix, page 144, tabled value, 3.90 at .05 confidence

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[24] Ibid.

[25] Ibid.

level[26]); thus, this part of the null hypothesis was rejected at the .05 confidence level.

By using a series of F tests, the following increases in predictive value were found to be insignificant at either the .01 or .05 confidence level:

(1) There was no significant increase in predictive value when the General Situational Choice Inventory (GSCI) was combined with the American Council on Education Psychological Examination (ACE) (r_{ACE} = .4190, $R_{ACE + GSCI}$ = .4398; F = 3.8398, Table XIV, Appendix, page 142, tabled values, 6.785 at the .01 confidence level and 3.90 at the .05 confidence level[27]); thus, this part of the null hypothesis was accepted at the .01 and .05 confidence levels.

(2) There was no significant increase in predictive value when the Preferred Job Characteristics Scale (PJCS) was combined with the American Council on Education Psychological Examination (ACE) (r_{ACE} = .4190, $R_{ACE + PJCS}$ = .4266; F = 1.3613, Table XIV, Appendix, page 142, tabled values, 6.785 at .01 confidence level and 3.90 at .05 confidence level[28]); thus, this part of the null hypothesis was accepted at the .01 and .05 confidence levels.

(3) There was no significant increase in predictive value when the General Situational Choice Inventory (GSCI)

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[26] Ibid.

[27] Ibid.

[28] Ibid.

was combined with the Linguistic score, a subscore of the American Council on Education Psychological Examination, (L-ACE) ($r_{L\text{-}ACE} = .3454$, $R_{L\text{-}ACE + GSCI} = .3701$; $F = 3.6627$, Table XV, Appendix, page 143, tabled values, 6.785 at .01 confidence level and 3.90 at .05 confidence level[29]); thus, this part of the null hypothesis was accepted at the .01 and .05 confidence levels.

(4) There was no significant increase in predictive value when the Preferred Job Characteristics Scale (PJCS) was combined with the Linguistic score, a subscore of the American Council on Education Psychological Examination, (L-ACE) ($r_{L\text{-}ACE} = .3454$, $R_{L\text{-}ACE + PJCS} = .3503$; $F = .6743$, Table XV, Appendix, page 143, tabled values, 6.785 at .01 confidence level and 3.90 at .05 confidence level[30]); thus, this part of the null hypothesis was accepted at the .01 and .05 confidence levels.

(5) There was no significant increase in predictive value when the General Situational Choice Inventory (GSCI) was combined with the Quantitative score, a subscore of the American Council on Education Psychological Examination, (Q-ACE) ($r_{Q\text{-}ACE} = .4032$, $R_{Q\text{-}ACE + GSCI} = .4201$; $F = 2.9370$, Table XVI, Appendix, page 144, tabled values, 6.785 at .01 confidence level and 3.90 at .05 confidence level[31]); thus,

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[29] Ibid.

[30] Ibid.

[31] Ibid.

this part of the null hypothesis was accepted at the .01 and .05 confidence levels.

(6) There was no significant increase in predictive value when the Preferred Job Characteristics Scale (PJCS) was combined with the Quantitative score, a subscore of the American Council on Education Psychological Examination, (Q-ACE) ($r_{Q\text{-}ACE}$ = .4032, $R_{Q\text{-}ACE + PJCS}$ = .4037; F = .0831, Table XVI, Appendix, page 144, tabled values, 6.785 at .01 confidence level and 3.90 at .05 confidence level[32]); thus, this part of the null hypothesis was accepted at the .01 and .05 confidence levels.

Section II--Second Semester:

The first null hypothesis tested was:

> Each predictor variable will not significantly predict achievement of eleventh grade girls in second semester of Gregg Shorthand (r = 0).

The zero order correlations were used to test this hypothesis. The Table "Value of the Correlation Coefficient for Different Levels of Significance"[33] was used to determine significance of the zero order correlations. The correlations between the predictor variables and shorthand grades for the 171 subjects in the second semester analysis are summarized in Table XVII, Appendix, page 145. The tabled

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[32] Ibid.

[33] Edwards, op. cit., p. 502.

value of r for 150 degrees of freedom at .05 confidence level is .159 and at .01 confidence level is .208. All except four of the zero order correlations between second semester shorthand grades and the predictor variables were found to be significant at the .01 confidence level since all were found to be greater than .208. The four zero order correlations found to be not significant were: (a) the correlation between General Situational Choice Inventory (GSCI) and shorthand grades; (b) the correlation between Preferred Job Characteristics Scale (PJCS) and shorthand grades; (c) the correlation between the Human Trait Inventory (HTI) and shorthand grades; and (d) the correlation between the total Michigan M-Scales and shorthand grades. Thus, the null hypothesis was rejected at the .01 level of confidence except for the parts which pertained to the total score of the Michigan M-Scales for which the null hypothesis was rejected at the .05 confidence level and for those parts which pertained to the General Situational Choice Inventory (GSCI), Preferred Job Characteristics Scale (PJCS), and Human Trait Inventory (HTI) for which the null hypothesis was accepted at .05 and .01 confidence levels.

By comparing Table XII, Appendix, page 140, "Zero Order Correlations Between First Semester Shorthand Achievement and Predictor Variables for the Population of the Present Study" with Table XVII, Appendix, page 145, "Zero Order

Correlations Between Second Semester Shorthand Achievement and Predictor Variables for the Population of the Present Study" certain increases and decreases in correlations were noted. The noted increases were:

(1) Tenth grade English increased from .5078 for first semester to .5253 for second semester.

(2) American Council on Education Psychological Examination (ACE) increased from .4190 for first semester to .4704 for second semester.

(3) American Council on Education Psychological Examination Linguistic subscore increased from .3454 for first semester to .4491 for second semester.

The noted decreases were:

(1) Grade Point Average (GPA) decreased from .6743 for first semester to .6011 for second semester.

(2) Ninth grade English decreased from .5212 for first semester to .4684 for second semester.

(3) M-Scales total score decreased from .2219 for first semester to .1593 for second semester.

(4) General Situational Choice Inventory (GSCI) decreased from .1627 for first semester to .0905 for second semester.

(5) Preferred Job Characteristics Scale (PJCS) decreased from .0592 for first semester to .0169 for second semester.

(6) Word Rating List (WRL) decreased from .2280 for first semester to .2216 for second semester.

(7) Human Trait Inventory (HTI) decreased from .2235 for first semester to .1114 for second semester.

(8) American Council on Education Psychological Examination Quantitative subscore decreased from .4032 for first semester to .2624 for second semester.

The above changes in correlation from first semester shorthand grades to second semester shorthand grades indicate that a predictor variable may be of value in predicting achievement for one semester but of greater or lesser value in predicting shorthand achievement for another semester.

The second null hypothesis tested was:

> The predictor variables as a group will not significantly predict achievement of eleventh grade girls in second semester Gregg Shorthand ($R = 0$).

The multiple correlation computed from grade point average, tenth grade English grades, ninth grade English grades, American Council on Education Psychological Examination subscores, and M-Scales subscores was .6399. For the reason that the obtained value from the test ($F = 12.7788$; tabled value, 5.70 at .01 confidence level[34]) was greater than the tabled value at .01 confidence level, the

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[34]Edwards, op. cit., pp. 504-507.

assumption was made that the multiple correlation obtained in the present study was significantly greater than zero; thus, the null hypothesis was rejected at the .01 confidence level.

The third null hypothesis tested was:

> The Michigan M-Scales subscore or total score when combined with an estimate of mental ability will not significantly increase the precision of prediction of achievement for eleventh grade girls in second semester of Gregg Shorthand.

Tables XVIII, XIX, and XX, Appendix, pages 146, 147, and 148, present a summary of the zero order correlations, multiple order correlations, and results of the F tests made to statistically test the third hypothesis for second semester.

To test this hypothesis, a multiple correlation was computed by combining the total score or a subscore of the Michigan M-Scales with the total score or a subscore of the American Council on Education Psychological Examination. The computed multiple correlation between the two independent variables and the dependent variable was then statistically compared, by means of an F test, with the zero order correlation between the total score or a subscore of the American Council on Education Psychological Examination and second semester shorthand grades to determine the significance of increase in predictive value.

The F values obtained by the statistical tests were compared with the tabled values of F for 1 and 168 degrees

of freedom at the .01 and .05 confidence levels. Obtained F values greater than 6.785[35], the tabled value of F for 1 and 168 degrees of freedom at the .01 confidence level, were considered significant at the .01 confidence level. Obtained F values greater than 3.90, the tabled value of F for 1 and 168 degrees of freedom at the .05 confidence level, but less than 6.785[36], the tabled value of F for 1 and 168 degrees of freedom at the .01 confidence level, were considered significant at the .05 confidence level. Obtained F values less than 3.90[37], the tabled value of F for 1 and 168 degrees of freedom at the .05 confidence level, were considered not significant.

F Tests at the .01 Confidence Level:

By using a series of F tests at the .01 confidence level, the following significant increases in predictive value were found when the Michigan M-Scales were used in combination with the Quantitative score, a subscore of the American Council on Education Psychological Examination, to predict achievement of eleventh grade girls in second semester Gregg Shorthand:

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[35] Ibid.

[36] Ibid.

[37] Ibid.

(1) There was a significant increase in predictive value when the Word Rating List (WRL) was combined with the Quantitative score, a subscore of the American Council on Educational Psychological Examination, (Q-ACE) ($r_{Q\text{-}ACE}$ = .2624, $R_{Q\text{-}ACE + WRL}$ = .3281; F = 7.2860, Table XX, Appendix, page 148, tabled value, 6.785 at .01 confidence level[38]); thus, this part of the null hypothesis was rejected at the .01 confidence level.

(2) There was a significant increase in predictive value when the total score of the Michigan M-Scales was combined with the Quantitative score, a subscore of the American Council on Education Psychological Examination, (Q-ACE) ($r_{Q\text{-}ACE}$ = .2624, $R_{Q\text{-}ACE + \text{total M-Scales}}$ = .3347; F = 8.1541; Table XX, Appendix, page 148, tabled value, 6.785 at .01 confidence level[39]); thus, this part of the null hypothesis was rejected at the .01 confidence level.

F Tests at the .01 and .05 Confidence Levels:

By using a series of F tests at the .01 and .05 confidence levels, no significant increases in predictive value were found when the total score or subscores of the Michigan M-Scales were used in combination with the total score or subscores of the American Council on Education

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[38] Ibid.

[39] Ibid.

Psychological Examination except as indicated above; thus, these parts of the null hypothesis were accepted at the .01 and .05 confidence levels. It should be pointed out that four combinations approached the tabled value at the .05 confidence level (tabled value for 1 and 168 degrees of freedom at .05 level of confidence is 3.90[40]). These combinations were as follows:

(1) Word Rating List (WRL) and total score of the American Council on Education Psychological Examination (ACE) (r_{ACE} = .4704, $R_{ACE + WRL}$ = .4858; F = 3.2256; Table XVIII, Appendix, page 146, tabled value, 3.90 at .05 confidence level[41]).

(2) Total score of the Michigan M-Scales and total score of the American Council on Education Psychological Examination (ACE) (r_{ACE} = .4704, R_{ACE} + total M-Scales = .4868; F = 3.4560; Table XVIII, Appendix, page 146, tabled value, 3.90 at .05 confidence level[42]).

