A COMPARISON OF THE DIFFICULTY OF MATERIALS USED IN THE TEACHING AND TESTING OF SHORTHAND WITH THE DIFFICULTY OF BUSINESS LETTERS IN USE IN BUSINESS OFFICES

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ABSTRACT

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By

Donalda MacLean Warner

THE PROBLEM

This is descriptive research in which an attempt is made to compare the difficulty of instructional materials used in teaching shorthand in college and secondary classrooms with the difficulty of letters in use in business offices. The instructional materials included textbooks used by students in the learning of Gregg Shorthand, Diamond Jubilee edition, and books of tests used by teachers in measuring students' progress. The letters studied were from two sources: (1) those dictated in the normal routine of conducting daily business matters, and (2) those direct-mail advertising pieces received with the mail and designed to sell a product or a service.

The question to be answered through research was whether the instructional materials used in the classroom in the preparation and testing of the students' ability to write shorthand adequately prepared him to perform satisfactorily when he was employed in a business office. The criterion was the difficulty of the letters used in business offices in the daily carrying on of routine business matters.

PROCEDURES

Letters, representing mid-management personnel, were obtained from business offices through correspondence with the presidents of randomly selected chapters of The Administrative Management Society. Forty-five chapters nationwide were contacted and requested to ask their members to share samples of letters normally dictated in their offices as well as samples of direct-mail advertising letters which come unsolicited in the daily mail.

Letters from executives were obtained by requesting letters dictated and unsolicited from presidents of corporations, banks, colleges, transportation companies, as well as congressmen and governors.

The five college textbooks of Gregg Shorthand, the five secondary textbooks, and five of the books of tests in common use by both college and secondary teachers were used as instructional materials.

Three-hundred-word samples were taken from each book and from letters, which were put together in groups of three. The words were counted through the use of a COBOL program, which recorded the number of words in each three-hundred-word sample found in each of the following six categories:

1. Brief forms
2. Perry's 1 - 100
3. Perry's 101 - 500
4. Perry's 501 - 1,500
5. Perry's Over 1,500
6. Syllabic Intensity

A one-way analysis of variance was performed using the Finn program. The Scheffé Post Hoc Technique was later used to study pair-wise comparisons which showed an F ratio greater than the tabled F at the .05 level of significance.

FINDINGS AND CONCLUSIONS

The statistical analysis revealed the following conclusions:

1. Four variables contained significant differences:
    1. Brief forms
    2. Perry's 1 - 100
    3. Perry's Over 1,500
    4. Syllabic Intensity
2. The two remaining variables were constant in all samples:
    1. Perry's 101 - 500
    2. Perry's 501 - 1,500
3. The syllabic intensity of the letters, both dictated and unsolicited, was greater than the syllabic intensity of the instructional materials.
4. The unsolicited letters were more difficult than the dictated letters and the secondary textbooks on the variables, Perry's over 1,500 and Syllabic Intensity.
5. Letters dictated by top-level management personnel were not significantly different from letters dictated by mid-management personnel.
6. The letters from Transportation and Government categories contained significantly more words from Perry's over 1,500 than did the letters from the Finance category.

The following conclusions were drawn:

1. Both college and secondary textbooks are of sufficient difficulty to prepare the student to pass the tests published in the five books of tests examined in this study.

2. The college textbooks were of sufficient difficulty on all the variables studied to prepare the college student to write from dictation the letters normally dictated by businessmen and the unsolicited letters used in direct-mail advertising.

3. The secondary textbooks were not sufficiently difficult to prepare the secondary student to write the unsolicited letters.

4. Syllabic intensity was one of the variables on which there was no significant difference when letters only were analyzed either by source or by category; therefore, the differences in difficulty among letters existed elsewhere than on this variable.

5. Of the four speed levels studied in each of the five books of tests, no developmental plan was discernible; the books appear to be a collection of test materials without any consistent organization of content.

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By

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To the memory of my mother, Margaret Hunter MacLean, a Scottish immigrant, whose lifelong interest in learning inspired this effort.

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Chapter 1

INTRODUCTION

In writing about the vocabulary of instructional materials, Leonard West[1] said that the words used in the instructional materials for typewriting and stenographic skills should prepare the student for the vocabulary which he will encounter later in life. Furthermore, materials used in testing should validly assess the individual's readiness for employment.

The vocabulary used outside the classroom gives direction to the work within the classroom. If a set of criteria were established, the difficulty of the vocabulary used by the businessman in normal transactions could be compared with that of the classroom materials.

The textbooks on the secondary level have been revised as recently as 1971; books for advanced classes were ready in 1972. These textbooks from which the student studies and prepares daily homework assignments determine in part the quality of his preparation. That the textbooks are new is commendable, but the question remains as to whether the vocabulary level is comparable to that of the businessman.

The books of tests regularly in use in both secondary schools and colleges were published in 1950, 1956, and 1963. Editions of these three books have been essentially the only bound volumes of tests available to shorthand teachers. Monthly tests were published in magazine

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[1]Leonard West, "The Vocabulary of Instructional Materials for Typing and Stenographic Training--Research Findings and Implications," The Delta Pi Epsilon Journal, Volume X, No. 3, May 1968, p. 13.

form which contributed ten tests a year to the teacher who might be collecting new test material. In 1969, the first paperback of tests was published. All of the monthly tests were bound into one volume for easy handling. At this date, there have been six paperback volumes published. Students of stenography comment that the new tests published in paperback form are more difficult than the tests in bound volume form.

Due to advanced technology and higher educational level of businessmen, the vocabulary used in the conduct of normal business transactions may have increased in difficulty in the last decade. If the vocabulary of the instructional materials has failed to keep pace with the words in use, the student may not be ready for employment upon graduation.

This study is an attempt to compare the materials in use in the classroom with the letters in use in business, insofar as the difficulty of the vocabulary is concerned.

PURPOSE OF THE STUDY

The purpose of the study is threefold: (1) To make a comparison of the level of difficulty between the textbooks used by college and secondary shorthand classes and the books of tests available to both college and secondary teachers of shorthand. The textbooks and books of tests are referred to hereafter as instructional materials. (2) To make a comparison of the level of difficulty between the instructional materials in use in college and secondary shorthand classes and letters dictated in business offices in the daily conduct of business. (3) To make a comparison of the difficulty between instructional materials in use in shorthand classes and unsolicited, direct-mail advertising letters received by businesses.

STATEMENT OF THE PROBLEM

The instructional materials used by the shorthand student are designed to accomplish two objectives: (1) to teach the student the shorthand system, and (2) to prepare him for a career of handling business correspondence and related office activities. These instructional materials should prepare the student to write a vocabulary equal to the difficulty of the vocabulary on a job requiring entry-level skills. This study was an attempt to ascertain whether the instructional materials met this difficulty level.

NEED FOR THE STUDY

The instructional materials currently in use in college and secondary shorthand classes contain letters and memoranda composed of normal running business English. The content has not been labeled to indicate the frequency with which these words occur in business correspondence.

