

AN ABSTRACT OF THE THESIS OF

Stanley Jack Baird for the Doctor of Education degree in education presented on December 9, 1966.

Title: The Effectiveness of Introducing Regular Dictation of Unpracticed Material Before the Completion of Gregg Shorthand Theory

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The purpose of this study was to test, by means of a controlled classroom experiment, the effectiveness of an experimental method involving the introduction of regular dictation of unpracticed material beginning with Lesson 25 in the Gregg Shorthand Manual Simplified, Second Edition, by Gregg, Leslie, and Zoubek.

The study involved one major hypothesis: the introduction of regular and frequent dictation of unpracticed material beginning with the 25th lesson in a beginning high school class in Gregg Shorthand will result in reaching a dictation speed of 60 words a minute with at least 95 percent accuracy in less time than if dictation of unpracticed material is delayed until all 53 theory lessons have been presented.

The experiment was conducted simultaneously in four high schools. In each high school one of the two

beginning shorthand classes was selected at random to serve as the experimental group and the other class served as the control group. At each school the same teacher taught both the experimental and control classes. The sample at the four high schools totaled 73 in the control classes and 55 in the experimental classes.

The study measured shorthand achievement in terms of the number of periods of instruction required before the student was able to transcribe with 95 percent accuracy unpracticed material dictated at a rate of 60 words a minute for three minutes.

All of the experimental classes devoted 15 minutes a period four days a week to the dictation of new material with transcription two days a week. All experimental classes used the same material for new-matter dictation. Dictation material for the first semester was so selected that students would not be required to write outlines involving shorthand theory they had not yet studied. The control classes used the same material for three-minute takes as that used by the experimental classes. Transcripts were scored according to a uniform, predetermined scoring plan.

At the end of the school year, the mean number of periods of instruction received before passing the 60-word-a-minute take was computed for each class. A

comparison of the means for the control and experimental classes at each school revealed a reversal effect between the results achieved at the two schools designated as School B and School D. In an effort to explain this reversal effect, the overall grade point average was secured for each student and the difference between the means was tested for statistical significance by computing the t-score with an analysis of covariance. The grade point average was considered the uncontrolled variable in this analysis. The t-scores were not statistically significant at the five-percent level except for School D. Thus, the analysis of covariance explained the reversal effect at School B but not at School D. Since the data from three out of four schools yielded t-scores which fell far short of statistical significance, the hypothesis was rejected.

The study led to three conclusions:

1. The early introduction of unpracticed dictation material in beginning high school shorthand classes using the Gregg Shorthand Manual Simplified, Second Edition, does not reduce the time required to successfully transcribe unpracticed material dictated at 60 words a minute for three minutes.

2. The early introduction of unpracticed dictation material in beginning high school shorthand classes using

the Gregg Shorthand Manual Simplified, Second Edition, has no discernible adverse effect on student achievement as measured in this study.

3. There is no evidence to justify early introduction of new-matter dictation before completion of the theory in the average beginning high school shorthand class using the Gregg Shorthand Manual Simplified, Second Edition.

The Effectiveness of Introducing
Regular Dictation of Unpracticed Material
Before the Completion of Gregg Shorthand Theory

by

Stanley Jack Baird

A THESIS

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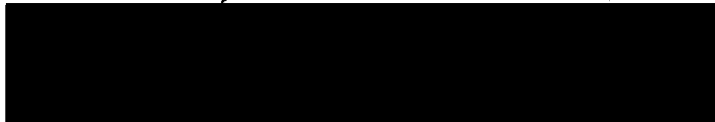
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-- S. J. B.

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THE EFFECTIVENESS OF INTRODUCING
REGULAR DICTATION OF UNPRACTICED MATERIAL
BEFORE THE COMPLETION OF GREGG SHORTHAND THEORY

I. INTRODUCTION

The idea for this study first began to evolve when the writer started experimenting informally with the introduction of new-matter dictation (see definitions, p. 6) prior to the completion of the theory in beginning shorthand classes at Humboldt State College. This departure from the more usual practice of postponing new-matter dictation until completion of the theory seemed to produce results which might well presage a potential improvement in shorthand methodology. While the results of these preliminary experiments were very encouraging, they were in no sense scientifically controlled; but they did provide the initial impetus for the planning and completion of this study.

Need for the Study

It seems self-evident that any improvement in methodology will always be welcome to the educator, whatever the field of specialization; but any pedagogical improvements should be especially welcome to today's high school shorthand teacher. The high school shorthand teacher

currently faces problems somewhat different from those faced by shorthand teachers a decade ago. Today's high school shorthand class frequently contains more than its share of the average or below-average students, many of the more capable students having been siphoned off into the currently prestigious science and mathematics courses and college preparatory programs which leave little or no time for business courses. The businessman, however, still clamors for secretaries who are intelligent, versatile, and efficient in addition to being able to take shorthand at anywhere from 80 to 120 words a minute and produce mailable transcripts without spelling and punctuation errors.

Further compounding the shorthand teacher's problems is a rapidly changing technology which places increasing pressure on the high school business education department to provide at least some exposure to the rudiments of electronic data processing. A course dealing with basic economic understandings is also demanding a place in the secondary curriculum. In response to these pressures, the business education department searches for some way to squeeze in an additional course, or at least some additional units in established courses. The additional training in shorthand transcription provided in the office practice course may well have to give way to make

room for a unit on automation, thus leaving even less time for the development of transcription skill, an aspect of shorthand which receives little enough attention at best.

The shorthand teacher is thus more and more faced with demands to accomplish the same results in less time and sometimes with students whose potentialities are not all that might be desired. To meet this challenge, the shorthand teacher looks for new teaching aids or more efficient teaching techniques. The mechanical teaching aids may be forthcoming if the funds are available; but unfortunately, a search of the literature for any really significant pedagogical improvements may prove futile. Articles on minor innovations appear frequently, but there appears to have been relatively few significant improvements in shorthand methodology which have been subjected to the test of controlled classroom experiments since the introduction of Louis Leslie's functional method in 1935. According to an exhaustive study by Inez Frink, of all research pertaining to shorthand which was completed in the years from 1946 through 1957, only 2.6 percent was experimental in nature (8, p. 21). It is hoped that this study will make some small contribution toward alleviating this dearth of experimental research in the field of shorthand. Any experiment

testing an innovation in shorthand methodology that holds promise of reducing the time required to bring students to a vocational level of skill in taking shorthand dictation fills a very definite need. A reduction in the time needed for developing skill in taking dictation permits the shorthand teacher either to achieve the same results in less time or to produce better results in the same time by devoting more time to transcription.

Statement of the Problem

The primary purpose of this study, then, was to attempt to discover a more efficient method of developing the ability to take dictation of unpracticed material by conducting a controlled classroom experiment that would measure the effectiveness of introducing regular dictation of unpracticed material prior to the completion of the theory in beginning high school classes in Gregg shorthand. To be more specific, the introduction of dictation of unpracticed material began with Lesson 25 in the Gregg Shorthand Manual Simplified, Second Edition, by Gregg, Leslie, and Zoubek. (This text concluded the initial presentation of shorthand theory in Lesson 53.) The material which was dictated to the experimental group before the theory was completed was so selected that no

words were dictated involving the application of theory not yet studied.

Hypothesis

This study involved one major hypothesis: the introduction of regular and frequent dictation of unpracticed material beginning with the 25th lesson in a beginning high school class in Gregg Shorthand will result in reaching a dictation speed of 60 words a minute with at least 95 percent accuracy in less time than if dictation of unpracticed material is delayed until all 53 theory lessons have been presented.

Assumptions and Limitations of the Study

For the purpose of this study, it was assumed that a successful transcript was one which was 95 percent accurate or better.

The study limited itself to measuring the effect of the experimental method in terms of the number of periods of classroom instruction required to successfully transcribe unpracticed material dictated at a rate of 60 words a minute for three minutes. It was assumed that if students could reach a dictation speed of 60 words a minute in less time they would also reach the higher speeds sooner.

The study also limited itself to measuring the effectiveness of the experimental method with students in the secondary school only and was limited to one system of shorthand, Gregg Shorthand Simplified.

Definition of Terms

For the convenience of the reader who is unfamiliar with terminology peculiar to the teaching of shorthand, the following definitions are offered:

Mailable letter. A "mailable letter" is one which has been transcribed from shorthand notes with sufficient accuracy that it could be mailed as submitted without any additions, corrections, or deletions. The "mailable letter" must be free from typographical, spelling, punctuation, capitalization, and paragraphing errors. It is sometimes distinguished from a "correctable letter" in that the "correctable letter" requires minor changes which can be made without retyping the letter.

New-matter dictation. This term refers to the dictation of material which the student has never read in any form and which he has never written in shorthand either from dictation or by copying from shorthand plates at his own speed. Such dictation material is also referred to as "new material" or "unpracticed dictation."

One-minute step plan. The "one-minute step plan" is a technique widely used to increase the students' ability

to take dictation at a higher rate of speed. The procedure followed in this speed-building plan is as follows: If the majority of the class is unable to take dictation faster than 60 words a minute, then the material is first dictated at 60 words a minute for one minute. Then, using the same material and starting at the same point, the instructor dictates at 70 words a minute for one minute. As the third step, the instructor dictates at 80 words a minute for one minute again using the same material and starting at the same point. The fourth step, which is sometimes omitted, involves dictating the same material a fourth time but dropping back to a speed of 70 words a minute to enable students to write more accurate shorthand outlines. If time permits, the instructor may continue the speed-building plan by beginning the next series of one-minute "takes" at the point in the dictation material where the first "takes" terminated.

Outline. The term "outline," when used in connection with shorthand, simply refers to the complete shorthand symbol or combination of symbols used to represent a word, or sometimes a phrase.

Previewed dictation. This term refers to the dictation of material on which the students have first been given a "preview," or in other words drilled on the more difficult and unusual shorthand outlines. This "preview,"

which precedes the dictation, generally consists of the instructor writing the difficult outlines on the chalk-board after which the students then either read and spell the outlines, copy them in shorthand, or sometimes both.

Reading back. "Reading back" in the shorthand class is the process of having students read from their shorthand notes, either individually or in unison. Normally, it is used to determine whether students actually wrote notes for all of the material dictated and whether their notes are of such a quality that they can be read without prolonged study.

Shorthand plate. This term refers to a page, pages, or portion of a page in a text depicting well-written shorthand outlines for complete sentences, short essays, articles, or entire letters.

Shorthand theory. Shorthand theory consists of the rules and principles which govern the construction of outlines in a shorthand system.

Take. In the shorthand class a "take" consists of dictation, at an even and predetermined rate of speed, of material which the students are expected to take down in shorthand. A "take," conceivably, can be dictation for any given length of time. Variations of one-half minute to five minutes are common examples.