(3) Word Rating List (WRL) and the Linguistic score, a subscore of the American Council on Education Psychological Examination (L-ACE) (r_{L-ACE} = .4491, $R_{L-ACE + WRL}$ = .4671; F = 3.5457; Table XIX, Appendix, page 147, tabled value,

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[40] Ibid.

[41] Ibid.

[42] Ibid.

3.90 at .05 confidence level[43]).

(4) Total score of the Michigan M-Scales and Linguistic score, a subscore of the American Council on Education Psychological Examination, (L-ACE) ($r_{L\text{-}ACE}$ = .4491, $R_{L\text{-}ACE + \text{total M-Scales}}$ = .4686; F = 3.8534, Table XIX, Appendix, page 147, tabled value, 3.90 at .05 confidence level[44]).

The above analysis indicates that the Word Rating List (WRL), Human Trait Inventory (HTI), and total score of the Michigan M-Scales significantly increased the precision of prediction of the American Council on Education Psychological Examination (ACE) in predicting achievement for eleventh grade girls in first semester Gregg Shorthand; however, in second semester, only the Word Rating List (WRL) and total score of the Michigan M-Scales significantly increased the precision of prediction of the Quantitative score, a subscore of the American Council on Education Psychological Examination (Q-ACE).

First Semester Uniform Shorthand Examination:

Table XXI, Appendix, page 149, presents a summary of the zero order correlations between the predictor variables of the present study and Shorthand I uniform examination, Shorthand I teacher grades, Shorthand II uniform examination,

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[43] Ibid.

[44] Ibid.

and Shorthand II teacher grades. The first semester uniform shorthand examination, which was administered to 68 subjects in the three schools using the test, was given to validate teacher grades. The total score of the test correlated with teacher grades at .7762 which indicates that teacher grades may be accepted as a valid measure of student achievement for first semester in the three participating schools.

All but six of the correlations between the predictor variables and teacher grades for first semester were higher than the correlations between the predictor variables and the total score of the researcher's uniform shorthand examination for first semester. The six correlations that were lower were:

(1) The correlation between the total score of the uniform shorthand examination for first semester and the tenth grade English grades was .4779 (Table XXI, Appendix, page 149) while the correlation between the tenth grade English grades and the teacher grades for first semester shorthand was .4456 (Table XXI, Appendix, page 149).

(2) The correlation between the total score of the American Council on Education Psychological Examination and the total score of the uniform shorthand examination for first semester was .5115 (Table XXI, Appendix, page 149) while the correlation between the total score of the American Council on Education Psychological Examination and teacher grades for first semester shorthand was .3880 (Table

XXI, Appendix, page 149).

(3) The correlation between the Linguistic score, a subscore of the American Council on Education Psychological Examination, and the total score of the uniform shorthand examination for first semester was .4001 (Table XXI, Appendix, page 149) while the correlation between the Linguistic score and teacher grades for first semester shorthand was .2818 (Table XXI, Appendix, page 149).

(4) The correlation between the Quantitative score, a subscore of the American Council on Education Psychological Examination, and the total score of the uniform shorthand examination for the first semester was .5313 (Table XXI, Appendix, page 149) while the correlation between the Quantitative score and teacher grades for first semester shorthand was .4658 (Table XXI, Appendix, page 149).

(5) The correlation between the theory score, a subscore of the uniform shorthand examination for first semester, and the total score of the uniform shorthand examination for first semester was .7994 (Table XXI, Appendix, page 149) while the correlation between the theory score and teacher grades for first semester shorthand was .7017 (Table XXI, Appendix, page 149).

(6) The correlation between the transcription score, a subscore of the uniform shorthand examination for first semester, and the total score of the uniform shorthand examination for first semester was .8635 (Table XXI,

Appendix, page 149) while the correlation between the transcription score, a subscore of the uniform shorthand examination for first semester, and Shorthand I teacher grades was .5773 (Table XXI, Appendix, page 149).

The correlation analysis for second semester for the 68 subjects in the three schools that used the uniform shorthand examination for first semester showed that the teacher grades correlated higher with the predictor variables than did the uniform shorthand examination for second semester in all but two cases. The two exceptions were:

(1) The correlation between the brief form-theory score, a subscore of the uniform shorthand examination for second semester, and the total score of the second semester uniform shorthand examination was .5088 (Table XXI, Appendix, page 149) while the correlation between the brief form-theory score and teacher grades for second semester shorthand was .4378 (Table XXI, Appendix, page 149).

(2) The correlation between the transcription score, a subscore of the uniform shorthand examination for second semester, and the total score of the uniform shorthand examination for second semester was .9632 (Table XXI, Appendix, page 149) while the correlation between the transcription score and teacher grades for second semester shorthand was .6551 (Table XXI, Appendix, page 149).

A major portion of the uniform shorthand examination

for second semester consisted of transcription which accounts for the correlation of .9632 (Table XXI, Appendix, page 149) between the transcription subscore for second semester shorthand and the total score on the uniform shorthand examination for second semester for the 68 subjects who used the uniform shorthand examination for first semester.

The correlation between the total score of the uniform shorthand examination for first semester and the teacher grades for first semester shorthand was .7762 (Table XXI, Appendix, page 149) which indicates that teacher grades were valid measures of Shorthand I student achievement in the three schools using the uniform shorthand examination for first semester. The correlation between the total score of the uniform shorthand examination for second semester and teacher grades for second semester shorthand was .7058 (Table XXI, Appendix, page 149) which indicates that teacher grades were valid measures of Shorthand II student achievement for the 68 subjects in the three schools that had used the uniform shorthand examination for first semester. The correlation between teacher grades for first semester shorthand and teacher grades for second semester shorthand was .7528 (Table XXI, Appendix, page 149). This correlation of .7528 (Table XXI, Appendix, page 149) is:

(1) higher than the correlations between the total score or subscores of the uniform shorthand examination for first semester and teacher grades for second semester

shorthand;

(2) higher than the correlations between the total score or subscores of the uniform shorthand examination for first semester and the total score or subscores of the uniform shorthand examination for second semester; and

(3) higher than all the zero order correlations between the predictor variables of the present study and Shorthand II teacher grades for the 68 subjects who took the uniform Shorthand I examination in the three participating schools.

Analysis of Table XXII, "Intercorrelations Between Uniform Shorthand I Examination, Uniform Shorthand II Examination, Shorthand I Teacher Grades, and Shorthand II Teacher Grades," Appendix, page 151, shows that the correlation between the first semester transcription score and the second semester transcription score was .2125 (Table XXII, Appendix, page 151) which indicates that the relationship was not significantly different from zero between the two variables for the 68 subjects in the present study who took the uniform Shorthand I examination (tabled value for 60 degrees of freedom at the .05 confidence level is .250[45]). The correlation between the theory score, a subscore of the uniform shorthand examination for first semester, and the transcription section of the uniform shorthand examination for second semester was .6315 (Table XXII,

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[45] Ibid., p. 502.

Appendix, page 151) which indicates that there is a considerable amount of relationship between the two variables. The correlation between the brief form score, a subscore of the uniform shorthand examination for first semester, and the transcription score, a subscore of the uniform shorthand examination for second semester, was .0064 (Table XXII, Appendix, page 151) which indicates there is no relationship between the variables.

The above analysis of the uniform Shorthand I examination indicates that a predictor variable for Shorthand I may be of greater or lesser value in predicting Shorthand II achievement.

Second Semester Uniform Shorthand Examination:

Table XXIII, Appendix, page 152, presents a summary of the zero order correlations between the predictor variables of the present study and the Shorthand II uniform examination, Shorthand I teacher grades, and Shorthand II teacher grades.

The second semester uniform shorthand examination was administered to 153 subjects in the eight participating schools. The correlation between the total score of the uniform examination for second semester shorthand and Shorthand II teacher grades was .6198 (Table XXIII, Appendix, page 152) which indicates that teacher grades may be accepted as valid measures of student achievement for second semester.

All but two of the correlations between the predictor

variables and teacher grades for second semester shorthand were higher than the correlations between the predictor variables and the uniform shorthand examination for second semester. The two correlations that were lower were:

(1) The correlation between the Preferred Job Characteristics Scale (PJCS) and teacher grades for second semester shorthand was -.0215 (Table XXIII, Appendix, page 152) compared to a correlation of .0434 (Table XXIII, Appendix, page 152) between the Preferred Job Characteristics Scale (PJCS) and total score of the uniform shorthand examination for second semester.

(2) The correlation between the transcription score, a subscore of the uniform shorthand examination for the second semester, and teacher grades for second semester shorthand was .5614 (Table XXIII, Appendix, page 152) compared to a correlation of .9853 (Table XXIII, Appendix, page 152) between the transcription score, a subscore of the uniform shorthand examination for second semester, and the total score of the uniform shorthand examination for second semester. This extremely high correlation of .9853 (Table XXIII, Appendix, page 152) is due to the composition of the uniform Shorthand II examination. The examination consisted of 100 points for the brief form-theory section and a maximum of 360 points for the transcription section of the test (Appendix, pages 167-177). These two scores were added to make the total score; thus, the high

correlation of .9853 (Table XXIII, Appendix, page 152) between the transcription score and the total score of the uniform shorthand examination for second semester.

Table XXIV, Appendix, page 153, presents a summary of the intercorrelations between the first semester shorthand grades, second semester shorthand grades, and the subscores and the total score of the uniform shorthand examination for the second semester for the 153 subjects who took the examination. The correlations presented in Table XXIV, Appendix, page 153, indicate that there is a high degree of commonalty among the predictor variables. The correlation between the Shorthand II teacher grades and the brief form-theory subscore of the uniform shorthand examination for second semester shorthand was .5986 (Table XXIV, Appendix, page 153) which is higher than the correlation between the teacher grades for second semester shorthand and the transcription subscore which was .5614 (Table XXIV, Appendix, page 153). The correlation between the brief form-theory subscore of the uniform shorthand examination for second semester and the transcription score of the uniform shorthand examination for second semester was .4373 (Table XXIV, Appendix, page 153) which indicates that there is a relationship between the brief form-theory section of the uniform shorthand examination and the transcription section of the uniform shorthand examination. This correlation of .4373 (Table XXIV, Appendix, page 153) is lower than the

correlation found between the theory score of the first semester uniform shorthand examination and the transcription section of the second semester uniform shorthand examination which was .6315 (Table XXIV, Appendix, page 153) for the 68 subjects who took the first semester uniform shorthand examination; however, this correlation of .6315 (Table XXIV, Appendix, page 153) is much higher than the correlation of .0064 (Table XXIV, Appendix, page 153) between the brief form subscore of the first semester uniform shorthand examination and the transcription subscore of the uniform shorthand examination for first semester. The difference between .4373 and .6315 (Table XXIV, Appendix, page 153) might be due to differences in number of people (68 for first semester and 153 for second semester) or to a suppressing effect of the brief form score when used in combination with the theory score.

Summary of Findings:

The summary of findings is divided into two parts--Part I is a summary of the general findings; Part II is a summary of the findings for first and second semester.

Part I--General Findings: The general findings are summarized as follows:

(1) The subjects' responses to the Michigan M-Scales were found to be reliable. The estimates of reliability in the present study were higher than the estimates of

reliability for the female population of the Farquhar Study for the Preferred Job Characteristics Scale (PJCS) and for the Word Rating List (WRL); however, the estimates of reliability were lower than the estimates of reliability for the female population of the Farquhar Study for the General Situational Choice Inventory (GSCI) and Human Trait Inventory (HTI).

