AN EXPERIMENT TO DETERMINE THE EFFECT OF THE EARLY INTRODUCTION OF NEW-MATTER DICTATION IN THE TEACHING OF BEGINNING SHORTHAND TO COLLEGE STUDENTS

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This is to certify that the

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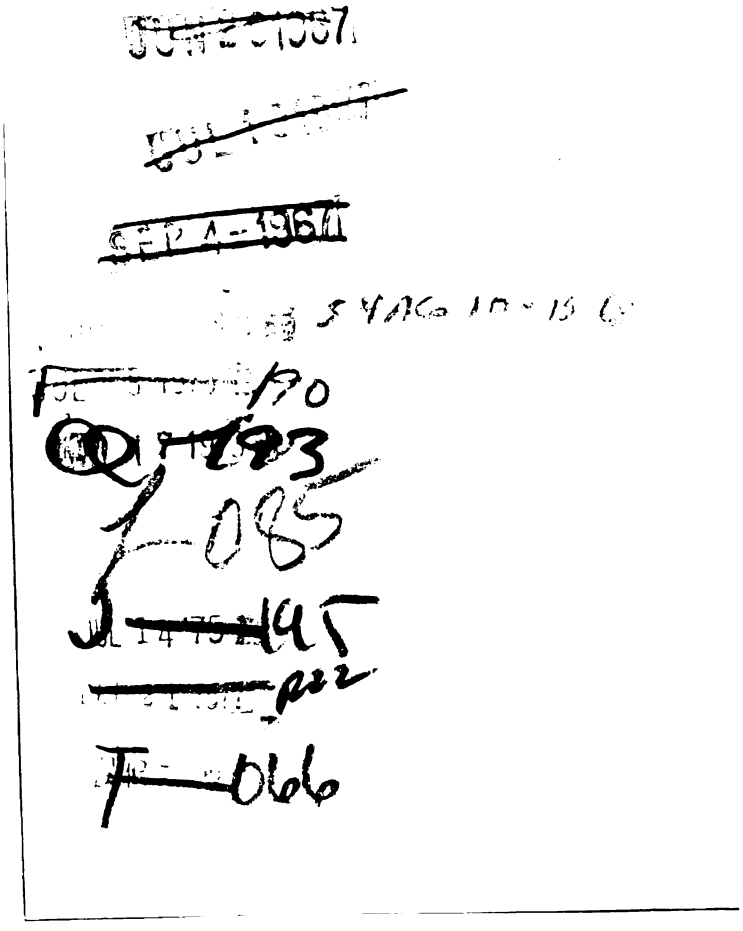

ABSTRACT

AN EXPERIMENT TO DETERMINE THE EFFECT OF THE EARLY INTRODUCTION OF NEW-MATTER DICTATION IN THE TEACHING OF BEGINNING SHORTHAND TO COLLEGE STUDENTS

by Margaret Ann McKenna

Purpose of the Study

The purposes of this study were (1) to determine the effect of the early introduction of new-matter dictation on the performance of a group of beginning shorthand students, (2) to prepare new-matter dictation for each lesson containing words that the students had not actually written but should have been able to write from the principles already studied, and (3) to determine the predictive value of the Michigan State University Entrance Test Battery for achievement in beginning shorthand.

Procedures

The sample for the study consisted of 33 Michigan State University students enrolled in two sections of Beginning Shorthand I and Beginning Shorthand II.

Section one was taught by a language-arts approach with no writing until the students had completed three chapters of the textbook, automatization of responses without

knowledge that there are rules governing the construction of shorthand outlines, and no new-matter dictation until the completion of all shorthand theory.

Section two was taught by a science-type approach with students writing after the completion of the first chapter in the textbook, rules for outline construction presented after the students are familiar with the alphabet and joinings, and new-matter dictation beginning in the eighth class period.

Scores from two theory tests and a series of dictated letters at speeds of 60, 80, and 100 words a minute were used to compare the two sections. The statistical procedures used were analysis of variance and correlation analysis.

Findings

1. There was no statistically significant difference between the achievement of the two groups on the dictation tests or on the two theory tests.

2. Transcription achievement as measured by the dictation tests correlated with knowledge of theory as measured by the word tests in each section and in the two sections combined.

3. The following simple correlation coefficients were statistically significantly different from zero: Section one: English, .5203; Section two: Verbal, .6171; Informational, .6400; CQT-Total, .6924; English, .6935;

Sections one and two: Verbal, .3889; Informational, .4423; CQT-Total, .4431; English, .6103; Reading, .3450.

4. The five subtests of the Michigan State University Entrance Test Battery when considered simultaneously produced the following multiple correlation coefficients: Section one: .64; Section: .84; Sections one and two: .63. Only the correlation of section two was significantly different from zero.

Conclusions

The following conclusions were drawn from an analysis of the findings of the study:

1. That the early introduction of new-matter dictation did not result in an increase nor did it retard students in the ability to take and transcribe new-matter dictation as measured by the existing departmental standards at Michigan State University.

2. That this study provides no evidence to suggest either postponed benefits or postponed handicaps due to the early introduction of new-matter dictation.

3. That students taught by the functional method did not differ in knowledge of theory as measured by word tests from students taught by a science-type approach.

4. That there is a relationship between transcription achievement as measured by the ability to take dictation accurately and knowledge of theory as measured by word tests.

6. That this provides no evidence to support the theory that students with verbal facility will do better in a language arts approach and students with quantitative ability will do better in a science-type approach to the learning of shorthand.

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

I. INTRODUCTION

Increasing emphasis on academic subjects and increasing demand for trained stenographic and clerical employees have made it imperative for teachers of secretarial skills to search for ways to teach their courses more efficiently. All too often in shorthand, teaching materials and procedures have been based on opinion rather than on sound research. Attention needs to be given to the behavior of learners at each successive level of skill and the implications of such behavior for instructional materials and procedures.

There are two radically different approaches to the teaching and learning of shorthand: (1) the language arts approach and (2) the science-type approach.

The language arts approach is essentially an imitative method, with an objective of rapid and accurate use of unverbalized generalizations. It is based, according to Leslie, "on the concept that the student should not be required to write any shorthand outline until he is thoroughly prepared to write it correctly."[1] The learner never

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[1]Louis A. Leslie, The Teaching of Gregg Shorthand by the Functional Method (New York: The Gregg Publishing Company, 1935), p. 13.

puts into words the rules, principles, or generalizations governing the skill. He is taught to automatize the correct shorthand response without ever knowing that there are any rules for writing shorthand outlines.

Science-type teaching, at some point in the learning process, gives the learner verbalized rules or principles or generalizations by which the shorthand outlines are constructed. Emphasis is given to the application of shorthand principles in the writing of shorthand not to the learning of rules for writing.

Probably few teachers today teach at either end of the continuum of language arts or science-type teaching. There are many variations in the procedures of both types of teaching as applied to shorthand and many teaching procedures that are equally effective with either type of teaching, although the objectives of the teacher may cause variations in the exact way in which the procedure will be used.

In the functional method of teaching shorthand (a language arts approach), new-matter dictation is not introduced until all shorthand theory has been presented. The reasoning behind this method of teaching is that the learner, from dictation of practiced material at higher and higher speeds and from writing large amounts of connected material, is constantly building a larger vocabulary and automatizing the use of that vocabulary. He is learning to write outlines more and more rapidly. When

he does begin new-matter dictation, it is claimed that this dictation will present fewer difficulties and will be less likely to cause fears and tension. According to Leslie, developer of the functional method, the

> ability to construct an outline instantly for any word that may occur is obtained only by practicing outlines for thousands of different words in order to obtain the greatest possible familiarity with all the sound and symbol combinations of the English language.[2]

It takes only a few "new" words in any dictation, however, to cause the student to "lose" the dictation. It would seem, therefore, that a major objective of the training in shorthand should be to reduce the number of words that will be "new" by utilizing the principle of constructing outlines right from the beginning. There is no way to insure that all the words the employed stenographer could ever be asked to write can be included in the training. It is possible, however, to furnish many practice situations in which the words must be constructed during the press of dictation. To do this, a few "new" words could be included in some of the dictation material quite early in the training and continuously thereafter (a science-type approach).

II. STATEMENT OF THE PROBLEM

Purposes of the Study

The major purpose of this study was to compare two methods of teaching shorthand to determine the effects on

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[2]Louis A. Leslie, Methods of Teaching Gregg Shorthand (New York: McGraw-Hill Book Company, 1953), p. 342.

the performance of a group of beginning shorthand students. In one class, new-matter dictation was introduced after approximately two weeks of shorthand instruction and was continued through the twenty-week period of the study. The other class was taught by the language arts method in which new-matter dictation was deferred until all shorthand theory had been introduced, which was after ten weeks of instruction.

A secondary purpose of the study was to prepare new-matter dictation material for each lesson based on the shorthand principles known by the students and containing words that the student had not actually written but should have been able to write from the principles already studied.

To contribute to the available data on shorthand prognosis and to determine, if possible, predictors of success in beginning shorthand at Michigan State University, a portion of the study conducted by Coleman in 1964 was replicated and the correlations between student scores on sub-tests of the Michigan State University Entrance Test Battery and subsequent performance in beginning shorthand were analyzed statistically. The scores of the sub-tests on the Michigan State University Entrance Test Battery were also analyzed to determine if a relationship exists between aptitudes as indicated by these scores and success or failure in shorthand when taught by a language-arts or science-type approach.

Hypotheses to be Tested

The objectives of this study were to determine (1) whether students taking new-matter dictation early in their training would achieve greater skill in taking dictation and transcribing at the end of twenty weeks of instruction than students who were taught by the language arts method in which no new-matter dictation was introduced during the period when theory was being learned and (2) whether subtests of the Michigan State University Entrance Test Battery can be used as predictors of possible success in beginning shorthand.

The following null hypotheses were tested:

1. There is no difference at the end of two terms of instruction in the achievement of beginning shorthand students taking new-matter dictation from the beginning of the third week of the first term and that of students who have had only practiced material for dictation until after all theory has been presented.

2. There is no relationship between student scores on the Michigan State University Entrance Test Battery and subsequent performance in beginning shorthand.

Importance of the Study

Much of what has been written about teaching methods in Gregg shorthand is the work of Louis Leslie, a co-author of the Simplified and Diamond Jubilee editions of Gregg shorthand and the developer of functional method of teaching beginning shorthand.

According to Leslie, the ability to construct rapidly a legible shorthand outline is the most important single objective of shorthand learning for prospective stenographers. Such students need not be concerned with theoretical accuracy.[3] Some recent research, however, is in conflict with this belief. Fermenick, in a study concerning the relationships between a knowledge of shorthand principles and errors in transcription, found that a significant relationship existed between accuracy in shorthand principles and accuracy in transcription as well as between inaccuracy in shorthand principles and inaccuracy in transcription.[4]

Danielson, in a study of the relationships between competency in shorthand vocabulary and shorthand dictation, found a significant relationship between competency in shorthand vocabulary and dictation achievement.[5]

Leslie's functional method of teaching shorthand is an application of language-art teaching in which the acquirement of shorthand skill is divided into four main stages: (1) reading shorthand, (2) copying shorthand, (3) writing shorthand from dictation with a preview, and

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[3]Ibid., p. 121.

[4]William F. Fermenick, "An Analysis of the Relationship between Application of Some Principles of Gregg Shorthand Simplified and Errors in Transcription" (unpublished Master's thesis, Mankato State College, 1959). Cited by Ruth Anderson, Secretarial Education with a Future, American Business Education Association Yearbook, 1962, p. 59.

[5]Harriet Ann Danielson, "The Relationship Between Competency in Shorthand Vocabulary and Achievement in Dictation" (unpublished Doctoral thesis, Indiana University, 1959).

(4) writing shorthand from dictation without a preview.[6] This last stage is not attempted until after the presentation of all theory and the completion of the manual.

According to Leslie, a learner who is compelled to write new-matter dictation too soon develops a fear of dictation because he has difficulty with it. Because of his inability to supply outlines readily, he may develop a hesitating style of writing.

Leslie also states that the functional writer writes fluently and unhesitatingly because he is not asked to construct outlines until "his mind is well stocked with outlines and parts of outlines ready to be assembled into finished outlines."[7]

Leonard West disagrees with Leslie on the subject of new-matter dictation. In a psychological analysis of the acquisition of stenographic skill, West describes shorthand activities as writing shorthand as responses to stimuli consisting of sounds in the ears. In the beginning the student sounds out the component parts of each word as he writes the component strokes. The intervening mediating behaviors in the form of verbal self-direction are both the learner's response to the overt stimulus (hearing the word) and the stimulus for making the overt (writing) response.

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[6]Leslie, Methods of Teaching Gregg Shorthand, pp. 84-85.

[7]Ibid., p. 123.

Nothing in the learner's past experience enables him to write shorthand as response to language stimuli; and so he makes to those stimuli the previously learned response of spelling or vocalizing, usually silently. As shorthand skill is acquired, certain mediators are eliminated and others developed. At first, vocalization of the element to be written serves as a mediating stimulus; next the sensations of motion generated by the writing of stroke one serve as stimuli for the writing of stroke two. Little chains are built up and grow progressively longer as skill develops. These two stages (vocal mediators and kinesthetic mediators) are not distinct in time. When heavily practiced outlines are being written on the basis of kinesthesis, new words are still being spelled out. With more and longer kinesthetically stimulated response chains the defining characteristic of higher levels of dictation, the number of outlines that can be written in chained fashion should be maximized. To accomplish this, a large vocabulary must be included in the training materials and practice situations must be furnished in which new words are constructed during the press of dictation.[8]

The present study compared these two theories regarding the teaching of shorthand in an effort to determine whether instructional materials and procedures affect achievement in beginning shorthand.

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[8]Leonard J. West, "The Acquisition of Stenographic Skill: A Psychological Analysis," Business Education Forum, October, 1963, pp. 7-8.

Prognosis has been an area of considerable interest in shorthand research. To date, however, prediction as to success in shorthand cannot be made with accuracy. Researchers agree that a battery of skills including general scholastic average, grades in English, and intelligence test scores show greater promise than the use of any single test yet devised.

According to Anderson, a number of investigators found English marks, scholastic achievement and foreign language marks among the best measures to predict success or failure in shorthand.[9]

This study compared achievement in shorthand as measured by the ability to take dictation and transcribe it accurately with scores on the Michigan State University Entrance Test Battery. It is hoped that norms might be established whereby these test scores, or some combination of them, could be used to predict success or failure in shorthand at Michigan State University.

Definition of Terms

The following terms are defined according to the way they are used in this study.

Beginning shorthand. A course designed to teach the theory of Gregg shorthand and to develop the ability to

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[9]Ruth Anderson, "An Analysis and Classification of Research in Shorthand and Transcription" (unpublished Doctoral thesis, Indiana University, 1946), pp. 737-738.

transcribe from dictated material at appropriate speeds. In this study beginning shorthand was taught in two ten-week terms, Beginning Shorthand I and Beginning Shorthand II.

Shorthand theory. The principles of writing Gregg shorthand.

New-matter dictation. Dictation of material that has not been practiced or previewed and that contains at least a few words that the learner may never have written before but that are based on the principles of writing already studied.

Preview. Presentation of selected outlines from the material to be dictated prior to the dictation.

Postview. Review of selected outlines from the dictated material after it has been dictated.

Gregg Shorthand, Diamond Jubilee Series. The 1963 edition of Gregg shorthand.

Limitations of the Study

Achieving adequate control of all the variables is extremely difficult in educational studies and in this study variables might exist that are uncontrolled. Such variables as the subject's age, race, other classes being taken, study habits, motivation, and attendance were not analyzed as this information was considered beyond the scope of the study.

The sample size for the study was relatively small--15 in section one and 18 in section two. It was felt, however, that this sample was not too small to draw meaningful conclusions regarding college students studying shorthand.[10]

Students enrolled in a college course in shorthand may be a more select group than high school students of shorthand or those enrolled in post high school business schools. The results of the study may be applicable, however, to teaching methods in other groups. This is true since classes in high school and college generally meet for approximately the same number of hours, the students may be of approximately the same maturity (high school seniors and college freshmen, for example), the teaching materials are similar, and the content of the course is essentially the same. Differences, however, may exist in student motivation, study habits, and willingness to cooperate.

III. ORGANIZATION OF THE STUDY

Chapter I has presented the purpose and importance of the study. Chapter II contains a review of the literature related to the study. Chapter III outlines the

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[10]The total enrollment in the course was 71--35 in section one and 36 in section two.

procedures followed by the researcher. Findings and the researcher's interpretation of the findings are included in Chapter IV while Chapter V contains the summary, conclusions, and recommendations.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter reviews the literature related to the study. It is divided into two parts: (1) methods of teaching beginning shorthand and (2) prediction of achievement in shorthand. The section on methods of teaching is concerned with (1) the functional versus manual methods of teaching shorthand, (2) the teaching of shorthand theory, and (3) the introduction of new-matter dictation.

I. LITERATURE ON THE TEACHING OF SHORTHAND

Early investigators showed great interest in studying shorthand teaching methods. During the 1950's, however, much less attention was given to this aspect of shorthand and transcription. In recent years attention has again been given to research on teaching methods in shorthand, and some controversy still exists in the current literature over which approach to teaching beginning shorthand produces superior results.

Functional Versus Manual Method of Teaching Shorthand

Prior to the introduction of Gregg Simplified Shorthand in 1949, a number of studies were conducted to determine the superiority of the functional or manual

methods of teaching shorthand. According to Frink,[1] however, there is no evidence to show conclusively the superiority of either method as the findings of the different studies were in favor of one and then another. The majority of teachers appear to be using a combination of the two methods.

Among the early studies were those of Regan, Balluff, and Belanger. In Regan's[2] study, an examination was made of the objectives, materials, activities, and results of the functional method of teaching Gregg shorthand in the light of educational psychology and modern teaching practices. Thirty-one teachers who had been using the functional method of teaching shorthand for only one semester reported in a questionnaire that in most cases pupils taught by the functional method were superior in shorthand penmanship to pupils taught by other methods. The teachers stated that pupils using the functional method attained a higher speed of writing in a shorter time, could read their own shorthand notes more readily, and were more interested in the course that pupils using other methods.

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[1]Inez Frink, "A Comprehensive Analysis and Synthesis of Research and Thought Pertaining to Shorthand and Transcription" (unpublished Doctoral dissertation, Indiana University, 1961), pp. 141-142.

[2]Teresa A. Regan, "Psychological and Pedagogical Basis of the Functional Method of Teaching Gregg Shorthand" (unpublished Doctoral dissertation, Boston College, 1937).