II. RELATED LITERATURE

A study of literature related to the early dictation of new material in beginning shorthand is particularly of interest in this study because it reflects one readily discernible trend in the thinking on this topic. Up until the early 1950's, many writers in the field expressed approval of early dictation of new material; but from that point on the majority of writers, with one notable exception, frowned on any early dictation of new material.

What brought about this change in the prevailing sentiment is open to speculation, but it is perhaps significant that in 1935 when Louis Leslie first introduced the functional method of teaching shorthand he also authored a book entitled The Teaching of Gregg Shorthand by the Functional Method in which he stated:

. . . we strongly recommend that no substantial amount of new-matter dictation should be given until the completion of the theory; then some simple graded new matter may be given, to accustom him to the idea of writing matter which he has not previously had an opportunity to practice (15, p. 19).

It should be pointed out that at that time the Anniversary Edition of Gregg Shorthand was still in use, and this text required the major portion of the first year to complete the theory because of the much greater theory memory load than in more recent Gregg shorthand textbooks.

In 1949, when Gregg Shorthand Simplified was introduced, Leslie and his co-author, Charles E. Zoubek, took a somewhat more rigid position in regard to introducing new-matter dictation. In the Teacher's Handbook of the first edition of the Gregg Shorthand Manual Simplified, Functional Method, they made the following statement:

The authors recommend that no new-matter dictation be attempted until the beginning of the second semester in high school or the completion of this Manual in university and business school classes. No harm can come from delaying the introduction of new-matter dictation, but great harm can come from introducing new-matter dictation too soon.

If the learner is compelled to write new-matter dictation too soon, he develops a fear of dictation because his experience has convinced him that he has great difficulty with it. Because he is not properly prepared, he makes many errors and develops a hesitating, faltering style of writing, a style that springs from his inability to supply the outline readily and correctly (13, p. 33).

Leslie and Zoubek have also expressed their views on this subject frequently and persuasively in the two periodicals published by the Gregg Division of McGraw-Hill Book Company, The Business Teacher and the Business Education World. In addition, Leslie published in 1935 one of the few "methods books" for shorthand teachers, Methods of Teaching Gregg Shorthand. In this book he reiterates his admonition against dictation of new matter before the completion of the theory:

The author's experience has convinced him that new-matter dictation should not be given until after the completion of the theory. Some instructors feel about this and other similar teaching procedures, "The sooner they start, the sooner they will be able to master it." This is not so. 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 (14, p. 169).

Leslie and Zoubek continued to counsel, although perhaps a bit less emphatically, against early dictation of new matter in the later editions of the handbooks for the Gregg texts. In the Teacher's Handbook for Gregg Shorthand Manual Simplified, Second Edition, 1955, the authors state:

Toward the end of the Manual some classes will be ready for dictation of new matter for test purposes. Some teachers will decide to use only practiced matter for dictation while the learner is working on the Manual, and the writers are in accord with that decision. Other teachers will decide to begin the use of new-matter dictation toward the end of the Manual (10, p. 83).

An almost identical statement appears in the handbook for Gregg Shorthand, Diamond Jubilee Series, a recent revision of Gregg Shorthand published in 1963 (9, p. 76). It should be noted that the Gregg Shorthand Manual Simplified contained 70 lessons and that the last of the theory was presented in Lesson 53, while in Gregg Shorthand,

Diamond Jubilee Series, the text still contains 70 lessons, but all of the theory is presented in the first 47 lessons.

Because of this shift in attitude toward the early dictation of new material, which occurred around 1950, the remaining relevant literature in the field will be reviewed in chronological order beginning with the earliest literature on the subject which the writer was able to discover.

One of the earliest books dealing with methods of teaching shorthand was The Factors of Shorthand Speed by David Wolfe Brown published in 1910. Brown favored early dictation of unfamiliar lists of words to facilitate the mastery of the various theory principles.

As a means of averting sluggish habits of mind and hand, and as a most important discipline in other respects, nothing can be more beneficial to the student than to write off-hand from dictation, words upon which he has had no previous practice, but which can be correctly written in accordance with the principles he is learning or is supposed to have mastered (4, p. 21).

This dictation practice upon each principle in its turn should be so thorough that any work calling for the application of that principle, may be written without a particle of hesitation, though it may never have been written before (4, p. 23).

However, Brown did not advocate dictation of unfamiliar letters until the student had thoroughly mastered all theory as evidenced by his ability to take dictation of

unfamiliar lists of words involving application of the theory. It is difficult to understand why Brown favored dictation of lists of unfamiliar words but opposed dictation of unfamiliar letters in the beginning class. It may have been that Brown was simply cognizant of one of the problems which still exists today--that of finding any really easy letters for dictation during the first semester of the course, especially letters including no words which would involve application of theory not yet covered.

In 1931 Minnie DeMotte Frick published a unique approach to the teaching of shorthand entitled Teaching Gregg Shorthand by the Analytical Method. This book was designed to be used as a supplementary teaching manual and stressed the study of frequently used syllables as components of shorthand outlines. Frick believed that

Dictation of practiced matter is excellent for: (1) increasing speed; (2) testing study; (3) recall; (4) rewarding services performed. But new material should be given every class hour to help establish nerve control while the student is under the pressure of taking unpracticed matter (7, pp. 47-48).

One year later Paul Lomax and John Walsh collaborated on a book entitled Problems of Teaching Shorthand. The authors recommended the direct or analytic method in which each lesson includes the following nine steps: (1) statement of aim, (2) review dictation, (3) organization chart,

(4) order of presentation, (5) motivation, (6) dictation of new material in sentence form, (7) skill building, (8) connected dictation of new material, and (9) assignment (17, p. 125). Whether they meant that connected dictation of new matter should begin on the very first day is not entirely clear, but it does seem obvious that they intended to introduce new-matter dictation before the theory was completed.

Lomax also authored, along with Etta Skene and John Walsh, a similar "methods" text entitled Teaching Principles and Procedures for Gregg Shorthand. This book and the other Lomax-Walsh collaboration, Problems of Teaching Shorthand, were both published in 1932. In Teaching Principles and Procedures for Gregg Shorthand, the authors recommend beginning new-material dictation in Lesson 2, using material selected from Word and Sentence Drills for Gregg Shorthand by Mark I. Markett, Dictation for Beginners by Edith V. Bisbee, or Progressive Dictation by Lillian G. Wilson (21, p. 14). It is interesting to note the number of books available at that time which contained dictation material suitable for use early in the beginning shorthand class. The very number of such books which were available in the 1930's (as compared to only one such book in print at the present time) would seem to attest to the prevalence of early dictation of new material during that

period. The Markett book was first published in 1922 and a revised edition was published in 1930. As the title indicates, it contained only isolated lists of words and sentences rather than connected dictation material. It was designed to provide supplementary dictation of word lists and sentences with the material so arranged as to provide additional practice in application of theory principles currently being studied.

About the same time (1933), the Brewington-Soutter text, Direct-Method Materials for Gregg Shorthand, appeared. The direct-method approach is characterized by high-speed tracing with a dry pen and high-speed writing early in the course. Dictation of new material apparently begins before the completion of Chapter I (3, p. xviii). The chart in this book entitled "Standard of Achievement--Transcription," which was designed to be used with a first-year class studying Anniversary Gregg Shorthand, provides for the recording of transcription scores for both new and familiar dictation (3, p. xx). The sample scores on this chart show transcription from new material included in the first chapter of the direct-method materials. The designated dictation speed in this instance was approximately 60 words a minute.

In 1934 Zinman, Strelsin, and Weitz published a book of teaching aids entitled Daily Lesson Plans for Teaching

Gregg Shorthand by the Sentence Method. The preface of this book indicates that the lesson plans were inspired by demonstration classes conducted by John Robert Gregg himself in which he would introduce a new word or phrase and immediately follow up by dictating a sentence containing that word or phrase (22, p. v). In describing the sentence method of teaching shorthand, the authors make the following statement concerning their rather detailed lesson plans:

Summary Sentences. After the new words are taught, the teacher has an opportunity of testing the pupils by dictating new matter containing these new words. Every effort was made by the authors to apply the principle of continuous review by inserting words of previous lessons on which the pupils need drill (22, p. 9).

Examination of these "summary sentences" reveals that they were new in the sense that the students had not written these particular sentences before, but they had written all of the words contained in these sentences either in the current day's lesson or in preceding lessons. However, the authors go on to say:

In the past, business letter dictation was reserved for the dictation classes. It is now the practice, however, among the more progressive teachers, to introduce business letter dictation almost from the very beginning. And, whereas it was formerly difficult for students entering the dictation classes to write from 20 to 30 words a minute, pupils taught by the new method can write from 50 to 60 words a minute with ease (22, p. 9).

The lesson plans included in this book call for the dictation of new continuity material at the beginning of the second week. There is no suggestion of any previewing of difficult outlines. New-matter dictation of this sort is then called for frequently throughout the remaining lesson plans. The suggested source for this new-matter dictation was Progressive Dictation by Wilson or Dictation for Beginners by Bisbee, the same books recommended in the Lomax-Skene-Walsh book. After observing the paucity of dictation material in the anniversary edition of Gregg Shorthand, it is not too surprising that the resourceful teacher looked elsewhere for supplementary dictation material. This book of lesson plans would seem to have been far ahead of its time in methodology, for it even cautions against over emphasizing rules (22, p. 36). While it did not provide the amount of reading from shorthand plates which most teachers today prefer, it must be remembered that at that time shorthand plates from which students might read were in very short supply. According to Inez Frink's study (8, p. 133), the dictation speeds of 50 to 60 words a minute, which the authors of this book achieved after one year of instruction, compare favorably with the average achievement of today's shorthand teacher using Gregg Shorthand Simplified. Equally remarkable is the fact that this laudably explicit book was written not

by a university professor with time allotted for writing and research but by three shorthand teachers in Brooklyn's Abraham Lincoln High School.

In 1943 J. Frances Henderson completed a doctoral dissertation dealing with suggested techniques for improving the teaching of shorthand by the functional method; which, it will be remembered, had been introduced less than eight years previously. The findings of this study were based primarily on the survey type of research. The first part of the study was designed to determine the most important controversial issues relating to the functional method of teaching shorthand as advocated by Leslie. Checklists of possible problems encountered in the use of the functional method were sent out to a group of high school teachers to determine which problems were most common. The 37 most common problems were then rated as to their importance by a jury of 19 experts. After being rated by the jury, these 37 controversial issues were then assigned weighted ranks. The issue which received a weighted rank of "one" was "Does writing just naturally develop by reading and copying shorthand notes?" (11, p. 125) an issue which still has not been resolved. Four issues tied for the next weighted rank of 3.5, and one of these four issues was in regard to the advisability of postponing new-material dictation until after the

completion of the theory. Henderson comments that the jury of experts, as well as some of the other teachers, questioned postponing new-material dictation until after the completion of the theory (11, p. 126).