In the beginning textbooks, vocabulary is chosen to illustrate a principle in the theory, but the student is not informed as to whether the words being studied are high-frequency or low-frequency words. The test material used by the teacher for beginning dictation has no index to indicate its suitability for that level. The standard word, established in the 1930's, was defined as 1.4 syllables. This average is considered to be below that which occurs in most of today's correspondence.[2]

Unsolicited letters flow daily into business offices via the mail. These letters advertise new products, services, real estate, publications, and a myriad of opportunities for growth or change. They are

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[2]Joe M. Pullis, "A New Standard Word in Shorthand?" The Journal of Business Education, 52 (January, 1971), 144-145.

readily available to the shorthand teacher who is looking for new dictation material or to the researcher in need of test letters. Many of the very long letters in the published books of tests advertise vacation trips, insurance policies, or new books. These long letters may or may not be dictated at the source. If these letters do, indeed, creep into the textbooks and books of tests, they should also be studied on all the factors of difficulty.

RESEARCH HYPOTHESES TESTED

The following six research hypotheses were tested:

1. There is a difference between the normal business dictation and all the textbooks on all of the difficulty factors studied.

2. There is a difference between the unsolicited mail and all the textbooks on all of the difficulty factors studied.

3. There is a difference between the unsolicited mail and the normal business dictation on all of the difficulty factors studied.

4. There is a difference between the books of tests and the textbooks on all of the difficulty factors studied.

5. There is a difference between the books of tests and the dictated letters on all of the difficulty factors studied.

6. There is a difference between the books of tests and the unsolicited letters on all of the difficulty factors studied.

For statistical analysis, they were restated in null form. Six subhypotheses were also tested; they were also restated in null form. In the subhypotheses, the textbooks were tested at two levels on all variables:

1. There is a difference between the normal business dictation and the secondary textbooks on each of the dependent variables.

2. There is a difference between the unsolicited business letters and the difficulty of the secondary textbooks on each of the dependent variables.

3. There is a difference between the normal business dictation and the college textbooks on each of the dependent variables.

4. There is a difference between the difficulty of the unsolicited business letters and the difficulty of the college textbooks on each of the dependent variables.

5. There is a difference between the books of tests and the college textbooks on each of the dependent variables.

6. There is a difference between the secondary textbooks and the books of tests on each of the dependent variables.

DELIMITATIONS

This study involved the use of business letters which had been dictated by top-level management and mid-management personnel. These letters were classified as normal business dictation.

The one-hundred word samples taken from books and letters varied slightly over or under exactly the one hundred words. This was due in part to the arrangement of words in Perry's list which records in two lists words commonly considered as one unit. For example, Los is in the twelfth hundred word list and Angeles is in the fourteenth hundred word list. The variation is also due in part to error. There were 330 one-hundred word samples. If the samples had been few in number, an adjusted column could have been included.

This study does not attempt to determine what levels of word difficulty should be taught at the secondary or college level. The purpose was only to identify what levels of word difficulty are used in

currently published textbooks. Neither does this study attempt to analyze whether the books get progressively more difficult. Such analysis is recommended for further study.

DEFINITION OF TERMS

For the purposes of this study, the following definitions were used:

Average Business Correspondence: Pullis' description of 42 percent brief forms, 53 percent high-frequency words, 72 percent common words, and 1.6 syllabic intensity.

Brief Forms - A shorthand outline which has been abbreviated because of its frequency of use or to facilitate phrasing.

College Level - The four years of higher education which follow the years of public school education.

Dependent Variable - The criteria established to determine the difficulty of the vocabulary used in classroom instructional materials and in letters from business firms.

Instructional Materials - All of the textbooks and books of tests, examined in this study, in use by teachers of shorthand classes in the preparation of the student for entry-level employment.

Perry's List - The 500 most frequently used word combinations and the 5,000 most frequently occurring words in business letters as presented in the dissertation of Dr. Devern J. Perry.

Reading Level - The difficulty of the materials being used as determined by the SMOG Grading formula based on the number of polysyllabic words found in blocks of ten sentences taken from the beginning, middle, and end of a book.

Secondary School - The years of the public school system which include the grades 10 through 12.

Standard Word - A device for equalizing the difficulty of shorthand dictation material. It is computed by allowing every 28 syllables to equal 20 standard words.

Syllabic Intensity - The ratio of the number of words dictated in a minute to the number of syllables spoken by the dictator.

Take - A shorthand test which is dictated for a predetermined number of minutes at a specified rate of speed.

Test - The actual paragraphs dictated to determine the shorthand writer's ability to write shorthand at a prescribed rate for a preset length of time.

Unsolicited Mail - Letters sent out by business firms as direct-mail advertising pieces to sell a product or a service.

SUMMARY

This chapter has outlined the parameters of the study. The need for the difficulty of instructional materials to be more explicitly labeled has been developed.

The question of whether the difficulty level of the instructional materials adequately prepares the student to work effectively on entry-level positions will be analyzed by examining letters dictated by top-level management and mid-management personnel on a nationwide basis. The difficulty of unsolicited, direct-mail advertising letters, which may or may not be dictated, will be examined also because of the easy access that teachers and publishers have to this source of dictation material.

Another measurement of difficulty will be made by determining the reading level of both the instructional materials and the letters to see how it compares with the reading level of textbooks in general use in classrooms.

PLAN OF THE STUDY

In Chapter 2, which follows, the literature written by researchers on the subject of difficulty of shorthand dictation materials is reviewed.

Chapter 3 explains the procedure and methodology used to examine the difficulty of the instructional materials correctly in use in the classroom and the letters in use in business.

Chapter 4 analyzes the data generated from the study after all the samples from the instructional materials and letters had been prepared for analysis.

Chapter 5 gives the conclusions and recommendations of the study. Appendices A, B, and C follow Chapter 5.

Chapter 2

THE REVIEW OF LITERATURE

Business education gained impetus in the schools with the commercial manufacture of the typewriter in the early 1870's.[1] Shorthand was used occasionally before the invention of the typewriter. The Greeks had a system of shorthand, and the Romans recorded the proceedings of the Roman Senate in stenographic notes. The British Parliament adopted Gurney Shorthand for preserving its proceedings. With the perfection of the typewriter, however, shorthand also increased in importance.[2]

Gregg Shorthand was first published in 1888 in two little paper-covered pamphlets under the title, "Light-Line Phonography." In 1893, a revised and greatly improved edition was published under the title, "Gregg Shorthand."[3] About that time John Robert Gregg brought his system to the United States.[4] The second revision came in 1901, followed by other revisions in 1916, 1929, 1949, and 1963.

All of the revisions were made with the student in mind. Attempts were made to simplify the system and to reduce the memory load. Paralleling the need to keep revising the system is the need to constantly revise

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[1]Herbert A. Tonne, Principles of Business Education (2nd ed.; New York: McGraw-Hill Book Company, 1954), p. 22.

[2]Ibid., p. 23.

[3]John Robert Gregg, Gregg Shorthand (New York: The Gregg Publishing Company, 1916), p. ix.

[4]Tonne, op. cit., p. 24.

the textbooks used by the student and the dictation materials used by the teacher.

Thirty-five years ago Clyde I. Blanchard put it this way:[5]

> When you are dictating, do you know what the dictation consists of? I don't refer to its meaning. I refer to the words that make up the dictation. I have found that it helps me to increase my students' speed on a take if I know in advance what the dictation is "made of."