In 1938, Adelaide Balluff[3] made an analysis of the functional method of teaching shorthand to determine whether (1) desirable teaching procedures are followed, (2) students learn shorthand more easily by this method, (3) teachers consider this method superior to the manual method. Questionnaires were sent to teachers of functional method asking them to list the advantages and disadvantages they had experienced with the functional method. A list of 45 advantages and 30 disadvantages were compiled and sent to high school teachers. They were asked to indicate whether each item was considered of major or minor importance. The conclusions of the study were based on the teacher's opinions.

Lillian Belanger[4] made a study to compare the functional and manual methods of teaching shorthand in order to determine which method was better suited for the pupils of the East Boston (Mass.) High School and to determine to what degree those entering the Stenography II class retained their skill acquired in Stenography I.

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[3]Adelaide Balluff, "An Analysis of the Functional Method of Teaching Shorthand" (unpublished Master's thesis, State University of Iowa, 1938).

[4]Lillian A. Belanger, "A Comparison of the Manual and Functional Methods of Teaching Shorthand" (unpublished Master's thesis, Tufts College, 1944).

Two classes of shorthand, taught by different teachers, were selected for the study of shorthand methods. Each class had 32 pupils with I.Q.'s averaging 100, similar backgrounds, the same length of time for instruction, and the same environmental conditions. An attempt was also made to attain teacher equality. The two groups were taught together for Stenography II. Various types of tests were administered, including brief form, written transcription, theory, dictation.

The following findings were reported:

1. A comparison of the results achieved between the two classes on the monthly brief form tests showed that, according to the median scores for the nine months, the group using the manual method was superior to the group using the functional method in the writing of correct shorthand forms from dictation.

2. An analysis of the transcription of word lists revealed that the group using the functional method had more nearly perfect scores than the group using the manual method in eight of the nine months.

3. On the transcription tests, the average number of words transcribed per minute by the class using the manual method ranged from 3 to 28 words a minute and for the class using the functional method, from 8 to 35 words a minute. The differences between the two groups in average words a minute transcribed ranged from 5 to 15 words a minute. On the last transcription test the pupils

taught by the manual method transcribed at the rate of 28 words a minute and the pupils taught by the functional method, at 35 words a minute.

4. On the first theory test, the median score for the pupils using the functional method was one point above that of the pupils using the manual method. On the second test, the group using the functional method showed the greater improvement in average scores. The author concluded that the class using the functional method in which rules were not learned except through reading and writing made a better showing on theory than the class using the manual method in which rules were learned.

On the theory test given to the Stenography II pupils in the fall of 1943, the median for the 17 pupils that had been in the group taught by the manual method in first-year shorthand was 75; the median for the pupils who had been taught by the functional method was 60.

5. On the first letter test dictated at 80 words a minute, the median score for the class using the manual method was 97; for the class using the functional method, 98. Scores on the test indicated that both groups could take dictation at 80 words a minute and transcribe with a high degree of accuracy.

6. On the five-minute test dictated at 60 words a minute, the error average for the class using the functional method was 12.43; for the class using the manual method, 18.0. According to the 95 per cent accuracy

standards set by the Gregg Publishing Company for the test, 72.4 per cent of the pupils taught by the functional method compared to 66.8 per cent of the pupils taught by the manual method passed the test. The author concluded that pupils using the functional method reached a higher level of achievement than pupils using the manual method.

The conclusions of the author of the study were that in the beginning shorthand course better results were secured with the functional method than with the manual method. However, in the advanced shorthand class, the theory test showed that the group taught by the manual method retained more of the theory during the summer vacation than the group taught by the functional method.

Shorthand Theory

According to Frink,[5] many teachers and business educators believe that greater emphasis should be given to the teaching of shorthand theory. Frink cites numerous articles in professional literature in which "the need for greater emphasis on theory is implied by the statement that poor transcripts are probably the result of poorly written or inaccurate outlines."[6]

In an article on the fallacies in shorthand teaching methods, Parker Liles states that

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[5]Frink, op. cit., p. 149.

[6]Ibid., p. 150.

> Some teachers feel that it makes little difference whether the student is highly proficient in knowledge of shorthand theory or not. It has even been said that any shorthand outline which can be transcribed correctly is a correct outline.[7]

Liles feels that the implications of such a statement lead some teachers to feel that it isn't necessary to require students to master the shorthand system and says that

> Those who fall into the trap of concluding that knowledge and testing for mastery of knowledge are unessential make the mistake of beginning at the wrong end of the process and working backward. They contend that the ultimate objective in shorthand instruction, and rightly so, is the mailable transcript; therefore shorthand is a means to an end and whether or not it is correct or incorrect shorthand is of no consequence. It should be remembered that correct shorthand will probably contribute more than any other one thing to the ultimate objective--the mailable transcript.[8]

Much of such criticism is directed against Louis Leslie, co-author of the Simplified and Diamond Jubilee editions of Gregg shorthand. This criticism may be based on an incorrect interpretation of Leslie's views. It is true that Leslie says,

> The learner who shows the most favorable symptoms of learning is the one who can take dictation at the highest speed and who can read back or transcribe the notes most rapidly and accurately, regardless of the theoretical accuracy of the shorthand outlines or the perfection and refinement of the shorthand penmanship.[9]

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[7]Parker Liles, "Issues in Teaching Shorthand," The Balance Sheet, XLV (October, 1963), p. 52.

[8]Ibid., p. 53

[9]Louis A. Leslie, Methods of Teaching Gregg Shorthand, p. 79.

But, he goes on to say,

> The stenographer needs a 100 per cent knowledge of the shorthand alphabet, perhaps an 80 per cent knowledge of the brief forms, perhaps a 60 per cent knowledge of the other abbreviating devices of the shorthand system, and no measurable percentage of accuracy or consistency in the application of the niceties or intricacies of shorthand outline construction.
>
> Most of the theory "errors" that annoy teachers, and that cause teachers to annoy learners, come under the last heading.[10]

Leslie cites examples, such as the inclusion of the vowel "u" in the word "jump," the inconsistency of a student in one place writing "cousin" with a vowel before the "n" and in another writing "dozen" without the vowel. He contends that in cases such as these the exact outline used is far less important than the ability to write without hesitation a reasonable, readable, transcribable outline.

Some recent studies by Danielson, Patrick, and Palmer provide evidence concerning the relationship between accurate outlines and accurate transcription.

Danielson studied the relationship between competency in shorthand vocabulary and achievement in shorthand dictation. The problem involved two main factors--working knowledge of shorthand vocabulary and the attainment of dictation ability.

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[10] Ibid., p. 81.

According to Danielson,

> Competency in shorthand vocabulary involves the ability to identify mentally the various sounds within a word dictated in a word list and to convert these sounds into the written shorthand outline. It also involves the ability to translate in longhand these shorthand outlines into the English language, giving all possible translations for each outline.[11]

The essential findings relating to shorthand vocabulary and ability to take dictation resulting from this study were:

1. Shorthand vocabulary competency was found to be significantly related to shorthand dictation achievement but not to be the sole factor influencing dictation achievement.

2. As a student's shorthand vocabulary index increased, his rate of taking dictation was increased.

3. General scholastic ability, as measured by selected indices used in this study, was found to be only remotely related to ability in shorthand vocabulary.

From this study, Danielson made the following general conclusions:

> 1. The objective of shorthand instruction is the development of shorthand dictation at acceptable rates and the ability to produce a high-quality transcript in a reasonable time. Based upon the findings pertaining to shorthand vocabulary and shorthand dictation rate, it may be concluded that during the learning period continuous growth in shorthand vocabulary is a factor of prime importance in the development of acceptable shorthand dictation rates.

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[11]Danielson, op. cit., p. 5.

2. The lack of influence of general scholastic ability on competency in shorthand vocabulary leads to the observation, if not to a defensible conclusion, that apparently mastery of shorthand vocabulary requires abilities and capacities considerably different from those required for mastery of general academic subject areas. Failure of students of high-level general scholastic ability to achieve well in shorthand may in part be due to the absence of the abilities peculiar to mastery of shorthand vocabulary.

3. In general, achievement in shorthand dictation is directly proportionate to general scholastic ability. In practice, this means that the chance of attaining high dictation rates for students of below average scholastic ability is relatively small.

4. The evidence revealed in this study indicates that:

   a. shorthand vocabulary competency significantly influences achievement in shorthand dictation at all speed levels

   b. general scholastic ability also significantly influences shorthand dictation achievement at all speed levels, but

   c. shorthand vocabulary competency and general scholastic ability bear little relationship to each other.[12]

The purpose of Patrick's[13] study was to determine on the basis of error rates in writing whether the changes that were made in the Diamond Jubilee Series for selected brief forms and principles were justified and whether there is a need for further changes.

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[12] Ibid., p. 119.

[13] Alfred Patrick, "An Error Analysis of Selected Brief Forms and Principles in Shorthand Notes of Beginning Students" (unpublished Master's thesis, The University of Tennessee, Knoxville, 1965).

Sub-problems in the study were to determine (1) the adequacy, from the standpoint of frequency of occurrence of the selected brief forms and principles of the first textbooks (Functional and Manual) and of 15 lessons of the second textbook of the high school Diamond Jubilee Series, (2) whether there are patterns of errors in writing brief form outlines and outlines constructed according to principles, and (3) how error rates found in Patrick's study compared with error rates found in a concurrent study by Frye who studied high school students studying Gregg Shorthand Simplified.

Patrick's study is reported in rather full detail here because many people are interested in the comparison between writing Diamond Jubilee and Simplified shorthand. This is not to be interpreted as evidence that all the findings were considered to be of great significance.

The population for the study consisted of first-year high school students in five southeastern states who were studying Diamond Jubilee material.

The findings of the study were based on statistical analysis of the errors made in six specially constructed letters of approximately 150 words each dictated to the students and transcribed by them. Each brief form and each principle being studied occurred three times in the dictation material.

Among the findings reported were:

1. The most significant patterns of errors for brief forms were the following: The outline a-m-o-ng was written for 41.0 per cent of the errors on among. The outline s-e-r-k was written for 35.4 per cent of the errors on circle. The outline p-t was written for 88.8 per cent of the errors on put. The outline r-e-k-n-i-s was written for 32.1 per cent of the errors on recognize. The outline ith-r-ow was written for 19.8 per cent of the errors on throughout. The outline o-p-n was written for 58.9 per cent of the errors on upon. The outline d-r was written for 36.3 per cent of the errors on doctor. The outline e-oo-l was written for 19.8 per cent of the errors on usual. The very significant patterns for among and upon include an o for an oo sound.

2. The most significant patterns of errors for principles were the following: The strokes p-r were written for 52.4 per cent of the errors on pro. The strokes d-v or d-f were written for 51.5 per cent of the errors on def, dev, div. The strokes ith-r were written for 40.4 per cent of the errors on ther. The strokes j-e-nt were written for 16.6 per cent of the errors on gent. The strokes e-r-m and e-r-n were written for 42.3 per cent of the errors on erm, ern.

Patrick made the following conclusions:

1. A highly significant positive relationship exists between accuracy of outlines and accuracy of transcription for both brief forms and principles.

2. A significant negative relationship exists between the frequency of occurrence of brief forms in the textbooks and the shorthand error rate on brief forms.

3. The relationship between frequency of occurrence of principles in the textbooks and the error rate on principles is not significant.

4. On the basis of error rates and patterns of errors, the following brief forms should be revised to be written as shown: circle, s-e-r-k; put, p-t; recognize, r-e-k-n-i-s; throughout, ith-r-ow; doctor, d-r; and usual, e-oo-l.

5. On the basis of error rates and patterns of errors, the following principles should be revised to be written as shown: def, dev, div, d-v or d-f; ther, ith-r; gent, j-e-nt; erm, ern, e-r-m or e-r-n; and pro, p-r.

6. The following Diamond Jubilee brief forms occurred fewer than 15 times in the textbook material analyzed: acknowledge, 1; enclose, 1; recognize, 2; progress, 5; throughout, 5; among, 6; upon, 11; and experience, 14.

7. The following principles occurred fewer than 50 times in the textbook material analyzed: incl, 6; ify, 9, rity, 19, ification, 24; super, 28; ulate, ulation, 29; electr, 32; cient, tient, 39; pose, position, 42; pend, gent, 49.

8. Changes in the following brief forms and principles apparently influenced higher shorthand error rates: desire, doctor, go, house, usual, ally, illy, short, ship, pro.

9. Changes in the ify and less principles apparently influenced lower shorthand error rates.[14]

The Rose Palmer[15] study (not to be confused with Elise Palmer's[16] study) was an investigation to ascertain differences in performance between two groups of shorthand writers (one group of first-year students writing at 80 words a minute and another group of second-year students writing at 120 words a minute).

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[14]Alfred Patrick, "An Error Analysis of Selected Brief Forms and Principles in Shorthand Notes of Beginning Students," National Business Education Quarterly, XXXIV (Spring, 1966), p. 34.

[15]Rose Palmer, "A Comparison Between Two Groups of Shorthand Writers" (unpublished Doctor's thesis, New York University, 1964).

16 Elise Douglass Palmer, "Development and Evaluation of Multiple-Channel Dictation Tapes in Beginning Shorthand Classes" (unpublished Doctor's thesis, University of Tennessee, 1963).

The study considered three aspects of shorthand writing:

1. The manner in which students wrote unfamiliar words.
2. The way in which students wrote shortcuts for certain words as compared to the way in which they wrote the same words in full.
3. The effect of fatigue on the writing of both groups.

Evidence was supplied from motion pictures and from shorthand notes and transcripts of how students construct shorthand outlines at various stages of their training and under pressure of actual dictation at their maximum abilities.

Among the findings that are of interest to the present study are the following:

In one-third of the instances, students transcribed the correct word from an incorrect outline.

In two-thirds of the instances, an incorrectly transcribed word followed an incorrect outline.

An experiment was conducted by Schloemer[17] at the University of Wisconsin to determine the achievement of theory versus non-theory shorthand students. Two classes of approximately equal ability as indicated by grade-point average participated in the experiment.

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[17]Carolyn Schloemer, "Approaches to Teaching Beginning Shorthand," The Balance Sheet, XLVI (March 1965), pp. 299,332.

One section was taught by the functional method, using a reading approach of 20 lessons, all writing in context, no drill on isolated outlines, and no theory tests.

The second section was taught with a great deal of emphasis on accurate outlines. Frequent theory tests were given and students were encouraged to write dictionary correct outlines.

At the end of the year all students, except one in each class, had passed tests at 60 words a minute. Seventy-five per cent in the non-theory class and 73 per cent in the theory class had passed the 80 word test, while 25 per cent in the non-theory class and 18 per cent in the theory class had passed the 100.

In a 100-word theory test given to each class at the end of the second semester, the median number of theory errors was 19.5 in the theory class and 39 in the non-theory class. The non-theory class, however, had fewer transcription errors--a median number of 3.5 in the non-theory class and 4.5 in the theory class.

As a second-semester final examination, three-minute dictation tests on new material were given at 60, 80, 100 words a minute. The transcripts and the shorthand notes were analyzed. In a pair-by-pair comparison of the students in the two classes, the theory class wrote more accurate shorthand outlines in 12 pairs, the non-theory class wrote more accurate outlines in 8 pairs, and neither

student wrote more accurate outlines in 2 pairs. Transcripts with 95 per cent or better accuracy were turned in by 19 non-theory students and 15 theory students.

Schloemer concludes that when two classes are taught by the same teacher but using a different method with each class, the results secured will be comparable and that the method of approach in teaching shorthand is not as significant to shorthand success as are other factors, such as the ability and interest of the student and the enthusiasm of the teacher in the methods he uses.

The disagreement between Leslie and these writers calling for more emphasis on theory seems to lie not in the necessity for knowledge of the principles of writing theory but in the way that knowledge is obtained.

According to Leslie, the functional method is based on the concept that the student should not be required to write any shorthand outline until he is thoroughly prepared to write it correctly. Leslie further states that one of the most effective ways of accomplishing this end is found in the reading approach.

West, on the other hand, labels the reading approach a "non-functional approach to the acquisition of skill" and says that "Oral spelling must from the very start be accompanied by writing."[18]

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[18]West, op. cit., p. 8.

New-matter Dictation

Another area of disagreement among shorthand teachers but one about which no research is available is that concerning the point at which new-matter dictation should be introduced.

Leslie says,

> Premature introduction of any phase of any subject will retard rather than accelerate the learner's progress. The learner should not be compelled, should not be permitted to take new-matter dictation until his shorthand habits are strong enough to withstand the strain. He should not be allowed to begin new-matter dictation until he can handle practiced-matter dictation without undue effort. Then his shorthand habits and skills are strong enough to begin new-matter dictation. To put it another way--the learner is not prepared to begin new-matter dictation until he can write practiced matter at the rate of 80 to 100 words a minute on 60-second repetitive dictation.[19]

West,[20] however, stresses the need to maximize the number of outlines that can be written in chained fashion. He feels that brief forms and highly common words are overlearned at the expense of time that could be devoted to the development of a larger writing vocabulary. West advocates practice situations in which words must be constructed during the press of dictation. Quite early in the training and continuously thereafter some"new" words should be included in the dictation.

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[19]Leslie, Methods of Teaching Gregg Shorthand, p. 169.

[20]West, loc. cit.

Hillestad's[21] study of learning difficulties in shorthand provided some evidence to support West's contention that more time should be devoted to developing a larger vocabulary.

In Hillestad's study a series of 100 letters, each containing 160 actual words, were dictated to advanced shorthand classes in eight secondary schools. From each class a random sample of five papers was checked for shorthand errors to provide information regarding the principles of shorthand and the kinds of words with which students had most difficulty, as reflected by the errors they made in recording dictation in shorthand.

Comparison of the errors made on brief forms and on constructed words showed that errors occurred four times more frequently on the written-out words as on all brief forms, including the derivatives. Apparently, it may be concluded, students learn brief forms quite adequately.

The dictation material was analyzed for errors caused by difficulty of vocabulary. It was found that errors increased approximately 4 to 6 per cent from one vocabulary group to the next. The correlation between vocabulary level and the number of errors was .81. This means that over 65 per cent of whatever causes errors in recording shorthand is accounted for by the vocabulary level.

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[21]Mildred Hillestad, "Factors Which Contribute to the Difficulty of Shorthand Dictation Materials" (unpublished Doctoral dissertation, University of Minnesota, 1960).

This finding would seem to indicate that increased emphasis should be given to the application of the principles of word construction.