After the most important problems had been isolated, the next phase of the study attempted to determine teaching procedures which might help to alleviate these problems. Through interviews and a study of the literature, a list of 301 possible helpful activities was drawn up. The value of these various activities was then rated by approximately 92 superior functional method teachers and 20 shorthand methods teachers in teacher-training institutions. However, because of the large number of activities to be rated, the list of activities was split up among the various teachers so that each activity was rated by approximately 45 teachers. In evaluating the list of activities designed to help pupils develop the ability to construct outlines for unfamiliar words, nine out of 17 teachers began new-material dictation prior to the completion of the theory and eight waited until all theory had been covered (11, p. 267).

One of Henderson's conclusions was as follows:

It seems unwise to postpone new-material dictation until the shorthand theory has been completed. Perhaps as soon as pupils begin writing they should be taught a method of writing new words, and in each day's dictation

they should be provided experience in initiating new outlines (11, p. 449).

While Henderson's study did not test the efficacy of deferring dictation of new material, it does indicate that during the early 1940's this procedure was not yet widespread and was still a controversial practice.

Following the publication of Daily Lesson Plans for Teaching Gregg Shorthand by the Sentence Method in 1934, there were apparently no new "methods" books published for the next 16 years. During this 16-year period, World War II took place with far-reaching effects on every aspect of society, including education; and in 1949 the Gregg Publishing Company introduced a rather extensive revision of the Gregg Shorthand system entitled Gregg Shorthand Simplified. Thus, it was not until 1950 that a new methods book by Marion Lamb, Your First Year of Teaching Shorthand and Transcription, was published.

Lamb's book gives an excellent historical review of the various methods of teaching shorthand which have been in vogue at one time or another. She remains silent as to her own opinion on the optimum point at which to begin new-matter dictation. She does, however, quote Leslie's admonition that new-matter dictation should not take place until the completion of the theory (12, pp. 70-71) with the implication that she is in accord with this practice.

It was in the following year, 1951, that Hazel Flood published Brass Tacks of Skill Building in Shorthand. Flood does not deal directly with the problem of when to introduce new-matter dictation, but she does cite in her summarization of significant research J. Frances Henderson's doctoral dissertation previously discussed in this chapter.

In 1956 Carl Salser, Jr., wrote a book entitled Correlated Methods, Basic and Functional, which was designed to serve as a guide for those teachers who use an eclectic approach in teaching Gregg Shorthand. Salser's position is firmly in agreement with that of Leslie:

Defer new-matter dictation as long as possible. In high school certainly until the completion of Lesson 54, no harm may be done by postponing new-matter practice; but irreparable damage may be done by introducing it too early (20, p. 9).

In 1958 an article by Arnold Condon and Rowena Wellman, "More Shorthand Learning in Less Time," appeared in the Delta Pi Epsilon Journal. Condon and Wellman took sharp issue with Leslie's position regarding new-matter dictation. Their rationale for introducing new-matter dictation early in the course is particularly interesting.

We do not agree with the opinion of many that no new-matter dictation should be given until the completion of theory. In our revised instructional materials we were able to cover the theory in five weeks. However, we began graded, new-matter dictation before all the theory had been studied.

When all the alphabetic characters had been presented (Lesson 18), we were ready to introduce new matter. It was apparent that the students, instead of feeling frustrated, liked to attempt writing outlines for new words and felt that they could function in a realistic situation. They subsequently welcomed the short-cuts introduced in succeeding lessons.

For guidance purposes, it seems unreasonable to delay new-matter dictation until students are settled in their second-semester schedules. To be competently advised, individuals should have early opportunity to demonstrate their talents or their ineptitudes for stenographic work through the complete process of reporting and transcribing new dictation material (5, p. 22).

Dr. Condon, Chairman of the Department of Business Education at the University of Illinois, appears to be a courageous innovator, for he also advocates almost no time for oral reading of shorthand, either in concert or individually, substituting two-minute transcriptions from the homework assignment, which is consistent with his transcription method of teaching shorthand in which transcription of very easy material begins on the first day (5, p. 20). He also recommends postviews rather than previews when introducing new-matter dictation (5, p. 22).

Rowena Wellman, coauthor of this article, is Professor Emeritus of Business Education at Women's College, University of North Carolina. Condon and Wellman's recommendations were based on three years of experience in

teaching a modified version of Gregg Shorthand Simplified (which was apparently not too dissimilar to Diamond Jubilee Gregg Shorthand) to adult evening classes, high school personal-use classes, and university classes.

Finally, there is Frink's exhaustive analysis and synthesis of research findings and thought pertaining to shorthand and transcription completed as a doctoral dissertation in 1961. Her study includes the following statement:

There is general agreement that new-matter dictation should be deferred until the completion of the theory and that after mastery of theory, emphasis can be shifted to "getting something down" (8, p. 150).

This statement, however, was not based on the findings of a research study but rather on opinions expressed in an article which appeared in the March, 1956, issue of American Business Education.

To summarize, in this review of related literature the gradual evolution of shorthand methodology becomes apparent. The word-list approach advocated by Brown in 1910 gave way to the sentence approach and the early use of new-material dictation in the 1930's. Among those advocating early dictation of new material during this period were Frick, Lomax, Skene, Walsh, Brewington, Soutter, Zinman, Strelsin, and Weitz. In 1935 Leslie took a strong stand against early use of new-matter

dictation. He reiterated this position even more emphatically with the advent of the simplified version of Gregg Shorthand in 1949 and again in his Methods of Teaching Gregg Shorthand published in 1953, although there is no evidence of any research to support his position. Since that time both Lamb and Salser have supported Leslie's stand. Henderson in 1943 and Condon and Wellman in 1958 have been among the few dissenters.

III. THE EXPERIMENTAL DESIGN

The Sample

As previously stated, the inspiration for this study arose from the writer's informal experimentation with early introduction of new-matter dictation in the beginning shorthand classes at Humboldt State College. It soon became apparent, however, that an adequate sample for a controlled classroom experiment could not be accumulated from the beginning shorthand classes at Humboldt State College within a reasonable length of time. This was partly due to the relatively small size of most of the beginning shorthand classes at Humboldt State College and partly due to the fact that a certain percentage of every beginning shorthand class at Humboldt State was comprised of students who had received some previous instruction in shorthand. Such students, of course, could not be included in the sample for the experiment.

The only feasible alternative was to use students in local high school shorthand classes. Four high school teachers graciously consented to give of their time to make this experiment possible and to permit the utilization of their beginning shorthand classes for carrying out the experiment. Those teachers were Mr. Tom McCoy

of Del Norte High School, Crescent City, California; Miss Evelyn Hessel of Eureka Senior High School, Eureka, California; Mrs. Rae Graham of Arcata Union High School, Arcata, California; and Mrs. Frances Baribault of Fortuna Union High School, Fortuna, California. All four of these teachers were experienced and effective instructors, all of them having completed at least a year of graduate work. Because these teachers were regarded as conscientious and dedicated members of their profession by both the writer and their colleagues, the writer did not presume to observe the teaching of the experimental classes. Also, it was felt that the presence of the writer in the classroom might present a distraction to the class.

Since it is not the purpose of this study to compare the effectiveness of these teachers in terms of results achieved in their beginning shorthand classes, the schools will hereafter be referred to simply as Schools A, B, C, and D.

Each of these teachers taught both classes of beginning shorthand in their respective schools. Thus, each teacher was able to use one of his or her beginning shorthand classes as the experimental group and the other beginning class as the control group. The control classes followed the conventional procedure of delaying

all new-matter dictation until the completion of the shorthand theory near the end of the first semester. The experimental classes began taking dictation of new matter when they reached the 25th lesson in their text, Gregg Shorthand Manual Simplified, Second Edition, by Gregg, Leslie, and Zoubek. When registration occurred at the various high schools, there was no attempt to direct the more capable students into one class or another. The students selected the shorthand class in which they would enroll on a random basis without knowing that one class would be taught on an experimental basis. Also, the teachers and counselors at each school attempted to keep the enrollment in the two beginning shorthand classes approximately equal and succeeded in doing so. However, as the year progressed, dropouts, transfers to other schools, and transfers from one shorthand class to another because of schedule changes partially destroyed this equality in some cases.

At the conclusion of the experiment in the spring of 1963, the samples at the four high schools totaled 73 in the control classes and 55 in the experimental classes. The total number of students involved in the study was 129. A breakdown of the number enrolled in the experimental and control class at each school is shown in Table I.

TABLE I
 ENROLLMENT IN THE CONTROL AND
 EXPERIMENTAL BEGINNING SHORTHAND
 CLASSES AT THE CONCLUSION OF THE EXPERIMENT

School	Number in Control Class	Number in Experimental Class	Number in Both Classes
A	11	12	23
B	23	12	35
C	26	16	42
D	13	15	28
TOTALS	73	55	128

The figures in Table I do not include students who dropped the course, who transferred from a control class to an experimental class or vice versa, or who failed to successfully transcribe new material at 60 words a minute for three minutes before the end of the school year.

There were several reasons for excluding from the experiment those students who were unable to transcribe a 60-word-a-minute "take" during first-year shorthand. Most of the schools involved in the experiment either prohibit or discourage beginning shorthand students from enrolling in second-year shorthand if they have not been able to transcribe with at least 95 percent accuracy a three-minute "take" dictated at 60 words a minute or faster. This practice is based on the belief that a

student who has not mastered a minimum dictation speed of 60 words a minute would have little chance of success in the second-year shorthand class. According to Rahe, such a practice is probably not unique. He reports that during a problem clinic at the 1955 National Business Teachers Association convention it was determined that 60 words a minute on a three-minute "take" seemed to be the most common standard for first-year students studying Gregg Shorthand Simplified (19, p. 134). Furthermore, even if some of these students did continue with second-year shorthand, there was no way to secure data on the 60-word-a-minute "take" during that year without introducing several uncontrollable variables; namely, a different teacher for the second-year shorthand class and the deterioration of shorthand skill which usually takes place during summer vacation.