(2) No significant differences were found between variances (distribution of scores) of grade point average and responses to the Michigan M-Scales between the female population of the Farquhar Study and the population of the present study.

(3) The mean score of the total score of the Michigan M-Scales and the mean score of each of the subscores of the Michigan M-Scales was significantly less for the population in the present study than the mean score of the female population of the Farquhar Study; however, the mean score of the grade point average for the population in the present study was significantly greater than the mean score of the grade point average of the female population of the Farquhar Study.

Part II--Summary of Findings for First and Second Semester: Findings for first and second semester are summarized as follows:

(1) Grade point average, tenth grade English grades, ninth grade English grades, total score and subscores of the

American Council on Education Psychological Examination, and the Word Rating List, which is a subscore of the Michigan M-Scales, individually correlated with shorthand teacher grades significantly greater than zero for first and second semester of shorthand. The total score of the Michigan M-Scales, General Situational Choice Inventory, and Human Trait Inventory, which are subscores of the Michigan M-Scales, individually correlated with shorthand teacher grades significantly greater than zero for first semester shorthand. The Preferred Job Characteristics Scale, which is a subscore of the Michigan M-Scales, did not correlate with shorthand teacher grades significantly different from zero for first and second semester shorthand.

(2) The predictor variables used in the present study when used as a group did predict achievement significantly different from zero of eleventh grade girls in first semester of Gregg Shorthand.

(3) The combination of the total score of the American Council on Education Psychological Examination with either (a) the Word Rating List, a subscore of the Michigan M-Scales, or (b) the Human Trait Inventory, a subscore of the Michigan M-Scales, or (c) the total score of the Michigan M-Scales, produced a significant increase in precision of prediction over the use of the American Council on Education Psychological Examination as a single predictor in predicting achievement of eleventh grade girls in first semester Gregg

Shorthand; however, these combinations did not produce a significant increase for second semester.

(4) The combination of the Linguistic score, a subscore of the American Council on Education Psychological Examination, with either (a) the Word Rating List, a subscore of the Michigan M-Scales, or (b) the Human Trait Inventory, a subscore of the Michigan M-Scales, or (c) the total score of the Michigan M-Scales produced a significant increase in precision of prediction over the use of the Linguistic score, a subscore of the American Council on Education Psychological Examination, as a single predictor in predicting achievement of eleventh grade girls in first semester Gregg Shorthand; however, these combinations did not produce significant increases for second semester.

(5) The combination of the Quantitative score, a subscore of the American Council on Education Psychological Examination, with either (a) the Word Rating List, a subscore of the Michigan M-Scales, or (b) the Human Trait Inventory, a subscore of the Michigan M-Scales, or (c) the total score of the Michigan M-Scales produced a significant increase in precision of prediction over the use of the Quantitative score as a single predictor in predicting achievement of eleventh grade girls in first semester Gregg Shorthand; and the combination of the Quantitative score with the Word Rating List or total score of the Michigan M-Scales produced a significant increase in precision of prediction

for second semester also.

(6) The correlation between the uniform examination for first semester Gregg Shorthand and teacher grades was significant. The correlations between the uniform examination for first semester Gregg Shorthand and the predictor variables of the present study were lower than the correlations between teacher grades and the predictor variables except for the correlation between the total score of the uniform examination with (a) the American Council on Education Psychological Examination total score and subscores; with (b) tenth grade English grades; with (c) theory score, a subscore of the uniform examination for first semester; and with (d) the transcription score, a subscore of the uniform examination for second semester.

(7) The correlation between the uniform examination for second semester Gregg Shorthand and teacher grades was significant. The correlations between the uniform examination for second semester Gregg Shorthand and the predictor variables of the present study were lower than the correlations between teacher grades for second semester Gregg Shorthand and the predictor variables, except for (a) the correlation between the Preferred Job Characteristics Scale and the total score of the uniform examination for second semester Gregg Shorthand, and (b) the correlation between the transcription score, a subscore of the uniform examination for second semester Gregg Shorthand.

(8) The present study found that the best single predictors of Shorthand I achievement were: (a) grade point average (.6743); (b) ninth grade English grades (.5212); (c) tenth grade English grades (.5708); and (d) mental ability as measured by the American Council on Education Psychological Examination (.4190) (Table XII, Appendix, page 139).

The best single predictors of Shorthand II achievement (in order) were: (a) Shorthand I teacher grades (.7459); (b) grade point average (.6011); (c) tenth grade English grades (.5253); and (d) mental ability as measured by the American Council on Education Psychological Examination (.4704) (Table XVII, Appendix, page 144).

Summary of Findings of the Hypotheses:

A summary of the findings of the hypotheses is as follows:

(1) Each predictor variable did significantly predict achievement of eleventh grade girls in first semester Gregg Shorthand except for the Preferred Job Characteristics Scale (PJCS), a subscore of the Michigan M-Scales. Each predictor variable did significantly predict achievement of eleventh grade girls in second semester Gregg Shorthand except for the Preferred Job Characteristics Scale (PJCS), the General Situational Choice Inventory (GSCI), and the Human Trait Inventory (HTI), subscores of the Michigan M-Scales.

(2) The predictor variables as a group did significantly predict achievement of eleventh grade girls in first and second semesters of Gregg Shorthand.

(3) The Michigan M-Scales when combined with an estimate of mental ability did significantly increase the precision of prediction of achievement for eleventh grade girls in first semester of Gregg Shorthand. However, the Michigan M-Scales when combined with an estimate of mental ability did not significantly increase the precision of prediction of achievement for eleventh grade girls in second semester Gregg Shorthand.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Chapter V is divided into three parts. Part I presents a summary of the study; Part II presents the conclusions of the study; and Part III presents the recommendations of the study.

Part I

Summary

Statement of the Problem: The problem of the present study was to find a criterion for predicting achievement of students in first and second semesters of Gregg Shorthand that would be useful to high school teachers. The present study was specifically concerned with the relationship of academic motivation to achievement in first and second semester shorthand and the extent to which motivation might add to the precision of predicting achievement.

Purpose of the Study: The purpose of this specific study was to determine the predictive value, if any, of the Michigan M-Scales total score or subscores for predicting achievement of eleventh grade girls in first and second semesters of Gregg Shorthand when used individually or in combination with the total score or a subscore of an estimate of mental ability.

Need for the Study: A review of the studies in shorthand prognosis showed that there were no known reliable predictors of shorthand achievement; however, many researchers concluded that a measurement of motivation, interest, desire, and need might aid in predicting success.

Delimitations: The study was delimited to eleventh grade girls in eight participating high schools in central and southern Michigan who enrolled in and completed the first and/or the second semester of Gregg Shorthand during the 1964-1965 school year.

Review of Literature: The review of literature showed that considerable effort has been spent on analyzing shorthand achievement through tests of mental ability, English tests and grades, grade point average, and a host of other criteria. The review showed that the best known predictors of shorthand achievement are grade point average, English grades, and mental ability. There is disagreement among researchers as to the value of these three predictors; however, the criteria used for each analysis appears to cause the discrepancies. Several researchers mentioned the need for an instrument to measure interest, motivation, or desire of a student. The researcher utilized a test designed to measure academic motivation which had been created by Dr. W. W. Farquhar and his associates of the Michigan State University faculty in 1963. The Farquhar Study identified

overachievers and underachievers by means of mental ability and grade point average based on a regression analysis. From the discrepant achievers, certain differences were noted. Questions were then formulated to measure the noted differences. The questions were grouped into four objective tests which were labeled the Michigan M-Scales. Dr. Farquhar and his associates tested the Michigan M-Scales and found them to produce a significant increase in predictive efficiency of a test of mental ability in predicting grade point average.

Procedures: In order to achieve the purpose, the Michigan M-Scales, a test to measure academic motivation, were administered to the beginning shorthand students in the eight participating schools in the fall of 1964. The American Council on Education Psychological Examination for high school students, a test to measure mental ability, was also given. Academic grades were obtained from the students' permanent records in the school offices. Teacher grades in shorthand were collected at the end of the first semester and at the end of the second semester. A uniform shorthand examination for first semester was administered to the students in three schools at the end of the first semester and a uniform examination for second semester was administered in all eight participating schools.

The collected data were statistically analyzed by (a) an F test of homogeneity of variances between the population of

the present study and the female population of the Farquhar Study; (b) a "t" test to compare mean scores of the population of the present study with the mean score of the female population of the Farquhar Study; and (c) a correlation analysis to determine the linear relationship between the predictor variables of the present study and teacher grades for first and second semesters.

Findings:

(1) Zero-Order Correlations: Grade point average, ninth grade English grades, tenth grade English grades, total score and subscores of the American Council on Education Psychological Examination, total score of the Michigan M-Scales, and the Word Rating List, which is a subscore of the Michigan M-Scales, each correlated with achievement, as measured by teacher grades, of eleventh grade girls in first and second semester of Gregg Shorthand significantly greater than zero.

(2) Multiple Order Correlation: Grade point average, English grades, mental ability, and motivation score produced a multiple correlation significantly greater than zero.

(3) Increase of Precision of Prediction by Michigan M-Scales: The total score of the Michigan M-Scales and the subscores, Word Rating List (WRL), and Human Trait Inventory (HTI), increased the precision of prediction

produced by an estimate of mental ability in predicting achievement of eleventh grade girls in first semester Gregg Shorthand. The Word Rating List (WRL), a subscore of the Michigan M-Scales, correlated with achievement of eleventh grade girls in second semester Gregg Shorthand significantly greater than zero. The Human Trait Inventory (HTI) significantly increased the precision of prediction produced by the quantitative score, a subscore of the American Council on Education Psychological Examination, in predicting achievement of eleventh grade girls in second semester Gregg Shorthand.

(4) Predictors for Shorthand I and II: Grade point average and English grades predicted achievement of eleventh grade girls in first or second semester Gregg Shorthand better than did the combination of academic motivation test scores and an estimate of mental ability. The present study found that the best predictors for first semester shorthand grades, in order, were (a) grade point averages, (b) ninth grade English grades, (c) tenth grade English grades, and (d) mental ability; however, the best predictors for second semester shorthand grades, in order, were (a) Shorthand I teacher grades, (b) grade point average, (c) tenth grade English grades, and (d) mental ability.

Part II

Conclusions

The conclusions of the present study are as follows:

(1) Analysis of the responses of the subjects of the present study to the Michigan M-Scales produced reliability estimates that compared favorably with reliability estimates of the Farquhar Study on the Preferred Job Characteristics Scale (PJCS); however, lower reliability estimates were found for the General Situational Choice Inventory (GSCI), for the Human Trait Inventory (HTI), and for the Word Rating List (WRL). Therefore, the conclusion was made that the shorthand students respond, in certain cases, in a manner more reliabile than the female population of the Farquhar Study, and in certain cases, in a manner less reliable than the female population of the Farquhar Study.

(2) By comparing the distributions of the total score and subscores of the Michigan M-Scales of the population of the present study to the distributions of the total score and subscores of the Michigan M-Scales of the female population of the Farquhar Study, the conclusion was made that the distributions of scores were similar which indicates that the shorthand students' responses to the Michigan M-Scales were distributed in a manner similar to the female population of the Farquhar Study.