Blanchard followed with admonitions to avoid wasting time on the 94 percent common words, which need no additional practice, but to reap dividends through mastery of the 6 percent difficult words.[6]

At one time or another, all teachers of shorthand have wondered why students could successfully pass a dictation at a given rate and then not be able to repeat the accomplishment for several days. What made one selection easy and another difficult at the same level of speed? The matter of difficulty in the writing of shorthand dictation materials has been examined from within the shorthand system itself through studies of the difficulty of executing a shorthand character, the phraseability of some words over others, the abbreviating principles, the time taken to write a disjoined prefix or suffix. The problems of difficulty presented by the language itself have produced readability scales, syllabic intensity scales, vocabulary level indices, and vocabulary lists.

This study was concerned with three language elements contributing to the difficulty of shorthand materials; namely, the syllabic intensity of the dictated material, the vocabulary level of the words, and the reading level of the instructional materials. The pages which follow review the research which has been published in these three areas.

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[5]Clyde I. Blanchard, 20 Shortcuts to Shorthand Speed (New York: The Gregg Publishing Company, 1939), p. 59.

[6]Ibid., p. 61.

SYLLABIC INTENSITY

The need to equate the difficulty of shorthand dictation materials had its genesis in the first modern shorthand contest which was held in 1887.[7] It was the result of claims made by shorthand writers of speeds up to 500 words a minute. The first contest was held without any set standards of duration, accuracy, or difficulty of the dictation being used. The following year the second shorthand contest took place under the supervision of the New York State Shorthand Reporters' Association; this group established five minutes as the length of the dictation. In 1906, the Eastern Commercial Teachers Association held the Miner Medal Contest, limiting the accuracy to 90 percent. By 1909, the National Shorthand Reporters' Association was conducting the contests, and it raised the accuracy to 95 percent for most dictation, retaining 90 percent for the highest speed. In 1913, the Association raised the accuracy requirements to 95 percent for all dictation.[8]

In 1922, Mechler concluded that syllabic intensity was responsible for differences of difficulty in dictated matter. He wrote:

> The theory with respect to it is that a low syllabic intensity indicates easy matter, while high syllabic intensity indicates matter of greater difficulty. In other words, it is thought that as syllabic intensity--that is, the number of syllables to the word--increases, a corresponding increase in difficulty of writing is encountered. This is not strictly scientific, but there is a relationship between the two that makes the method fairly accurate in judging results.[9]

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[7]Louis A. Leslie, Methods of Teaching Tanscription (New York: The Gregg Publishing Company, McGraw-Hill Book Company, 1949), p. 193.

[8]Ibid., p. 194.

[9]Walter H. Mechler, Shorthand Championship Tests (Boston: The Gregg Publishing Company, 1922), p. 51, quoted by Rowena Wellman, An Examination of Certain Factors Involved in the Reporting and Transcribing of Stenographic Materials (New York: Teachers College, Columbia University, 1937), p. 28.

After analyzing the copy used in the Shorthand Championship Tests over a ten-year period, Dr. John Robert Gregg found a median syllabic intensity of 1.40.[10] Consequently, Gregg Shorthand textbooks used the 1.40 syllabic intensity. In September, 1931, the Gregg Publishing Company first announced and used the phrase, "standard word," as the 1.40 syllabic intensity was named, for counting dictation in published tests. The purpose of the standard word was to equate the difficulty of different tests at the same speed level.

For many years, German shorthand authorities have expressed shorthand speeds in terms of syllables a minute but have never tried to convert the syllables into words a minute. That this might be more scientific has been accepted, but the practice has never been put into use in this country.[11]

Studies of Syllabic Intensity

Leslie, who had joined with Dr. John Robert Gregg in his study of the speed-contest material, listed nine measures of difficulty. They were the following:[12]

1. Typing Stroke Count
2. Shorthand Character Count
3. Sound Count
4. Artificial Restriction of Vocabulary
5. Vocabulary Spread Index
6. Vocabulary Analysis
7. Sentence Length
8. Syllabic Intensity
9. The Standard Word

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[10]Leslie, op. cit., p. 198.

[11]Leslie, op. cit., p. 201.

[12]Louis A. Leslie, "The Difficulty of Shorthand Dictation Material," Business Education World 28: (September, 1947), 14-15.

After working with several of these measures and finding them too time-consuming to be practical or lacking in validity, Louis discarded all of them except syllabic intensity. He found that not only was it the easiest to compute, but also had the highest validity as a predictor of difficulty. He felt that two factors of difficulty were being measured. A high syllabic intensity index indicates a wider vocabulary in addition to longer words.[13] Leslie gave the 1.40 syllabic intensity index identity by calling it the "standard" word.

About the twofold function of the syllabic intensity index, Leslie said:[14]

> While it is true that a higher syllabic intensity does indicate more long words, that fact in itself is of less significance to the shorthand writers than the fact that the higher syllable intensity does, in addition, indicate a wider vocabulary and that is where the shorthand writer's difficulty comes in.

This concept of wider vocabulary is the basis of the controversy over syllabic intensity as a measure of difficulty; and if it measures, does it equate difficulty?

Rowena Wellman[15] attempted to study four factors which she thought contributed to difficulty in dictation materials. The four measures were vocabulary frequency, syllabic intensity, sentence length, and stroke intensity. Her study was designed to hold three factors constant while she studied the fourth factor. High syllable count was

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[13]Ibid., (November, 1947), 165.

[14]Louis A. Leslie, Methods of Teaching Gregg Shorthand (New York: The Gregg Publishing Company, McGraw-Hill Book Company, 1953), p. 229.

[15]Rowena Wellman, An Examination of Certain Factors Involved in the Reporting and Transcribing of Stenographic Materials (New York: Teachers College, Columbia University, 1937), p. 37.

one of these factors. She constructed ten 150-word letters. Seven letters were in Battery A; two of these letters were "control letters." Each of the remaining five letters was written to test one of the following variables: spelling demons, long sentences, high syllable count, and higher vocabulary level. Battery B contained three letters: one "new control letter," one with additional spelling demons, and one with the highest vocabulary level. In all she checked 445 student papers.

All of the letters in Battery A were of 1.40 syllabic intensity and contained only words found in the first one thousand on Horn's list except the one letter designed to test high syllabic count. In that one letter, the syllabic intensity was 1.80, an increase of 28 percent. However, Wellman found no real difference large enough to be significant on the student transcripts of the letter with the 1.80 syllabic intensity. Of the two control letters in Battery A, she found significant differences in mean scores (errors), even though these letters were written to be identical.

Wellman stated that "the results revealed the fallacy of attempting to equalize stenographic difficulty by equating the objectively measurable components in the dictation material."[16] She was attempting to make physical changes in material and to objectively measure the results without the use of more sophisticated statistical techniques for measuring differences. She has been criticized by proponents of syllabic intensity for arbitrarily controlling the difficulty of the letters in her study. They, as a group, say that the copy must be normal running English and that the test must contain more than 150 words.[17]

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[16]Ibid., p. 22.

[17]Leslie, Methods of Teaching Transcription, op cit., p. 191, 199.