The Experimental Procedure

Since the four high schools participating in the study were located within a radius of approximately 100 miles, the shorthand teachers involved in the study met with the writer shortly after the beginning of the fall semester in 1962 to discuss any potential problems in carrying out the experiment. The first problem dealt with was the scoring of transcripts. The group agreed upon a

set of rules for the scoring of students' shorthand transcripts and copies of these rules were subsequently distributed to each teacher. (See Appendix I.) These rules for scoring of transcripts were designed to eliminate inconsistencies in the scoring, which could well have distorted the data secured from the experiment. For example, shorthand teachers frequently disagree as to whether the use of a comma is mandatory or optional. The rules adopted for the scoring of transcripts in this experiment were not intended to be ideal rules for the average shorthand teacher to follow. They were merely intended to eliminate any subjective or judgmental decisions on the part of the teachers who scored the transcripts for the experiment and thus maximize uniformity of scoring.

These four shorthand teachers further agreed that during the first semester it would be best to devote 15 minutes a period four days a week to the dictation of new material in the experimental classes. Two days each week were to be devoted to transcription. This plan allowed 40 minutes of the period to be devoted to study of the shorthand theory currently being introduced and also allowed one day a week for testing, if desired, or for interruptions of the schedule by school assembly programs or other schedule deviations.

No attempt was made to specify the exact method of teaching to be used by each shorthand teacher during the experiment other than to specify the material to be used for new-matter dictation for each lesson. Thus, any variation in the results achieved could not be caused by any possible differences in the difficulty of the dictation material used.

When the shorthand classes participating in the experiment reached Lesson 25 in the Gregg Shorthand Manual Simplified, Second Edition, by Gregg, Leslie, and Zoubek, each shorthand teacher received every week a list of the new material which was to be used for dictation. In order that such material would not include words involving shorthand theory not yet studied, the dictation material was selected from either Graded Drills in Gregg Shorthand Simplified by A. E. Klein or from the dictation material included in the lessons in Gregg Shorthand Simplified for Colleges, Volume One, Second Edition, by Leslie, Zoubek, and Hosler. Since the theory in the college text is introduced in the same sequence as in the high school text, it was a simple matter to select dictation material from lessons corresponding to lessons which had been covered by the experimental classes.

The plan followed for introducing new-material dictation in the experimental classes was designed to

approach this phase of shorthand skill in easy steps. For the first four weeks the new material was previewed and dictated at 60 words a minute for one minute. During the fifth week, previews were eliminated and replaced by postviews (drilling on the difficult words after the new material had been dictated). For the sixth through the eleventh week, the dictation speed ranged from 50 to 70 words a minute and the length of the dictation was increased to two minutes.

At the beginning of the second semester, both control and experimental classes began taking new-matter dictation of three minutes' duration and were given an opportunity to transcribe three days a week. The shorthand teachers were instructed to introduce new-matter dictation to their control classes in the same manner as was done with the experimental classes; that is, beginning with easy, one-minute "takes" with previews and gradually eliminating the previews and progressing to longer "takes." In all cases the control classes used the same material used by the experimental classes for the three-minute "takes" that were to be transcribed. All material for the three-minute "takes" that were to be transcribed was taken from Progressive Dictation by Charles E. Zoubek or from Previewed Dictation by Charles E. Zoubek.

The shorthand teachers were asked to keep a record of the date on which each student first successfully transcribed with 95 percent accuracy a three-minute take dictated at 60 words a minute. At the end of the school year, these records were then submitted to the writer, who computed the number of actual periods of shorthand instruction each student had received before passing his 60-word-a-minute "take." All school holidays or special events which prevented the shorthand classes from meeting were taken into consideration in computing the number of days of instruction.

An effort was made to impress upon the shorthand teachers the importance of teaching both beginning shorthand classes as nearly alike as possible, except for the earlier introduction of new-matter dictation in the experimental class. It was the writer's impression that each teacher made a conscientious effort to do this. When the four teachers were asked to state their personal opinions as to the possible success of the experimental method, they were equally divided. Two felt that the experimental method would yield superior results, and the other two held the opposite viewpoint. Interestingly enough, the one experimental class that achieved results somewhat superior to the control class was taught by a teacher predisposed to the conventional method.

The Statistical Procedure

At the conclusion of the 1962-63 academic year, data were secured from each teacher as to the date on which each student first passed a 60-word-a-minute take. With the use of school calendars, the number of periods of instruction which each student received before passing a 60-word-a-minute take was then computed. The mean number of periods of instruction was also computed for each control class and for each experimental class.

It then became evident that in two of the four schools there was a reversal effect in the results achieved through use of the experimental method. Such a reversal effect indicated that some uncontrolled factor had probably influenced the results at one or both of these two schools. If all factors which influenced student achievement in this experiment had been held constant, except for the experimental method, then one would normally expect the experimental method to yield comparable results at all four schools. Since differences in shorthand aptitude seemed the most logical factor which might produce such a reversal effect, the overall high school grade point average was secured for each student, using a four-point grade scale with a grade of A equal to four points. According to Frink, research to date indicates that the overall high school grade

average is the best single factor for predicting success in high school shorthand (8, p. 38). Frink cites two studies which found in one case a correlation coefficient of $+0.79$ and in the other case a correlation coefficient of $+0.74$ between overall high school grade average and success in beginning high school shorthand (8, pp. 186 and 229). There was a combined total of 184 students involved in these two studies.

Considering shorthand aptitude as measured by overall high school grade average as the uncontrolled variable, the analysis of covariance was then computed for each school. The student's t-test was used to determine if the difference between the experimental groups and control groups was statistically significant. There was no attempt to statistically pool the t-scores or any other data from the individual schools because it was felt that such a procedure would serve no useful purpose. Also, pooling the data would merely average out the one significant difference which did exist. It would not explain this difference or have any effect upon the conclusions.

Those interested in the statistical formulas used in the analysis of the data from this study will find them listed in detail in Appendix II.

IV. PRESENTATION AND ANALYSIS OF DATA

The Analysis of Covariance

The analysis of covariance is a statistical procedure uniquely suited to the type of data secured from this study. Because it is not one of the more common statistical techniques, a brief explanation of the function it serves should prove useful in understanding the information in the various tables and charts in this chapter. The analysis of covariance is designed to cope with situations in which there is a factor present which may affect the outcome of the experiment but which cannot be controlled during the conduct of the experiment. This type of analysis determines how much of the difference in results may be attributed to this uncontrolled factor. Thus, any differences which are not explained in this fashion may be tested for statistical significance by using either the Student's t-test or Fisher's F-test. In this case, since there is only one type of covariance being analyzed, the t-test has been used. Specifically, the analysis of covariance is being used in this study in an attempt to explain the reversal effect between the data from School B and the data from School D. Table II shows that the mean number of periods for the control group at School B was 15.12 periods greater than the

mean for the experimental group, while the mean number of periods for the control group at School D was 16.89 periods less than the mean for the experimental group. At Schools A and C, however, there was relatively little difference between the means of the control and experimental groups.

TABLE II
COMPARISON OF MEAN SCORES
FOR THE CONTROL AND EXPERIMENTAL GROUPS

School	(a) Mean Number of Periods, Control Groups	(b) Mean Number of Periods, Experimental Groups	Differences Between Means (a) - (b)
A	136.09	134.58	1.51
B	142.78	127.66	15.12
C	116.65	118.19	-1.54
D	119.77	136.66	-16.89

In Table III the means have been adjusted to remove the effect of differences in the high school grade averages. Comparing Table II and Table III, it will be noted that eliminating the effect of the GPA (grade point average) increases the difference between the means for all schools except School B. It is also worthy of note that the difference between the means

TABLE III
 COMPARISON OF ADJUSTED MEANS
 FOR THE CONTROL AND EXPERIMENTAL GROUPS

School	Adjusted Means, Control Groups	Adjusted Means, Experimental Groups	Differences Between Adjusted Means
A	136.77	133.89	2.88
B	140.84	129.42	11.42
C	116.48	118.35	-1.87
D	116.76	140.18	-23.42

for School D has been changed to a much greater extent than those for any other school. The relative effect of the analysis of covariance upon data from Schools B and D will be discussed in more detail in the explanation accompanying Tables V and VII and Figures 2 and 4.

Analysis of Data from Individual Schools

For each school, the data will be presented both in tabular form with exact scores for individual students and in scatter diagrams plotting the individual scores in relationship to the grade point averages and to the regression line. In Table IV it can be seen that the best student in each group at School A first passed a 60-word-a-minute take in exactly the same length of

TABLE IV
 NUMBER OF PERIODS OF INSTRUCTION
 BEFORE PASSING 60-WORD-A-MINUTE TAKES
 COMPARED WITH G.P.A.'S IN SCHOOL A

CONTROL GROUP			EXPERIMENTAL GROUP		
Student's Rank No.	No. of Periods	G.P.A.	Student's Rank No.	No. of Periods	G.P.A.
1	108	3.13	1	108	2.84
2	120	3.35	2	127	3.28
3	120	2.05	3	127	2.98
4	127	3.23	4	127	2.73
5	127	2.88	5	127	2.60
6	127	2.28	6	127	2.29
7	127	2.25	7	127	1.76
8	145	2.85	8	138	2.70
9	161	2.74	9	138	2.18
10	161	2.13	10	145	1.80
11	174	2.30	11	162	3.00
			12	162	2.73
TOTALS	1,497	29.79	TOTALS	1,615	30.89
MEANS	136.09	2.71	MEANS	134.58	2.57

$t = +.372$ Critical regions are where $t \leq -2.086$ and where $t \geq 2.086$ at the 5 percent significance level.

time, 108 periods. The slowest student in the control group passed the 60-word-a-minute take in 174 periods as compared to 162 periods for the slowest student in the experimental group. The G.P.A.'s for the control group ranged from a low of 2.05 to a high of 3.35. For