There is, as this review of literature indicates, no consensus as to the most effective method of teaching shorthand. A concern on the part of business educators about the need for improvement of instruction, however, is evident. While it may be true that there is no such thing as one best method for all teachers, we cannot be satisfied with this statement until all stenographic graduates meet acceptable standards. Researchers must continue to isolate factors influencing the quality of instruction and seek also, as this study attempts, to identify the type of students who may learn better one way and those who learn better by another method of instruction.

II. LITERATURE ON PREDICTION OF ACHIEVEMENT IN SHORTHAND

Many investigators have studied the relationship between one or more factors and achievement in beginning shorthand. Factors which have been studied include intelligence, reading ability, penmanship, typewriting, foreign languages, English grades, scholastic achievement, and personal characteristics.

According to Anderson,[22] there has been little agreement in the techniques used or in the findings reported in

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[22]Anderson, op. cit., p.733.

the experiments to predict success or failure in shorthand. A number of investigators, however, have found English marks, scholastic achievement, and foreign language marks to be among the best measures yet selected to predict success or failure in shorthand. Some of these studies will be discussed here.

Frink[23] also noted considerable interest in predictive measures among researchers and stated that a greater number of investigators found average grades exclusive of English to be the best single predictor of success in shorthand of any factor studied. None of the factors, however, yielded a sufficiently high degree of relationship for use in indivudual prediction.

Three studies dealing with possible predictors of success or failure in shorthand achievement are of interest to anyone working in this area, not only for the conclusions of the studies themselves but also for the unusually thorough reviews of the research in the field. These are the studies of Byers,[24] Coleman,[25] and Varah.[26]

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[23]Frink, op. cit., p. 40.

[24]Edward E. Byers, "Construction of Tests Predictive of Success in First-Year Shorthand" (unpublished Doctor's thesis, Boston University, 1958).

[25]Brendan G. Coleman, "The Effects of a Tape Laboratory Instructional Approach Upon Achievement in Beginning Shorthand Classes" (unpublished Doctor's thesis, Michigan State University, 1964).

[26]Leonard J. Varah, "Effect of Academic Motivation and Other Selected Criteria on Achievement of First and Second

Byers' study, the purpose of which was to construct tests predictive of success in first-year shorthand, reported on six other major efforts to construct shorthand aptitude tests by means of experimental research. These were: Hoke Prognostic Test of Stenographic Ability, Bennette Stenographic Aptitude Test, Turse Shorthand Aptitude Test, Detroit Clerical Aptitudes Examination, and Vocational Aptitude Tests for Shorthand Students. The study included a description of the subtests making up each of these test batteries, the measures of validity for each, and a critical evaluation of each test.

Byers' study attempted to identify functional factors believed to influence the learning of shorthand. Test items were constructed for tests of (1) Phonetic Perception, (2) Retention Ability, (3) Observation Aptitude, (4) Pattern from Parts, and (5) Hand Dexterity.

The aptitude tests were administered to three sample populations--college, junior college and business school, and high school. The criterion measure of shorthand achievement was Dickinson's Semester Shorthand Accomplishment Test, consisting of seven letters each consisting of two and one-half minutes of material dictated at progressive speeds.

The multiple R between the scores of the aptitude tests and the shorthand accomplishment scores for 128

Semester Shorthand Students" (unpublished Doctor's thesis, Michigan State University, 1966).

students in the College group was .76, with a standard error of ±.04. Correlations between the subtests were: Phonetic Perception, .36; Retention Ability, .44; Observation Aptitude, .18; Pattern from Parts, .28; and Hand Dexterity, .68. The standard error of estimate for any criterion score, when predicted from aptitude scores, was found to be ±49.42 score points.

The multiple R between the scores of the aptitude tests and the shorthand accomplishment scores for 142 students in the Junior-College and Business-School group was .59, with a standard error of ±.04. Correlations between the five aptitude tests as listed above and the criterion measure were .52, .27, .37, .31, and .27, respectively. The standard error of estimate for any criterion score, when predicted from aptitude scores, was found to be ±68.70 score points.

The multiple R between the scores of the aptitude tests and the shorthand accomplishment scores for 137 students in the High School group was .62, with a standard error of ±.05. Correlations between the five aptitude tests as listed above and the criterion measure were .49, .24, .32, .46, and .47 respectively. The standard error of estimate for any criterion score, when predicted from aptitude scores, was found to be ±54.68 score points.

Byers concluded that the obtained multiple R for the college group indicated the presence of a significant relationship between the scores of the aptitude tests and the criterion measure. The multiple R's for the junior college and business school group and for the high school group indicated a relationship of considerable value.

The scores from the proposed aptitude tests, together with measures of other factors such as motivation and intelligence, could be used in forecasting group performance for each sample population. For the college group, the obtained multiple R indicated that the scores from the aptitude tests, together with measures of other factors, could be used to estimate an individual's potentialities to succeed in first-year shorthand.

Among the studies reported by Coleman was that conducted in Connecticut by Wright[27] for the purpose of (1) surveying recent literature relating to shorthand prognosis and (2) evaluating the Byers' First-Year Shorthand Aptitude Tests by administering them to a group of potential shorthand students at the high school level. The results of the Byers' Tests were compared with student achievement in shorthand after one year of instruction.

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[27]Ellen M. Wright, "A Summary of Recent (1940-1962), Selected Findings in Shorthand Prognosis with Specific Reference to the Use of the Byers' First-Year Shorthand Aptitude Tests at the High School in Southington, Connecticut" (unpublished Master's thesis, Central Connecticut State College, New Britain, Connecticut, 1963), pp. 38-40.

The achievement test used consisted of seven dictated business letters, ranging in speed from 45 to 75 words per minute and each taking two and one-half minutes to dictate. Complete data were available for 36 students. Wright concluded that because the correlations obtained between the Byers' Tests and shorthand achievement were .3737 $\pm$.1511 that they were not accurate enough as predictors of shorthand ability for use in the school system in which she conducted the experiment. She did find, however, that a correlation of .6822 $\pm$.0940 was produced by comparing the Phonetic Perception Subtest of Byers' Test with shorthand achievement and that there was a higher correlation between these two items than there was between any other two measures in the study.

Veon's[28] study was designed to determine the relationship of learning factors found in certain foreign-language aptitude tests to the prediction of shorthand achievement in college. The tests selected for this investigation included: (1) American Council on Education Psychological Examination for College Freshmen, 1944 edition, (2) Iowa Placement Examination, New Series, Revised, Foreign Language Prognosis Test, Form A, (3) Luria-Orleans Modern Language Prognosis Test, and (4) Carmichael's

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[28]Dorothy H. Veon, "The Relationship of Learning Factors Found in Certain Modern Foreign-Language Aptitude Tests to the Prediction of Shorthand Achievement in College" (unpublished Doctor's dissertation, Oklahoma Agricultural and Mechanical College, 1950).

Shorthand Learning Test, Semester I (the shorthand criterion of achievement). The tests were administered to 299 elementary shorthand students at the George Washington University during the academic years 1945-1948.

Veon found that the Iowa Placement Examinations, Foreign Language Aptitude Test, Form M, yielded a correlation of .6374 with the shorthand criterion test. The Symond's Foreign Language Prognosis Test provided a higher correlation with the shorthand criterion, .7192, than that obtained on the Iowa Test. A fairly low correltation was obtained between the Luria-Orleans Modern Language Pronosis Test and the shorthand criterion test, .3165.

The American Council on Education Psychological Examination for College Freshmen, 1944 edition, correlated .5102 with the shorthand criterion. The multiple correlation was found to be .5421 which seemed to indicate that the combination of tests used in the study was not particularly effective in predicting success in shorthand.

Missling[29] conducted a study at Skawano (Wisconsin) High School involving two groups of shorthand students. The first group consisted of twenty students who were given the Turse Shorthand Aptitude Test prior to enrolling in shorthand. Upon the completion of one year of shorthand,

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[29]Lorraine Missling, "Prognosis Testing in Skawano (Wisconsin) High School" (unpublished Seminar Report, University of Wisconsin, 1954), pp. 36-39.

correlations were made to compare performance in the Turse Shorthand Aptitude Test with achievement in shorthand. A correlation of .51 was found. A second group of 36 students who had completed a year of shorthand were tested with the Turse test and the total test correlation with success in shorthand was .54.

Missling also compared achievement in first and second year shorthand with the Henmon Nelson Test of Mental Ability, grades in all high school courses excluding English, English grades, and typewriting grades. The correlation between achievement for each year and average high school grades was the greatest in both instances--.74 for the first class and .73 for the second.

Powell[30] attempted to determine whether 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.

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

The study concluded that 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.

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.[31]

Other conclusions of the Powell study were:

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.

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[31] Ibid., p. 78.

> Average grades for the continuants tend to be higher than those of the discontinuants.[32]

Coleman assumed that because no predictor of probable success in shorthand had been identified, additional effort should be expended in an attempt to identify and isolate significantly accurate predictors of shorthand success. One of the purposes of his study was

> To determine, if possible, predictors of potential success in beginning shorthand at Michigan State University by statistically analyzing the correlations between student scores on subtests of the Michigan State University Entrance Test Battery and subsequent performance in beginning shorthand as reflected in the form of terminal grades.[33]

The results of Coleman's analysis revealed that none of the correlations between Entrance Test Battery subtests and subsequent performance in beginning shorthand were substantial enough to possess predictive value of grades of potential shorthand students. The following correlations were computed in Coleman's study.

	Experimental Group	Control Group
CQT-Verbal	.2014	.1056
CQT-Informational	.3997	-.1189
CQT-Numerical	.2006	.4310
CQT-Total	.3290	.1905
Reading	.1999	-.1158
English	.0598	.3757

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

[33] Coleman, op. cit., p. 2.

Coleman also found, through the use of t tests, that those students who received a terminal grade of A and D differed significantly as to their performance on the English subtest and they also differed significantly as to their performance on the College Qualification portion of the Entrance Test Battery which was represented by the total score for the Verbal, Informational, and Numerical tests.

Varah's study includes an extensive review and synthesis of research in shorthand prognosis. He summarized the predictors of shorthand ability that have been studied as follows:

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.[34]

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[34]Varah, op. cit., pp. 35-36.

The purpose of Varah's study was to determine the predictive value of the Michigan M-Scale, total scores or subscores, (a test of academic motivation) 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.

Varah found that

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-Scale when used in combination with an estimate of mental ability would 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.

The preceding review of the literature on shorthand prognosis indicates a continuing interest in this particular subject on the part of researchers. A battery of tests, including general scholastic average, grades in English, and intelligence scores, shows more promise than any single test. Motivation apparently plays a part, also, in shorthand success. It is also evident that further research is needed to find better predictors of shorthand achievement, and it is one of the stated purposes of this study to add to the available information on the subject.

CHAPTER III

PROCEDURES

In order to test the two hypotheses made in this study, two groups of students, enrolled in two sections of beginning shorthand, were selected. Section one was arbitrarily designated as the language arts class and section two as the new-matter or science-type class. Both classes met four times a week for a fifty-minute period. Section one met at two o'clock on Monday, Tuesday, Wednesday, and Thursday; section two met at three o'clock on the same days.

I. SELECTION OF THE SAMPLE

The sample for this study consisted of 33 Michigan State University students enrolled in two sections of LIO 201, winter term 1965, and LIO 202, spring term 1965. LIO 201 is Beginning Gregg Shorthand I and LIO 202 is Beginning Shorthand II. No reference was made in the registration material to indicate that either section was other than the typical beginning shorthand course offered each term by Michigan State University. Students who elected to take beginning Gregg shorthand during the winter term selected their sections without knowledge of the significance of their choice.

At the first class meeting of each section, however, an announcement was made that, because the two sections would be taught in a different manner, students planning to take LIO 202, Beginning Shorthand II, in spring term 1965 would not be permitted to change sections. It had been arranged that the two sections would meet at the same time during spring term as winter, and it was suggested that students who knew they would be unable to remain in the same section or would be unable to take LIO 202 in spring 1965 should drop LIO 201 for that term. It was explained to the students that the two sections would be covering the material at a different rate, although accomplishment at the end of the second term would be measured according to the same standards and by the same tests. A copy of the notice given to students about this requirement is found in the Appendix on page 99.

Because it was not considered desirable to announce prior to the first class that there would be anything different about the two sections, the University booklist for the course did not indicate that one section would use the functional method book while the other section would use the manual method book. Only the manual book, which was regularly used at Michigan State University, was listed. Students in section one were furnished functional books at the first class meeting. These books were donated for research purposes by the Gregg Division of the McGraw-Hill Book Company.

Randomization of Student Choice of Section

It was assumed that, because of the size of the student body at Michigan State University, students electing beginning shorthand during the winter term 1965 would provide a random sample for the experiment. This assumption was made with full recognition of the fact that all enrollees for the winter term 1965 were not really potential students for a beginning shorthand class. All students, however, could have elected beginning shorthand since no prior requisites existed as conditions of entry to the course.

It was also assumed that the students who elected either section one or section two of beginning shorthand for the winter term 1965 would, through their own selection process, randomly distribute themselves between the two sections.

Equality of the Two Sections

In order to establish the equality or inequality of the two sections studied, the Entrance Test Battery scores of each participating student were secured from the Office of Evaluation Services of the University. These scores are derived from a battery of examinations given to all entering students. The battery consists of six scores: Verbal or Vocabulary, General Information, Numerical, Total, English, and Reading. Student scores on these tests are included in the Appendix on page 103.

The two groups were compared for equality of performance on each section of the Entrance Test Battery. The statistical technique used was Analysis of Variance.

Table I shows the means, standard deviations, and F statistics for both sections on each part of the Entrance Test Battery.

The F tests revealed that there was no statistically significant difference between the groups in any of the six factors compared. With degrees of freedom of 1 and 31, the F value required for significance at the .05 level is found to be between 4.17 and 4.08.[1] Comparing the computed F with the tabled value of F revealed each computed value to be below the tabled value. The fact that there was no statistically significant difference between the groups is important to the study because it substantiated the assumption that the students of the two sections entered the course with no significant difference between the groups in aptitude for college level work as shown by their scores on this test battery, which is regularly used for prognostic purposes.

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[1]William L. Hays, Statistics for Psychologists. New York: Holt, Rinehard and Winston, 1963), p. 677.

TABLE I

MEANS, STANDARD DEVIATIONS, AND F STATISTICS OF MICHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY SCORES FOR SECTIONS ONE AND TWO

Test	Section One		Section Two		F. Stat.
	Mean	S. D.	Mean	S. D.	
CQT-Verbal	51.80	14.59	49.61	13.86	.19460
CQT-Informational	44.93	9.64	44.55	11.36	.01036
CQT-Numerical	32.40	9.14	30.17	9.65	.45968
CQT-Total	129.13	29.38	124.33	28.66	.22435
English	25.73	8.42	23.55	7.63	.60650
Reading	29.80	8.98	30.83	6.60	.14491

Shorthand Pre-test

In order to validate students' statements about prior shorthand training, each student was given a shorthand pre-test on the first day of class. The test consisted of the following parts:

1. A three-minute transcription test from plate material which consisted of approximately 180 words possible for transcription.

2. A three-minute test on theory which consisted of 10 words written in shorthand to be transcribed into their longhand counterparts and of 10 words written in longhand to be transcribed into their shorthand counterparts.

3. A three-minute test of brief forms which consisted of 10 brief forms written in shorthand to be transcribed into their longhand counterparts and of 10 brief forms written in longhand to be transcribed into their shorthand counterparts.

On the basis of this test and the students' statements regarding prior study of shorthand, the students were selected for inclusion in the study. Seventy-one students took the pre-test: 35 in section one and 36 in section two. Five students in section one were eliminated from the study because of previous knowledge of shorthand. Five students dropped the course during the first term and ten students dropped it at the end of the term, leaving fifteen students in this section to be included in the study. Two students in section two dropped the course

during the first term and twelve dropped it at the end of the first term. Four students were not included in the study because of previous knowledge of shorthand, leaving eighteen students in section two who were included in the study. Those students included in the study had no prior experience in shorthand or so little, as demonstrated by the pre-test, that it could be considered as none.

II. DESCRIPTION OF THE STUDY

Language-arts Class

The language-arts class was taught by the functional method, an imitative method with an objective of rapid and accurate use of unverbalized generalizations.

Reading Approach. The functional method of teaching shorthand is based, according to Leslie,[2] on the concept that "the student should not be required to write any shorthand outline until he is thoroughly prepared to write it correctly." To accomplish this, Leslie recommends deferring writing until Lesson 19. In the language-arts class this suggestion was followed, and writing in class and for homework was deferred until the fifteenth class period when students had completed three chapters in the textbook.

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[2]Louis A. Leslie, Gregg Shorthand Manual for the Functional Mehtod, Teacher's Handbook (New York: Gregg Publishing Company, 1936), p. 8.

Rules. No rules, principles, or generalizations for writing shorthand outlines were mentioned. Students were expected to automatize the correct shorthand responses without ever knowing that there are any rules governing the construction of outlines.

Dictation. No new-matter dictation was given until the students had completed the shorthand theory. All dictation consisted of letters taken from the textbook.

Presentation of Theory. In the Gregg Diamond Jubilee Series, theory is presented in eight chapters or forty-eight lessons. These lessons were covered in thirty-two class periods so that all theory was taught during the first term of the experiment. Every sixth lesson in the textbook is a review lesson. These lessons were omitted and on eight occasions during the term two lessons were presented in a single class period. Six class periods at the end of the term were used for review and testing. Lesson plans showing the schedule for presentation of theory in both sections are shown in the Appendix on pages 104-5.

Science-type Class

The science-type or new-matter class was taught by what has been known among shorthand teachers as the manual method. It is also called the deductive method, the logical method, and the traditional method. According to

Leslie and Zoubek[3] "the one determining factor in the use of the science-type approach is the objective of verbalized generalizations."

Reading Approach. A limited reading approach was used, with students beginning to write in class and for homework after the completion of Chapter I of their textbook, or during the seventh class period.

Rules. Rules or generalizations for writing were presented in a method that Leslie and Zoubek[4] refer to as a compromise between the deductive and inductive methods. The alphabet and joinings are first presented inductively and then re-presented deductively after the learner has become familiar with the joinings but without taking the time required for him to form and put the generalizations into words. Students, therefore, knew that there was a theoretically correct way of writing shorthand outlines; but they were not expected to memorize the rules for writing outlines or to write an outline in a particular way during dictation. In both classes, emphasis in dictation was on rapid writing--on "getting something down"--

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[3]John Robert Gregg, Louis A. Leslie, and Charles E. Zoubek, Instructor's Handbook for Gregg Shorthand, Diamond Jubilee Series (New York: McGraw-Hill Book Company, Inc., 1963), p. 2.