In 1944 Turse studied three possible measures of difficulty--namely, actual word count, standard word count, and shorthand stroke count--and concluded that all three methods of measuring difficulty "miss" often enough to be questioned. The shorthand stroke count was unreliable due to phrasing and abbreviating principles, but was less subject to such influences than the syllable count.[18] Turse reiterated his position on the matter of the validity of the syllable count method as a measure of difficulty in 1948 when he wrote that on 38 letters supposedly equated in difficulty by this means, one was so easy that all 26 students in his study made a total of only 5 errors, while one letter was so difficult that a total of 99 errors was made. He felt that 80 to 90 percent of ordinary dictation matter is non-discriminatory in difficulty no matter what measures are employed and that a preliminary tryout was the safest method of arranging materials in order of difficulty.[19]

Sister Mary Elfreda Elsen[20] reinforced the proponents of syllabic intensity when she studied syllabic intensity along with vocabulary spread index and shorthand character count. Her design included two series of tests, A and B, with five letters and one speech in each series. The six pieces used were chosen for their syllabic intensity in order to fit a progression beginning with 1.30 and ending with an article at 1.90. There was no dictation at the 1.80 level of difficulty.

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[18]Paul L. Turse, "Standard Word vs. Shorthand Stroke in Shorthand Dictation," Business Education World 24: (June, 1944) 541-542.

[19]Ibid., "Validity of the Syllable Count," Journal of Business Education, 23: (March, 1948) 29-30, 32.

[20]Sister Mary Elfreda Elsen, "Factors of Difficulty in Shorthand Dictation Material" (unpublished Master's dissertation, DePaul University, Chicago, Illinois, 1946).

The A and B series of tests were dictated to a total of 100 pupils in four different schools at the rate of 80 words a minute. The difficulty of a test was measured in terms of errors made. A graph was made of the three predictive indexes, one for Test Series A and another for Test Series B. The results in terms of errors for Test Series A and Test Series B were also graphed. The graphs of the predictive indices were compared with the graphs of the errors in order to study the relative regression of the lines. Elsen concluded that syllabic intensity was the best predictive index.[21]

The word-frequency count used in computing the vocabulary spread index of the 12 pieces of material which comprised Test Series A and Test Series B was the Basic Vocabulary of Business Letters by Horn and Peterson published in 1943.[22] Elsen stated:[23]

> There is every reason to believe that if a more extensive word count on the order of the Horn-Peterson count were available, it would be possible to make the vocabulary spread index much more accurate than it is especially in regard to the proper assessment of the words occurring in the 16+ group.

One of the criticisms of Elsen's study was her choice of material for use at the 1.90 level of difficulty. Since letter copy of that difficulty was not available, Elsen used Congressional Record material. Half of this material was used in Test Series A, and the remaining half of the same material was used in Test Series B. Unless students were familiar with the vocabulary used in Congressional Record dictation, they would in all likelihood make numerous errors.

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[21]Ibid., p. 68.

[22]Ibid., p. 18.

[23]Ibid., p. 68.

Curtin[24] studied the relationship between four selected factors and the difficulty of dictated material. The four factors were the Cloze score (a tool for predicting readability), syllabic intensity, number of different words, and vocabulary level. Coefficients of correlation were calculated between the criterion score (the number of shorthand errors made on each letter) and each of the four factors. She reported an insignificant relationship between syllabic intensity and the number of errors, with near zero intercorrelations among the predictor variables. Curtin's primary interest was the Cloze score, which will be reviewed later with the readability studies, but she concluded that syllabic intensity did not adequately predict difficulty.

In 1960, Hillestad[25] published a formula which purported to predict the difficulty of dictation materials. Of the 16 predictor variables initially in her study, only two remained in the final prediction formula: number of syllables in the dictation and number of words not included among the first 1,500 on the Silverthorn list. Hillestad weighted the number of words not included among the first 1,500 on the Silverthorn list almost twice as heavily as she did the number of syllables in the dictation. This was the first study which empirically demonstrated the necessity to account for more than one factor to predict difficulty. Of the two factors included in the formula, syllabic intensity was assigned about half the weight of the second factor.

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[24]Rita C. Curtin, "The Relationship Between Selected Factors and Difficulty of Dictated Material" (unpublished Master's thesis, University of Minnesota, Minneapolis, 1958).

[25]Mildred C. Hillestad, "Factors Which Contribute to the Difficulty of Shorthand Dictation Material" (unpublished Ph.D. dissertation, University of Minnesota, Minneapolis, 1960).

WORD FREQUENCY LISTS

One of the earliest known special word lists appeared in 1588 in the first English shorthand textbook, Timothie Bright's Characterie.[26] The largest count made for shorthand purposes in English is the one made by Godfrey Dewey.[27] This count was made to determine the frequency of English phonetic sounds rather than frequency of words, but Dewey also listed the frequency of the most commonly used words. He determined the syllabic intensity of his study to be 1.43.

Word counting received its greatest advocacy from those interested in the teaching of elementary reading, spelling, modern languages, and similar school activities. Thorndike[28] and Horn[29] spend considerable time in making word counts that have been valuable to shorthand teachers. These men examined every kind of literary work to determine the frequency with which words occurred. The Thorndike count showed only the root word, but the Horn count gave every form of every word listed separately. The Horn-Peterson[30] list was a further improvement for shorthand writers because it was based almost altogether on business correspondence in addition to giving every form of every word that was found.

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[26]Leslie, op. cit., p. 393.

[27]Godfrey Dewey, "The Relativ (sic) Frequency of English Speech Sounds," Harvard Studies in Education, Vol. IV (Cambridge, Harvard University Press, 1923).

[28]Edward L. Thorndike, The Teacher's Word Book (A List of 10,000 Words) (New York: Bureau of Publications, Teachers College, Columbia University, 1921).

[29]Ernest Horn, A Basic Writing Vocabulary (Iowa City, University of Iowa, 1926).

[30]Ernest Horn and Thelma Peterson, A Basic Vocabulary of Business Letters (New York: Gregg Publishing Company, 1943).

James E. Silverthorn[31] examined 2,039 pieces of business communication, written by 1,012 different writers, containing 300,000 running words on which he based his basic business vocabulary. He found 11,564 different words taken from 15 categories of business. The number of words from each category of business was in proportion to the number of secretaries, stenographers, and typists in each category as reported by the United States Census Bureau. Mellinger[32] established the syllabic intensity of the Silverthorn word list as being 1.56.

Devern J. Perry[33] examined a representative sample of 2,061 business letters from 687 business firms throughout the nation. The body of each letter was keypunched on data cards and a frequency count made of each word and word combination. Perry[34] found the average syllabic intensity of the words in his study to be 1.63.

Morris Mellinger[35] examined approximately 2,000 letters, reports, and memoranda from the files of a representative sample of 5,000 firms, schools, and nonprofit organizations in all critical occupations in the

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[31]James E. Silverthorn, "The Basic Vocabulary of Written Business Communications," Ph.D., University of Minnesota, 1955, Dissertation Abstracts, 1955, 15/10, p. 1746.

[32]Morris Mellinger, "Has the Syllabic Intensity Yardstick Lost Its Magic?" Business Education World 45: (No, 3, November, 1964), 9.

[33]Devern J. Perry, "An Analytical Comparison of the Relative Word-Combination Frequencies of Business Correspondence With Phrase Frequencies of Selected Shorthand Textbooks," Journal of Business Education 44: (May, 1969), 340.

[34]Ibid., Dissertation Abstracts 29/11A, p. 3921.

[35]Morris Mellinger, "New High-Frequency Vocabulary," Delta Pi Epsilon Journal XIV, (No. 2, February, 1972), p. 37.

major metropolitan areas of 43 states. He obtained 295,271 running words and a frequency list of 12,897 words.