(3) By comparing the mean score of the grade point

average of the population of the present study with the mean score of the grade point average of the female population of the Farquhar Study, the conclusion was made that shorthand students have a higher grade point average than the female population of the Farquhar Study which might be due to the courses taken in the ninth and tenth grades. This significant difference indicates that shorthand students in this study tend to have better academic records than did the female population of the Farquhar Study.

(4) By comparing the mean scores of the total score and subscores of the Michigan M-Scales of the population of the present study with the mean scores of the total score and subscores of the Michigan M-Scales of the female population of the Farquhar Study, the conclusion was made that the shorthand students were not as academically motivated as the female population of the Farquhar Study. This significant difference in mean scores to the Michigan M-Scales might be due to the composition of the Michigan M-Scales. For example, a question in the Human Trait Inventory (HTI) is "I think I would like the work of a teacher."[1] The shorthand student with educational goals leading to employment as a secretary would tend to answer this question in a manner that would indicate low academic

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[1]William W. Farquhar, The Michigan M-Scales (Form C - Female) "Human Trait Inventory" Item #128, (East Lansing: Michigan State University College of Education), 1961, p. 12.

motivation, which would not necessarily be true.

(5) From the analysis of the combination of the Michigan M-Scales with the estimate of mental ability as measured by the American Council on Education Psychological Examination, the conclusion was made that academic motivation, as measured by the Michigan M-Scales, is a factor in learning in first semester Gregg Shorthand but is not a factor in second semester Gregg Shorthand. The Michigan M-Scales total score did increase the precision of prediction by the American Council on Education Psychological Examination, an estimate of mental ability, in predicting first semester shorthand achievement; however, the Michigan M-Scales total score did not produce a significant increase for second semester. The increase for first semester was not sufficient to warrant usage of the Michigan M-Scales in the present form by high school teachers. The lack of increase in predictive efficiency for second semester might be due to the manner of grading by the teachers of second semester Gregg Shorthand or to the homogeneity of the population of the second semester shorthand classes.

(6) The Human Trait Inventory, a subscore of the Michigan M-Scales, was found to be the most valuable subscore of the Michigan M-Scales in predicting achievement in first semester shorthand; however, it did not correlate significantly different from zero for second semester. The researcher concluded that the personal characteristics of

the student, as measured by the Human Trait Inventory, are factors of learning for the first semester of Gregg Shorthand but are not factors of predicting learning for second semester except when used in combination with a measure of quantitative ability. This difference in correlation between the Human Trait Inventory and Shorthand I Teacher Grades and Shorthand II Teacher Grades might be due to difference in learning load between Shorthand I and Shorthand II. Shorthand I is predominantly memory work--a large amount of new material must be memorized and automatized--whereas in Shorthand II, memorization is reduced and is replaced by learning of rapid responses and by fusion of other skills such as typing, spelling, punctuation, and reading imperfect notes. As there is a larger amount of teacher-pupil interaction in Shorthand I than in Shorthand II, the Shorthand I teacher might become more aware of the personal characteristics as measured by the Human Trait Inventory than the teacher of Shorthand II where a majority of the activity is drill work in the fusion of skills to gain speed in taking dictation and to produce a usable copy.

It was further concluded that the Human Trait Inventory and the Quantitative score, a subscore of the American Council on Education Psychological Examination, are measuring different abilities and can advantageously be combined in predicting shorthand achievement.

(7) The subtest, Word Rating List (WRL), was found to

be the second most valuable subtest of the Michigan M-Scales in predicting achievement in first semester Gregg Shorthand and was found to be the most valuable subtest of the Michigan M-Scales in predicting achievement in second semester Gregg Shorthand. This subtest of the Michigan M-Scales was found to be a significant predictor and a consistently significant predictor of shorthand achievement for both first and second semesters of Gregg Shorthand. It was concluded that the academic self-concept of the student is a factor in learning in the first and second semesters of Gregg Shorthand.

(8) The Preferred Job Characteristics Scale and the General Situational Choice Inventory were found to be of little or no value in predicting shorthand achievement. The researcher concluded that these two subtests in their present form should not be used to predict shorthand achievement.

(9) The aptitude measure, American Council on Education Psychological Examination for high school students, in combination with the motivation score as measured by the Michigan M-Scales did not predict shorthand achievement for the subjects in this study as well as the other predictor variables--grade point average and English grades. It was concluded that grade point average is the most accurate of the variables used in the present study followed by English grades; however, the correlation did not warrant the usage of grade point average as a reliable predictor of shorthand

achievement.

(10) The correlation between theory subscore of the uniform Shorthand I examination and achievement of students in first and second semesters was suppressed by the presence of brief forms. The researcher concluded that knowledge of brief forms is not an aid in predicting achievement of second semester and is not an aid in predicting transcription ability as measured by the uniform examinations in the present study. The score of the brief form section of the test had a very small variance which might account for this suppressing effect. The brief form score when used with the theory score tended to suppress the relationship with Shorthand II teacher grades. The reason for this suppressing effect of the brief form score might be due to the short range of scores. The test had a high mean score and a low standard deviation which indicates that this particular subtest was not giving a high degree of discrimination.

The relationship between the brief form subscore of the uniform Shorthand I examination and the transcription subscore of the uniform Shorthand I examination was .3496, which indicates that there is a tendency for those who did well on the brief form test in Shorthand I to do well on the transcription subtest of the uniform Shorthand I examination; however, the relationship between the brief form subscore of the uniform Shorthand I examination and the transcription subscore of the uniform Shorthand II examination was .0064

which indicates that there is no relationship. The conclusion, based on the analysis of the 68 subjects who took the uniform Shorthand I examination, was made that, if second semester shorthand achievement is to be predicted, knowledge of brief forms should not be included as a predictor variable for second semester and that knowledge of brief forms is of little or no value in predicting second semester transcription skills. This difference in relationship between the brief form score and transcription score for first semester and the transcription score for second semester might be due to the difference in the vocabulary of the dictation. The Shorthand II dictation may contain more non-brief-form vocabulary; therefore, the automatization of outlines has not taken place and the student can not create these outlines as rapidly in the second semester of shorthand where the dictation reaches speeds of 80 to 100 words per minute or higher.

(11) The predictor variables used in the present study correlated in some instances higher and in some instances lower with first semester teacher grades than with second semester teacher grades. Thus, the researcher concluded that different predictors should be utilized for different semesters of achievement; that is, if first semester shorthand achievement is to be predicted, a set of predictor variables could be utilized; whereas, if second semester shorthand achievement is to be predicted, another set of

predictor variables could be utilized. The objectives of the prediction should determine the criteria to be employed in making the prediction. For the reason that Shorthand I is of little value without Shorthand II, the conclusion was made that a criterion should be sought to predict achievement in Shorthand II (second semester) instead of a criterion to predict achievement in Shorthand I (first semester).

(12) The total score or subscores of the Michigan M-Scales did not correlate sufficiently high to warrant the use of the M-Scales in their present form by shorthand teachers as accurate predictors of achievement in either Shorthand I or Shorthand II. It should be noted, however, that the correlations were higher in Shorthand I than in Shorthand II. This difference in correlations between the Michigan M-Scales with Shorthand I and with Shorthand II indicates the need for different predictors of Shorthand II success than those used for predicting success in Shorthand I.

Part III

Recommendations

The recommendations of the present study are as follows:

(1) A subsequent study should be made to determine the value of the Michigan M-Scales in combination with more recent measures of mental ability in predicting shorthand achievement in first semester and second semester Gregg

Shorthand.

(2) A study should be made to determine whether the personality factors as measured by the Human Trait Inventory (HTI) and Word Rating List (WRL) are factors which successful secretaries possess.

(3) Further studies should be made of the academic self-concept to refine the Word Rating List and to determine the effect self-concept has on learning in various types of programs; such as, academic and vocational.

(4) Further study of the General Situational Choice Inventory (GSCI) should be made to determine potential revisions to make it more useful in predicting achievement of a particular subject area.

(5) Further study of the Preferred Job Characteristics Scale (PJCS) should be made to determine potential revisions to make it more useful in predicting achievement of a particular subject area.

(6) An instrument similar to the Michigan M-Scales should be created for use with adults and business college students to measure motivation in a vocationally oriented group.

(7) Studies should be made to discover a device to more accurately predict achievement in transcription in shorthand.

(8) Studies should be made of the effect knowledge of brief forms and theory has on achievement in transcription

and speed in taking dictation.

(9) A series of studies should be made to analyze the learning activities of theory, speed building, and transcription in shorthand. As the findings of the present study indicated, a predictor variable, in some instances, had a low correlation with shorthand achievement in one semester and had a high correlation in another semester; thus, it is recommended that the learning activities of each semester be thoroughly analyzed to determine what activity or activities are unique to that particular semester and what activity or activities are similar to the subsequent or preceding semester or semesters of shorthand. A means of measuring these activities could then be selected or created to measure these particular factors in order to predict transcription ability which is the ultimate goal in shorthand.

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APPENDIX

TABLE I

FACSIMILE OF LETTER TO SCHOOL ADMINISTRATORS

Mr. XXXXX XXXXXXXXXX
XXXXXXXXXX Public Schools
XXXXXXXXXX, Michigan

1317 Loraine
Lansing, Michigan
July 13, 1964

Dear Mr. XXXXXXXXXX:

For my doctoral research project at Michigan State University, I am analysing the value of a motivation test in predicting achievement of eleventh grade girls in first and second semester Gregg Shorthand. May I have your permission to collect the necessary data from the student records and administer two class periods of tests in the XXXXXXXXXX High School of XXXXXXXXXX, Michigan, to be used as primary data for the study?

The items needed from the students' permanent records are as follows:

1) ninth and tenth grade scholastic averages
2) tenth grade English grades
3) ninth grade English grades.

The tests I would like to administer are as follows:

1) American Council on Education Psychological Examination for high school students--time 50 minutes.
2) Motivation Battery created by Dr. Farquhar of the Michigan State University faculty--time 45 minutes.

I will need from the teacher the grades at the end of the first semester of Gregg Shorthand and the grades at the end of the second semester of Gregg Shorthand as well as general information on standards.

All information will be held in strict confidence and no school, students, or teachers will be identified in the study. This study is being directed by Dr. Helen H. Green, Professor of Business Education, Michigan State University.

Your permitting me to obtain the above information from the XXXXXXXXXX High School will make my study possible.

I will look forward to receiving your reply regarding my request.

Sincerely yours,

/s/ Leonard J. Varah
Leonard J. Varah

TABLE II

FREQUENT REASONS FOR DROPPING SHORTHAND AS CHECKED BY FORTY-FIVE STUDENTS[a]

Rank	Reason	Frequency
1	I could not keep up in taking dictation	20
2	I did not work hard enough	18
3	I did not have enough time to study shorthand because I had to concentrate on other subjects	17
4	I changed my plans about what I want to do when I leave school	16
5	There wasn't much likelihood of using shorthand on the job	15
6	The class went too fast; I could not keep up with the rest of the class	14
6	I didn't get started right	14
6	My teacher recommended that I drop shorthand	14
7	The course was too difficult; I could not understand it	13
8	I found it difficult to read shorthand	12
8	I found it difficult to write shorthand	12
9	My homeroom teacher advised me to drop shorthand	11
10	I could not find room for shorthand in my college preparatory schedule	10

[a]Georgia Faye Powell, "An Analysis of Shorthand Dropouts at Ottawa Township High School" (unpublished Master's thesis, Illinois State Normal University, 1961), p. 71.