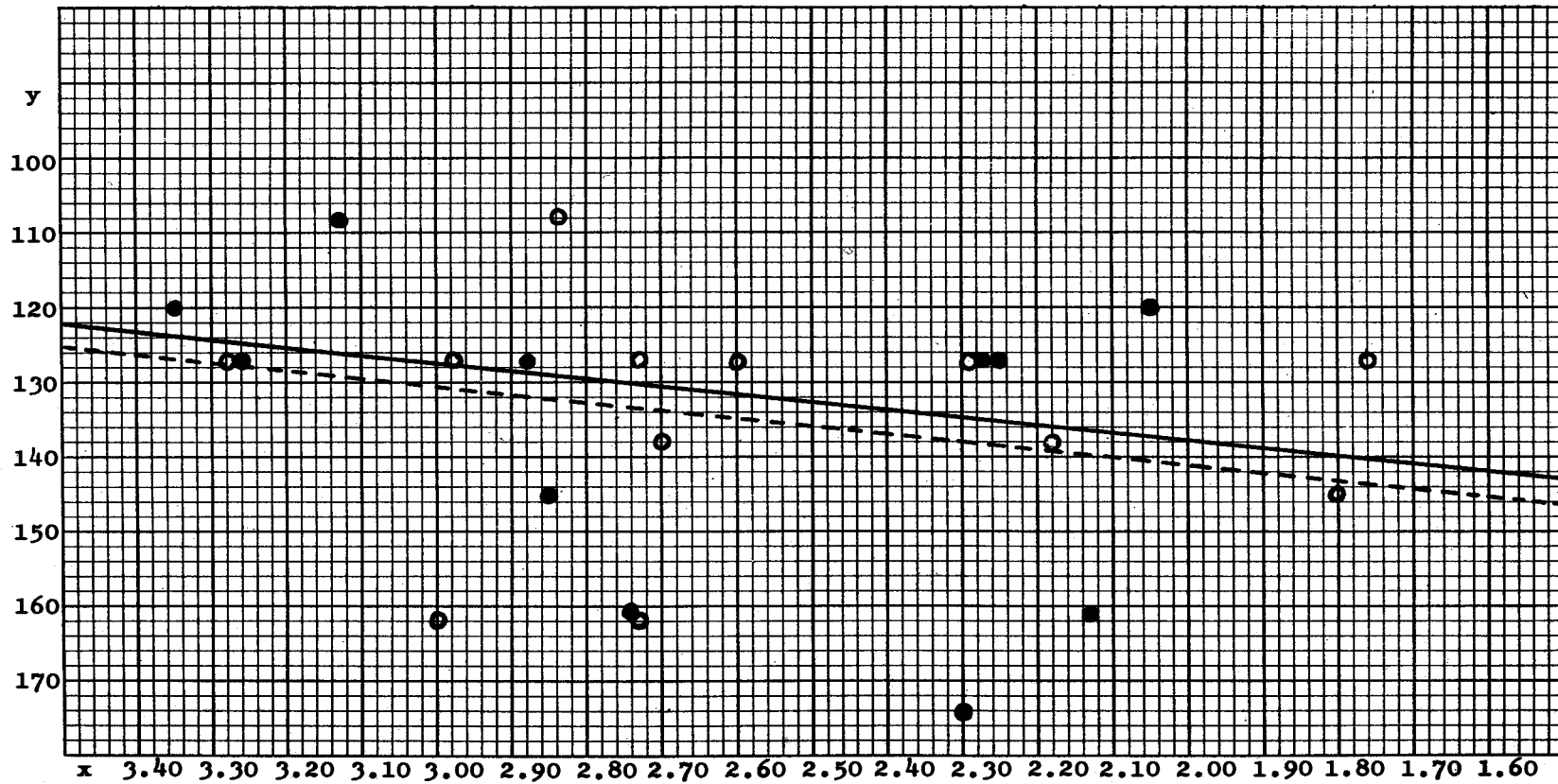
the experimental group, the G.P.A.'s ranged from 1.76 to 3.28. However, the student with a G.P.A. of 1.76 managed to pass a 60-word-a-minute take in 127 periods. The mean G.P.A. for the control group was .14 of a grade point higher than for the experimental group. The difference between the mean number of periods for the two groups was slight, so it is not surprising to find that the t-score computed from the analysis of covariance fell far short of being statistically significant.

An examination of Figure 1 discloses a very gradual slope to the estimated regression lines for the two groups in School A. The slope of the regression lines indicates the degree of relationship between the shorthand scores and the G.P.A.'s at this particular school. A gradual slope to the regression lines indicates that the relationship between the two factors was not great. A steep slope to the regression lines, as in Figure 4, for example, indicates that there was a high degree of relationship between these two factors at that particular school. The slope of the regression lines varies from school to school because the estimated slope of each pair of regression lines was computed from the data secured from that particular school. In Figure 1 it will be noted that while some scores cluster closely around their respective regression lines, others deviate

FIGURE 1

SCATTER DIAGRAM FOR SCHOOL A SHOWING SCORES
PLOTTED IN RELATIONSHIP TO G.P.A. AND THE REGRESSION LINE

y = shorthand score ● = score, control group — = regression line, control group
x = G.P.A. ○ = score, experimental group --- = regression line, experimental group



considerably. This, of course, reflects the fact that the overall high school grade point average is not a perfect predictor of the type of shorthand achievement being measured in this study. While the overall high school grade average is apparently the best single factor which research has yet discovered for predicting success in shorthand according to Frink's study previously cited at the end of Chapter III (8, pp. 38, 186, and 229), a positive correlation coefficient of .74 or .79 certainly does not justify expectations of a perfect prognosis. The distance between the two regression lines in Figure 1 reflects the difference between the adjusted means for the two groups, or in other words the mean number of periods for each group after those means have been statistically adjusted to compensate for differences in G.P.A.'s. The difference between the adjusted means for School A was 2.88 (see Table III, p. 38).

In Table V, one finds that the best time in each group at School B was very close--114 periods in the control group and 115 periods in the experimental group. The number of periods required by the slowest students in each group, however, is another matter. In the experimental group, the slowest student required only

TABLE V

NUMBER OF PERIODS OF INSTRUCTION
BEFORE PASSING 60-WORD-A-MINUTE TAKES
COMPARED WITH G.P.A.'S IN SCHOOL B

CONTROL GROUP			EXPERIMENTAL GROUP		
Student's Rank No.	No. of Periods	G.P.A.	Student's Rank No.	No. of Periods	G.P.A.
1	114	2.94	1	115	2.90
2	115	3.37	2	115	2.40
3	115	2.77	3	121	3.22
4	115	2.10	4	121	3.09
5	121	3.07	5	121	2.72
6	121	2.83	6	121	2.69
7	121	2.78	7	121	2.51
8	121	2.36	8	122	2.80
9	122	1.87	9	123	2.88
10	126	2.34	10	147	2.50
11	126	2.21	11	152	2.30
12	134	2.12	12	153	2.43
13	148	2.57			
14	155	1.82			
15	160	2.52			
16	167	2.22			
17	167	2.17			
18	168	2.56			
19	170	2.72			
20	170	2.50			
21	170	2.22			
22	179	2.75			
23	179	2.45			
TOTALS	3,284	57.26	TOTALS	1,532	32.44
MEANS	142.78	2.49	MEANS	127.66	2.70
<p>$t = +1.46$ Critical regions are where $t \leq -2.036$ and where $t > 2.036$ at the 5 percent significance level.</p>					

153 periods as compared to 179 periods for the slowest student in the control group--a difference of 26 periods or slightly over five weeks. The data also reveals that ten students out of the 23 in the control group took more than 153 periods to pass their 60-word-a-minute take. It is, therefore, not surprising to find a difference of 15.12 periods between the unadjusted means for these two groups. However, in comparing the G.P.A.'s of the two groups, the data show a difference between the mean G.P.A.'s for the two groups of .21 of a grade point in favor of the experimental group. G.P.A.'s for the experimental group range from 2.30 to 3.22. In the control group the G.P.A.'s range from 1.82 to 3.37. Because of this difference in G.P.A.'s, which was greater than at any of the other schools, the difference between the mean number of periods was substantially reduced after these means were adjusted through the analysis of covariance. As shown in Tables II and III on pages 37 and 38, the difference between the unadjusted means for School B was 15.12 periods; but the difference between the adjusted means was 11.42 periods. The t-score computed from the analysis of covariance was +1.46. Although there was a considerable difference between the unadjusted means; the t-score, as shown at the bottom of Table V, again fell considerably

short of statistical significance. A t-score in excess of 2.036 would have been required for statistical significance at the five-percent level. The comparison of t-scores in Table VI shows that only at School B was the t-score reduced through the use of the analysis of covariance. To this extent the analysis of covariance has provided at least a part of the answer to the question as to why there was a reversal effect in the differences between the unadjusted means at Schools B and D. At all other schools the t-score was increased by using the analysis of covariance.

TABLE VI
EFFECT OF THE ANALYSIS OF COVARIANCE UPON THE T-SCORE

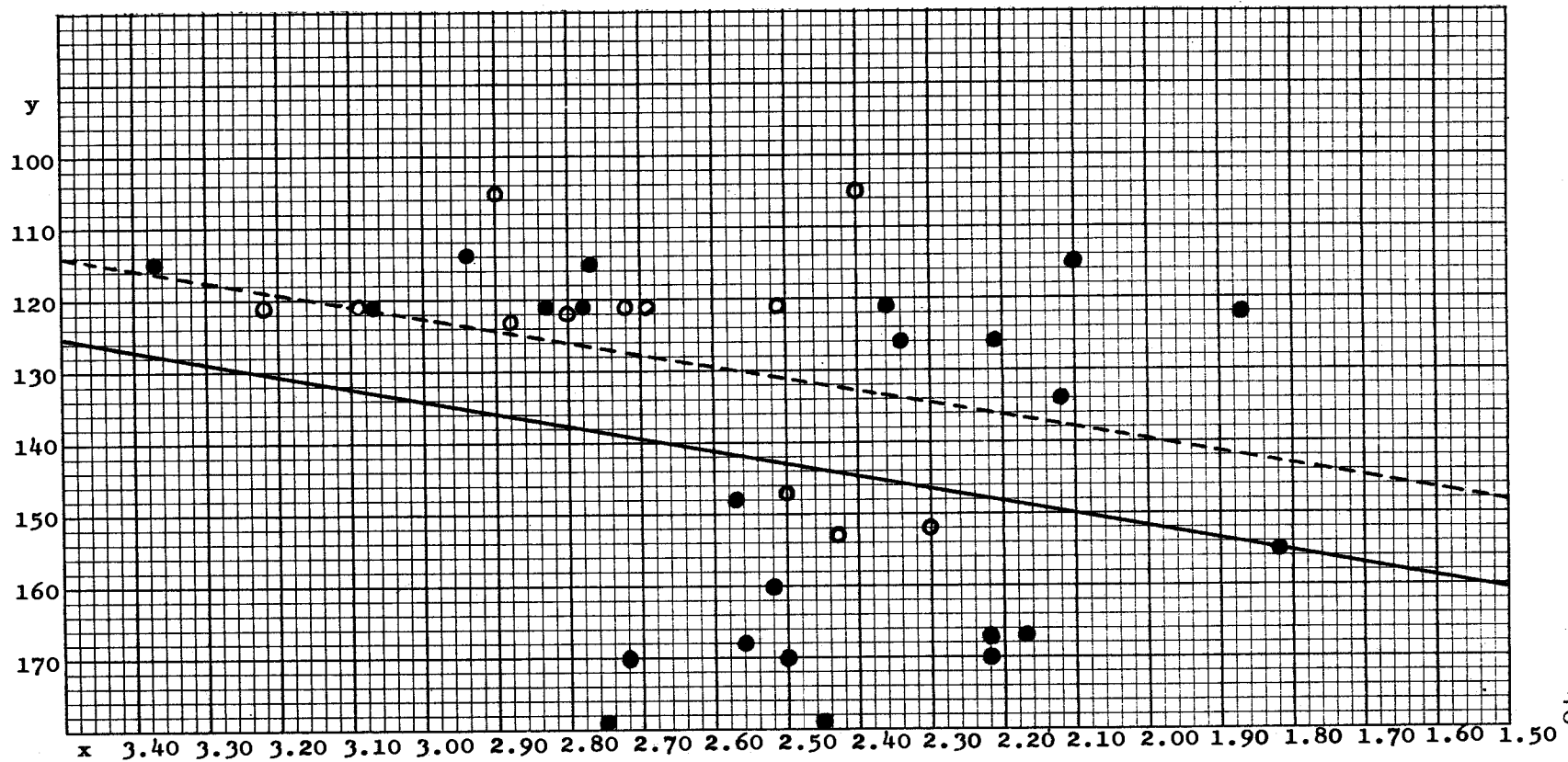
School	t-Score Without Analysis of Covariance	t-Score With Analysis of Covariance	Difference
A	.068	.372	.304
B	1.97	1.46	-.51
C	-.328	-.475	.147
D	-1.476	-2.253	.777