Studies in Vocabulary Level Indices

The first of the four measures which Wellman studied in 1937 was vocabulary frequency. The question which she raised about this measure was the following:[36]

> Other things being equal, as far as they can be measured quantitatively, do students find materials from the higher levels of vocabulary more difficult to reproduce than materials drawn from the most frequent rank or ranks?

To answer the question, Wellman constructed two batteries of letters, each 150 words in length. Battery A consisted of seven letters, six of which were composed of 86.7 percent words from Horn's first 500 words and 13.3 percent from the second 500 words. The seventh letter was written with 88 percent of the words from the first one thousand words on Horn's list, 7 percent from the second one thousand, and 5 percent from the third one thousand words. Letters 1 and 6 were the control letters with all variables the same. In Battery B, the first and second letters were written with the same percentages as the seventh letter of Battery A, but the third letter in Battery B was written with 70 percent of the words taken from the first one thousand on the Horn list, 15 percent from the second thousand, 4 percent from the fourth one thousand, and 1 percent from the fifth thousand.

The experiment sought to determine how accurately the dictated materials would be reproduced. Therefore, the speed of dictation varied

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[36]Rowena Wellman, An Examination of Certain Factors Involved in the Reporting and Transcribing of Stenographic Materials (New York: Columbia University, 1937), p. 2.

from 60 to 80 words a minute, and the length of transcribing time was not controlled. The total number of papers scored was 445.

Wellman[37] concluded that the qualitative nature of the vocabulary is much more important as a factor of stenographic difficulty than is mere frequency of word forms. She considered the qualitative elements of be unmeasurable by the techniques available at that time. These elements were idea density, multifarious uses of individual words, or the dynamics of sequences.

Elsen[38] used two sets of six letters each in her study. She found letters of 400 words in length which had syllabic intensities of 1.20, 1.40, 1.50, 1.60, 1.70, and 1.90, the last being Congressional Record material. In computing the vocabulary spread index of the 12 pieces, she used the Horn-Peterson list, which was based on business letters. She concluded that vocabulary spread index was second to syllabic intensity as a valid predictor of difficulty.

Crandall[39] used Silverthorn's list to compute a word-frequency index for each of the 12 pieces used by Elsen in her study. The tests were written and transcribed by Crandall's students in transcription. He studied the total transcription errors per student and reported that "there appears to be no positive relationship between high frequency of general business vocabulary and transcription errors on these tests as reported for 100 tests."

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[37]Ibid., pp. 55, 65.

[38]Sister Mary Elfreda Elsen, "Factors of Difficulty in Shorthand Dictation Material" (unpublished Master's thesis, DePaul University, Chicago, Illinois, 1946).

[39]Lars G. Crandall, "Word Frequency Applied to Stenography," The Journal of Business Education, 36: (November, 1960) 67-68.

However, when Crandall based his word-frequency index on the hundred word block in which a word appeared on the Silverthorn list, he found a positive relationship of frequency and errors. His frequency index more nearly paralleled the transcription errors than did the syllabic intensity. He said, "Thus, it appears that transcription errors are related to the half of business communication which is made up of the infrequently occurring words. . . ."[40]

In addition to her primary concern with the Cloze score (a measure of the readability of dictation materials), Curtin[41] reported on two other measures in her 1959 study, vocabulary level index and syllabic intensity. After determining the coefficient of correlation between the criterion score (the number of shorthand errors made on each letter), she concluded that the vocabulary level index was the best predictor of difficulty of the three measures that she had studied. The vocabulary level index correlation with the criterion was $r = .501$.[42] She recommended that this measure be included in any study of a combination of several predictors. Each word of each letter used in Curtin's study was keypunched on a data card along with the vocabulary index and the number of syllables. This greatly improved the accuracy of tabulation.

By putting the information about a single word on separate data cards, Hillestad studied the problem of difficulty of dictation material

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[40]Ibid., p. 68.

[41]Rita C. Curtin, "The Relationship Between Selected Factors and Difficulty of Dictated Material" (unpublished Master's thesis, University of Minnesota, Minneapolis, 1958).

[42]Ibid., p. 15.

using the multiple regression technique.[43] She singled out 13 characteristics of the shorthand system itself and 3 characteristics of the language as predictor variables. The criterion was the error made on the shorthand outline of a word by high school shorthand students.

In Hillestad's study, 100 letters were collected from a wide range of businesses and were modified so that each letter was 160 actual words in length. She checked the distribution of variables in these letters with a sample of published dictation from Dictation for Mailable Transcripts,[44] from which Curtin had drawn 41 letters for her study. The letters were randomly arranged into blocks of 25 letters each and into four different orders. Each order was assigned to two of eight schools. The letters were dictated by the teachers of each of these eight fourth-semester classes at a rate that the class could write satisfactorily, and the notes were collected by the teachers. A random sample of five papers were selected from each of the eight classes for each of the hundred letters making a total of 4,000 papers of 160 words each, or a total of 640,000 shorthand outlines which were studied for errors in the application of shorthand principles. A data card was prepared for each word in each letter, containing all the information about the word, including the number of errors made on each characteristic.[45]

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[43]Mildred C. Hillestad, "Factors Which Contribute to the Difficulty of Shorthand Dictation Material" (unpublished Ph.D. dissertation, University of Minnesota, Minneapolis, 1960).

[44]Louis A. Leslie and Charles E. Zoubek, Dictation for Mailable Transcripts (New York: Gregg Publishing Division, McGraw-Hill Book Company, Inc., 1950).

[45]Hillestad, op. cit., p. 60.

After a regression analysis was performed on the data, it was found that the characteristics which contributed the greatest portion to the criterion variance were characteristics of the words themselves. Over 73 percent was due to number of syllables and to the vocabulary level. Only 15 percent was contributed by four of the 13 characteristics of the shorthand system. The criterion variance of six word-associated characteristics was .86.

The decision was made to drop the four shorthand characteristics from the equation. The result of using two predictors instead of six reduced the criterion variance to .83. Substituting the count of words not included in the first 1,500 on Silverthorn's list resulted in a loss of 5 percent of the criterion variance ($R^2 = .78$). The formula was greatly simplified by this move for the reason that there are fewer of the low-frequency words. The following equation resulted given in standard score form:

$$\tilde{z}_y = .4511_{x_1} + .7311_{x_{16}}$$

where $\tilde{z}_y$ = predicted errors, x_1 = syllables, x_{16} = words beyond the 1,500. The R^2 associated = .7779.[46]

Hillestad's study dealt entirely with the shorthand outlines. If she had used errors in the transcript as the criterion, her results might have been quite different since students often can read many outlines which are not written correctly Hillestad did not attempt to control the speed at which the dictation was given and this might have varied considerably from school to school. The random selection of five

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[46]Hillestad, op. cit., p. 80.

papers from each of the eight classes for each of the 100 letters did not preclude the chance of getting more than one paper from the same student.

Several researchers attempted to validate Hillestad's formula for difficulty prediction. The work of these researchers will be reviewed in the section which follows entitled "Studies in Validation."