TABLE III

PARTIAL SUMMARY OF CORRELATION BETWEEN INTELLIGENCE TEST RESULTS AND SHORTHAND ACHIEVEMENT REPORTED IN PREVIOUS INVESTIGATIONS
(as compiled by Leonard J. Varah)

Researcher	Correlation	Date	Level	Remarks
DiBona[a]	.40	1957	high school	Teacher grades and achievement tests.
Blackler[F24*]	.38	1951	high school	Otis to final semester teacher grades.
Jones[F128]	.5238	1951	college	Third quarter shorthand grades.
Hutson[b]	.433	1951	high school	Teacher grades in shorthand.
Green[F129]	.35	1950	high school	Henman Nelson to Shorthand I.
Veon[c]	.7129	1948	college	Shorthand reading to Carmichael Shorthand Learning Test.
Davis[A666]	.323	1944	high school	Otis Self Administering Test to Teachers marks.
Osborne[d]	.3765	1943	high school	Carmichael Shorthand Test to Teachers marks.

TABLE III (continued)

Researcher	Correlation	Date	Level	Remarks
Cruzan[A663]	.271	1942	college	Marks in two terms of stenography.
Sherman[A712]	.218	1942	high school	I.Q. to first semester shorthand grades.
Dodson[A671]	.75	1943	college	ACE for college freshmen to theory test in shorthand.
Briscoe[A656]	.270	1937	high school	Transcription tests.
Duncan[A673]	.491	1936	high school	I.Q. score to shorthand grades.
Heil[A681]	.40	1936	high school	I.Q. score to shorthand grades.
Fox[A677]	.34	1936	high school	Final grades in course.
Kessinger[A689]	.280	1936	high school	Terman test to shorthand grades.
Riggs[A710]	.51	1935	high school	First semester grades.
	.32	1935	high school	Second semester grades.

TABLE III (continued)

Researcher	Correlation	Date	Level	Remarks
Sandy[H23]	.35	1932	high school	Average of five studies correlation shorthand achievement to I.Q.
Whitley[A729]	.589	1932	secretarial school	Time taken to complete course.
Worley[A731]	.398	1931	high school	I.Q. and marks in shorthand.
Beal[020]	.36	1929	high school	First Semester grades.
	.34	1929	high school	Second Semester grades.
Cooley[020]	.22	1928	high school	Teacher grades.
Bills[A651]	"Predicted F's 85% accurate"	1921	technical school	Used teacher grades.

[a]Lucille J. DiBona, "Predicting Success in Shorthand," Journal of Business Education XXXV (February, 1960), pp. 213-214.

[b]Billy T. Hutson, "Prognosis of Achievement in First-Year Gregg Shorthand Simplified," (unpublished Master's thesis, University of Tennessee, 1951).

TABLE III (continued)

[c]Dorothy Veon, The Relationship of Learning Factors Found in Certain Modern Foreign-Language Aptitude Tests to the Prediction of Shorthand Achievement in College (Stillwater, Oklahoma: Oklahoma Agricultural and Mechanical College; Delta Pi Epsilon Research Award Series, 1950).

[d]Agnes E. Osborne, The Relationship Between Certain Psychological Tests and Shorthand Achievement (New York: Bureau of Publication, Teachers College, Columbia University, 1943).

*Letters and numbers following name indicate source of information. A=Anderson Study; F=Frink Study; H=Hutson Study; O = Osborne Study. Numbers indicate specific pages in study.

TABLE IV

PARTIAL SUMMARY OF CORRELATION BETWEEN ENGLISH GRADES AND TESTS AND SHORTHAND ACHIEVEMENT REPORTED IN PREVIOUS INVESTIGATIONS
(as compiled by Leonard J. Varah)

Researcher	Correlation	Date	Level	Remarks
DiBona[a]	.31	1957	high school	English grades to transcription test at the end of the fourth semester.
Hutson[b]	.416	1951	high school	English grades to shorthand achievement test during final 12 weeks of class.
Kortendick[F186]	.6371	1952	high school	English averages to shorthand grades.
Jones[F176]	.3345	1951	college	English composition to third quarter shorthand grades.
Davis[A670]	.857	1944	high school	O'Rourke's Survey test of English Usage to teacher marks.
Dodson[A670]	.70	1943	high school	English grades to first semester shorthand grades.
	.26	1943	high school	English grades to second semester shorthand grades.

TABLE IV (continued)

Researcher	Correlation	Date	Level	Remarks
Cruzan[A663]	.475	1942	college	Coop. English Test to marks in two terms of stenography
Sherman[A712]	.543	1942	high school	Average English grades to final shorthand grades.
Mandell[A693]	.01	1940	high school	Grammar test scores to shorthand grades.
	.296	1940	high school	Second semester sophomore grades to shorthand test scores.
Kessinger[A689]	.425	1936	high school	Pressey Diagnostic Test of English Composition to Shorthand marks.
Fox[A677]	.54	1936	high school	English grades to stenography grades.
Duncan[A673]	.742	1936	high school	Tenth grade English grades to Shorthand theory.
	.586	1936	high school	Ninth grade English grades to Shorthand theory.

TABLE IV (continued)

Researcher	Correlation	Date	Level	Remarks
Riggs[A710]	.70	1935	high school	First semester shorthand grades to English usage.
	.56	1935	high school	Second semester shorthand grades to English usage.
	.62	1935	high school	First semester shorthand grades to English grades.
	.53	1935	high school	Second semester shorthand grades to English grades.
Hazlett[A684]	.622	1934	high school	Tenth grade English to second semester shorthand grades.
	.603	1934	high school	Sophomore test score to second semester shorthand grades.
	.5599	1934	high school	Eleventh grade English to second semester shorthand grades.
	.692**	1934	high school	Tenth grade English grades, tenth grade English test score to second semester shorthand grades.

[a]Lucille J. DiBona, "Predicting Success in Shorthand," Journal of Business Education XXXV (February, 1960), pp. 213-214.

TABLE IV (continued)

[b]Billy T. Hutson, "Prognosis of Achievement in First-Year Gregg Shorthand Simplified," (unpublished Master's thesis, University of Tennessee, 1951).

*Letters and numbers following name indicate source of information. A=Anderson Study; F=Frink Study.

**Multiple correlation.

TABLE V

PARTIAL SUMMARY OF CORRELATIONS BETWEEN ACADEMIC ACHIEVEMENT AND SHORTHAND ACHIEVEMENT REPORTED IN PREVIOUS INVESTIGATIONS
(as compiled by Leonard J. Varah)

Researcher	Correlation	Date	Level	Remarks
Missling[F230]	.74	1954	high school	GPA exclusive of English to shorthand grades.
Kortendick[F186]	.7947	1952	high school	GPA to first semester shorthand grades.
	.5716	1952	high school	GPA to second semester shorthand grades.
	.7116	1952	high school	GPA to third semester shorthand grades.
Jones[F176]	.5963	1951	college	GPA to third quarter shorthand grades.
Hutson[a]	.381	1951	high school	GPA to final achievement record.
Riggs[A710]	.70	1935	high school	Scholastic standing to first semester shorthand grades.
	.60	1935	high school	Scholastic standing to second semester shorthand grades.
Dodson[A671]	.74	1943	high school	High school subjects to shorthand grades.
	.43	1943	high school	High school subjects to shorthand grades.

TABLE V (continued)

[a]Billy T. Hutson, "Prognosis of Achievement in First-Year Shorthand Simplified," (unpublished Master's thesis, University of Tennessee, 1951).

*Letters and numbers following name indicate source of information. A=Anderson Study; F=Frink Study.

TABLE VI

SIZE OF SCHOOLS ACCORDING TO STUDENT ENROLLMENT, SEPTEMBER, 1964

School No.	Teachers	Student Enrollment
1	36	605
2	45	1130
3	21	452
4	36	800
5	29	597*
6	32	578
7	36	692
8	71	1619

*Grades 10 through 12.

TABLE VII

LIST OF ACADEMIC COURSES USED IN DETERMINING GRADE POINT AVERAGE

English	Biology
History	Bookkeeping
Civics	Contemporary Affairs
Algebra	Natural Science
General Math	Chemistry
Geometry	Physical Science
Spanish	Social Science
French	Economics
Latin	Business Organization
Home Economics	Speech
Typing	Geography
General Business	Business Law

TABLE VIII

LIST OF COURSES REJECTED IN DETERMINING GRADE POINT AVERAGE

Physical Education
Vocal Music
Instrumental Music
Health
How to Study
Driver Education
Teen Age Living

TABLE IX

SUMMARY OF KUDER-RICHARDSON #20 FORMULA FOR ESTIMATE OF RELIABILITY FOR THE M-SCALES FOR THE EIGHT SCHOOL SAMPLE OF FEMALE SHORTHAND STUDENTS

Sub-Test	Number of Items	N	Reliability Estimate**	Farquhar Study*
GSCI	30	177	.73	.90
PJCS	33	177	.89	.83
WRL	48	177	.89	.93
HTI	25	177	.73	.93

*Computed by Hoyt's Analysis of Variance

**Computed by Kuder-Richardson #20 Formula. Lindquist points out that

> It has been indicated that the result obtained by Hoyt's procedure is identical with that from Kuder-Richardson #20, so nothing new has been added so far as analysis of items of a test is concerned.[a]

[a]E. F. Lindquist, Design and Analysis of Experiments in Psychology and Education (Boston: Houghton Mifflin, 1953), 591.

TABLE X

STANDARD DEVIATIONS AND F TESTS FOR THE FEMALE POPULATION OF THE FARQUHAR STUDY AND FOR THE POPULATION FOR THE PRESENT STUDY

Variable	Total Possible	Farquhar[a] S.D. (N=261)	Shorthand S.D. 1st Sem. (N=177)	F
GPA	5.00	.66	.6032	1.1970
GSCI	30	5.11	4.4327	1.3290
PJCS	33	5.78	6.3399	1.2032
WRL	48	8.29	8.3674	1.0187
HTI	25	3.60	3.8649	1.1525
TOTAL M-SCALES	136	18.69	17.4341	1.1492

[a]Kipfmueller, op. cit., p. 28.

TABLE XI

MEANS AND T-TESTS FOR THE FEMALE POPULATION OF THE FARQUHAR STUDY AND FOR THE POPULATION OF THE PRESENT STUDY

Variable	Total Possible	Farquhar[a] Means (N=261)	Shorthand Means (N=177)	Values of "t"
GPA	5.00	3.27	3.42	2.4878*
GSCI	30	20.45	19.48	-2.0704*
PJCS	33	27.44	23.84	-6.1943**
WRL	48	28.99	27.06	-2.3957*
HTI	25	17.51	17.42	- .2564
TOTAL M-SCALES	136	94.93	87.80	-4.0530**

*Significant at the .05 level of confidence.

**Significant at the .01 level of confidence.

Tabled values of t for 400 degrees of freedom at the .05 level of confidence, 1.966; at the .01 level of confidence, 2.588.

[a]Kipfmueller, op. cit., p. 28.