[4]Ibid.

and students knew that, except in occasional brief form and theory tests, their shorthand outlines would not be corrected.

Dictation. In the science-type class, new-matter dictation, consisting of a letter containing a few words which the students had never seen before, was introduced in the eighth class period and was given every period after that. This dictation was not previewed. After the letter was dictated, however, the teacher would postview it, placing on the chalkboard both outlines requested by the students and others selected by the teacher, including the new words. Then the letter was dictated a second time.

Presentation of Theory. The theory in the science-type class was presented at the rate of one lesson in each class period. During the first term, thirty lessons were presented, including the review lesson at the end of each chapter. Eight class periods at the end of the first term were used for review and testing. The final eighteen theory lessons were presented during the second term of the experiment.

III. PREPARATION OF MATERIAL

Special dictation material for the science-type class was prepared by the researcher for every class period beginning with the eighth. This dictation consisted of a short letter containing a few words which the students had never

read or written before but which they should have been able to construct from the shorthand principles already studied. The words appearing in Gregg Shorthand, Diamond Jubilee Series, were checked with the Silverthorn Basic Word List.[5] A list of words appearing in the Silverthorn list among the 1,500 most frequently used words in written business communications but not appearing in the textbook was arranged according to the lesson in which the principle for the word was taught. Some of these words and other less common words were then used in a short letter to be dictated in the science-type class. Because of the limited vocabulary, the dictation material for the first three periods, based on lessons 1 through 4, consisted of sentences rather than letters. Thereafter the dictation consisted of a short letter. Dictation was prepared for forty-five periods; the dictation material and the word list are found in the Appendix on pages 106-130.

IV. TEACHING PROCEDURES

Teacher

The two sections of LIO 201 and 202 were taught on a team-teaching basis by two experienced shorthand teachers, the researcher and the director of the study.

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[5]J. H. Silverthorn, Word Division Manual for the Basic Vocabulary of Business Writing (Cincinnati: South-Western Publishing Co., 1958).

During winter term, both teachers were in both classes every day. Each teacher, teaching the same day in both sections, taught two days of the week and observed the other two days.

During the first five weeks of spring term, because of other commitments, the researcher taught only one day a week and did not observe either section on one day or section one on two days. For the last five weeks of the term, both teachers again taught two days a week and usually observed when not teaching.

Lesson Plans

The course outline for the two terms was prepared by the researcher after consultation with the director of the study. Daily lesson plans were prepared by the person teaching. The teacher was free to present the material and use the class time in any way desired. The only restriction placed on either teacher was to present the prescribed theory lesson, to dictate the new-matter letter to the science-type class, and to follow the functional method procedures in the language-arts class.

The teachers met almost daily before and after class for discussion and evaluation of procedures.

Multiple-channel Tape Laboratory

The classes were taught in the multiple-channel tape laboratory at Michigan State University, and the tape facilities were utilized in both sections in the same way. The

tape lab was not used in either section until both classes were taking dictation. The Gregg tapes, correlated with the textbook, were used. Usually a tape was put on as the classes were assembling, and students began to take dictation as soon as they came into the classroom. The tape used each day was that of a review lesson, usually about six lessons prior to the lesson to be presented that day.

Since there were ten minutes between classes at Michigan State University, some students had nearly ten minutes of dictation before class. Whether or not the tapes were used during the class period depended upon the plans of the teacher. However, if the tapes were used in one section, they were also used in the other.

Students of both sections were also encouraged to use the tape laboratory in the evening and weekend hours that it was open.

The facilities of the tape laboratory were also used in the administration of tests, as explained below.

V. CRITERION TESTS

Two theory tests and a series of dictated letters were used to compare the two sections in order to test the hypothesis that there would be no significant difference at the end of two terms of instruction in the achievement of beginning shorthand students who were taking new-matter dictation from the beginning of the third week

of the term and those students who had no new-matter dictation until after all theory had been presented. The statistical procedure used to measure the difference between the group means on these tests was the Analysis of Variance routine UNEQ1, computed on the Michigan State University Control Data Corporation 3600 computer. The experimental design for UNEQ1 is described as one-way randomized, unequal number of observations in subclasses (treatments).

Theory Tests

At the end of the first term, a theory test covering lessons 1 through 30 was given to both sections. The test was given in two parts. The first part consisted of 25 brief forms written in shorthand to be transcribed into longhand by the students and 25 brief forms written in longhand to be written in shorthand by the students. The second part of the test consisted of 25 words that are not brief forms written in shorthand to be transcribed into longhand by the students and 25 words written in longhand to be written in shorthand by the students. Students were allowed five minutes to do both parts of the test. A copy of the test is included on pages 131-2.

During the eighth week of the second term, a theory test covering all theory in Gregg shorthand was given to both sections. This test consisted of 50 words and brief forms dictated to the students and written by them in shorthand and then transcribed into longhand. The test was recorded on tape and the facilities of the

multiple-channel tape laboratory were utilized to insure that it would be administered in exactly the same way in both sections. Both longhand and shorthand were corrected; and the total score, the number of shorthand errors, and the number of transcription errors were compared statistically.

Dictation Tests

The dictation tests used for purposes of comparison were all given during the second term after section two had completed the theory. The tests consisted of three minutes of dictation at 60, 80, and 100 words a minute. There were 27 letters dictated: 9 at 60 words a minute, 9 at 80 words a minute, and 9 at 100 words a minute. A letter at each speed was dictated in seven class periods beginning at the end of the eighth week. Two letters at each speed were dictated during the two-hour period assigned for the final examination.

The letters were taken from Speed Dictation[6] and from The Business Teacher.[7] A list of the letters used from these two sources is included in the Appendix on page 135.

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[6]Charles E. Zoubek, Speed Dictation with Previews in Gregg Shorthand (New York: McGraw-Hill Book Company, Inc., 1963).

[7]A magazine published by the Gregg Division, McGraw-Hill Book Company for teachers of business education.

The letters and a brief preview for each letter were recorded on tape by the instructors; and the facilities of the multiple-channel tape laboratory were used to insure that the administration was exactly the same in both sections. The tests were given on the same day in each section. Three letters were dictated--one at each speed (60, 80, and 100 words a minute); students, however, were required to take the dictation and transcribe only one letter.

After taking the dictation, students transcribed the letter on the typewriter. The typed transcripts were all corrected by the researcher and were marked on the basis of correct words transcribed. Students were considered to have passed a test if they were able to transcribe at 95 per cent accuracy. Errors in transcribing, spelling, punctuation, and typing were counted and had equal weight. Scores were recorded as correct words transcribed, which was computed by subtracting the number of errors from the total number of standard words in the letter. The total number of standard words in a letter dictated at 100 was 300; at 80, it was 240; and at 60, it was 180. Students had to have transcribed three letters at 95 per cent accuracy at one speed before going on to the next higher speed.

The number of correct words in the student's three tests passed at the highest speed were added to get the correct words transcribed, the score used for statistical analysis.

VI. RELATIONSHIP BETWEEN MICHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY SCORES AND ACHIEVEMENT IN SHORTHAND

In order to test the second hypothesis, that there is no relationship between the student scores on the Michigan State University Entrance Test Battery and subsequent performance in beginning shorthand, student scores on these tests were correlated with achievement in shorthand as measured by the total number of correct words transcribed in the dictation tests.

The battery of examinations were described by Warrington as follows:

> Measures are obtained for four areas all of which we think are highly relevant to success in college. These areas are as follows: General Academic Ability, Language Usage, Reading Comprehension, and Quantitative Ability. Most of the tests have been developed locally by faculty members of the Office of Evaluation Services. We feel that these tests are good tests and the fact that several of the test writers have served and/or are serving as consultants to most of the better known testing operations supports this claim.
>
> The one standardized test regularly used is the College Qualification Test (CQT) published by the Psychological Corporation of New York City. This instrument is designed to measure several abilities which are indicative of success in college. The test yields four scores: Verbal or Vocabulary (CQT-V), General Information (CQT-I), Numerical (CQT-N), and a total score (CQT-T). The total score provides the best single index of college ability for Michigan State University students in general, although (CQT-V) supplemented by (CQT-I) seems to relate most closely to success in courses in which verbal facility is important, such as social science and literature, while (CQT-N) supplemented by (CQT-I) seems to be most closely related to success in technically oriented courses which make demands on quantitative ability such as physical science, chemistry, or mathematics.

> Other locally developed tests are described below. The Michigan State University English Placement test (E) consists of objective test items representing various aspects of sentence structure, and organization. Although the test is intended primarily to identify students who may require assistance from the preparatory English program, the test has proved to be a satisfactory and convenient means of identifying students for honors sections.
>
> The Michigan State University reading test (R) is a test of reading comprehension. The score is based upon the student's ability to answer questions based on reading passages representative of several academic areas at the University. The test is not restricted to the simple mechanics of reading, but rather the score provides some measure of factors involved in critical thought. The test is useful to faculty members in any decision requiring some knowledge about the student's verbal ability.[8]

The Core Routine on the CDC 3600 was used to calculate multiple regressions. Taking achievement in shorthand as the dependent variable and each student's score on the entrance test battery as the independent variables, the reseacher secured the following data: simple correlations, multiple correlation coefficients, regression coefficients, standard errors of coefficients, beta weights, standard error of betas, and partial correlation coefficients. These data were analyzed to determine whether a relationship exists between any of these variables and achievement in shorthand and whether any of these tests--or a combination of them--could be used to predict success in shorthand.

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[8]W. G. Warrington, Director, Office of Evaluation Services, Report to the Board of Trustees, Michigan State University (unpublished manuscript), January 10, 1964.

The results of the statistical analyses and their implications will be discussed in Chapter IV.

CHAPTER IV

FINDINGS

This chapter presents the results of the statistical comparisons made to test the two hypotheses of the study. The first part sets forth the findings related to the achievement of the students in the two sections while the second part contains the findings regarding the use of the Michigan State University Entrance Test Battery scores as predictors of success in shorthand.

I. TERMINAL PERFORMANCE OF THE TWO SECTIONS

The first hypothesis of the study was that there would be no statistically significant difference in the achievement of the two equated sections of participants at the end of two terms of shorthand instruction. The statistical technique selected to test this hypothesis was a one-way analysis of variance. The sample groups compared differed systematically in only one way--the introduction and use of new-matter dictation during instruction. The independent or treatment variable, therefore, was the early introduction of new-matter dictation; while the dependent or criterion variable was the achievement as shown by a score, called the correct words transcribed, of the participants on three dictation tests administered to the two groups at the end of the second term.

Table II shows the scores achieved on the dictation tests, the letter grades received by each student, and the mean and standard deviation for each group. The score is the total of correct words transcribed by the student on three tests--a score which was derived by subtracting from the standard words in each test the number of errors in the transcript.

The mean score, when rounded to a whole number, was the same for each group: 602.20 for section one (the language arts group) and 601.89 for section two (the science-type or new-matter group). The F statistic of variance between groups was .00008; therefore, the null hypothesis that there would be no difference between the achievement of the two groups could not be rejected.

Among the 15 students included in the study in section one, there were no A's, 5 or 33 per cent of the students in this section received B and 9 or 60 per cent received C. One student, 7 per cent, received D.

In section two, among the 18 students included in the study, one student, 5.6 per cent, received A; 4 students, 22 per cent, received B; 12 students, 66.7 per cent, received C; and 1 student received D. No F grades were given in either section.

The standards for grades were:

A 3 three-minute letters, dictated at 100 words a minute, transcribed at 95 per cent accuracy.

TABLE II

TERMINAL PERFORMANCE AS SHOWN BY SCORES ACHIEVED ON DICTATION TESTS AND SECOND-TERM GRADES

Section One Language-arts Group		Section Two Science-type Group	
Correct Words Transcribed	Grade	Correct Words Transcribed	Grade
768	B	873	A
705	B		
700	B	713	B
699	B	710	B
699	B	702	B
		700	B
638	C		
592	C	648	C
588	C	642	C
530	C	581	C
528	C	575	C
521	C	527	C
519	C	527	C
517	C	526	C
516	C	526	C
		521	C
513	D	520	C
		516	C
		516	C
		511	D
Mean 602.20		601.89	
S. D. 90.57		103.89	
No. 15		18	

B 3 three-minute letters, dictated at 80 words a minute, transcribed at 95 per cent accuracy.

C 3 three-minute letters, dictated at 60 words a minute, transcribed at 95 per cent accuracy.

The scores and letter grades for the entire class are shown in the Appendix on page 136.

Results of the Theory Tests

At the end of the first term and in the seventh week of the second term, theory tests were administered to each group and the scores were compared statistically. The theory tests in no way entered into the computation of the students' grades. They were used solely for research purposes.

Table III shows the scores received by the students on the two theory tests.

The mean score on the first theory test for students in section one was 85.33 and the mean score for section two was 84.89. With an F statistic of variance between groups of .04534, the hypothesis that there is no significant difference between the groups cannot be rejected.

On the second theory test, the mean score for section one was 73.40 while for section two it was 74.17. The F statistic was .02118 and again the hypothesis of no significant difference could not be rejected.

As a matter of interest, the number of shorthand and transcription errors made by students on the second theory test were analyzed and compared. The mean number

TABLE III

STUDENT SCORES ON THEORY TESTS

Section One		Section Two	
Test One	Test Two	Test One	Test Two
93	87	95	86
91	90	94	90
89	79	92	95
89	81	92	87
89	73	89	86
88	85	89	64
87	83	88	93
87	76	88	90
86	80	85	78
84	79	84	80
84	67	82	57
80	52	81	79
79	75	81	70
79	49	81	66
75	45	80	66
		80	56
		78	48
		69	44
Mean 85.33	73.40	84.89	74.17
S. D. 5.09	14.04	6.6	15.87
No. 15		18	

of shorthand errors in section one was 18.20 and in section two it was 17.67; the mean number of transcription errors in section one was 8.40 and in section two, 8.17. In neither case could the hypothesis of no significant difference be rejected. This information is shown in Table IV.

TABLE IV

NUMBER OF SHORTHAND AND TRANSCRIPTION ERRORS MADE BY STUDENTS IN THEORY TEST TWO

	Section One		Section Two	
	Shorthand Errors	Transcription Errors	Shorthand Errors	Transcription Errors
Mean	18.20	8.40	17.66	8.16
S. D.	7.04	7.40	10.17	6.38
No.	15		18	
F Statistic:	Shorthand errors:		.02939	
	Trans. errors:		.00946	

Relationship Between Terminal Performance and Theory Tests

To determine whether a relationship existed between achievement in the dictation and transcription tests and the theory tests, these scores were correlated and the results are shown in Table V.

The correlations shown in Table V indicate that there is a significant relationship between transcription achievement and knowledge of theory as indicated by a word test. The coefficient of determination, in which the correlation coefficient is squared, was computed to obtain a deeper understanding of this relationship. The coefficient of determination represents "the strength of linear relationship in a given set of data."[1] In this

[1]Hays, op. cit., p. 502.

TABLE V

CORRELATION BETWEEN TRANSCRIPTION SCORES AND THEORY TEST SCORES

	Theory Test 1		Theory Test 2	
	Coeff. of Corr.	Coeff. of Deter.	Coeff. of Corr.	Coeff. of Deter.
Section 1	.76	.58	.61	.37
Section 2	.59	.35	.43	.19
Sections 1 and 2	.61	.37	.52	.27

case, it may be said to reflect the proportion of the influence of knowledge of theory on achievement in dictation and transcription. For example, the coefficient of correlation for Theory Test 2 and achievement of both groups was .52, indicating some relationship between the two factors.. The coefficient of determination was .27, indicating that 27 per cent of the achievement was related to knowledge of theory while 73 per cent was brought about by other factors.

Admittedly, the number of students involved in this study was limited. These figures, however, are in agreement with those obtained by Danielson in her study of the relationship between shorthand vocabulary competency and shorthand dictation achievement. Danielson found a coefficient of correlation of .49 and a coefficient of determination of .24. From this, she concluded that about 25

per cent of the shorthand dictation rate variable was effected by the shorthand vocabulary index.[2]

II. ENTRANCE TEST BATTERY SCORES AS PREDICTORS OF SUCCESS IN SHORTHAND

The second hypothesis of the study was that there would be no relationship between student scores on the Michigan State University Entrance Test Battery and subsequent performance in beginning shorthand. Simple and multiple regression correlations were calculated to test this hypothesis. Through the use of the CORE routine on the CDC 3600, the following information was obtained:

1. Simple correlations between the six scores on the Michigan State University Entrance Test Battery and achievement in shorthand as measured by the transcription scores previously described.
2. Multiple correlation coefficients.
3. Regression coefficients.
4. Beta weights.
5. Partial correlation coefficients.

This information was obtained for each of the sections and for the two sections combined.

Analysis of Simple Correlations

Table VI shows the simple correlations between scores on each element of the Michigan State University

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[2]Danielson, op. cit., p. 41.

Entrance Test Battery and achievement in shorthand as measured by the correct words transcribed on the three theory tests.

TABLE VI

CORRELATION OF MICHIGAN STATE UNIVERSITY TEST BATTERY SCORES AND ACHIEVEMENT IN SHORTHAND

Section	Verbal	Informational	Numerical	Total	English	Reading
1	.0953	.1203	.0843	.1120	.5203	.2639
2	.6171	.6400	.4173	.6924	.6935	.4430
1 and 2	.3889	.4423	.2799	.4431	.6103	.3450

In order to determine whether the correlation coefficients obtained on the two sections were significantly different, that is, whether the two samples can be considered random samples from a common population, Fisher's Z transformation was used.

Each r was converted to Z by using the Table of Transformation of r to Z.[3] By dividing the difference between the two values of Z by the standard error of the difference, a test of significance may be made. These computations are found in the Appendix on page 137.

[3]Hays, op. cit., p. 680.

A value of 1.96 is required for significance at the .05 level.[4] Since the computed Z fell short of this value in each case, the difference between the correlations cannot be said to be significant.

The apparent difference in the correlations is probably due to the relatively small number of cases in the samples.

Significance of the Correlation Coefficients

The correlations between the predictor variables and shorthand achievement were then tested to determine whether they were significantly different from zero. The table Critical Values of the Correlation Coefficient was used to determine significance.[5] The tabled values of r were used with confidence limits of .05. The degree of freedom were determined by N - 2 where N equals the number of observations.

Section One. The tabled value of r at the .05 level with 13 degrees of freedom was .514. Only the correlation between English and achievement in shorthand at .5203 was found to be significantly different from zero.

Section Two. The tabled value of r with 16 degrees of freedom is .468. Therefore, four of the correlations in section two were significant: CQT-Verbal at .6171,

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[4] Ibid., p. 673.