In 1966, Uthe[47] used the same 100 letters specially constructed by Hillestad for use in her study. Uthe followed the same general design used by Hillestad, but she set up some controls. First, she dictated the letters on records at 80 words a minute. Second, Uthe chose three "common" letters, one easy, one average, and one difficult as defined by the Hillestad formula, which were dictated to each student to be used to eliminate student differences on the 100 letters. The letters were divided into 25 blocks of four letters each, and the blocks were randomly assigned to 25 groups of students. The third control was to randomly select a sample of three papers for each letter. The sample was to be completely independent for each letter.[48]

Uthe scored the shorthand notes to obtain a mean shorthand error score for each of the hundred letters. The 16 variables used by Hillestad were expanded to 35, so that there were 20 characteristics of the shorthand system and 15 characteristics of the dictation material. A stepwise regression procedure determined the multiple regression equation using all 35 variables, and the F value was computed for each

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[47]Elaine Uthe, "An Evaluation of the Difficulty Level of Shorthand Dictation Materials" (unpublished Ph.D. dissertation, University of Minnesota, Minneapolis, 1966), pp. 44-48.

[48]Ibid., p. 50.

variable. At each step in the procedure, the least significant variable was dropped and a new equation was developed. The final equation contained three of the variables; namely, vocabulary level, brief forms, and endings. With only three variables, the r was .788. As in Hillestad's formula, using the words beyond the 1,500 on Silverthorn's list simplified the application of the formula. When this was substituted in the final formula, the r remained at .764. The equation which formed the best and most practical method of prediction of the number of errors students made on the hundred letters written from dictation was as follows:

$$y' = 64.77 - .50x_1 + .56x_2 - .21x_3$$

where y' = predicted word errors, x_1 = brief forms, x_2 = 1,500+ words, and x_3 = endings.

Uthe[49] went on to validate the formula using six letters, predicting the number of errors students would make, and tested them in four classes in one school. The mean error scores for the total group placed the letters in the difficulty levels predicted by the formula.

This formula contained three variables, which made computation difficult. Both formulas were equally difficult to compute using hand computation methods. The increasing availability of small calculators should work to overcome this difficulty. At the time this study was being done, publishing companies were not using either of the formulas.

As with the Hillestad formula, researchers attempted to validate the Uthe formula. These studies are reviewed in the section which follows entitled "Studies in Validation."

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[49]Ibid., p. 108.

Larsen,[50] convinced that the most frequently occurring words in business correspondence should be the basis of instructional materials, arranged an experimental class to use specially constructed materials and a control group to use conventional shorthand dictation materials. The experimental class was taught by live instruction[51] with materials composed of the 2,800 most frequently occurring words in business correspondence.

Larsen[52] found that there was no significant difference in the terminal achievement of the two groups. He concluded that the experimental method could be expanded to a full year since the results were equally as satisfactory as those of the control group.

Larsen's experiment was limited to one semester in length. He was satisfied with the progress of the experimental class. He needed to develop more instructional materials to reinforce the 2,800 words. With a variety of good materials, the experimental class might do very well. It was a new approach to teaching shorthand, but at the time of Larsen's study, such materials were not available.

Mickelsen[53] composed three letters constructed to follow Perry's stratification of words by 500-word groups. Each letter contained 240 actual words and had an overall syllabic intensity of 1.43 or 343

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[50]Nathan P. Larsen, "The Terminal Effect of Emphasizing the Most Frequently Occurring Words in Intermediate and Advanced Gregg Shorthand" (unpublished Master's thesis, Brigham Young University, 1970).

[51]Ibid., p. 44.

[52]Ibid., p. 45.

[53]Leonhard Paul Mickelsen, "The Relationship Between Word Frequency and the Difficulty of Shorthand Dictation Materials" (unpublished Ed.D., The University of North Dakota, 1970).

syllables. The exact composition of the three test letters by word levels is as follows:

	Words Used at This Level in Tests		
500 word groups	Letter A (credit)	Letter B (insurance)	Letter C (investments)
0 - 500	240	167	97
501 - 1,000	0	23	45
1,001 - 1,500	0	13	24
1,501 - 2,000	0	8	16
2,001 - 2,500	0	5	11
2,501 - 3,000	0	5	8
3,001 - 3,500	0	3	7
3,501 - 4,000	0	3	5
4,001 - 4,500	0	2	4
4,501 - 5,000	0	2	4
Beyond 5,000	0	9	19
Total	240	240	240
	100%	70%	40%

The first letter was made easy with 100 percent of the words coming from Perry's first 500 words. The second letter was considered to be average with 70 percent of the words drawn from Perry's first 500 words and the remainder of the letter made up according to the percentage found in the groups from Perry's study.[54] The third letter was made difficult with only 40 percent of the words drawn from Perry's first 500 and the remaining 60 percent of the words drawn from the groups of lower frequency according to the percentages found in those groups in Perry's study.

The letters were dictated to 117 high school students enrolled in fourth semester shorthand classes. The transcripts were checked for errors, and the errors were tallied according to the 500-word group in which each occurred.

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[54]Ibid., p. 39.

Mickelsen[55] concluded that the indices of high frequency words were successful in determining distinct dictation levels. Although the syllabic intensity was held constant at 1.43 for the three letters, the mean raw error scores varied from 14.871 to 50.598 to 131.017 on the three letters. He also concluded that transcription errors were directly related to vocabulary level. The low-frequency words caused more transcription errors than the high frequency words when the percentage figure was based upon frequency of occurrence in the tests.

Mickelsen recommended that vocabulary level be used as a single determinant in assessing the difficulty of stenographic materials. He agreed with Wellman's 1937 conclusion that syllabic intensity does not adequately measure difficulty. Like Wellman, Mickelsen constructed letters artificially and arbitrarily selected the words he used. This material is not the same as the natural flow of dictation which students get on the job. Mickelsen indicated that constructing the letters was made difficult by having to keep the syllabic intensity to 1.43. This task would not have been a problem had he been using normal running English in the letters. However, this study did provide evidence that students are successful on carefully prepared materials and that instructional materials could be improved by moving from a very simple vocabulary to a more complex vocabulary through carefully developed stages of difficulty.

Studies in Validation

Several researchers have attempted to validate Hillestad's formula for difficulty prediction. Farmer[56] designed a study using six

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[55]Ibid., p. 83.

[56]Geraldine Mary Farmer, "An Experiment to Test the Validity of a Measure of the Difficulty of Shorthand Dictation Materials," Dissertation Abstracts, Volume 26, (1965), p. 1648.

letters, two from each of the three levels of difficulty according to the Hillestad formula: namely, hard, medium, and easy. These letters were dictated to second-year Pitman shorthand classes in Calgary, Alberta, Canada, and the transcripts were scored for errors. She concluded that Hillestad's formula did not successfully predict errors in the transcripts of Pitman shorthand notes, although it might successfully predict errors in notes taken in Gregg shorthand.

Baggett[57] used six letters of six different difficulty levels from Hillestad's 100 letters and dictated them to seven classes of second-year shorthand students in Richmond, California, School District. He concluded that the Hillestad formula could discriminate between the difficulty of the six letters but was not effective in predicting the order of difficulty.

Peterson[58] designed a study to validate Hillestad's formula by constructing eight letters using words selected from Silverthorn's list. The predictor error score of the eight letters ranged from 93 to 1,657 (values typically range from 300 to 1,000). The syllabic intensity was

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[57]Harry William Baggett, "The Validity of a Measure of the Difficulty of Gregg Shorthand Dictation Materials," Dissertation Abstracts, Volume 26, (1965), p. 1648.