In Figure 2 there is a somewhat steeper slope to the regression lines than in Figure 1, indicating a higher degree of relationship between the shorthand

FIGURE 2

SCATTER DIAGRAM FOR SCHOOL B SHOWING SCORES
PLOTTED IN RELATIONSHIP TO G.P.A. AND THE REGRESSION LINE

y = shorthand score ● = score, control group — = regression line, control group
x = G.P.A. ○ = score, experimental group --- = regression line, experimental group



scores and the G.P.A.'s. The estimated common slope of the regression lines for School B was -17.62 as compared to -9.78 for School A. (The term "estimated" as used here refers to a statistical estimate in the same sense that the mean of a population is "estimated" from the mean of a random sample from that population.) An estimated slope of -17.62 means that for each 1.00 decrease in the G.P.A. the adjusted mean number of periods should decrease by 17.62 periods.

The data in Table VII from School C were derived from the largest sample secured from any of the four schools. The best scores in terms of periods were identical for both groups at this school. The slowest student in the experimental group, with a G.P.A. of 1.50, required 153 periods to pass the 60-word-a-minute take. The slowest student in the control group, with a G.P.A. of 2.04, required 146 periods. The difference between the unadjusted means was 1.54 periods in favor of the control group. The difference between the adjusted means was 1.87 in favor of the control group.

School C is also unique in that the mean G.P.A.'s are almost identical. The mean G.P.A. for the experimental group is only .02 of a grade point higher than the mean G.P.A. for the control group. The G.P.A.'s for the experimental group ranged from 1.50 (the lowest

TABLE VII

NUMBER OF PERIODS OF INSTRUCTION
BEFORE PASSING 60-WORD-A-MINUTE TAKES
COMPARED WITH G.P.A.'S IN SCHOOL C

CONTROL GROUP			EXPERIMENTAL GROUP		
Student's Rank No.	No. of Periods	G.P.A.	Student's Rank No.	No. of Periods	G.P.A.
1	98	3.16	1	98	2.74
2	98	2.82	2	98	2.03
3	98	2.25	3	101	3.40
4	101	2.68	4	101	2.92
5	102	2.47	5	105	3.36
6	105	3.29	6	116	2.43
7	105	3.07	7	116	2.42
8	105	2.84	8	118	3.13
9	105	2.72	9	118	2.77
10	105	2.26	10	118	2.70
11	107	3.20	11	118	2.54
12	107	2.70	12	126	1.88
13	118	3.09	13	126	1.71
14	118	2.62	14	133	2.20
15	121	1.88	15	146	2.87
16	126	2.36	16	153	1.50
17	126	2.08			
18	128	3.15			
19	128	2.30			
20	128	2.20			
21	128	2.17			
22	128	2.14			
23	133	2.50			
24	133	1.55			
25	136	1.91			
26	146	2.04			
TOTALS	3,033	65.45	TOTALS	1,891	40.60
MEANS	116.65	2.52	MEANS	118.19	2.54
<p>$t = -.475$ Critical regions are where $t < -2.023$ and where $t > 2.023$ at the 5 percent significance level.</p>					

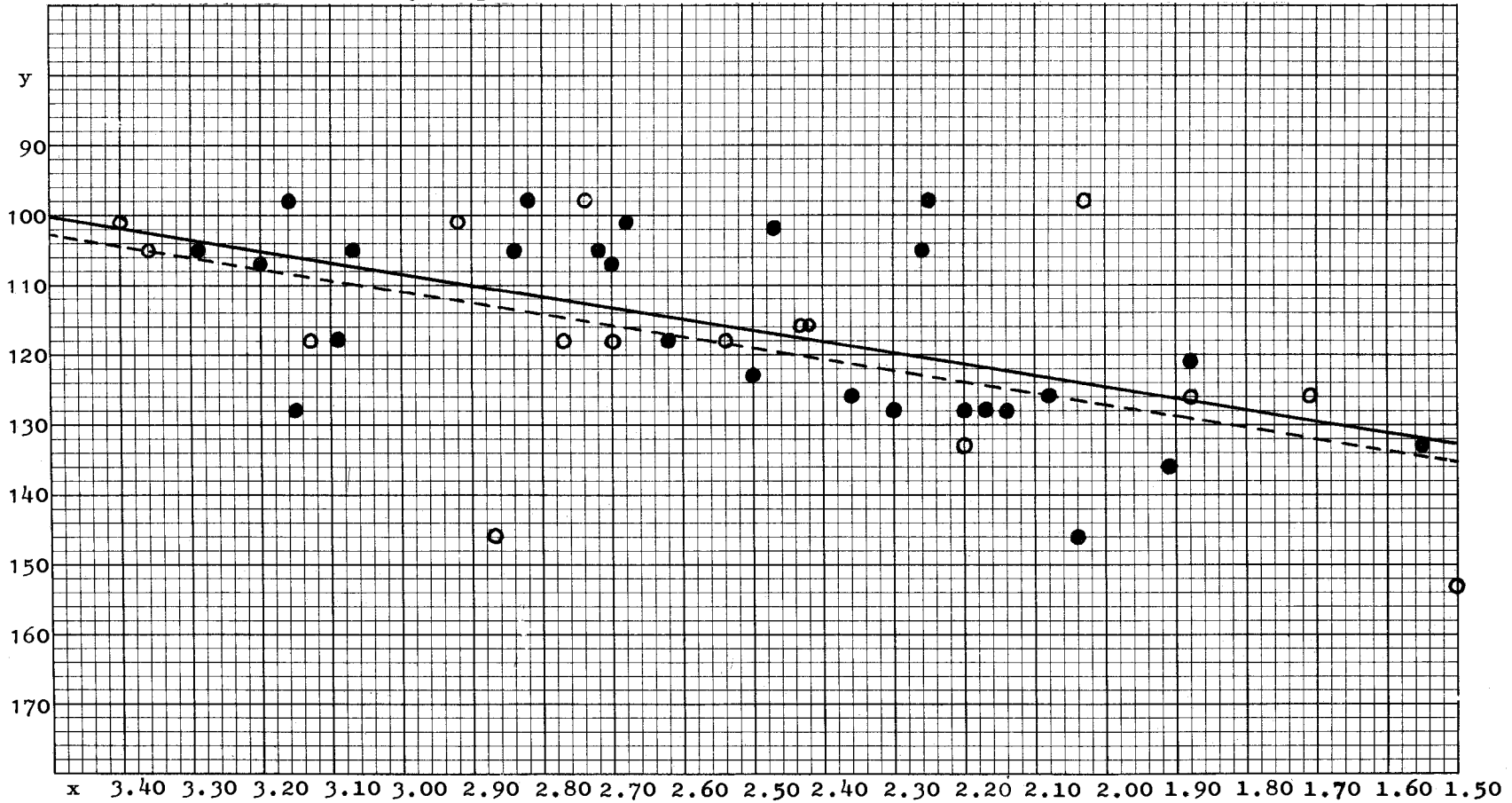
G.P.A. of any student involved in the study) to 3.40. The G.P.A.'s for the control group ranged from 1.55 to 3.29.

The t-score as computed from the analysis of covariance, $-.475$, again fell far short of significance at the five-percent level. Referring again to Table VI on page 45, it becomes evident that the t-score for School C was changed less by the analysis of covariance than at any other school. One is tempted to assume that this is because there is a lower degree of relationship between the number of periods of instruction and the G.P.A.'s. However, a careful examination of the data reveals that such is not the case. The estimated common slope of the regression line for School C is -16.26 , which indicates a considerably higher relationship between the two factors than the -9.78 estimated slope for School A. A comparison between the regression lines for School C as depicted in Figure 3 and the regression lines for School A as depicted in Figure 1 shows that there is indeed a steeper slope to the regression lines for School C. A careful study of Figure 3 in comparison with Figures 1, 2, and 4 reveals another significant factor--the scores for both groups at School C are grouped more closely around their respective regression lines than are the scores for any of the other schools.

FIGURE 3

SCATTER DIAGRAM FOR SCHOOL C SHOWING SCORES
PLOTTED IN RELATIONSHIP TO G.P.A. AND THE REGRESSION LINE

y = shorthand score ● = score, control group — = regression line, control group
x = G.P.A. ○ = score, experimental group --- = regression line, experimental group



This means that the variance around the regression lines as computed by the analysis of covariance is less than for any other school. The variance has a significant effect upon the t-score, which at School C was not greatly affected by the analysis of covariance.

In Table VIII the scores for School D are tabulated. Since the reversal effect previously mentioned occurred between Schools B and D, a careful analysis of the data for School D is essential. The most striking aspect of Table VIII is the rather sizable difference between the best score for the experimental group and the best score for the control group. In the experimental group, the best student as determined by this study passed a 60-word-a-minute take in the remarkably short time of 71 periods of instruction. In the control group the best score was 92 periods. This is 21 periods, or approximately four weeks, longer than the best time for the experimental group. The second best student in the experimental group also passed a 60-word-a-minute take in an exceptionally short period of time. The score for the slowest student in the experimental group was 166 periods as compared to 171 periods for the slowest student in the control group. Nevertheless, the unadjusted mean for the control group was 119.77 periods as compared to 136.66 periods for the experimental group.