[5] George A. Ferguson, Statistical Analysis in Psychology and Education (New York: McGraw-Hill Book Company, Inc.), 1959, p. 315.

CQT-Informational at .64, CQT-Total at .6924, and English at .6935. These correlations indicate that the relationship between these predictor variables and shorthand achievement was significantly different from zero.

Combined Sections. The correlations between the predictor variables and shorthand achievement for sections one and two combined were also tested to determine whether they were significantly different from zero. With a tabled value of .345 required for significance at the .05 level with 31 degrees of freedom, all but one of the correlations (CQT-Numerical) were found to be significant. There is, therefore, some relationship between these predictor variables (CQT-Verbal, CQT-Informational, CQT-Total, English, and Reading) and achievement in shorthand.

To simply stop with a statement as to the significance of the coefficient of correlation is not enough. The coefficient of correlation tells us to what extent two things are related, to what extent variations in one go with variations in the other. It does not, however, give directly anything like a percentage of relationship. We cannot say that an r of .50 indicates two times the relationship that is indicated by an r of .25. There are, however, three derivations of r that give us more information about the correlation coefficients and the accuracy of prediction. These are the coefficient of alienation, the index of forecasting efficiency, and the coefficient of determination.

Coefficient of alienation. The coefficient of alienation ($k = \sqrt{1 - r^2}$) indicates the degree of lack of relationship. It is the ratio of the dispersion of errors to the dispersion of obtained values.

Index of forecasting efficiency. The index of forecasting efficiency ($E = 100(1 - k)$) is the percentage reduction in errors of prediction by reason of correlation between two variables. For example, when $r = .61$, k (the coefficient of alienation) = .7924 and E (the index of forecasting efficiency) is .2076. The margin of error in predicting Y with knowledge of X scores is about 79 per cent as great as the margin of error we should make without X scores. The reduction of margin of error is 20.76 per cent by reason of correlation between two variables. In other words, the efficiency of prediction made with knowledge of X scores is estimated to be about 21 per cent better than predicting without such knowledge.

Coefficient of determination. The coefficient of determination (r^2) represents the strength of the linear relationship in a given set of data. If the correlation is .80, then 64 per cent of the variance in Y is accounted for or associated with variance in X. When $r = .50$, the percentage of the variance in Y that is accounted for by the variance in X is 25, or one-fourth.[6]

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[6]J. P. Guilford, Fundamental Statistics in Psychology and Education (New York: McGraw-Hill Book Company, 1965) pp. 376-379.

In order to obtain more information about the correlation coefficients and the accuracy of prediction, these three derivatives of r were calculated for those correlation coefficients that were statistically significant.

Table VII shows the calculated values for these derivatives.

The figures in Table VII indicate that none of the Michigan State University Entrance Test Battery scores alone can be used as a criterion measure for predicting success in shorthand. The coefficient of alienation, indicating the degree of lack of relationship, is high in each case while the highest coefficient of determination (CQT-Total and English for Section 2) is .48 indicating that 48 per cent of achievement in shorthand is accounted for by whatever is measured by each of these two tests. In the two sections combined, the English test has a coefficient of determination of .37 indicating that 37 per cent of achievement in shorthand is accounted for by whatever is measured by the English test.

These findings are in agreement with those of Coleman who also tried to use Michigan State University Entrance Test Battery scores as predictors of success in shorthand. His conclusion was that none of the correlations between Entrance Test Battery subtests and subsequent performance in beginning shorthand was substantial enough to possess predictive value of grades for potential shorthand students.

TABLE VII

DERIVATIVES OF r FOR SIGNIFICANT CORRELATIONS

	r Coefficient of Correlation	k Margin of error in prediction Coefficient of Correlation	E Percentage reduction in errors of prediction	r^2 Percentage of variance accounted for Coeff. of Determination
Section 1:				
English	.520	.85	15	27
Section 2:				
Verbal	.617	.79	21	38
Informational	.640	.77	23	41
Total	.692	.72	28	48
English	.693	.72	28	48
Sections 1 and 2:				
Verbal	.389	.92	8	15
Informational	.442	.89	11	20
Total	.443	.89	11	20
English	.610	.79	21	37
Reading	.345	.94	6	12

Coleman, however, did not go beyond the coefficient of correlation in interpreting the relationship.

Analysis of Multiple Correlation

A multiple regression equation provides a means of predicting achievement from several variables considered simultaneously. According to Hull,

> The multiple regression equation gives the closest estimate it is possible to secure from any particular battery of tests. If the battery contains test units of considerable prognostic value, the equation will make the most of them. If, however, the test units are of little or no value, then the forecasts made by the equation will be without significance. This will be the fault not of the equation but of the tests.[7]

Partial regression coefficients. The partial regression coefficients provide the weights to be attached to the scores of each independent test when shorthand accomplishment is to be estimated from all of these tests in combination. These coefficients give the weight which each test exerts in determining the measure of shorthand accomplishment when the effects of other variables are held constant. Also, when used in the regression equation, the regression coefficients assist in the determination of just what role each of the test variables plays in determining the predicted criterion score.

Table VIII presents the partial regression coefficients obtained.

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[7]Clark L. Hull, Aptitude Testing (New York: World Book Company, 1928), p. 466.

TABLE VIII

PARTIAL REGRESSION COEFFICIENTS
FOR FIVE PREDICTOR TESTS

	Section One	Section Two	Sections One and Two
Verbal	2.73	.50	- .59
Informational	-6.83	4.42	1.16
Numerical	-5.67	3.82	1.28
English	14.26	2.80	8.77
Reading	5.13	-4.65	- .10

The regression equation which expresses the relationship between the criterion measure of shorthand achievement and the five tests may be written as follows:

$$\hat{Y} = a_o + a_1X_1 + a_2X_2 + a_3X_3 + a_4 X_4 + a_5 X_5$$

with $\hat{Y}$ representing the predicted shorthand accomplishment score

a_o representing the constant score which must be added

a_1 through a_5 representing the weight of each test

X_1 through X_5 representing the actual scores obtained on the tests.

Utilizing the partial regression coefficients obtained, prediction of the shorthand achievement score from the Michigan State University Entrance Test Battery scores could be accomplished with the following multiple regression equations.

Section One:

$$406.86 + 2.73X_1 + (-6.83)X_2 + (5.67)X_3 + 14.26X_4 + 5.13X_5$$

Section Two:

$$323.64 + .50X_1 + 4.42X_2 + 3.82X_3 + 2.80X_4 + (-4.65)X_5$$

Combined Sections:

$$305.66 + (-.59)X_1 + 1.16X_2 + 1.28X_3 + 8.77X_4 + (-.10)X_5$$

In order to determine the strength of the relationship between the combined variables and shorthand achievement, a multiple correlation was computed. By combining the Verbal, Informational, Numerical, English, and Reading scores on the Michigan State University Entrance Test Battery, the multiple correlations shown in Table IX were obtained.

TABLE IX

MULTIPLE CORRELATIONS BETWEEN FIVE PREDICTORS AND ACHIEVEMENT IN SHORTHAND

	R	R^2
Section One	.6403	.4100
Section Two	.8390	.7039
Sections One and Two	.6261	.3920

Significance of the Multiple Correlation Coefficients

To determine the significance of the multiple correlation coefficients shown in Table IX, an F ratio was computed using the formula

$$F = \frac{R^2}{1 - R^2} \quad \frac{N - k - 1}{k}$$

where R = multiple correlation coefficient

N = number of observations

k = number of predictor variables

The table of F is entered with degrees of freedom of k and N - k - 1.[8]

When computed by the above formula, only the multiple correlation for section two with an F value of 5.23 as compared with the tabled F value of 4.70 was considered significant. The computations are found in the Appendix on page 138.

The multiple R is subject to the same kinds of interpretation as simple r. It does not give directly a percentage of relationship. The coefficient of multiple determination (R^2), however, tells us the proportion of variance that is associated with or predicted by the predictor variables. For section one we can say that 41 per cent of the variance in shorthand achievement is accounted for by whatever is measured by the Michigan State University Entrance Test Battery. For section two, this percentage

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[8]Ferguson, op. cit., p. 301.

was 70 and for the two sections combined it was 39 per cent. The latter figure is slightly higher than the best single predictor for the two groups combined, English, with a common variance of 37 per cent.

To determine the value of each variable in the combined test battery, coefficients of multiple determination with each variable in turn dropped were computed. Table X shows these coefficients of multiple determination.

TABLE X

COEFFICIENTS OF MULTIPLE DETERMINATION WITH ONE VARIABLE DELETED

Variables Deleted	Section One	Section Two	Sections One and Two
Verbal	.3823	.7021	.3895
Informational	.3101	.6402	.3874
Numerical	.3083	.5611	.3799
English	.1464	.6937	.1574
Reading	.3607	.6626	.3920

Comparing these figures with the R^2 obtained by using all of the variables--.41 for Section One, .70 for Section Two, and .39 for the combined sections--it is evident that dropping any one of the tests would lower the predictive value of the test battery. Dropping the English test from the battery would lower its predictive value considerably for section one and for the combined sections. In these cases, without English, R^2 would be reduced from .41 to .15 and from .39 to .16.

Corrected Multiple Correlations

According to Guliford,[9] the multiple R, is an inflated value especially when dealing with samples of under 100. A correction for bias can be made by the following formula:

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

where N = number of cases in sample

and m = number of variables correlated.

Table XI shows the corrected R and R^2 for each section and the combined sections.

TABLE XI

CORRECTED MULTIPLE CORRELATIONS BETWEEN FIVE PREDICTORS AND ACHIEVEMENT IN SHORTHAND

	cR	cR^2
Section One	.2031	.04
Section Two	.7546	.57
Sections One and Two	.5200	.27

The figures in Table XI reduce considerably the coefficients of multiple determination, with 57 per cent of the variance in achievement being accounted for by whatever is measured by the Michigan State University Entrance Test Battery in section one and 27 per cent for the combined

[9] J. P. Guilford, op. cit., pp. 400-401.

sections. There is, however, some evidence of a relationship between the tests and achievement in shorthand that would make further study of these factors worth while.

A bulletin prepared by the Office of Evaluation Services at Michigan State University states that CQT-Verbal supplemented by CQT-Informational seems to relate most closely to success in courses in which verbal facility is important and that CQT-Numerical supplemented by CQT-Informational appears to be most closely related to success in technically oriented courses which make demands on quantitative ability.[10]

In order to see if these combinations of tests could be used to predict success in shorthand when taught by either a language arts or science-type approach, multiple correlations of these two variables were computed. Table XII shows the results of these calculations.

These figures do not support the theory that students with verbal facility will do better when taught by a language arts method while those with quantitative abilities will do better in a science-type approach. The relatively small numbers, however, do affect multiple correlation and further experiments in this area would be worth considering.

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[10]"The Use of Orientation Test Data," Testing Bulletin No. 3 (Office of Evaluation Services, Michigan State University, July, 1960), p. 1.

TABLE XII

MULTIPLE CORRELATIONS BETWEEN TWO PREDICTOR VARIABLES AND ACHIEVEMENT IN SHORTHAND

	Verbal and Informational		Informational and Numerical	
	R	R^2	R	R^2
Section One	.1245	.0155	.1900	.0083
Section Two	.6600	.4358	.6860	.4705
Combined Sections	.5345	.2857	.4120	.1698

This combination of variables does not improve the prediction value of the tests. The best prediction equation makes use of the five parts of the Michigan State University Entrance Test Battery.

This chapter presented the findings of the study. Chapter V will summarize the study and present the conclusions and recommendations of the researcher.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

I. NATURE OF THE STUDY

This study was an experiment to determine the effects of the early introduction of new-matter dictation on achievement in beginning shorthand and to contribute to the available data on shorthand prognosis.

Need for the Study

A review of the literature on the teaching of beginning shorthand revealed that there was no consensus as to the most effective method of teaching shorthand and that much of what is being written about the teaching of shorthand is based on opinion rather than on sound research. It was felt that attention needed to be given to the behavior of learners at each successive level of skill and the implications for instructional materials and procedures. This study looked at one aspect of the teaching of beginning shorthand--the early introduction of new-matter dictation.

Delimitations of the Study

The study was delimited to students enrolled at Michigan State University in LIO 201, Beginning Shorthand I, and LIO 202, Beginning Shorthand II, during winter and spring terms of 1965.

Hypotheses Tested

The null hypotheses tested in the study were:

1. There is no difference at the end of two terms of instruction in the achievement of beginning shorthand students taking new-matter dictation from the third week of the first term and that of students who have had only practiced material for dictation until after all theory has been presented.

2. There is no relationship between student scores on the Michigan State University Entrance Test Battery and subsequent performance in beginning shorthand.

II. SUMMARY OF THE PROCEDURES

Definition of the Population

The sample for the study consisted of 33 Michigan State University students enrolled in two sections of LIO 201 and LIO 202.

It was assumed that, because of the size of the student body at Michigan State University, students electing beginning shorthand during the winter term 1965 would provide a random sample for the experiment. It was also assumed that the students who elected either section one or section two of beginning shorthand for the winter term 1965 would, through their own selection process, randomly distribute themselves between the two sections.

Equality of the Sections. To establish that there was no significant difference between the groups in aptitude

for college work, they were compared for equality of performance on each section of the Michigan State University Entrance Test Battery by means of an Analysis of Variance. F tests revealed that there was no statistically significant difference between the two groups in any of the subtests of the test battery.

Pre-test. To validate students' statements about prior shorthand training, each student was given a shorthand pre-test on the first day of class. On the basis of this test and the students' statements regarding prior study of shorthand, 15 students from section one and 18 students from section two were selected for inclusion in the study.

Preparation of Material

Dictation material for the new-matter class was prepared for every class period beginning with the eighth. The dictation consisted of a short letter containing a few words which the students had never read or written before but which they should have been able to construct from the shorthand principles already learned.

Teaching Procedures

The two sections of LIO 201 and 202 were taught on a team-teaching basis by two experienced shorthand teachers. Daily lesson plans were prepared by the person teaching. The facilities of the Michigan State University multiple channel tape laboratory were utilized in both sections.

Collection of the Data

Criterion Tests. Two theory tests and a series of dictated letters were used to compare the two sections in order to test the first hypothesis that there would be no significant difference in the achievement at the end of two terms of instruction.

Predictive Tests. In order to test the second hypothesis that there is no relationship between the student scores on the Michigan State University Entrance Test Battery and subsequent performance in beginning shorthand, student scores on these tests were correlated with achievement in shorthand as measured by the correct words transcribed in the dictation tests.

III. FINDINGS

Terminal Performance of the Two Sections

1. There was no statistically significant difference between the achievement of the two groups on the dictation tests. The mean score, when rounded to a whole number, was the same for each group: 602.20 for section one and 601.89 for section two. Although there was a wider range in the scores in section two--511 to 873 as compared with 513 to 768 in section one--this was due to one high score. The low scores were close.

2. There was no statistically significant difference between the two groups on the two theory tests. Neither was there any statistically significant difference between

the two groups in the number of shorthand or transcription errors made on those tests. The mean score on the first theory test for students in section one was 85.33 while for section two it was 84.89. On the second test, the mean score was 73.40 in section one and 74.17 in section two. The mean number of shorthand errors made by students in section one on the second theory test was 18.20 while for section two it was 17.66. On this same test, the mean number of transcription errors in section one was 8.40 and in section two it was 8.16.

3. Transcription achievement as measured by the dictation tests correlated with knowledge of theory as measured by the word tests in each section and in the two sections combined. The correlation coefficient between scores on theory test two and scores on the dictation tests was .52 for the combined sections. The coefficient of determination was .27 indicating that 27 per cent of the variation in achievement in shorthand is due to variation in knowledge of theory.

Reliability of Entrance Tests as Predictors

The following simple correlation coefficients were statistically significantly different from zero: Section one: English, 5203; Section two: Verbal, .6171; Informational, .6400; CQT-Total, .6924; English, .6935; Sections one and two: Verbal, .3889; Informational, .4423; CQT-Total, .4431; English, .6103; Reading, .3450. None

of these correlation coefficients, however, are high enough to be used as a criterion measure for predicting success in shorthand.

The five subtests of the Michigan State University Entrance Test Battery when considered simultaneously produced a multiple correlation coefficient of .84 in section two. This correlation was significantly different from zero. The multiple correlations for section one at .64 and for the combined sections at .63 were not statistically significantly different from zero.

IV. CONCLUSIONS

From an analysis of the findings of the study pertaining to the effect on shorthand achievement of the early introduction of new-matter dictation and from an analysis of the observable relationships between student scores on the Michigan State University Entrance Test Battery and subsequent achievement in beginning shorthand, the following conclusions are drawn. These conclusions are pertinent to this study; substantiating research will be necessary before they can be generalized.

1. That the early introduction of new-matter dictation does not result in an increase in the ability to take and accurately transcribe new-matter dictation material as measured by the existing departmental standards at Michigan State University.

2. That the early introduction of new-matter dictation does not, as claimed by some experts, retard the students in their ability to take and transcribe new-matter dictation as measured by the existing department standards at Michigan State University for beginning shorthand.

3. That this study provides no evidence to suggest either postponed benefits or postponed handicaps due to the early introduction of new-matter dictation. Further long-range research is needed before conclusions can be drawn regarding the effects of this practice on terminal achievement in shorthand.

4. That students taught by the functional method in which no emphasis is given to the principles of outline construction do not differ in knowledge of shorthand theory as measured by word tests from students taught by a science-type approach in which rules and the principles of outline construction are discussed.

5. That there is a relationship between transcription achievement as measured by the ability to take dictation and transcribe accurately and knowledge of theory as measured by word tests. This concurs with the research findings of Danielson,[1] Palmer,[2] and Hillestad.[3] It should be reiterated, however, that there was no difference in

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[1]Danielson, op. cit. [2]Palmer, op. cit.

[3]Hillestad, op. cit.

knowledge of theory between the group taught by a language arts approach with no emphasis on theory and the group taught by a science-type approach with emphasis on outline construction.

6. That performance on the subtests of the Michigan State University Entrance Test Battery does not provide an accurate measure for predicting individual success in beginning shorthand at Michigan State University.

7. That a multiple regression equation obtained by considering the five subtests of the Michigan State University Entrance Test Battery simultaneously does not provide an accurate measure for predicting individual success in shorthand.

8. That there is no evidence to support the theory that students with verbal facility will do better in a language arts approach and students with quantitative ability will do better in a science-type approach to the learning of shorthand.

V. RECOMMENDATIONS

The following recommendations are made from the findings and conclusions of this study.