[58]Richard B. Peterson, "An Investigation of the Validity and Reliability of a Formula for Determining Difficulty of Shorthand Dictation Materials" (unpublished Master's thesis, Mankato State College, 1964). As reviewed by Elaine Frances Uthe, "An Evaluation of the Difficulty Level of Shorthand Dictation Materials" (unpublished Ph.D. dissertation, University of Minnesota, Minneapolis, 1966), pp. 42-43.

held at 1.40, the standard word. The letters were composed of the following words from Silverthorn's list:

Letter 1 - Mainly from the first 400 words
2 - Mainly from the second 400 words
3 - Mainly from the third 400 words
4 - Group ending at 1,500 words
5 - 2,100 to 2,500 words
6 - 3,100 to 3,500 words
7 - 4,100 to 4,500 words
8 - 5,000 and over

The letters were one minute in length and were dictated by the individual teacher at 50 words a minute to both first- and second-year students at the end of the year. Transcription errors was the criterion score.

Although the predictor error score increased consistently from Letter 1 to Letter 8, the percent of error fluctuated considerably. Peterson found that the coefficient of correlation for the predicted error and the percent of error for the entire group and for both the first-year and second-year students separately was too low for predictive purposes. He found significant differences in the number of errors if there was at least a difference of 500 in the predictor error score. Peterson concluded that Hillestad's formula was not reliable for measuring small differences between tests.

Uthe[59] questioned whether Peterson's tests of one minute's duration at 50 words per minute would yield reliable results. The make-up of the letters composed by Peterson raised doubts due to his reference to "mainly," and the irregular progression in Letters 5 through 8.

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[59]Elaine Frances Uthe, "An Evaluation of the Difficulty Level of Shorthand Dictation Materials" (unpublished Ph.D. dissertation, University of Minnesota, Minneapolis, 1966), pp. 42-43.

Each one of the researchers who have used the Hillestad formula for predicting the difficulty of shorthand dictation materials have used transcription errors as the criterion of validation. Hillestad based her formula on errors found in recording the shorthand. Students frequently can read their own shorthand notes so the result in transcript form would be a departure errorwise from what Hillestad herself found to be true. The defense used by all of these researchers was that accuracy of shorthand notes has a high correlation with accuracy of the transcript. Transcription requires a skill in handling the language not necessarily possessed by all shorthand writers.

After Uthe had published a new formula for predicting the difficulty of shorthand dictation materials, Meyer[60] attempted to validate the formula by using 12 letters from the 100 used by Uthe, four of which were classified as "easy," four, as "medium," and four, as "difficult." Letters were recorded on tape and dictated to fourth semester high school students. Transcripts of 95 students in eight different high schools were checked.

The analysis of variance of the transcription errors showed no significant differences in the groups, but there were significant differences in errors on the 12 letters and on the three levels of difficulty. There were also significant differences within each level of difficulty and some interaction of letters within the groups.

Meyer further investigated the shorthand papers of a sample of 24 selected students. Results of the analysis were similar to the

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[60]Lois Irene Meyer, "A Test of the Validity of a Measure of Difficulty of Shorthand Dictation Materials," University of Minnesota, 1967, Dissertation Abstracts 28/11A, p. 4536.

results on the transcripts. Consequently, Meyer could not validate the Uthe formula conclusively. The formula appeared to identify the very easy and the very difficult but did not make clear distinctions at other levels of difficulty.

The main criticism of the Uthe formula is that it is time consuming to calculate. It, like the Hillestad formula, is designed for use with shorthand notes. Meyer's sample of 24 students' shorthand papers was too small to be reliable. A more thorough study would have required a study of all 95 of the shorthand papers and a correlation made between the shorthand papers and the transcription papers. Perhaps further research along this line should be done.

In 1971 Henrie[61] studied four prediction formulas. They were the Hillestad formula, the Uthe formula, the Mellinger method, and the syllabic intensity method. Henrie used 20 two-minute letters from Speed Dictation by Zoubek[62] which were dictated at the following speeds: 70, 80, 90, and 100 words a minute to fourth-semester shorthand students in ten public high schools. The dictation was placed on tape, three letters at a time, and was given without previewing. The letters were transcribed within the same class period. The student transcript was the basis for determining the mean-error score for each letter.

Of the four methods of predicting the difficulty of shorthand dictation materials, Henrie found the Hillestad formula to be the most valid and the most reliable. The Uthe formula was next in validity and

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[61]Bill S. Henrie, "A Comparative Analysis of Difficulty Prediction Formulas for Shorthand Dictation," (unpublished Ed.D. dissertation, Utah State University, Logan, 1971).

[62]Charles E. Zoubek, Speed Dictation (New York: Gregg Publishing Division, McGraw-Hill Book Company, Inc., 1963).

reliability. Both of these formulas used more than one variable for prediction purposes. Henrie found the single variable predictors as being the easiest to calculate but also the least valid.

The Hillestad formula had the largest figures to calculate, but it showed the highest statistical validity and reliability of the formulas.

Henrie[63] considered the Uthe formula easier to calculate than the Hillestad formula because the numbers were smaller. He concluded that the brief forms and word endings, which are variables in the Uthe formula, weakened it. These factors show a negative correlation with reliability. The strength of the Uthe formula, therefore, lay in the variable, words over 1,500, with a positive correlation on validity.[64]

Henrie acknowledged, in Uthe's defense, that her prediction formula was designed for the prediction of errors in the recording of the material in shorthand and not for the prediction of errors in the transcript. His study supported Hillestad's use of two variables, both of which are characteristics of the language, to predict difficulty. Syllabic intensity and low-frequency words, taken together, were the best predictors of difficulty.

READABILITY SCALES

Teachers of reading have always needed to know how difficult the textbooks were that students were being asked to read. As early as 1921,

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[63]Henrie, op. cit., p. 80.

[64]Henrie, op. cit., p. 76.

E. L. Thorndike[65] published The Teacher's Word Book of 10,000 Words, which tabulated the frequency with which words occur in print. In 1932, he published A Teacher's Word Book of 20,000 Words. In 1944, The Teacher's Book of 30,000 Words followed.

Lively and Pressy[66] are credited with the first quantitative study of reading difficulty. They calculated a "weighted median index number," which increased as the vocabulary became easier.

The McCall-Crabbs Standard Test Lessons in Reading[67] were published in 1925. This set of test passages, which have developed norms through use on thousands of children, has been used more than any other criterion in the development of the readability formulas.

In 1934, Dale and Tyler[68] published a final formula which contained three factors: number of different technical words, number of different hard non-technical words, and the number of indeterminate clauses.

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[65]Edward L. Thorndike, The Teacher's Word Book (A List of 10,000 Words) (New York: Bureau of Publications, Teachers College, Columbia University, 1921).

[66]Bertha A. Lively and S. L. Pressy, "A Method for Measuring the 'Vocabulary Burden' of Textbooks," Educational Administration and Supervision, IX (October, 1923), 389-398, as reviewed by Joy L. Henshall, "An Application of Readability Techniques to Prediction of Difficulty Level of Shorthand Dictation Materials" (unpublished Ph.D. dissertation, North Texas State University, Denton, Texas, 1971), p. 17.

[67]William A. McCall and Lelah M. Crabbs, Standard Test Lessons in Reading (New York: Columbia University Teachers College, 1925), as reviewed by Henshall, ibid., p. 16.