TABLE VIII

NUMBER OF PERIODS OF INSTRUCTION
BEFORE PASSING 60-WORD-A-MINUTE TAKES
COMPARED WITH G.P.A.'S IN SCHOOL D

CONTROL GROUP			EXPERIMENTAL GROUP		
Student's Rank No.	No. of Periods	G.P.A.	Student's Rank No.	No. of Periods	G.P.A.
1	92	3.36	1	71	3.43
2	92	3.33	2	79	3.39
3	94	3.23	3	112	3.24
4	94	3.17	4	123	3.25
5	94	2.53	5	133	3.04
6	106	3.17	6	133	3.01
7	106	2.96	7	136	2.75
8	106	2.67	8	141	2.50
9	133	2.82	9	151	3.10
10	143	2.34	10	158	3.06
11	163	3.20	11	158	3.00
12	163	2.75	12	163	3.07
13	171	2.40	13	163	2.88
			14	163	2.79
			15	166	3.32
TOTALS	1,557	37.93	TOTALS	2,050	45.83
MEANS	119.77	2.92	MEANS	136.66	3.05
$t = -2.253$ Critical regions are where $t < -2.060$ and where $t > 2.060$ at the 5 percent significance level.					

The adjusted means, as shown in Table III on page 38, were 116.76 and 140.18 periods respectively for the control and experimental groups. It is immediately apparent that the analysis of covariance has had a very significant effect upon the means. The difference

between the unadjusted means was 16.89 periods; but after the means were adjusted for the effects of differences in G.P.A.'s, the difference was increased to 23.42 periods.

The G.P.A.'s for the experimental group ranged from 2.50 to 3.43. The G.P.A.'s for the control group ranged from 2.34 to 3.36. The difference between the mean G.P.A.'s (.13 of a grade point) was not particularly large. However, in computing the t-score from the analysis of covariance, School D was found to yield results markedly different from the other schools, for this t-score is statistically significant at the five-percent level. Referring to Table VI on page 45, the t-score computed without the analysis of covariance is found to be -1.476. This is, of course, a much lower t-score than the score of -2.253 computed from the analysis of covariance and is not statistically significant at the five-percent level, or even at the ten-percent level. A score in excess of -2.056 would have been required for statistical significance at the five-percent level.

This comparison of the two t-scores as shown in Table VI raises a question as to why the analysis of covariance increased the t-score to the point of statistical significance at School D but did not have a similar

effect at the other schools. Part of the answer is to be found in Table IX, where it is readily apparent that both the estimated slope of the regression lines and the

TABLE IX
THE COMMON ESTIMATED SLOPE
OF THE REGRESSION LINES AND THE VARIANCE
AROUND THE REGRESSION LINES FOR EACH SCHOOL

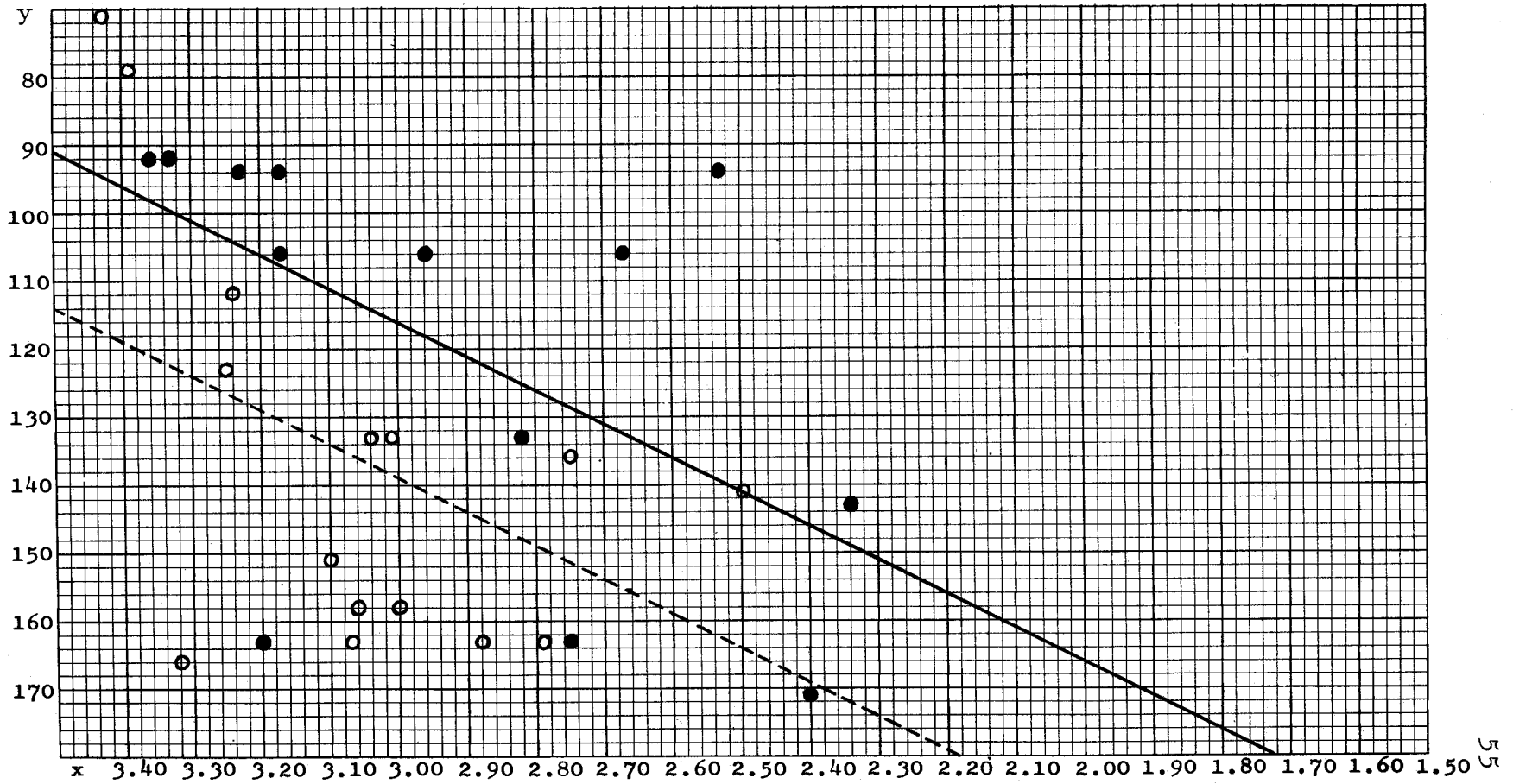
School	Slope of Regression Lines	Variance
A	-9.78	335.19
B	-17.62	445.93
C	-16.26	153.69
D	-50.29	718.22

variance is much greater for School D than for any of the other schools. The steep slope of the regression lines in Figure 4 indicates a much higher degree of relationship between the measurements of shorthand success and the G.P.A.'s than indicated by the data secured from the other schools. This steep slope of the estimated regression line is due to a large extent to the fact that the two students in the experimental group at School D who passed their 60-word-a-minute takes after 71 and 79 periods of instruction also had G.P.A.'s of 3.43 and 3.39 respectively. Their G.P.A.'s were higher

FIGURE 4

SCATTER DIAGRAM FOR SCHOOL D SHOWING SCORES
PLOTTED IN RELATIONSHIP TO G.P.A. AND THE REGRESSION LINE

y = shorthand score ● = score, control group — = regression line, control group
x = G.P.A. ○ = score, experimental group - - - = regression line, experimental group



than those for any of the students in the control group. These two high G.P.A.'s exert a very strong influence upon the estimated slope of the regression line as well as most of the other computations involved in arriving at the t-score using the analysis of covariance. To illustrate the effect of these two G.P.A.'s, a decrease of only .2 of a grade point in each of these G.P.A.'s would reduce the estimated slope of the regression line to -43.94 and would reduce the t-score to -2.033 , which would not be statistically significant at the five-percent level. This is not to imply that the t-score for School D which was computed from the analysis of covariance is invalid but is rather to demonstrate the effect of two particular scores upon the computations and thus explain why the effect of the analysis of covariance was considerably more dramatic for School D than for the other schools.

While the analysis of covariance did explain the cause of the reversal effect evident in the data from School B, it did not do so in the case of School D. However, it is perhaps worthy of note that the shorthand teacher at School D indicated that she was predisposed in favor of the conventional method of introducing dictation of unpracticed dictation material. The data from the other three schools, which were derived from

a combined sample equal to 78 percent of the total combined sample, consistently yielded t-scores which were not statistically significant at the five-percent level.

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The experimental method tested in this study consisted of introducing the dictation of unpracticed material at Lesson 25 in the Gregg Shorthand Manual Simplified, Second Edition, by Gregg, Leslie, and Zoubek. This experimental method was tested in four high schools. In each high school one of the two beginning shorthand classes was selected at random to serve as the experimental group and the other class served as the control group. At each school the same teacher taught both the experimental and control classes. The sample at the four high schools totaled 73 in the control classes and 55 in the experimental classes.

The effectiveness of the experimental method was measured by the number of periods of instruction required before the student was able to transcribe with 95 percent accuracy unpracticed material dictated at a rate of 60 words a minute for three minutes.

The hypothesis tested was that the introduction of regular and frequent dictation of unpracticed material starting with the 25th lesson in a beginning high school class in Gregg Shorthand would result in reaching a

dictation speed of 60 words a minute with at least 95 percent accuracy in less time than if dictation of unpracticed material was delayed until all 53 theory lessons had been presented.

All of the experimental classes devoted 15 minutes a period four days a week to the dictation of new material with transcription two days a week. All experimental classes used the same material for new-matter dictation. Dictation material used during the first semester was so selected that the student would not be required to write outlines involving shorthand theory that he had not yet studied. In all cases, the control classes used the same material for three-minute takes as that used by the experimental classes. All transcripts were scored according to a uniform predetermined scoring plan (see Appendix I).

At the end of the school year, the mean number of periods of instruction received before passing the 60-word-a-minute take was computed for each class. The means for the control class and the experimental class at each school were then compared. A reversal effect between Schools B and D then became evident. Because of this reversal effect, it was deemed advantageous to secure additional data regarding the students who participated in the experiment. Accordingly, the overall

high school grade point average was secured for each student; and the difference between the means was tested for statistical significance by computing the t-score with an analysis of covariance. The grade point average was considered the uncontrolled variable in this analysis. The t-scores were not statistically significant at the five-percent level except in the case of School D. Thus, the analysis of covariance explained the reversal effect at School B but not at School D. Since the data from three out of four schools yielded t-scores which fell far short of statistical significance, the hypothesis was rejected. The analysis of covariance failed to explain the results at School D. The most plausible explanation of this circumstance would seem to be interaction between the teacher and the utilization of the experimental method. However, there might conceivably have been some other undetermined factor which influenced the results at this school.