1. That further research be carried on in beginning and intermediate shorthand to determine, if possible, the most effective use of new-matter dictation through:

A. Studies in which new-matter dictation is introduced at different points in the learning

process, e.g., at the end of the second week, fifth week, tenth week.

B. A study in which considerably more new-matter dictation is given than in this study and in which the dictation material is constructed from words beyond the first 1500 in the Silverthorn list.

2. That this study be replicated with high school and junior college or business school groups.

3. That further experiments be conducted to determine the relationship between emphasis on accurate outlines and achievement in shorthand dictation ability.

4. That further attempts be made to determine predictors of success in shorthand in the Michigan State University Entrance Test Battery scores over a period of time.

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APPENDIX

LIO 201, Winter 1965
LIO 202, Spring 1965

In an effort to find a more effective and easier way to learn shorthand, the two sections of LIO 201 and 202 will be taught by different methods. The material will be covered at different rates; testing will be done in a different manner. By the middle of the second term, the two classes will be at the same point. Accomplishment at the end of the second term will be measured by the same grading standard. By the end of Spring term it will make no difference which section you are in, but you would be at a loss if you were to change sections at the end of the first term or plan to take 202 any time but Spring 1965.

For this reason, we are requiring that you remain in the same section for both terms. The sections will be taught at the same hour during Spring term. If you foresee difficulties in remaining in the same section or if you are not planning to continue with shorthand in the Spring term, we request that you not take it this term.

Please sign this paper on this line._____

Please write the English equivalent or word for each of the shorthand outlines given below. Write in the space just to the right of each shorthand outline. If you have no idea of the word that the shorthand outline stands for, just leave the space blank. It is quite possible that you will leave the entire page blank.

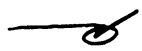
1.  _____
2. _____
3.  _____
4.  _____
5.  _____
6.  _____
7.  _____
8.  _____
9.  _____
10.  _____

Now, please write the shorthand outline (using Gregg shorthand) for each of the following words. Write in the space provided at the right of each of the English words. If you have no idea of what the shorthand outline should be, just leave the space blank. It is quite possible that you will leave the entire page blank. (Note: None of the words in the first list on this page is included in the list below.)

1. I _____
2. it, at _____
3. with _____
4. for _____
5. this _____
6. and _____
7. one _____
8. those _____
9. present _____
10. put _____

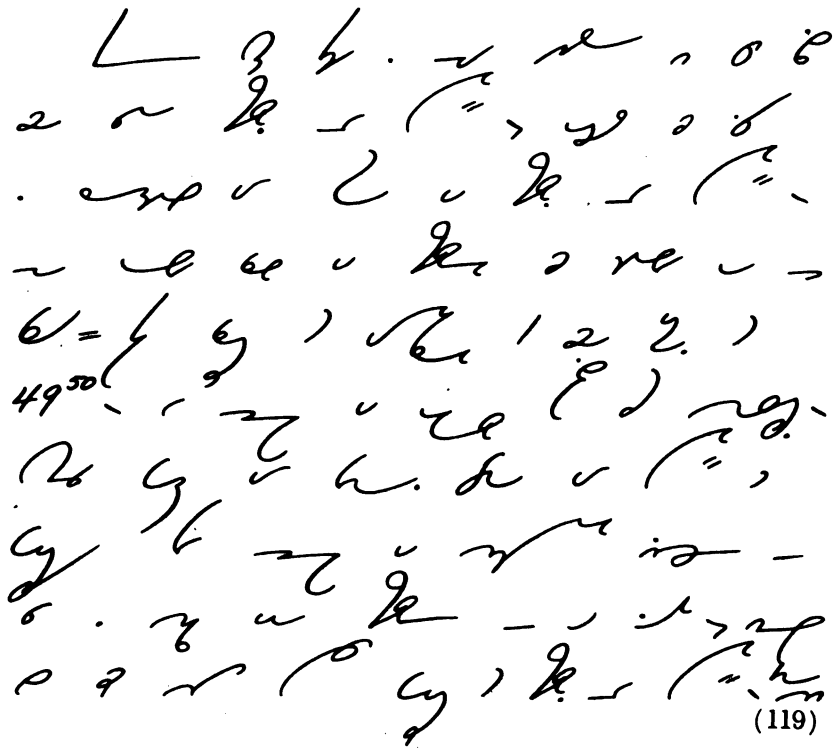
Please sign this paper on this line._____

Please write the English equivalent or word for each of the shorthand outlines given below. Write in the space just to the right of each shorthand outline. If you have no idea of the word that the shorthand outline stands for, just leave the space blank. It is quite possible that you will leave the entire page blank.

1.  _____
2.  _____
3.  _____
4.  _____
5.  _____
6.  _____
7.  _____
8.  _____
9.  _____
10.  _____

Now, please write the shorthand outline (using Gregg shorthand) for each of the following words. Write in the space provided at the right of each of the English words. If you have no idea of what the shorthand outline should be, just leave the space blank. It is quite possible that you will leave the entire page blank. (Note: None of the words in the first list on this page is included in the list below.)

1. dough _____
2. compose _____
3. each _____
4. large _____
5. line _____
6. enough _____
7. quite _____
8. sensible _____
9. efficient _____
10. toward _____



(119)

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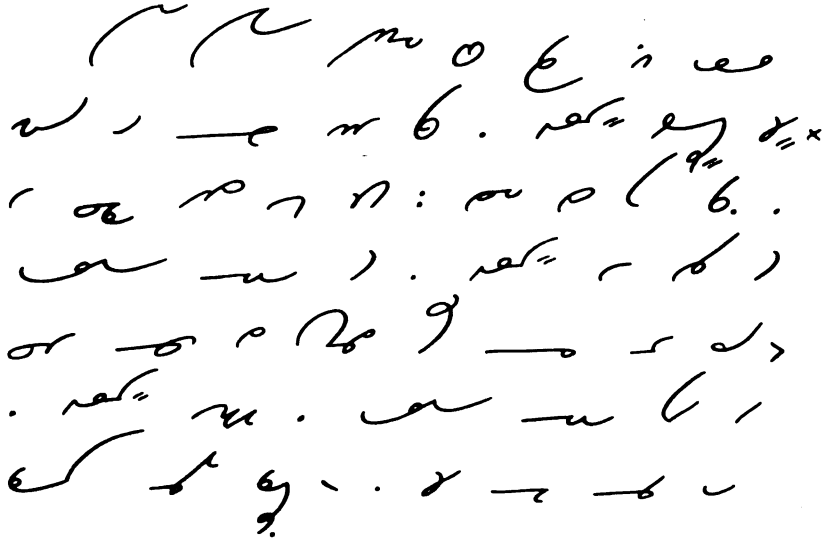

MICHIGAN STATE UNIVERSITY ENTRANCE TEST BATTERY SCORES

Student	Major	CQT-V	CQT-I	CQT-N	CQT-T	Eng.	Read	Grade
			I. SECTION ONE					
101	Non preference	59	35	40	134	23	29	C
102	Non preference	36	30	33	99	25	27	C
103	Non preference	39	44	36	119	33	36	B
104	French	32	30	20	82	26	17	B
105	Non preference	70	57	44	171	30	39	C
106	Non preference	47	49	20	116	22	28	C
107	Secretarial Ad.	42	42	34	118	24	18	C
108	Spanish	69	62	34	165	32	41	C
109	Non preference	40	39	18	97	23	18	D
110	Spanish	54	49	29	132	34	26	C
111	Art Practice	74	55	48	177	35	46	B
112	Marketing	46	40	40	126	27	28	C
113	Physical Sci.	70	54	37	161	--	38	C
114	Social Work	63	48	31	142	22	34	B
115	Non preference	36	40	22	98	30	22	B
			II. SECTION TWO					
201	Retainling	67	58	32	157	27	39	B
202	Bus. Education	59	53	17	129	28	34	C
203	Business	72	63	45	180	30	40	B
204	Secretarial Ad.	39	49	40	128	29	39	C
205	Secretarial Ad.	38	45	40	123	23	28	C
206	Secretarial Ad.	42	38	25	105	28	20	C
207	Secretarial Ad.	54	44	43	141	28	34	C
208	French	67	52	27	146	--	32	A
209	Non preference	36	26	26	88	19	23	D
210	Secretarial Ad.	62	43	18	123	26	32	C
211	Psychology	58	53	26	137	31	29	B
212	Non preference	55	49	31	135	24	39	C
213	Secretarial Ad.	65	57	46	168	32	39	B
214	Secretarial Ad.	39	36	30	105	17	24	C
215	Non preference	31	26	36	93	22	25	C
216	Secretarial Ad.	39	33	18	90	16	23	C
217	Business Ed.	29	27	18	74	18	25	C
218	Education	41	50	25	116	26	30	C

SCHEDULE OF THEORY PRESENTATION

SECTION 1	
Class Period	Lesson Presented
1	1
2	1, 2
3	3
4	4
5	5
6	7, 8
7	9
8	10
9	11
10	13
11	14
12	15
13	16
14	17
15	19
16	20
17	21
18	22
19	23
20	25
21	26
22	27
23	28
24	29
25	31, 32
26	33
27	34, 35
28	37, 38
29	39, 40
30	41, 43
31	44, 45
32	46, 47
33, 34, 35, 36, 37, 38	Review and Testing

SCHEDULE OF THEORY PRESENTATION

SECTION 2			
Class Period	Lesson Presented	Class Period	Lesson Presented
1	1	39	31
2	1, 2	40	32
3	3	41	33
4	4	42	34
5	5	43	35
6	6	44	36
7	7	45	37
8	8	46	38
9	9	47	39
10	10	48	40
11	11	49	41
12	12	50	42
13	13	51	43
14	14	52	44
15	15	53	45
16	16	54	46
17	17	55	47
18	18	56	48
19	19		
20	20		
21	21		
22	22		
23	23		
24	24		
25	25		
26	26		
27	27		
28	28		
29	29		
30	30		
31			
32			
33			
34	Review and Testing		
35			
36			
37			
38			

NEW-MATTER DICTATION FOR SECTION TWO

(New words are underscored.)

THIRD WEEK

Lesson 2 - Tuesday

1. Ray made a high score.
2. Dave drove me home late last night.

Source: Functional book, page 23

Lesson 3 - Wednesday

1. Ray seems able to drive.
2. Please season the meat well.
3. Mary typed my brief in an hour.

Source: #3 - Functional book, page 27

Lesson 4 - Thursday

1. He will provide two more chairs.
2. Most stores close at 9.
3. Will you do me a favor?
4. Jane applied for a job here.
5. The leading paper in Erie is the Star.
6. The price of meat is lower at that store.
7. Final grades are due.
8. Have a piece of cake.
9. I agree with Mrs. Green that you are doing fine.

Source: #1 and 2 - Functional book, page 31

FOURTH WEEK

Lesson 5 - Monday

Dear Sam: In your last letter you asked for a sample of our plastic ash trays. I am shipping our two latest models / to you in a separate package. The ash trays, which are red, green, or black, sell for 25 cents. A. J. Keith / (40 words)

Lesson 6 - Tuesday

Dear Jim: Harry Smith said his firm is planning to buy a fleet of cars for its sales staff. Capital Motor Sales is / selling the cars which will arrive in a day or two. I advise you to see Harry to sell him tire cabins for the / cars.

A salesman knows the benefits of carrying a set of tire chains in his car to enable him to make / calls even though it snows. Bill Jones (65 words)

Lesson 7 - Wednesday

Dear Sir: On May 12 I bought a set of dishes that I saw on sale at your store. As your staff did not take proper / care, in packing the dishes, two of the plates were broken when they arrived. I need the dishes for a tea that I / am giving. Please ship me two more plates to take the place of the broken dishes. Sincerely yours, (57 words)

Source: Adapted from Letter #58, Gregg Simplified for Colleges

Lesson 8 - Thursday

Dear Jim: Do you know that Helen Hayes will appear here in a play? The play, The Visit, opens on March 21. / It had rave notices in the papers at its opening in Gary last night. Let's ask Mary and Sue to go / to see the first lady of the stage in her latest play. The earliest date I can go is March 25. Call / me at my office to make plans. I will buy the tickets. Sincerely yours, (73 words)

FIFTH WEEK

Lesson 9 - Monday

Dear Jane: The election of chapter officers will take place at our meeting on March 12. At this meeting our group / will vote on the proposed changes in the by-laws. I urge you to be at the meeting and to call Mary to / be there too. Sincerely yours, (45 words)

Lesson 10 - Tuesday

Dear Sir: I am happy to write to you of an event that will take place at our Erie store. It is the largest / sale of television sets in our history and you should be there early in the day to make your selection. / All makes will be on sale. You can pay cash or charge it. You can be sure the price is right. Yours truly, (57 words)

Lesson 11 - Wednesday

Dear Sir: You have not, according to our records, paid for the table which we shipped you on approval 90 days / ago. We suppose that your daughter likes the table and that you plan to keep it. If so, please mail your check for / $89 or let us know when you will do so. Yours truly, (56 words)

Lesson 12 - Thursday

Dear Harry: The forms you mailed me will help a lot. I plan to apply for a job and the forms will help me to / prepare a data sheet. I hope to get a job selling heavy machines to farmers. I'll call you to tell you when I / get a job. Sincerely yours, (45 words)

SIXTH WEEK

Lesson 13 - Monday

Dear Mr. Woods: Thank you for the bonus which I received with my weekly wages today. It came as a pleasant / surprise to me and you may be sure it will come in handy. I want to visit my daughter for Christmas and / this check will help to take care of my plane fare. Sincerely, (50 words)

Lesson 14 - Tuesday

To our Sales Staff: The 1966 model of our ten-wheel trucks is ready. These new trucks are a good buy at / the price and should make a good profit for you.

We can supply you with an adequate number of trucks to enable / you to meet your sales quota.

The enclosed folder shows the special features of this model. It gets more miles to / a gallon of gas than last year's model. Of course, it is fully guaranteed. A limited number of copies / of the enclosure are being mailed to you; but if you need more, write me and I will send them to you. E. H. White / (100 words)

Lesson 15 - Wednesday

Dear James: Would it be possible for you to replace me as a referee at the basketball game at the high / school on April 15? Yesterday I received a cable from my sister that she is arriving from France on / April 15 and she wants me to meet her at the pier. I had agreed to be at the game but would like to meet / Sally if you can take care of my work at the game.

The game starts at eight o'clock. The teams will be there for practice / at seven. If you can do this for me, you will be doing me a great favor. Sincerely yours, (97 words)

Source: Adapted from Letter #132, Functional text

Lesson 16 - Thursday

Dear Bill: A meeting of the sales managers of each region of our company will be held at the Royal / Hotel in Tulsa from March 21 to March 23. At this meeting we will discuss sales plans and make an / analysis of our position in the industry with respect to sales.

Since my boys are on vacation from / school that week. I plan to take them and my wife with me. We will remain in Tulsa for a day after the meeting / and will then fly to Dallas to visit my daughter who is married and living there. While I am in Dallas, I / would like to see you. Perhaps we can get in a game of golf. I'll call you when I arrive. Sincerely, (117 words)

SEVENTH WEEK

Lesson 19 - Monday

Dear Mr. Harper: Please accept our good wishes on the opening of your new store. We invite you to make use / of our credit bureau to assist your staff in its credit operations. In view of the fact that we have been / in business for 22 years under the management of leading business and professional people of / the city, we feel we can help you.

To take advantage of our service, mail the enclosed agreement to us with / your fee of $100. Sincerely yours, (88 words)

Lesson 20 - Tuesday

Gentlemen: We have your letter concerning the desk we shipped you which arrived in poor condition. The desk was not / scratched when it left our warehouse, and we are sorry it was not in good condition when you received it.

We want to / take care of this matter in a way that will satisfy you. You may ship the desk directly to us for a / replacement or you may have the desk repaired in your town and we will make an allowance on your account for the cost. / Sincerely yours, (83 words)

Lesson 21 - Wednesday

Dear Mr. Miller:

Thank you for your letter of August 4. As you authorized us in that letter, we have / issued the enclosed accident policy.

The premium on this policy is only $28 a / year at the student rate for which you are eligible.

We are happy to be able to serve you and suggest / that you call our local agent, Mr. Brown, if you need any help. Sincerely yours, (75 words)

Lesson 22 - Thursday

Dear Miss Barnes: We are pleased to have the opportunity to tell you about the Davis fireplace. After you / have read the enclosed folder you will see why the fireplace is recommended by so many builders.

John Drew, a / leading contractor in your community, is our authorized dealer. We have asked him to call on you. Sincerely / yours, (61 words)

EIGHTH WEEK

Lesson 22 - Monday

Dear Mr. Niles: Please accept with our compliments the copy of the directory we are sending you today. / It is a service that we provide for our customers.

May I suggest that you show this directory to other / members of your firm who may find it valuable. We will be happy to give them copies as a demon / stration of our desire to serve. Sincerely yours, (68 words)

Lesson 23 - Tuesday

Dear Mrs. Ryan: We are pleased to note that you have purchased a new gas range from Jones and Company. We know that / you will like cooking on this range.

To help you get all the benefits from your new range, we will send a / certified representative to demonstrate its many special features. Mail the enclosed card today to let / us know when you want her to call. Very truly yours, (70 words)

Lesson 25 - Wednesday

Dear Mr. Lane: Thank you for sending us the device for cutting keys which you recently patented. We feel it / has many unusual features and that it will meet our special needs.

Mr. Smith, our president is away / for a few days. When he gets back I will talk to him. It is my understanding that in cases such as this we / will pay you a percentage of the savings made if we decide to adopt your device. You will hear from me soon. / Very truly yours, (83 words)

Lesson 26 - Thursday

Dear Sir: We want you to see for yourself how the Marketing Magazine can make profits for you. We invite you / to accept the next three issues at no charge.

Each issue includes advice on what to buy and when to buy it. The / advice is stated in a concise and accurate manner. When you have compared our magazine with others in / the investment field, you will not want to miss an issue. Yours truly, (72 words)

NINTH WEEK

Lesson 27 - Monday

Dear Mr. Frank: Recently you expressed a desire to act as our dealer in Long Beach. Our officers have discussed / this matter at length and we will be pleased to have you sell our products.

Enclosed are five copies of our latest / catalog, price list, and discount sheet. We are prepared to fill your orders immediately; in fact, our factory / will ship your order on the day it is received. We hope that the sale of our products will prove profitable / to you. Very truly yours, (85 words)

Lesson 28 - Tuesday

Dear Mr. Sax: I am writing to you at this time about a matter that is of importance to everyone / in Flint. On October 20 the Flint Community Chest will begin its yearly drive for funds. This / organization collects money to be divided among nineteen agencies that provide vital services / to the city.