TABLE XII

ZERO ORDER CORRELATIONS BETWEEN FIRST SEMESTER SHORTHAND ACHIEVEMENT AND PREDICTOR VARIABLES FOR THE POPULATION OF THE PRESENT STUDY
(significant at .01 level unless otherwise indicated)

Predictor Variable	Correlation
GPA	.6743
10th English	.5078
9th English	.5212
ACE Total	.4190
Linguistic	.3454
Same-opposite	.2940
Completion	.3440
Quantitative	.4032
Arithmetic	.3410
Number Series	.3548
M-Scale Total	.2219
GSCI	.1627**
PJCS	.0592*
WRL	.2280
HTI	.2235

*not significant
**significant at .05 level of confidence
N = 177

Tabled value of r for 175 degrees of freedom at the .05 level of confidence, .148; at the .01 level of confidence, .193.

TABLE XIII

INTERCORRELATION MATRIX OF M-SCALES, APTITUDE MEASURE, AND SHORTHAND I GRADES FOR THE POPULATION OF THE PRESENT STUDY

	GSCI	PJCS	WRL	HTI	TOTAL M	ACE	SHORTHAND
GSCI		.6226	.3898	.5112	.7811	.1095	.1627
PJCS			.2224	.3738	.7116	.0319	.0592
WRL				.5535	.7826	.2290	.2280
HTI					.7532	.0943	.2235
TOTAL M						.1702	.2219
ACE							.4190
SHTD							

N = 177

TABLE XIV

TESTS OF SIGNIFICANCE OF INCREASE IN PRECISION OF PREDICTION BY COMBINING EACH OF THE SUB-SCORES AND THE TOTAL SCORE OF THE M-SCALES WITH THE TOTAL SCORE OF THE AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION IN ESTIMATING FIRST SEMESTER SHORTHAND ACHIEVEMENT FOR ELEVENTH GRADE GIRLS

Scale	Multiple Correlations	Significant Levels of F Values		
		.01	.05	Not Significant
GSCI	.4398			3.8398
PJCS	.4266			1.3613
WRL	.4443		4.7261	
HTI	.4621	8.1856		
TOTAL M-SCALES	.4945	17.3826		

r_{ACE} = .4190

N = 177

Degrees of Freedom = 1 and 174

Tabled values for 1 and 174 degrees of freedom at .05 level of confidence, 3.90; at the .01 level of confidence, 6.785.

TABLE XV

TESTS OF SIGNIFICANCE OF INCREASE IN PRECISION OF PREDICTION BY COMBINING EACH OF THE SUB-SCORES AND THE TOTAL SCORE OF THE M-SCALES WITH THE LINGUISTIC SUB-SCORE OF THE AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION IN ESTIMATING THE FIRST SEMESTER SHORTHAND ACHIEVEMENT FOR ELEVENTH GRADE GIRLS

Scale	Multiple Correlations	Significant Levels of F Values		
		.01	.05	Not Significant
GSCI	.3701			3.6627
PJCS	.3503			.6743
WRL	.3787		4.8954	
HTI	.4033	7.6944		
TOTAL M-SCALES	.4091	10.0361		

$r_{L\text{-}ACE}$ = .3454

N = 177

Degrees of Freedom = 1 and 174

Tabled values for 1 and 174 degrees of freedom at .05 level of confidence, 3.90; at the .01 level of confidence, 6.785.

TABLE XVI

TESTS OF SIGNIFICANCE OF INCREASE IN PRECISION OF PREDICTION BY COMBINING EACH OF THE SUB-SCORES AND THE TOTAL SCORE OF THE M-SCALES WITH THE QUANTITATIVE SUB-SCORE OF THE AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION IN ESTIMATING FIRST SEMESTER SHORTHAND ACHIEVEMENT FOR ELEVENTH GRADE GIRLS

Scale	Multiple Correlations	Significant Levels of F Values		
		.01	.05	Not Significant
GSCI	.4201			2.9370
PJCS	.4037			.0831
WRL	.4403		6.7562	
HTI	.4312		5.0013	
TOTAL M-SCALES	.4517	9.0736		

$r_{Q\text{-}ACE} = .4032$

N = 177

Degrees of Freedom = 1 and 174

Tabled values for 1 and 174 degrees of freedom at .05 level of confidence, 3.90; at the .01 level of confidence, 6.785.

TABLE XVII

ZERO ORDER CORRELATIONS BETWEEN SECOND SEMESTER TEACHER GRADES AND THE PREDICTOR VARIABLES FOR THE POPULATION OF THE PRESENT STUDY

Predictor Variables	Correlation
Grade Point Average	.6011
Tenth Grade English	.5253
Ninth Grade English	.4684
ACE Total	.4704
Linguistic subscore	.4491
Same-opposite	.4369
Completion	.3978
Quantitative subscore	.2624
Arithmetic	.2087
Number Series	.2379
M-Scales Total Score	.1593**
GSCI	.0905*
PJCS	.0169*
WRL	.2216
HTI	.1114*

*not significant
**significant at .05 level of confidence
N = 171

Tabled value of r for 150 degrees of freedom is .159 at the .05 level of confidence; .208 at the .01 level of confidence.

TABLE XVIII

TESTS OF SIGNIFICANCE OF INCREASE IN PRECISION OF PREDICTION BY COMBINING EACH OF THE SUB-SCORES AND TOTAL SCORE OF THE M-SCALES WITH THE TOTAL SCORE OF THE AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION IN ESTIMATING SECOND SEMESTER SHORTHAND ACHIEVEMENT FOR ELEVENTH GRADE GIRLS

Scale	Multiple Correlations	Significant Levels of F Values		
		.01	.05	Not Significant
GSCI	.4722			.3662
PJCS	.4704			.0000
WRL	.4858			3.2256
HTI	.4757			1.0857
TOTAL M-SCALES	.4868			3.4560

r_{ACE} = .4704

N = 171

Degrees of Freedom = 1 and 168

Tabled values for 1 and 175 degrees of freedom (the closest tabled value of degrees of freedom to 168 degrees of freedom) is 3.90 at .05 level of confidence; 6.785 at .01 level of confidence.

TABLE XIX

TESTS OF SIGNIFICANCE OF INCREASE IN PRECISION OF PREDICTION BY COMBINING EACH OF THE SUB-SCORES AND TOTAL SCORE OF THE M-SCALES WITH THE LINGUISTIC SUB-SCORE OF THE AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION IN ESTIMATING SECOND SEMESTER SHORTHAND ACHIEVEMENT FOR ELEVENTH GRADE GIRLS

Scale	Multiple Correlations	Significant Levels of F Values		
		.01	.05	Not Significant
GSCI	.4523			.6125
PJCS	.4494			.0632
WRL	.4671			3.5457
HTI	.4587			1.8715
TOTAL M-SCALES	.4686			3.8534

$r_{L\text{-}ACE}$ = .4491

N = 171

Degrees of Freedom = 1 and 168

Tabled values for 1 and 175 degrees of freedom (the closest tabled value of degrees of freedom to 168 degrees of freedom) is 3.90 at .05 level of confidence; 6.785 at .01 level of confidence.

TABLE XX

TESTS OF SIGNIFICANCE OF INCREASE IN PRECISION OF PREDICTION BY COMBINING EACH OF THE SUB-SCORES AND TOTAL SCORE OF THE M-SCALES WITH THE QUANTITATIVE SUB-SCORE OF THE AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION IN ESTIMATING SECOND SEMESTER SHORTHAND ACHIEVEMENT FOR ELEVENTH GRADE GIRLS

Scale	Multiple Correlations	Significant Levels of F Values		
		.01	.05	Not Significant
GSCI	.2699			.7066
PJCS	.2626			.0180
WRL	.3281	7.2860		
HTI	.2716			.8888
TOTAL M-SCALES	.3347	8.1541		

$r_{Q\text{-}ACE} = .2624$

N = 171

Degrees of Freedom = 1 and 168

Tabled values for 1 and 175 degrees of freedom (the closest tabled value of degrees of freedom to 168 degrees of freedom) is 3.90 at .05 level of confidence; 6.785 at .01 level of confidence.

TABLE XXI

CORRELATIONS BETWEEN PREDICTOR VARIABLES AND UNIFORM SHORTHAND I EXAMINATION, UNIFORM SHORTHAND II EXAMINATION, SHORTHAND I TEACHER GRADES, AND SHORTHAND II TEACHER GRADES
(N = 68)

Predictor Variable	Shorthand I Exam.	Shorthand I Teacher Grades	Shorthand II Exam.	Shorthand II Teacher Grades
GPA	.6062	.6192	.3820	.5655
Tenth English	.4779	.4456	.5392	.5456
Ninth English	.5098	.5611	.4182	.5669
ACE	.5115	.3880	.4738	.5956
ACE-L	.4001	.2818	.4510	.5436
ACE-Q	.5313	.4658	.2604	.3945
GSCI	.1842	.2515	.0309	.1358
PJCS	.0285	.0603	-.1090	-.0265
WRL	.1609	.2206	.0752	.1682
HTI	.2399	.2532	.0647	.1275
TOTAL M	.1936	.2535	.0271	.1406

TABLE XXI (continued)

Predictor Variable	Shorthand I Exam.	Shorthand I Teacher Grades	Shorthand II Exam.	Shorthand II Teacher Grades
Shorthand I Teacher grades	.7762	1.0000	.5293	.7528
Shorthand II Teacher grades	.6719	.7528	.7058	1.0000
Shorthand I Exam. Subscores				
Brief Forms	.6031	.6145	.1013	.3820
Theory	.7994	.7017	.6756	.6435
Trans.	.8635	.5773	.2411	.5042
Total	1.0000	.7762	.4854	.6719
Shorthand II Exam. Subscores				
Brief-Form-Theory	.3552	.4374	.5088	.4378
Trans.	.4338	.4573	.9632	.6551
Total	.4854	.5293	1.0000	.7058

TABLE XXII

INTERCORRELATIONS BETWEEN UNIFORM SHORTHAND I EXAMINATION, UNIFORM SHORTHAND II EXAMINATION, SHORTHAND I TEACHER GRADES, AND SHORTHAND II TEACHER GRADES
(N = 68)

	Shtd.I	Shtd.II	Br.F.	Theory	Trans.	Total	BF&TH	Trans.	Total
Shorthand I		.7528	.6145	.7017	.5773	.7762	.4374	.4573	.5293
Shorthand II			.3820	.6435	.5042	.6719	.4378	.6551	.7058
Shorthand I Uniform Exam. Brief Form				.5318	.3469	.6031	.3443	.0064	.1013
Theory					.4050	.7994	.4055	.6315	.6756
Transcription						.8635	.1864	.2125	.2411
Total Score							.3552	.4338	.4854
Shorthand II Uniform Exam. Brief Form & Theory								.2587	.5088
Transcription									.9632
Total Score									1.0000

TABLE XXIII

CORRELATIONS BETWEEN PREDICTOR VARIABLES OF THE PRESENT STUDY AND SHORTHAND II UNIFORM EXAMINATION, SHORTHAND I TEACHER GRADES, AND SHORTHAND II TEACHER GRADES (N=153)

Predictor Variables	Shorthand II Examination	Shorthand I Teacher Grades
GPA	.4368	.5504
Tenth English	.4502	.4769
Ninth English	.3261	.4670
ACE Total Score	.3604	.4415
ACE-L Score	.3500	.4218
ACE-Q Score	.1708	.2292
GSCI	.0531	.0666
PJCS	.0434	-.0215
WRL	.1500	.2260
HTI	.0640	.0804
M-Scales Total Score	.1154	.1357
Shorthand I Teacher Grades	.5409	.7219
Shorthand II Teacher Grades	.6198	1.0000
Shorthand II Test Subscores		
Brief Form-Theory	.5831	.5986
Transcription	.9853	.5614
Total	1.0000	.6198