Conclusions

The statistical analysis of the data derived from this study leads to the following three conclusions:

First, the data secured from this study provide no evidence that the introduction of unpracticed material at Lesson 25 in the Gregg Shorthand Manual Simplified,

Second Edition, by Gregg, Leslie, and Zoubek in beginning high school shorthand classes will reduce the time required to successfully transcribe unpracticed material dictated at a rate of 60 words a minute for three minutes.

Second, the data secured from this study provide no evidence that the introduction of unpracticed material at Lesson 25 in the Gregg Shorthand Manual Simplified, Second Edition, by Gregg, Leslie, and Zoubek in beginning high school shorthand classes has any adverse effect on student achievement as measured by the amount of instruction required before successfully transcribing new material dictated at 60 words a minute for three minutes.

Third, the results of this study provide no justification for the use of new-matter dictation before completion of the theory lessons for the average beginning high school shorthand student using the Gregg Shorthand Manual Simplified, Second Edition, by Gregg, Leslie, and Zoubek.

Recommendations

Almost every research study, regardless of its scope, gives rise to a number of unanswered questions. These unanswered questions suggest the need for additional related research. The conduct and results of this particular study have prompted the following recommendations:

1. Because of the publication of the Diamond Jubilee revision of Gregg shorthand in 1963 following the completion of this experiment, a study to determine the effect of early introduction of new-matter dictation with students studying Diamond Jubilee Gregg Shorthand is recommended. The Diamond Jubilee revision reduced the theory memory load so that all theory is now presented in 47 lessons rather than the 53 lessons required for Gregg Shorthand Simplified.

2. If there is no assurance that the time selected to introduce new-matter dictation in this experiment was the optimum time, an experiment introducing new-matter dictation at a somewhat later date is recommended. A later date is recommended in preference to an earlier date because of comments from the teachers involved in this experiment. These comments seemed to indicate that earlier introduction of new-matter dictation would probably have little chance of producing results superior to those achieved by the conventional method.

3. Because there is no assurance that the time at which students in the experimental groups in this experiment first began to transcribe three-minute takes of new material was the ideal time to begin this phase of developing skill in taking new-matter dictation, a study

in which three-minute takes of new material is introduced somewhat earlier would seem to be a topic worthy of further research. This seems especially desirable if the Diamond Jubilee revision is used. As was noted in Chapter II, the authors still recommend in their Instructor's Handbook that no new-matter dictation be introduced until the second semester, even though all theory has been presented by the end of Lesson 47 with 23 lessons still to be covered in the first-semester text.

4. Because of the writer's experience with the early introduction of new-matter dictation in beginning shorthand classes at the college level and because of differences in maturation, level of academic achievement, and other factors; a study of the effectiveness of early introduction of new-matter dictation in beginning shorthand classes at the college level is strongly recommended.

5. Several teachers involved in the experiment felt that the early introduction of new-matter dictation tended to be discouraging for the less able students and seemed to be most effective with the more capable students. These are admittedly subjective judgments, but they came from experienced and highly regarded shorthand teachers. Therefore, if and when reliable and valid instruments for measuring shorthand aptitude are available, a study to determine the effectiveness of early

introduction of new-matter dictation for the more capable students in beginning shorthand would seem to be desirable.

BIBLIOGRAPHY

1. Anderson, Ruth I. An analysis and classification of research in shorthand and transcription. Doctoral dissertation. Bloomington, Indiana University, 1946. 874 numb. leaves.
2. Anderson, Ruth I. Significant implications of research in shorthand and transcription. In: American Business Education Yearbook. Vol. 19. New York, Eastern Business Teachers Association and National Business Teachers Association. p. 272 - 276.
3. Brewington, Ann and Helen I. Soutter. Direct-method materials for Gregg shorthand. New York, The Gregg Publishing Company, 1933. 391 p.
4. Brown, David Wolfe. The factors of shorthand speed. New York, The Gregg Publishing Company, 1910. 194 p.
5. Condon, Arnold and Rowena Wellman. More shorthand learning in less time. The Delta Pi Epsilon Journal 2:17 - 23. Oct., 1958.
6. Flood, Hazel A. Brass tacks of skill building in shorthand. New York, Prentice-Hall, 1951. 231 p.
7. Frick, Minnie DeMotte. Teaching Gregg shorthand by the analytical method. New York, The Gregg Publishing Company, 1931. 278 p.
8. Frink, Inez. A comprehensive analysis and synthesis of research findings and thought pertaining to shorthand and transcription. Doctoral dissertation. Bloomington, Indiana University, 1961. 336 numb. leaves. (Microfilm)
9. Gregg, John Robert, Louis A. Leslie and Charles E. Zoubek. Instructor's handbook for Gregg shorthand, diamond jubilee series. New York, Gregg Publishing Division, McGraw-Hill, 1963. 87 p.
10. Gregg, John Robert, Louis A. Leslie and Charles E. Zoubek. Teacher's handbook, Gregg shorthand manual simplified, 2nd ed. New York, Gregg Publishing Division, McGraw-Hill, 1955. 90 p.

11. Henderson, J. Frances. Suggested techniques for improving the teaching of shorthand by Leslie's functional method. Doctoral dissertation. Los Angeles, University of Southern California, 1944. 492 numb. leaves.
12. Lamb, Marion M. Your first year of teaching shorthand and transcription. Cincinnati, South-Western Publishing Company, 1950. 300 p.
13. Leslie, Louis A. and Charles E. Zoubek. Teacher's handbook, Gregg shorthand manual simplified. New York, The Gregg Publishing Company, 1949. 121 p.
14. Leslie, Louis A. Methods of teaching Gregg shorthand. New York, Gregg Publishing Division, McGraw-Hill, 1953. 497 p.
15. Leslie, Louis A. The teaching of Gregg shorthand by the functional method. New York, The Gregg Publishing Company, 1935. 229 p.
16. Li, Jerome C. R. Introduction to statistical inference. Ann Arbor, Edward Brothers, 1957. 553 p.
17. Lomax, Paul S. and John V. Walsh. Problems of teaching shorthand. New York, Prentice-Hall, 1932. 236 p.
18. Markett, Mark I. Word and sentence drills for Gregg shorthand. New York, The Gregg Publishing Company, 1922. 123 p.
19. Rahe, Harves. Fifth annual problem clinic. American Business Education 12:134 - 165. 1955.
20. Salser, Carl W., Jr. Correlated methods, basic and functional. Portland, Allied Publishers, 1956. 70 p.
21. Skene, Etta C., John V. Walsh and Paul S. Lomax. Teaching principles and procedures for Gregg shorthand. New York, The Gregg Publishing Company, 1932. 302 p.

22. Zinman, Meyer E., Roslyn E. Strelsin and Elizabeth Friend Weitz. Daily lesson plans for teaching Gregg shorthand by the sentence method. New York, The Gregg Publishing Company, 1934. 306 p.

APPENDICES

APPENDIX I

RULES FOLLOWED IN SCORING SHORTHAND TRANSCRIPTS

Plurals. The omission or addition of an "s" to form a singular or plural is an error only if it is grammatically incorrect.

The Use of Dictionaries. Students may consult a dictionary to determine correct spelling or correct syllabication.

Paragraphing. When dictating for transcription, all paragraphs are to be dictated. Any deviation from the paragraphing as dictated shall be counted as an error.

Terminal Punctuation. All terminal punctuation is to be dictated. Incorrect punctuation at the end of a sentence must therefore be counted as an error.

Punctuation Within a Sentence. Incorrect punctuation within a sentence shall not be counted as an error.

Synonymous Words. The wording of the transcript must be exactly as dictated. Any deviation from the wording as dictated shall be counted as an error even though the word substituted may be an acceptable synonym.

Capitalization. Incorrect capitalization shall be counted as an error only in the most obvious situations,

such as names of individuals, firm names, states, cities, and streets.

Expression of Numbers. No errors shall be counted for the manner in which a number is expressed.

APPENDIX II

STATISTICAL FORMULAS USED IN THIS STUDY

Symbols and Abbreviations:

\bar{y}_c = mean of control sample	\bar{x}_c = mean G.P.A., control sample
\bar{y}_e = mean of experimental sample	\bar{x}_e = mean G.P.A., experimental sample
n_c = number of observations in control sample	\hat{b} = common estimated slope of regression line
n_e = number of observations in experimental sample	\hat{a}_c = estimate of y intercept for a control sample
s_p^2 = pooled variance for two samples	\hat{a}_e = estimate of y intercept for an experimental sample
SS = sum of the squares	\bar{y}_{ac} = adjusted mean for control sample
Σ = sum of	\bar{y}_{ae} = adjusted mean for experimental sample
y = score for a single observation	$\bar{\bar{x}}$ = common mean G.P.A. for control sample and experimental sample
x = G.P.A. for a single observation	
s^2 = variance around regression line	

Formulas for testing the difference between the means of samples of unequal size using Student's t test:

$$t = \frac{\bar{y}_c - \bar{y}_e}{\sqrt{s_p^2 \left(\frac{1}{n_c} + \frac{1}{n_e} \right)}} \quad SS = \sum y^2 - \frac{(\sum y)^2}{n}$$

$$s_p^2 = \frac{SS_c + SS_e}{(n_c - 1) + (n_e - 1)}$$

Formulas for testing the difference between sample means using the analysis of covariance and Student's t test:

$$\hat{b} = \frac{\sum_c xy - \frac{(\sum_c x)(\sum_c y)}{n_c} + \sum_e xy - \frac{(\sum_e x)(\sum_e y)}{n_e}}{\sum_c x^2 - \frac{(\sum_c x)^2}{n_c} + \sum_e x^2 - \frac{(\sum_e x)^2}{n_e}}$$

$$\hat{a}_c = \bar{y}_c - \hat{b}\bar{x}_c$$

$$\hat{a}_e = \bar{y}_e - \hat{b}\bar{x}_e$$

$$\bar{\bar{x}} = \frac{\bar{x}_c + \bar{x}_e}{2}$$

$$\bar{y}_{ac} = \hat{a}_c + \hat{b}\bar{\bar{x}}$$

$$\bar{y}_{ae} = \hat{a}_e + \hat{b}\bar{\bar{x}}$$

$$s^2 = \frac{(\sum_c y^2 - \hat{a}_c \sum_c y - \hat{b} \sum_c xy) + (\sum_e y^2 - \hat{a}_e \sum_e y - \hat{b} \sum_e xy)}{n_c + n_e - 3}$$

$$t = \frac{\hat{a}_c - \hat{a}_e}{\sqrt{\left[\frac{(\bar{x}_c - \bar{x}_e)^2}{\sum_c x^2 - \frac{(\sum_c x)^2}{n_c} + \sum_e x^2 - \frac{(\sum_e x)^2}{n_e}} + \frac{1}{n_c} + \frac{1}{n_e} \right] s^2}}$$