Our goal this year is $400,000. The maximum amount we have collected in / other years was $10,000 less than that, but because of higher prices all agencies need more money. /

Won't you try to increase the size of your gift this year? Sincerely yours, (112 words)

Lesson 29 - Wednesday

Gentlemen: Thank you for your letter of September 16 telling us that you have not yet received the circulars / that you ordered from us. Delivery was held up because our stock was exhausted.

Upon examination / of our records, we find that we mailed you a card explaining this matter on September 5 and requesting / instructions as to whether we should send the circulars when a new supply came in. Perhaps this card did not reach / you.

A shipment is leaving our office today, and it should reach you in a few days. We are sorry for this / delay. Sincerely yours, (104 words)

Lesson 30 - Thursday

Dear Mr. Knox: We have six flights daily between Charlotte and Atlanta. I am enclosing a schedule on which / I have marked the flights in which you will be interested. I have indicated the time that these flights leave Charlotte / as well as the time of their arrival in Atlanta.

The round-trip fare is $27.51 / which includes the 10 per cent tax. We will be glad to make your reservations when your plans are definite. Sincerely / yours, (81 words)

TENTH WEEK

Lesson 30 - Monday

Mr. Harris: I am sending you a copy of the recommendations made by the committee which you / appointed to study our inventory system. They considered this matter carefully and have made several / specific suggestions which we plan to carry out.

I am sure we will be able to reduce our expenses / and still give better service to our customers.

I have expressed appreciation to the committee but perhaps / you will also want to write to the chairman. J. F. King (90 words)

ELEVENTH WEEK

Lesson 30 - Monday

Dear Student: The National Secretaries Association will hold a workshop for prospective secretaries / during the week of April 25. It will be held on the campus of the community college and / will include sessions on secretarial skills and office duties. A folder telling about these sessions is / enclosed.

The workshop is open to high school students in this area. Those attending will receive a certificate. / Since only a limited number can be accommodated, you should make your reservation soon. We know / you will enjoy yourself and profit from it. Sincerely yours, (110 words)

Lesson 30 - Tuesday

Dear Sir: With the help of an advertising campaign carried on in your paper during the past six months, we have / increased our sales tremendously over our sales for the same time last year.

We do not know to what extent this / advertising was responsible for the increase in sales for all of our products, but we feel certain that it / had a lot to do with it. Your paper is, therefore, an essential factor in our selling plans for the coming / year. Yours very truly, (85 words)

Lesson 30 - Wednesday

Dear Mr. Carter: We have extended credit to you for many years and have always considered you among / our best customers. For that reason, we are concerned about your account, which is now more than 90 days overdue. / We are concerned because we feel sure that something must be wrong with you or with your business.

Instead of keeping / us in the dark about this matter, won't you write to us. We want to help you maintain a sound credit rating and / will do anything we can if you are having financial difficulties. Sincerely yours,
(96 words)

Lesson 31 - Thursday

Dear Miss Lyons: Here is your copy of our booklet, "Making Your Home Attractive with Glass." If you are planning to / build a home, this booklet shows many plans which feature glass not only as a building material but also / for decoration.

You can secure most of the glass products that we manufacture at your local department / store. For additional literature about our glass, write us; or better still, visit one of the stores listed / in the booklet. They are all featuring glass products this month. Sincerely yours, (93 words)

TWELFTH WEEK

Lesson 32 - Monday

Dear Miss Keys: This announcement is going only to our charge account customers. In a few days, we shall open our / annual clearance sale. All items that are on display will be sold at very low prices. Special items will / be featured each day.

You will make no mistake in visiting our store early in the week when you will have first choice / in the selection of merchandise. After one week, we shall place an advertisement in the newspaper. Yours truly, / (80 words)

Lesson 33 - Tuesday

Dear Mr. Morris: For some time we have been hoping that we could give you a definite delivery date / on the orders you placed with us. It is unfortunate, however, that the supply situation has become / worse rather than better and we are forced to cancel your order.

The shortage of metal used in the goods which we / have been furnishing your company for so long prevents us from manufacturing these items. We hope you will / give us another opportunity toserve you when our manufacturing problems have been solved. Yours truly, (100 words)

Lesson 34 - Wednesday

Dear Jack: No doubt you have heard about the new office we are opening in Los Angeles. This office will be / our western headquarters and will help us give better service to our dealers in the southwestern part of the country./

In the future, send all your orders and reports to that office. Jim Jones, who formerly headed our Chicago / office, will be the manager of the new branch and will be glad to provide any special service you need. / Sincerely yours, (83 words)

Lesson 35 - Thursday

Dear Mr. Barnes: Perhaps this letter may seem to be somewhat out of season. However, we want to be sure that / the heating equipment in the buildings you own will be in first-class condition when it is needed in a few months.

I / am enclosing an agreement identical to the one we had with you last year. We will overhaul the / furnaces in each building before the start of the season and service them without charge all year. In this way you can / be sure that service will not be interrupted during the winter.

Sign the agreement and mail it to us today. / Sincerely yours, (103 words)

THIRTEENTH WEEK

Lesson 37 - Monday

Dear Sir: A girl by the name of Mary Jones has applied for work with our company and has referred us to you / for personal information regarding herself. We whould very much appreciate your giving us your / impression of her.

Will her educational background and experience enable her to work in a large / business organization and to benefit by training?

If Miss Jones becomes an employee of our firm, she / will be in a position where she will be dealing with highly confidential information. Therefore, it is / highly desirable that she be very discreet.

Your help in this matter will be appreciated. Very / truly yours, (122 words)

Lesson 38 - Tuesday

Dear Mr. Thomas: As a subscriber to our air-travel plan, you will receive a card that is good for travel / on all domestic air lines. The card is imprinted with your name and needs only your signature.

The enclosed / folder explains the advantages of your air-travel card. If you have any questions that are not answered in this / folder, write to our nearest office; it will be happy to answer your questions. We feel sure

you will find our / service useful and welcome you as a subscriber. Sincerely yours, (92 words)

Lesson 39 - Wednesday

Dear Mr. Baker: Do you have friends who would like to know more about owning securities or who might like to / have their holdings appraised by our research department? We shall be pleased to help them if you will give us their names and / addresses.

We believe that furnishing investment help for anyone who wants it is just as important a / part of our business as buying and selling securities.

Remember, we are always at your service, too, with / investment help and information. Sincerely yours, (90 words)

Lesson 40 - Thursday

Dear Mr. Day: We are returning today your premium book for your insurance policy and apologize / for the delay in answering your letter.

Our records indicate that all your premiums have been paid through / June 8, which completes your payments under this policy. We urge you not to let anyone induce you to / surrender this contract for the purpose of replacing it with another policy. No one can offer you, at / your age, a policy on terms that are so favorable.

We hope you will not hesitate to call on us when / we can be of service to you. Sincerely yours, (108 words)

FOURTEENTH WEEK

Lesson 41 - Monday

Dear Mrs. Cole: I want to express our appreciation of the opportunity you are giving us to / serve you through the checking account which you opened recently in our bank.

You will find that the modern facilities / we provide have been developed to meet the needs of our customers for every type of banking transaction. / When you desire specific information on any financial problem, please call on us. We will never / be inconvenienced by your requests. It is our purpose to cooperate with you in a practical and / helpful way. Thank you for your confidence. Cordially yours, (110 words)

Lesson 43 - Tuesday

Dear Mr. Riley: In response to requests from many of our customers, we are continuing the Christmas / accumulation accounts through which customers may systematically save a certain amount each month from / February through November for the payment of Christmas expenses.

This is the way the accumulation / account operates: each month we will charge your checking account with a stated amount, which will be credited to / your Christmas account. On November 30 you will receive a check for the amount in the fund.

To avail / yourself of this service, fill out and return to us the enclosed post card. Cordially yours, (116 words)

Lesson 44 - Wednesday

Dear Mrs. Stevens: Thank you for your courtesy in responding to our request for suggestions for improvements / in our store.

We appreciate your frank criticism of our elevator service. We had assumed that our / elevators were providing adequate service. We did not realize how much time our customers were / consuming waiting for elevators. Our engineers are now studying the matter to see how the service can / be improved.

In the future, if you should want to make a quick trip between floors, perhaps you would find the stairs more / convenient. A better system of signs is being planned to enable customers to find the location of the / stairs without any loss of time.

To express our appreciation for your suggestions, we are enclosing a / gift certificate for you. Sincerely yours, (148 words)

Lesson 45 - Thursday

Gentlemen: Thank you for your letter outlining the coming conference. After consultation with my staff, it / was decided that all of our sales men should attend the meeting. You will receive their reservations shortly.

If / it would not interfere with your plans, I would like to report on a project which we have been conducting with high / school students in our area to stimulate interest in careers in data processing. I think those /

attending your conference will be interested in what we are doing. If you would like further details, let me / know. Very truly yours, (105 words)

FIFTEENTH WEEK

Lesson 46 - Monday

Dear Mr. Adams: Do memories of last winter make you shiver? If they do, you will want to take steps now to / keep your house warm in the months to come.

If you act immediately, there is still time to have your house insulated, / to have your roof recovered, or to make sure that your heating plant gives you maximum heating for the fuel it / uses. Once these things are done, you will have nothing whatsoever to fear from winter.

As we all know, home repairs cost money; / but our bank is prepared to finance them with a long-term loan. Just take inventory of the work to be done; / then come in and consult with one of our officers.

You can then take as long as eighteen months to repay the loan. Very / truly yours, (123 words)

Source: Adapted from Letter #380, Gregg Dictation, DJS

WORD LIST FOR NEW-MATTER DICTATION

Words from Silverthorn's[1] first 1,500 words that are not written in Lessons 1 through 48, Gregg Shorthand, Diamond Jubilee Series.

Lesson 1

dates
favor
season

Lesson 2

apply
freight
here's
highest
homes
license
lower
meal
miles
motor
normal
rates
road
safety
seeing
titles
trying
vice
vote
wholesale

Lesson 3

based
basic
ceiling
having
I'm
labor
peace
postal
speed
steel
table
typewriter
typewriting

Lesson 4

chair
closed
due
group
groups
league
legal
major
makes
mortgage
provides
range
reduced
route
rules
sheets
veteran

Lesson 5

activity
ad
add
advanced
advise
advised
approved
approval
arrive
average
benefits
black
campaign
capacity
certificate
certified
chapter
charged
charges
checking
checks
chest
citizens
civil
death
duplicate
else
farmers
federal
fellow
film
finance
finish
firms
fiscal
gallon
gas
gasoline
heavy
largest
limit
listing
live
machine
map
marketing
metal
military
original

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[1]Silverthorn, op. cit.

plastic
practice
principle
relative
ribbons
sample
separate
sets
sickness
specific
tab
telephone
that's
you'll
yours

Lesson 7

calls
cooperative
corn
crop
dollar
follows
got
hospitals
jobs
lot
lots
officers
profits
proposal
proposed
prospective
stocks

Lesson 8

cordially
earliest
formal
forms
truly

Lesson 9

election
location
professional
protection
television
stabilization

Lesson 10

agents
analysis
binders
bonds
calendar
cent
classes
event
forces
indicated
kindly
says
tremendous
tremendously

Lesson 11

according
cards
folders
hand
prepared

Lesson 13

adjusted
bonus
bushels
campus
coverage
covered
enclosure
fully
hundred
looking
numbers
orders
plus
thanking
truck
trust
wage
war
water
weekly
weight
we'll
window
word
workers

Lesson 14

adequate
instead
limited
quota
twelve

Lesson 15

eligible
ones
reserves
respect
revenue
region

Lesson 16

boys
manager
managers
remain

Lesson 17

directly
directors
directory
manufacturers
per cent
percentage
persons
purchaser

Lesson 19

administration
agreement
amendment
bureau
management
shipments
view

Lesson 20

accounts
allowance
announced
authorized
commissioner
commitment
community
compared
concerning
condition
congress
consideration
considered
contractor
contracts
count
counties
economic
pound
concise
power
recommendations
recommended
sound
thousands
town
warehouse

Lesson 21

accidents
outline
standard
standing
student
vice president

Lesson 22

demonstration

Lesson 23

defense
develop

Lesson 25

states
understanding

Lesson 26

appreciation
areas
armed
associations
include
includes
increase
increases
inspection
instructions
inventory
via

Lesson 27

banks
length

Lesson 28

among
comes
fund
funds
maximum
running
supply

Lesson 29

examination
except
exchange
expenses
extended
extension
extent
regardless
regards

Lesson 31

century
equally
expenditure
feature
featured
features
fixture
gradually
individual
inexperienced
literature
mature
miniature
moisture
mutual
perpetual
scheduling
secure
shortage
shortages
shorten
shorter
shortest
signature
structure
temperature
treasury
venture
virtually

Lesson 32

display
miscarry
mislaid
misleading
mistake
misunderstood
necessarily

Lesson 33

governors
forced
foreclosure
formal
formerly
forms
furnishing
governed
millions
misfortune
railroads
respectfully
unfortunate

Lesson 34

court
headquarters
reports
western
alternative
analytical
assorted
attorney
chemicals
eternal
external
fraternity
headquarters
historical
identical
identically
logically
mechanical
mechanically
northwestern
particle
political
portable
practically
radical
reports
resort
sorted
southeastern
southwestern
sport
support
supports
surgical
terminal
terminate
turned
typical
western

Lesson 35

beginnings
buildings
drawings
entering
hearings
interests
interfere
interference
interim
intermediate
internal
interrupted
interview
linings
offerings
paintings
pleadings
servings
unenterprising

Lesson 37

educational
employee
premium
premiums
volumes
approvingly
auditorium
companion
embarrass
embarrassment
embraces
erroneous
graduate
graduation
immodest
impairment
impartial
implements
imported
imports
impractical
impression
imprint
imprinted
imprinting
improper
miscellaneous
periodical
periodically
radius
reimburse
reimbursement
theories
unknowingly
valuation

Lesson 38

subscriptions
fellowship
hardship
portfolio
rayon
subdivision
subordinate
subscribe
subscriber
substance
substantiate
subtract
subway

Lesson 39

advisability
charity
disability
inability
liabilities
nobility
possibilities
royalties
royalty
securities
sensibilities

Lesson 40

acquirement
apologies
apologize
apology
appendicitis
Atlantic
authentic
biology
constitute
contribution
distributed
fortitude
frantic
physiology
propriety
psychological
restitution
retribution
society
substitution
technology
terminology

Lesson 41

algebra
alphabetical
arithmetic
curriculum
inconvenience
inconvenienced
inconvenient
memoranda
memorandums
ratification
transaction
transcribe
transfer
transfers
transit
transition
transmit
transmittal
transparent
transposition

Lesson 43

accumulated
accumulation
calculate
circulated
circulating
post card
postal
postdate
posthaste
postmaster
postpaid
postscript
speculation
stimulate
stimulated
stimulates
superficially

Lesson 44

assumed
assumes
assumptions
circumvent
consumes
consuming
presumably
presumptions
presumptive
self-contained
self-educated
self-pity
self-sacrifice
self-satisfied
self-styled
self-supporting

Lesson 45

boyhood
consultation
culminate
culture
cultured
multiple
multitude
resulted
resulting
reward

Lesson 46

electric wire
electros
heretofore
telegrams
whatsoever
whensoever
whomsoever
whosoever
withstood

LIO 201 - BRIEF FORM TEST NAME_____

Part I: Write the longhand word for each of the following brief forms in the space to the right of each shorthand 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. _____

LIO 201 - BRIEF FORM TEST NAME_____

Part I: Write the longhand word for each of the following brief forms in the space to the right of each shorthand 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.  _____

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. should _____
4. thank _____
5. which _____
6. advantage _____
7. out _____
8. question _____
9. suggest _____
10. responsible _____
11. business _____
12. envelope _____
13. opportunity _____
14. subject _____
15. was _____
16. importance _____
17. your _____
18. particular _____
19. work _____
20. circular _____
21. satisfactory _____
22. great _____
23. publish _____
24. time _____
25. year _____

LIO 202
Theory Test
May 18, 1965 Dictated one word each 4 seconds

I am going to dictate 50 words which you will write in shorthand--one word on each line. If you are unable to write a word before the next one is dictated, skip the line and keep up with the dictation. Remember, you are going to write in shorthand, not in longhand.

1. majority
2. took
3. notification
4. traded
5. quite
6. research
7. sensible
8. women
9. regulate
10. skate
11. harder
12. mailed
13. subscribed
14. planned
15. prevent
16. losses
17. failure
18. furniture
19. critical
20. quote
21. entrance
22. contain
23. doubt
24. either
25. compare
26. system
27. after
28. united
29. payment
30. perhaps
31. chance
32. voice
33. encouragement
34. however
35. continued
36. different
37. next
38. childhood
39. assume
40. convenient

41. transported
42. consequently
43. actually
44. organize
45. change
46. begun
47. quietly
48. supervision
49. wrong
50. we hope you will

Now you are going to transcribe those words. When I give you the signal to begin, write the longhand word beside each shorthand outline. Work as quickly as you can. If you do not recognize an outline, leave it and go on. After you have finished, go back to omitted words, if you have time. Do not change your shorthand outlines now. Write only longhand.

You will have 8 minutes transcription time.

DICTATION TESTS

Speed Dictation with Previews in Gregg Shorthand, Charles E. Zoubek, McGraw-Hill Book Company, Inc., 1963

Three-minute tests at 60 words a minute:

Nos. 35, 36, 37, 38, 39, 40

Three-minute tests at 80 words a minute:

Nos. 68, 70, 71, 74, 75, 76

Three-minute tests at 100 words a minute:

Nos. 105, 106, 109, 111, 114, 116

Business Teacher, Gregg Division, McGraw-Hill Book Company, Inc.