TABLE XXIV

INTERCORRELATIONS BETWEEN SUB-SCORES AND TOTAL SCORE OF UNIFORM SHORTHAND II EXAMINATION, SHORTHAND I TEACHER GRADES, AND SHORTHAND II TEACHER GRADES (N = 153)

	Shtd.I Teacher Grades	Shtd.II Teacher Grades	BF&TH	Tran-scrip-tion	Total
Shorthand I Teacher Grades		.7219	.6588	.4620	.5409
Shorthand II Teacher Grades			.5986	.5614	.6198
Brief Form-Theory				.4373	.5831
Transcription					.9853
Total Score					

TABLE XXV

SHORTHAND I TEACHER GRADES FOR EACH SCHOOL
(N = 177)

School	A	B	C	D	F	Mean*	S.D.	Total
1	5	4	6	4	0	3.5263	1.1239	19
2	11	12	15	8	2	3.4583	1.1478	48
3	4	9	5	4	0	3.5909	1.0075	22
4	3	5	2	0	0	4.1000	.7379	10
5	2	0	0	2	0	3.5000		4
6	4	16	10	1	0	3.7419	.7288	31
7	2	5	9	6	3	2.8800	1.1299	25
8	11	4	0	1	2	4.1667	1.3827	18
TOTALS	42	55	47	26	7	3.5593	1.1222	177

*5.00 = A
4.00 = B
3.00 = C
2.00 = D
1.00 = F

TABLE XXVI

SHORTHAND II TEACHER GRADES FOR EACH SCHOOL
(N = 171)

School	A	B	C	D	F	Mean*	Total
1	6	3	6	3	1	3.5263	19
2	9	12	16	7	0	3.5227	44
3	8	6	3	4	1	3.7273	22
4	4	3	1	2	0	3.9000	10
5	1	1	0	2	0	3.2500	4
6	5	18	6	1	0	3.9000	30
7	1	7	8	8	0	3.0417	24
8	10	3	2	1	2	4.0000	18
TOTALS	44	53	42	28	4	3.6140	171

*5.00 = A
4.00 = B
3.00 = C
2.00 = D
1.00 = F

TABLE XXVII

UNIFORM EXAMINATION FOR FIRST SEMESTER SHORTHAND

ADMINISTRATION OF THE SHORTHAND ACCOMPLISHMENT TEST

The students should have at least three (3) blank sheets of shorthand note paper. After being assured that each student has three sheets, say

NUMBER YOUR SHEETS OF SHORTHAND PAPER 1, 2, and 3 IN THE UPPER RIGHT CORNER OF EACH SHEET.

After this has been done, say

I WILL DICTATE TO YOU THREE LETTERS. YOU ARE TO WRITE THESE LETTERS IN SHORTHAND ON THE SHEETS OF SHORTHAND PAPER PROVIDED YOU. USE A SEPARATE SHEET OF PAPER FOR EACH DICTATED LETTER. REMEMBER, WRITE AS MUCH OF EVERY LETTER DICTATED AS YOU CAN. DO NOT GIVE UP AT ANY TIME. IF YOU LOSE PART OF THE DICTATION, PICK UP WITH THE DICTATOR AS SOON AS YOU CAN. READY, LETTER #1.

2 minutes at 40 words per minute. Let 20 seconds lapse between the end of letter #1 and when you say

READY, LETTER #2.

2 minutes at 50 words per minute. Let 20 seconds lapse between the end of letter #2 and when you say

READY, LETTER #3.

2 minutes at 60 words per minute. Let 20 seconds lapse between the end of letter #3 and when you say

TURN TO THE MATERIALS HANDED TO YOU ENTITLED SHORTHAND EXAMINATION DICTATION SECTION. WRITE IN THE INFORMATION ASKED FOR ON THE FRONT.

TABLE XXVII (continued)

After about one minute has lapsed, say

NOW, PLEASE READ WITH ME THE PRINTED DIRECTIONS AND EXAMPLE PROVIDED ON THE FIRST PAGE OF YOUR TEST BOOKLET.

FROM YOUR SHORTHAND NOTES, FIND THE OMITTED WORD THAT COMPLETES THE PARTIAL TRANSCRIPT THAT FOLLOWS. EACH OMISSION IN YOUR PARTIAL TRANSCRIPT IS INDICATED BY A NUMBERED BLANK LINE. WRITE YOUR ANSWERS ON THE BLANK LINE. YOUR ANSWERS ARE TO BE IN LONGHAND. WORK AS RAPIDLY AS YOU CAN.

EXAMPLE: YOUR (1) *invoice* ARRIVED THIS MORNING. FROM YOUR SHORTHAND NOTES, YOU WOULD HAVE DISCOVERED THAT THE WORD INVOICE WAS OMITTED. YOU WOULD THEN HAVE WRITTEN "INVOICE" IN THE NUMBERED BLANK TO INDICATE THE MISSING WORD. ARE THERE ANY QUESTIONS?

TURN THE PAGE AND GO AHEAD.

Provide 15 minutes for the group to write their answers. Then say

STOP WHEN YOU COMPLETE THE WORD YOU ARE NOW WRITING. PLACE YOUR SHORTHAND NOTES INSIDE THE TEST BOOKLET.

Collect all test booklets.

FIRST SEMESTER SHORTHAND EXAMINATION
Dictation section

The following letter is to be dictated at 40 words per minute. The material is marked in 15 second intervals.

DEAR MRS GREEN: HAVE YOU MADE FINAL ARRANGEMENTS/ (15) FOR MOVING FROM PITTSBURGH TO YOUR NEW HOME ON/ (30) 21 FARMINGTON ROAD? IF NOT MAY WE HAVE AN/ (45) OPPORTUNITY TO SEND SOME OF OUR REPRESENTATIVES TO GIVE YOU/ (60) AN ESTIMATE? Paragraph

WE ARE A WELL-KNOWN AND ESTABLISHED/ (15) MOVING AND STORAGE FIRM AND HAVE AN OUTSTANDING REPUTATION/ (30) FOR DOING AN EFFICIENT JOB. Paragraph

OUR REPRESENTATIVES,/ (45) AS WELL AS OUR MANAGER, ARE LOOKING FORWARD TO/ (60) THE PLEASURE OF SERVING YOU.

YOURS SINCERELY

FIRST SEMESTER SHORTHAND EXAMINATION
Dictation section

The following letter is to be dictated at 50 words per minute. The material is marked in 15 second intervals.

DEAR MISS WELLINGTON: YOU WILL FIND SOMETHING NEW AND

CONVENIENT WAITING FOR/YOU THE NEXT TIME YOU DRIVE TO THE
15

MICHIGAN NATIONAL BANK. THE PARKING/LOT ON DANVILLE PLACE
30

HAS BEEN ENLARGED, COMPLETELY REPAVED, AND GENERALLY

IMPROVED./ paragraph
45

NO BANK OR BUSINESS CAN SOLVE THE COMPLICATED PROBLEM

OF PARKING FOR/ALL OF LANSING, BUT WE ARE DOING OUR UTMOST
60

TO MAKE SURE/THAT YOU, A CUSTOMER OF THE MICHIGAN NATIONAL
15

BANK, WILL HAVE PLENTY/OF FREE PARKING SPACE WHILE YOU DO
30

YOUR BANKING BUSINESS. paragraph

PARKING, MISS/WELLINGTON, IS PART OF THE SERVICE OF THE
45

MICHIGAN NATIONAL BANK/LANSING'S LEADING BANK. VERY
60

SINCERELY YOURS

FIRST SEMESTER SHORTHAND EXAMINATION
Dictation section

The following letter is to be dictated at 60 words per minute. The material is marked in 15 second intervals.

DEAR SIR: FOR THE PAST TEN WEEKS I HAVE BEEN TEACHING

SHORTHAND IN THE ADULT-EDUCATION/15 SCHOOL IN MY CITY. IT HAS

INDEED BEEN A REWARDING EXPERIENCE. I LOOK FORWARD TO/30 EACH

SESSION. paragraph

ALREADY MOST OF THESE ADULTS ARE WRITING 60 WORDS A

MINUTE./45 I ATTRIBUTE THESE FINE RESULTS IN LARGE PART TO YOUR

TEXTBOOK,/60 "SHORTHAND FOR ADULTS." I CHOSE THIS BOOK AFTER

EXAMINING, FORWARDS AND BACKWARDS, MORE THAN/15 TWELVE BOOKS ON

THE MARKET. paragraph

I FELT THAT THE AUTHORS WOULD BE INTERESTED IN LEARNING/30

ABOUT THE SUPERIOR RESULTS I HAVE BEEN GETTING WITH THEIR

FINE TEXTBOOK./45 PLEASE GIVE THEM MY CONGRATULATIONS FOR

PRODUCING SUCH A FINE TEXT. VERY TRULY YOURS/60

SHORTHAND EXAMINATION DICTATION SECTION

Your Name_____

Your School_____

Your Grade in School -- (circle one) 10 11 12

Current Date_____

DIRECTIONS: From your shorthand notes, find the omitted word that completes the partial transcript that follows. Each omission in your partial transcript is indicated by a numbered blank line. Write your answers on the blank. Your answers are to be in longhand. Work as rapidly as you can.

Example: Your (1)_____ arrived this morning. From your shorthand notes, you would have discovered that the word invoice was omitted. You would then have written "invoice" in the numbered blank to indicate the missing word. Your copy would then appear as follows:

Your (1)_____ arrived this morning.

LETTER #1

Dear (1)_____ Green:

Have (2)_____ made (3)_____ (4)_____ for moving from Pittsburgh to your new (5)_____ on (6)_____ Farmington Road? (7)_____ (8)_____, (9)_____ we have an opportunity to send (10)_____ of our representatives to give you an estimate?

We are a (11)_____ (12)_____ (13)_____ moving and storage firm and have an (14)_____ reputation for doing an efficient job.

Our (15)_____ as well as our (16)_____ (17)_____ looking forward to the pleasure of (18)_____ you. (19)_____ (20)_____

LETTER #2

Dear (1)_____ Wellington:

You will find something new and convenient waiting for you the next time you (2)_____ to the (3)_____ National Bank. (4)_____ parking lot on Danville (5)_____ has been (6)_____, (7)_____ (8)_____, and (9)_____ (10)_____.

(11)_____ bank or business (12)_____ solve the complicated problem (13)_____ (14)_____ for all of (15)_____, but we are doing our utmost to make sure that (16)_____, a customer of the (17)_____ National Bank, (18)_____ (19)_____ plenty of free parking space while (20)_____ (21)_____ (22)_____ (23)_____ (24)_____

Parking, (25)_____ Wellington, is part of the service of the (26)_____ National Bank, (27)_____ leading bank. (28)_____ (29)_____ (30)_____

LETTER #3

Dear Sir:

For the past (1)_____ weeks I have been teaching (2)_____ in the (3)_____ school in my (4)_____. It has (5)_____ been a (6)_____ experience. I (7)_____ (8)_____ to each session.

(9)_____ most of these adults are (10)_____ (11)_____ words a minute. I attribute these (12)_____ results in large part to your textbook, (13)_____ (14)_____ (15)_____. I (16)_____ (17)_____ (18)_____ after (19)_____, (20)_____ (21)_____ (22)_____, more than (23)_____ books on the market.