Three-minute tests at 60, 80, and 100:

May 1962
March 1963
September 1963

TERMINAL PERFORMANCE AS SHOWN BY SCORES ACHIEVED ON DICTATION TESTS AND SECOND-TERM GRADES FOR ALL STUDENTS

Section One			Section One		
CWT	Grade		CWT	Grade	
894	A		892	A	
888	A		889	A	18%
882	A	19%	*873	A	
866	A		870	A	
861	A				
*768	B		*713	B	
768	B		*710	B	
*705	B		704	B	26%
702	B		*702	B	
701	B	38.5%	*700	B	
*700	B		700	B	
*699	B				
*699	B				
695	B				
692	B		*648	C	
			*642	C	
*638	C		*581	C	
*592	C		*575	C	
*588	C		*527	C	
*530	C		*527	C	52%
*528	C	38.5%	*526	C	
525	C		*526	C	
*521	C		*521	C	
*519	C		*520	C	
*517	C		*516	C	
*516	C		*516	C	
*513	D	4%	*511	D	5%

*Students included in study

COMPUTATION OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS

$$F = \frac{Z_1 - Z_2}{\sqrt{\frac{1}{(N_1 - 3)} + \frac{1}{(N_2 - 3)}}}$$

Verbal:

$$= \frac{.095 - .719}{.388}$$

$$= \frac{-.624}{.388}$$

$$= -1.60$$

Reading:

$$= \frac{.270 - .475}{.388}$$

$$= -.53$$

Informational:

$$= \frac{.121 - .758}{.388}$$

$$= -1.61$$

Numerical:

$$= \frac{.084 - .443}{.388}$$

$$= -.92$$

Total:

$$= \frac{.112 - .852}{.388}$$

$$= -1.90$$

English:

$$= \frac{.576 - .858}{.4}$$

$$= -.70$$

SIGNIFICANCE OF MULTIPLE CORRELATION COEFFICIENT

$$F = \frac{R^2}{1 - R^2} \quad \frac{N - k - 1}{k}$$

Section 1

$$F = \frac{.41}{1 - .41} \quad \frac{15 - 5 - 1}{5}$$

$$= \frac{.41}{.59} \quad \frac{9}{5}$$

$$= (.695) \ (1.8)$$

$$= 1.25$$

Section 2

$$F = \frac{.70}{1 - .70} \quad \frac{18 - 5 - 1}{5}$$

$$= \frac{.70}{.30} \quad \frac{12}{5}$$

$$= (2.33) \ (2.4)$$

$$= 5.53$$

Sections 1 and 2

$$F = \frac{.39}{1 - .39} \quad \frac{33 - 5 - 1}{5}$$

$$= \frac{.39}{.61} \quad \frac{27}{5}$$

$$= (.64) \ (5.4)$$

$$= 3.46$$

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

10.14.35.14.

X(2)=AOV(X(1))= CUT V
LEVELS,2.
(F1.0,3X,12,0,F3.0,4,0F2.0,3F3.0)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1	1.000000	2	59.000000	3	35.000000	4	40.000000	5	134.000000	6	23.000000
7	29.000000	8	94.000000	9	47.000000	10	21.000000	11	11.000000	12	517.000000
13	141.000000	14	146.000000								

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 33 OBSERVATIONS
1	1.000000	51.00000
2	59.00000	1670.00000
3	35.00000	1476.00000
4	40.00000	1029.00000
5	134.00000	4175.00000
6	23.00000	810.00000
7	29.00000	1002.00000
8	94.00000	2808.00000
9	47.00000	2436.00000
10	21.00000	591.00000
11	11.00000	275.00000
12	517.00000	19867.00000
13	141.00000	6184.00000
14	146.00000	7168.00000

TOTAL RAW OBSERVATIONS 33
NUMBER OF OBSERVATIONS DROPPED 0
NUMBER OF OBSERVATIONS IN PROBLEM 33

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	777.00000002	15	51.80000000	1.19393939	14.59068363
2	893.00000001	18	49.61111111	-.99494949	13.89699606
TOTAL	1670.00000001	33	50.60606061		14.01329130

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	39.20101010	1	39.20101010	.19460
WITHIN GROUPS	6244.07777801	31	201.44121864	
TOTAL(AFTER MEAN)	6283.87878889	32		
MEAN EFFECT	84512.12121298			
TOTAL	90796.00000114			

X(3)=AOV(X(1))+ CUT I
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	474.00000001	15	44.93333333	.20606061	9.63969966
2	802.00000001	18	44.55555556	-.17171717	11.39437796
TOTAL	1476.00000004	33	44.72727273		10.49009787

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	1.16767677	1	1.16767677	.01036
WITHIN GROUPS	3493.37778112	31	112.68960584	
TOTAL(AFTER MEAN)	3494.54545787	32		
MEAN EFFECT	66017.45454391			
TOTAL	69512.00000185			

X(4)=AOV(X(1))+ CUT H
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	486.00000000	15	32.40000000	1.21818182	9.14017818
2	543.00000002	18	30.16666667	-1.01515152	9.64822446
TOTAL	1029.00000002	33	31.18181818		9.34229143

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	40.80909090	1	40.80909090	.45968
WITHIN GROUPS	2752.18888814	31	88.77741936	
TOTAL(AFTER MEAN)	2792.99999188	32		
MEAN EFFECT	32086.00000943			
TOTAL	34879.00000046			

X(5)=AOV((X(1))* CUT T
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	1937.00000000	15	129.13333334	2.61818182	29.3/896884
2	2238.00000000	18	124.33333334	-2.18181818	28.66028201
TOTAL	4175.00000000	33	126.51515152		28.63359173

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	188.50909082	1	188.50909082	.22435
WITHIN GROUPS	26047.73332569	31	840.24946213	
TOTAL(AFTER MEAN)	26236.24241478	32		
MEAN EFFECT	528200.75760246			
TOTAL	554437.00001392			

X(6)=AOV(X(1))* E
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	386.00000001	15	25.73333333	1.18787879	8.42162749
2	424.00000001	18	23.55555556	-.98989899	7.63291805
TOTAL	810.00000002	33	24.54545455		7.94941393

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	38.80404041	1	38.80404041	.60650
WITHIN GROUPS	1983.37777765	31	63.97992831	
TOTAL(AFTER MEAN)	2022.18181803	32		
MEAN EFFECT	19881.81818233			
TOTAL	21904.00000036			

X(7)=AOV(X(1))* R
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	447.00000001	15	29.80000000	-.56363636	8.97775028
2	555.00000001	18	30.83333333	.46969697	6.59991087
TOTAL	1002.00000001	33	30.36363636		7.66003501

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	8.73636364	1	8.73636364	.14491
WITHIN GROUPS	1668.90000132	31	60.28709682	
TOTAL(AFTER MEAN)	1677.63636495	32		
MEAN EFFECT	30424.36363539			
TOTAL	32302.00000034			

X(8)=AOV(X(1))* THEORY 1
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	1280.00000004	15	85.33333333	.24242424	5.09434793
2	1528.00000003	18	84.88888889	-.20202020	6.60560270
TOTAL	2808.00000006	33	85.09090909		5.88092063

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	1.61616163	1	1.61616163	.04534
WITHIN GROUPS	1105.11111807	31	35.64874574	
TOTAL(AFTER MEAN)	1106.72727968	32		
MEAN EFFECT	238935.27272229			
TOTAL	240042.00000490			

X(9)=AOV(X(1))* THEORY 2
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	1101.00000002	15	73.40000000	-.41818182	14.04482619
2	1335.00001004	18	74.16666667	.34848485	15.86802186
TOTAL	2436.00000005	33	73.81818182		14.83967348

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	4.80909090	1	4.80909090	.02117
WITHIN GROUPS	7042.09999734	31	227.16451605	
TOTAL(AFTER MEAN)	7046.90908824	32		
MEAN EFFECT	179821.09091462			
TOTAL	186868.00000432			

X(10)=AOV(X(1))* SH EP
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	273.00001011	15	18.20000000	.29090909	7.04272674
2	318.00001011	18	17.66666667	-.24242424	10.17494038
TOTAL	591.00001011	33	17.90909091		8.76200475

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	2.32727273	1	2.32727273	.02939
WITHIN GROUPS	2454.40000032	31	79.17419356	
TOTAL(AFTER MEAN)	2456.72727302	32		
MEAN EFFECT	10584.27272728			
TOTAL	13041.00000016			

X(11)=AOV(X(1)). TRANS FR
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	126.00000000	15	8.40000000	.12727273	7.40463176
2	147.00000000	18	8.16666667	-.10606061	6.36242071
TOTAL	273.00000001	33	8.27272727		6.75588969

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	.44545455	1	.44545455	.00946
WITHIN GROUPS	1440.10000000	31	47.10000000	
TOTAL(AFTER MEAN)	1440.54545454	32		
MEAN EFFECT	2258.45454552			
TOTAL	3719.00000006			

X(12)=AOV(X(1)). CORRECT WORDS
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	9033.00100020	15	602.20000002	.16969697	90.50584026
2	10834.00101025	18	601.48888889	-.14141415	103.20618365
TOTAL	19867.00101152	33	602.13333035		96.10100533

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	.79191925	1	.79191925	.00008
WITHIN GROUPS	295906.17781650	31	9545.36057456	
TOTAL(AFTER MEAN)	295906.96973172	32		
MEAN EFFECT	11960536.03052789			
TOTAL	12256443.00011410			

X(13)=ADV(X(1))• TAPE 11
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	2739.00000017	15	182.60000000	-4.91515151	22.86544491
2	3449.00000004	18	191.61111112	4.09595960	32.70570896
TOTAL	6188.00000011	33	187.51515152		28.59646090

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	664.36464638	1	664.36464638	.80754
WITHIN GROUPS	25503.87776610	31	822.70573503	
TOTAL(AFTER MEAN)	26168.24243232	32		
MEAN EFFECT	1158343.75758811			
TOTAL	1184512.00002199			

X(14)=ADV(X(1))• TAPE 12
LEVELS,2.

GROUP OR LEVEL	SUM	FREQ	MEAN	DEVIATION FROM OVERALL MEAN	STANDARD DEVIATION WITHIN GROUP
1	3208.00000009	15	213.86666667	-3.34545454	35.73087234
2	3960.00000018	18	220.00000000	2.78787879	33.29304055
TOTAL	7168.00000009	33	217.21212121		33.99426199

ONE-WAY ANALYSIS OF VARIANCE, UNEQUAL SUB-CLASSES.

SOURCE OF VARIANCE	SUM OF SQUARES	DEGS. OF FREEDOM	MEAN SQUARE	F STATISTIC
BETWEEN GROUPS	307.78181813	1	307.78181813	.26018
WITHIN GROUPS	36671.73331923	31	1182.99913931	
TOTAL(AFTER MEAN)	36979.51513750	32		
MEAN EFFECT	1556976.48489870			
TOTAL	1593956.00003329			

CORE PROGRAM--CORRELATION AND/OR REGRESSION ANALYSIS

10.6.14. SEC 1

X(6)=F(X(1),..,X(5)).

(4X,3F2.0,3X,2F2.0,8X,F3.0)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1	59.000000	2	35.000000	3	40.000000	4	23.000000	5	29.000000	6	517.000000

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 14 OBSERVATIONS
1	59.00000	707.00000
2	35.00000	620.00000
3	40.00000	449.00000
4	23.00000	386.00000
5	29.00000	409.00000
6	517.00000	8445.00000

TOTAL RAW OBSERVATIONS= 14
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 14

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
6	517.00000002	699.00000001	603.21428573	93.89616080
1	59.00000000	36.00000000	50.50000000	14.21131727
2	35.00000000	40.00000000	44.28571429	9.65902186
3	40.00000000	22.00000000	32.07142857	9.39283103
4	23.00000000	30.00000000	27.57142857	4.66928237
5	29.00000000	22.00000000	29.21428571	9.01433535

SIMPLE CORRELATIONS

	Achievement 6	Verbal 1	Informational 2	Numerical 3	English 4	Reading 5
6	1.000000	.117628	.136396	.091300	.520266	.284400
1		1.000000	.799114	.653778	.332701	.815133
2			1.000000	.377058	.506071	.739587
3				1.000000	.419939	.722974
4					1.000000	.543309
5						1.000000

FINAL REGRESSION SOLUTION

8 DEGREES OF FREEDOM
14 OBSERVATIONS
DEPENDENT VARIABLE 6

SUMS OF SQUARES		
TOTAL(AFTER MEAN)	REGRESSION	ERROR
.1146143572E+06	.4699204456E+05	.6762231262E+05

MULTIPLE CORR. COEFS.			S (STANDARD ERROR OF ESTIMATE)	S2 (ESTIMATED VARIANCE OF DISTURBANCE)
R2	R			
.41000138	.6403			
.04125224	.2031	OF CORRECTED	91.73905089	8452.78907786

VAR	REGRESSION COEFFICIENTS	STD. ERRORS OF COEFFICIENTS	BETA WEIGHTS	STD. ERRORS OF BETAS	TB	FB	PARTIAL CORR COEFS	R2 DELETES
0	406.85757256	175.29474893			2.3210	5.3870		
1	2.72537041	4.44335403	.41249	.67251	.6134	.3762	.21193	.38226
2	-6.88841894	5.86878959	-.70264	.60372	-1.1639	1.3546	-.38053	.31010
3	-5.67398933	4.83102748	-.56759	.48327	-1.1745	1.3794	-.38350	.30827
4	14.26124067	7.54263204	.70919	.37508	1.8908	3.5749	.55574	.14635
5	5.13398385	6.27993186	.49288	.60289	.8175	.6683	.27767	.36071

ALPHA* = .1648885788E-01 DET* = .9436467527E-08

10.6.17. SEC 2

X(6)=F(X(1),..,X(5)).

(4X,3F2.0,3X,2F2.0,8X,F3.0)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1	67.000000	2	58.000000	3	32.000000	4	27.000000	5	39.000000	6	702.000000

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 17 OBSERVATIONS
1	67.00000	826.00000
2	58.00000	750.00000
3	32.00000	516.00000
4	27.00000	424.00000
5	39.00000	523.00000
6	702.00000	9961.00000

TOTAL RAW OBSERVATIONS= 17
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 17

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
6	702.00000002	526.00000001	585.94117648	80.33171119
1	67.00000000	41.00000000	48.58823529	13.56493100
2	58.00000000	50.00000000	44.11764706	11.54617276
3	32.00000000	25.00000000	30.35294118	9.91174289
4	27.00000000	26.00000000	24.94117647	5.01834969
5	39.00000000	30.00000000	30.76470588	6.79640909

SIMPLE CORRELATIONS

	Achievement 6	Verbal 1	Informational 2	Numerical 3	English 4	Reading 5
6	1.000000	.574163	.715162	.625870	.693466	.548884
1		1.000000	.840577	.259140	.701069	.735790
2			1.000000	.406407	.797112	.820584
3				1.000000	.442738	.518090
4					1.000000	.651932
5						1.000000

FINAL REGRESSION SOLUTION

11 DEGREES OF FREEDOM
17 OBSERVATIONS
DEPENDENT VARIABLE 6

SUMS OF SQUARES		
TOTAL(AFTER MEAN)	REGRESSION	ERROR
.1032509412E+06	.7268466016E+05	.3056628101E+05

MULTIPLE CORR. COEFS. R2	R		S (STANDARD ERROR OF ESTIMATE)	S2 (ESTIMATED VARIANCE OF DISTURBANCE)
.70396124	.8390			
.56939816	.7546	DF CORRECTED	52.71387691	2778.75281878

VAR	REGRESSION COEFFICIENTS	STD. ERRORS OF COEFFICIENTS	BETA WEIGHTS	STD. ERRORS OF BETAS	TB	FB	PARTIAL CORR COEFS	R2 DELETES
0	323.64214659	74.24223551			4.3593	19.0033		
1	.49679145	1.89142373	.08389	.31939	.2627	.0690	.07895	.70210
2	4.42528468	2.87459685	.63616	.41324	1.5394	2.3699	.42102	.64018
3	3.82488062	1.66022297	.47193	.20485	2.3038	5.3077	.57050	.56112
4	2.80483612	4.53066143	.17522	.28303	.6191	.3833	.18349	.69365
5	-4.65223470	3.75186118	-.39360	.31742	-1.2400	1.5376	-.35019	.66258

ALPHA= = .1173800196E-01 DET= = .1321574302E+07

10,6,31, TOTAL

X(6)=F(X(1),..,X(5))*

(4X,3F2.0,3X,2F2.0,8X,F3.0)

TRANSFORMED OBSERVATION NO. 1 FROM RAW OBS. NO. 1

1	59.000000	2	35.000000	3	40.000000	4	23.000000	5	29.000000	6	517.000000

INPUT CHECK ON RAW OBSERVATIONS

VARIABLE	FIRST OBSERVATION	SUM OF 31 OBSERVATIONS
1	59.00000	1533.00000
2	35.00000	1370.00000
3	40.00000	965.00000
4	23.00000	810.00000
5	29.00000	932.00000
6	517.00000	18406.00000

TOTAL RAW OBSERVATIONS= 31
NUMBER OF OBSERVATIONS DROPPED= 0
NUMBER OF OBSERVATIONS IN PROBLEM= 31

STATISTICS ON VARIABLES IN PROBLEM

VAR.NO.	FIRST OBSERVATION	LAST OBSERVATION	MEANS	STANDARD DEVIATIONS
6	517.00000002	526.00000001	593.74193549	85.66522740
1	59.00000000	41.00000000	49.45161290	13.65976747
2	35.00000000	50.00000000	44.19354839	10.56225783
3	40.00000000	25.00000000	31.12903226	9.55943490
4	23.00000000	26.00000000	26.12903226	4.96482249
5	29.00000000	30.00000000	30.06451613	7.77575499

SIMPLE CORRELATIONS

	Achievement 6	Verbal 1	Informational 2	Numerical 3	English 4	Reading 5
6	1.000000	.350509	.451124	.376436	.610299	.386247
1		1.000000	.816777	.438351	.535349	.759496
2			1.000000	.393264	.660584	.757183
3				1.000000	.440000	.598103
4					1.000000	.536837
5						1.000000

FINAL REGRESSION SOLUTION

25 DEGREES OF FREEDOM
31 OBSERVATIONS
DEPENDENT VARIABLE 6

SUMS OF SQUARES		
TOTAL(AFTER MEAN)	REGRESSION	ERROR
.2201559355E+06	.8630459473E+05	.1338513408E+06

MULTIPLE CORR. COEFS.

R2	R		S (STANDARD ERROR OF ESTIMATE)	S2 (ESTIMATED VARIANCE OF DISTURBANCE)
.39201575	.6261			
.27041890	.5200	DF CORRECTED	73.17139901	5354.05363291

VAR	REGRESSION COEFFICIENTS	STD. ERRORS OF COEFFICIENTS	BETA WEIGHTS	STD. ERRORS OF BETAS	TB	FB	PARTIAL CORR COEFS	R2 DELETES
0	305.65653647	73.86438039			4.1381	17.1237		
1	-.59132320	1.83218593	-.09429	.29215	-.3227	.1042	-.06441	.38948
2	1.15715483	2.64592237	.14267	.32623	.4373	.1913	.08713	.38736
3	1.28363401	1.81991890	.14324	.20308	.7053	.4975	.13968	.37992
4	8.76757590	3.72651735	.50813	.21597	2.3528	5.5354	.42577	.25740
5	-.09506416	3.20076075	-.00863	.29053	-.0297	.0009	-.00594	.39199

ALPHA* = .1751728481E-01 DET* = .2491567805E-07