I (24)_____ that the authors would be interested in (25)_____ (26)_____ (27)_____ (28)_____ (29)_____ I have been getting with their fine (30)_____. Please (31)_____ them my congratulations for producing such a fine (32)_____.(33)_____ (34)_____ (35)_____

FIRST SEMESTER SHORTHAND EXAMINATION
Theory section

Words to be dictated every 6 seconds

1.	harm		26.	kingdom	30
2.	appears	6	27.	afternoon	36
3.	themselves	12	28.	patiently	42
4.	perplexing	18	29.	depending	48
5.	exportation	24	30.	investment	54
6.	self-made	30	31.	exceedingly	3 min.
7.	$3.	36	32.	encourages	6
8.	becoming	42	33.	skates	12
9.	cold	48	34.	ultimate	18
10.	furniture	54	35.	family	24
11.	circulation	1 min.	36.	skillful	30
12.	function	6	37.	township	36
13.	surest	12	38.	creative	42
14.	quiet	18	39.	whenever	48
15.	postponed	24	40.	3 o'clock	54
16.	$500,000	30	41.	checks	4 min.
17.	justification	36	42.	subdivide	6
18.	qualify	42	43.	seriously	12
19.	consumed	48	44.	earth	18
20.	ounces	54	45.	musical	24
21.	terminations	2 min.	46.	supervisor	30
22.	conveniently	6	47.	let us	36
23.	entertain	12	48.	if you want	42
24.	misinform	18	49.	at a loss	48
25.	amounts	24	50.	to know	54

5 min. stop!

FIRST SEMESTER SHORTHAND EXAMINATION
Brief form section

Words to be dictated every 6 seconds

1.	after		26.	success	30
2.	send	6	27.	are	36
3.	bill	12	28.	world	42
4.	never	18	29.	conclude	48
5.	advertise	24	30.	refer	54
6.	newspaper	30	31.	every	3 min.
7.	consider	36	32.	one	6
8.	time	42	33.	right	12
9.	glad	48	34.	and	18
10.	enclose	54	35.	organize	24
11.	to	1 min.	36.	advantage	30
12.	but	6	37.	soon	36
13.	purpose	12	38.	company	42
14.	am	18	39.	satisfy	48
15.	for	24	40.	character	54
16.	purchase	30	41.	put	4 min.
17.	correspond	36	42.	under	6
18.	have	42	43.	what	12
19.	govern	48	44.	was	18
20.	street	54	45.	yet	24
21.	correct	2 min.	46.	long	30
22.	important	6	47.	go	36
23.	part	12	48.	please	42
24.	could	18	49.	they	48
25.	object	24	50.	ever	54

5 min. stop!

TABLE XXVIII

UNIFORM EXAMINATION FOR SECOND SEMESTER SHORTHAND

DIRECTIONS FOR THE TRANSCRIPTION SECTION:

Attached are speed takes at 60, 80, 100, and 120 WPM. These are three minute takes. After the take is dictated, the students have 15 minutes for transcribing notes for each speed. At the end of the 15 minute period say: STOP. GO ON TO THE NEXT SPEED TAKE. YOU HAVE 15 MINUTES TO TRANSCRIBE YOUR NOTES FOR THIS SPEED. BEGIN.

If you wish to give the students more time for transcribing, please have the students prepare a carbon copy of their transcript. At the end of the prescribed 15-minute period, collect the original, leaving the carbon copy with the student so that she may continue her transcription on the carbon copy.

Note: The four speeds may be given at any time with any number dictated on a particular day. However, the transcript for each speed should be made during the same class period that the dictation is given.

60 WPM DICTATION

Dear Mr. Kelly: If you are tempted to buy a car with little or nothing down / and take three or four years to pay, be careful. These are not easy terms at all. They are, / in fact, very harsh terms.

The cheapest way to buy a car is to pay cash for it. In / that way you have no interest charges to pay. The next cheapest way to buy a car (1) is to pay as much down as you can afford and the rest as soon as possible.

It / is true, of course, that you can arrange payments that are too high for comfort; and, as a / result, your car may be a burden instead of a pleasure. On the other hand, if / you pay less than you can comfortably afford, you are paying for financing service (2) that you do not need. Consequently, it is wise to arrange your payments to suit / your income. Pay as much down as you can, and pay the rest as soon as you can.

If you / are planning to purchase a car on time, why not ask one of our finance experts to / advise you on the terms of payment that will be best for your budget.

Sincerely yours, (3)

80 WPM DICTATION

Dear Mr. Jones: Do you waste time every month standing in line to pay taxes and other bills? Do you sometimes / neglect to get a receipt for bills you have paid? Do you risk loss or theft of money by carrying large sums of / cash with you? You can avoid these unnecessary risks and nuisances by opening a special checking account. /

With one of our special checking accounts, you do not have to waste time standing in line to pay bills. You just write (1) out your check in the comfort of your home and send it through the mails. It is as simple as that.

Your canceled checks / represent the best kind of proof that you have paid your bills.

By using our special checks, you will not have to carry / a large sum of money with you and risk losing it or having it stolen from you. You may find it easier / to live within your budget, too, because your checkbook shows where the money goes. It helps you to find out whether you (2) are spending too much money on certain items.

It makes good sense to open a special checking account, / particularly in view of the fact that it costs so little. The cost of each check is 10 cents, plus a fee of 25 / cents a month for maintenance. You do not have to keep a minimum balance at any time.

Why not open / a special checking account today and start profiting from its many advantages. Very cordially yours, (3)

100 WPM DICTATION

Dear Mr. Green: Thousands of people think that they will never have to go to court. But it can happen to you. For example, the other fellow / drives his car like a maniac, while you drive carefully. There is a crash, and you have a lawsuit on your hands.

You suddenly inherit / some money, and unknown relatives appear from all over the place. The next thing you know, you are consulting lawyers and you are in court.

You / write a book, and then you find yourself in court because you are accused of stealing someone else's material.

You invent something, and you (1) are in trouble because someone is taking you to court for using his ideas.

You leave something out of a contract or make some / perfectly innocent mistake, and you are in a court action.

"A Day in Court," by Harry Shaw, is the layman's guide to the law. Even if you / never tangle with the law, you will have a fine time reading this witty book, which tells clearly and cheerfully how to stay out of court and what / to do if you happen to get there.

Whether you are a plaintiff or a defendant, this book will show you how to find a lawyer, how to act (2) in the courtroom, how to act on the witness stand, and how to help your lawyer win your case. This book will show you exactly what to do, from the / time your trial begins to the moment you are awaiting the decision of the jury.

A copy of this book will be sent to you for seven / days' free reading. If you are not completely satisfied, send it back and you will owe us nothing. Otherwise, remit $3.50 / plus a few cents for postage. A stamped and self-addressed envelope is enclosed for your convenience in sending us your order. Cordially yours, (3)

120 WPM DICTATION

Dear Mr. Gates: Suppose you were in a mood to look for a new car. It is the middle of the afternoon and the temperature is about 95 degrees. You drive / past a new car display that catches your eye, but there is no shade. Would the idea of getting out in the hot sun appeal to you?

Farther down the street, however, there is / another display of new cars; but there is a difference there. This outdoor display is completely under cover. The cars can be looked at and bought in cool, comfortable / shade.

Is there any question where you would stop to look and trade? Wouldn't you stop where you could be cool and comfortable? That is the reason why more and more progressive (1) car dealers all over the country are covering their outdoor display area. They do not want to lose good prospects to their competitor down the street.

If you want / to be sure that you do not lose car prospects to your competitors who already have covered outdoor displays, you will be interested in learning about Smith Carports. / For the first time in America a modern carport is available at an amazingly low cost. The reason that our carport can be offered at such a / low price is that it is made on a production line. Consequently, we can sell it for almost 35 per cent less than our competitors can.

The enclosed photos give you (2) an idea of the kind of

display you can have with our carports. Show these photos to your salesmen. See if they do not all agree that they can make more and better trades / with prospects who keep cool and comfortable.

You can easily find out, without any obligation on your part, how little it will cost you to have the finest car / display in town. Indicate on the enclosed card the number of cars you want to cover, and we will give you the cost by return mail. Just fill out the card and drop it in / the mail today.

You can pay for your covered display as it earns extra profits for you. If you prefer to do this, please indicate that fact on the reply card. Sincerely yours, (3)

SHORTHAND II - BRIEF FORM TEST

NAME_____

Part I: Write the longhand word for each of the following shorthand outlines in the space provided at the right of the outline.

1.  _____
2.  _____
3.  _____
4.  _____
5.  _____
6.  _____
7.  _____
8. _____
9. _____
10.  _____
11.  _____
12.  _____
13.  _____
14.  _____
15.  _____
16.  _____
17.  _____
18.  _____
19.  _____
20.  _____
21.  _____
22. _____
23.  _____
24.  _____
25.  _____

TURN PAGE AND CONTINUE TEST.

SHORTHAND II - BRIEF FORM TEST

NAME_____

Part II: Write the shorthand outline for each of the following words in the space provided at the right of the longhand word.

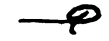
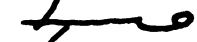
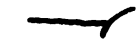
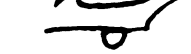
1. gentlemen _____
2. over _____
3. government _____
4. thank _____
5. which _____
6. advantage _____
7. progress _____
8. question _____
9. suggest _____
10. responsible _____
11. thing _____
12. Mr. _____
13. opportunity _____
14. subject _____
15. advantage _____
16. importance _____
17. quantity _____
18. particular _____
19. recognize _____
20. idea _____
21. satisfactory _____
22. organize _____
23. publish _____
24. time _____
25. year _____

STOP! DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

SHORTHAND II - THEORY TEST

NAME_____

Part I: Write the longhand word for each of the following shorthand outlines in the space provided at the right of the outline.

1.  _____
2. _____
3.  _____
4.  _____
5.  _____
6. _____
7.  _____
8.  _____
9.  _____
10.  _____
11.  _____
12.  _____
13.  _____
14.  _____
15.  _____
16.  _____
17.  _____
18.  _____
19.  _____
20.  _____
21.  _____
22.  _____
23.  _____
24.  _____
25.  _____

TURN PAGE AND CONTINUE TEST.

SHORTHAND II - THEORY TEST

NAME_____

Part II: Write the shorthand outline for each of the following words in the space provided at the right of the longhand word.

1. inaccurate _____
2. surest _____
3. daily _____
4. deficient _____
5. diagram _____
6. assist _____
7. helpful _____
8. forwarded _____
9. duplicated _____
10. township _____
11. join _____
12. managed _____
13. propose _____
14. refuse _____
15. threats _____
16. expire _____
17. $500 _____
18. August _____
19. article _____
20. dependable _____
21. science _____
22. appreciated _____
23. underpaid _____
24. Washington _____
25. addition _____

STOP! DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

TABLE XXIX

EXPLANATION FOR GENERALIZABILITY

In order to obtain generalizability for the results of the present study, no analysis was made of the teaching methods, motivation devices used in the classroom, equipment for teaching, objectives of the courses for each teacher, standards of the course, standards for grades by the teachers, professional preparation of the teachers, or the teacher's personality. Such analysis would have created a series of subgroups--one subgroup for each teacher--which may have created homogeneous groups in certain schools, if not in all schools. Homogeneity would have rendered the results of the Michigan M-Scales, the test that was analyzed in the present study, useless for the reason that an important prerequisite of the Michigan M-Scales is a heterogeneous population.