[68]Edgar Dale and Ralph W. Tyler, "A Study of the Factors Influencing the Difficulty of Reading Materials for Adults of Limited Reading Ability," Library Quarterly, IV (July, 1934), 384-412, as reviewed by Henshall, ibid., p. 19.

Other researchers in the 1930's included Ojemann,[69] who worked with qualitative factors of concreteness or abstractness of relationships in adult materials; Gray and Leary,[70] who were concerned with the adult reader of limited ability; and Morriss and Holversen,[71] who developed an idea analysis technique.

Lorge[72] tried to simplify formulas. His formula was based on three factors: (1) the number of different hard words, (2) the average sentence length, and (3) the number of prepositional phrases.

Flesch[73] (1948) was to become the best known in the history of readability research. He developed a Reading Base formula as follows:

> Use systematic selection of 100 word samples.
> Determine the number of syllables per 100 words (wl)
> Determine the average number of words per sentence (sl)
> Apply in the following equation:
>
> Reading Ease = 206.835 - .846(wl) - 1.015(sl)

Dale and Chall[74] introduced a 3,000 word list and along with it, a two-factor formula, which was devised to discriminate at levels beyond

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[69]Ralph Ojemann, "The Reading Ability of Parents and Factors Associated with the Reading Difficulty of Parent Education Materials," Researches in Parent Education (Iowa City, 1934), as reviewed by Henshall, ibid., p. 18.

[70]William S. Gray and Bernice E. Leary, What Makes a Book Readable (Chicago, 1935), as reviewed by Henshall, ibid., p. 19.

[71]Elizabeth C. Morriss and Dorothy Holversen, "Idea Analysis Technique" (unpublished manuscript, Teachers College, Columbia University, 1938), as reviewed by Henshall, ibid., p. 20.

[72]Irving Lorge, "The Lorge and Flesch Readability Formulae, a Correction," School and Society, LXVII (February, 1948), as reviewed by Henshall, ibid., p. 21.

[73]Rudolf F. Flesch, "A New Readability Yardstick," Journal of Applied Psychology, XXXII (June, 1948), 228-230, as reviewed by Henshall, ibid., p. 22.

[74]Edgar Dale and Jeanne S. Chall, "A Formula for Predicting Readability," Educational Research Bulletin, XXVII (January 21, 1948), 11-20, as reviewed by Henshall, ibid., p. 26.

fourth-grade difficulty. The two factors were average sentence length in words and percentage of words outside the Dale list of 3,000.

Gunning[75] developed the Fog index. This was a two-factor formula, which included average sentence length and percentage of words containing three syllables and over. Gunning is best known for his work in introducing readability to industry.

The Cloze Procedure developed in 1953 by Taylor[76] derived its name from the closure concept of Gestalt psychology. This is a non-structural approach to measuring the readability of material by deleting every fifth word in the transcript. The student must supply the missing words to give an index of his comprehension of the literary work.

McLaughlin[77] (1969) published the SMOG Grading, which he had named in tribute to Gunning's Fog Index. The term referred to McLaughlin's birthplace, London, where smog made its first appearance. The SMOG Grading required counting the polysyllabic words in 30 sentences. The 30 sentences were to be taken in groups of 10 from three different places in a book. The next step was to estimate the square root of the number of polysyllabic words counted. Lastly, three was to be added to the approximate square root. This last number became the reading grade that a student must have reached if he understood fully the text being assessed.

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[75]Robert Gunning, The Technique of Clear Writing (New York: McGraw-Hill Book Company, 1952), as reviewed by Henshall, ibid., p. 27.

[76]William L. Taylor, "Cloze Procedure: A New Tool for Measuring Readability," Journalism Quarterly, XXX (Fall, 1953), 415, as reviewed by Henshall, ibid., p. 30.

[77]G. Harry McLaughlin, "SMOG Grading--a New Readability Formula," Journal of Reading, 12 (May, 1969), 639-646.

The procedure was so simple that one statistician thought it was a "put on," a fake. Many secondary schools are using this grading method because the final answer is a grade level which corresponds with the Gates-MacGinitie Reading Tests[78] used in diagnosing reading problems.

Studies Using Readability Scales

From time to time, business educators have examined the usefulness of readability scales developed by reading specialists. They have been prompted to do so for two reasons: the need to determine the reading difficulty of the instructional materials themselves and the desire to use readability formulas to predict the difficulty of dictation materials.

Flood[79] (1953) applied the Reading Ease formula developed by Flesch[80] to Gregg materials prepared for student use and found the range of scores to be from very easy through standard as far as comprehension could be measured by the formula.

Curtin[81] (1959) investigated the Cloze Procedure as a possible new measure of determining difficulty of shorthand dictation material. The Cloze Procedure required the students to supply missing words in the letters used in the study. To get a correct score, the word chosen

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[78]Arthur I. Gates and Walter H. MacGinitie, Gates-MacGinitie Reading Tests (New York: Teachers College Press, Teachers College, Columbia University, 1969).

[79]Hazel Flood, "Some Factors Involved in Learning Shorthand--Analysis of the Learning Load of Two Systems of Shorthand" (unpublished Ph.D. dissertation, University of Minnesota, Minneapolis, 1953), Dissertation Abstracts 1953, 13/06, 720-721.

[80]Flesch, loc. cit.

[81]Rita C. Curtin, "The Relationship Between Selected Factors and Difficulty of Dictated Material" (unpublished Master's thesis, University of Minnesota, Minneapolis, 1958).

had to be the exact word which was omitted. The 41 letters used were randomly drawn from Dictation for Mailable Transcripts.[82] The same 41 letters were dictated to another four classes to study the errors which the students made in the recorded shorthand.

Each word in each letter was punched on data cards, along with vocabulary index, number of syllables, and shorthand errors. The relationship between the number of errors made on the dictated material and the Cloze scores for the same letters was determined by the Pearson-Product Moment Correlation. Curtin concluded that there was no apparent relationship existing between the Cloze score and the number of shorthand errors made on dictated material.

This study counted errors in recorded shorthand because the Cloze Procedure was applicable to oral as well as written communication. The Cloze Procedure resembles more closely the transcription process of reading outlines with the help of words which precede or which follow the outline the student is trying to transcribe. This study would have profited from having had the letters transcribed.

Madrid[83] worked with two readability formulas: the Gunning Fog Index[84] and the Flesch[85] Reading Ease Formula. Ten shorthand textbooks were selected from the price list of the Gregg Publishing Division of

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[82]Charles E. Zoubek, Speed Dictation (New York: Gregg Publishing Division, McGraw-Hill Book Company, Inc., 1963).

[83]Ernest William Madrid, "A Study of the Readability of Gregg Shorthand Textbooks" (unpublished Master's thesis, University of Southern California, Los Angeles, 1960), National Business Education Quarterly 30 (October), 31.

[84]Gunning, loc. cit.

[85]Flesch, loc. cit.

McGraw-Hill Book Company, and 12 samples were chosen from the transcript of each textbook for evaluation using the two readability formulas.

Madrid found that the textbooks ranged from ninth grade through college sophomore level when evaluated according to the Gunning formula. They ranged from seventh grade to twelfth grade when evaluated by the Flesch Reading Ease Formula. First semester textbooks were the easiest to read by both formulas and college textbooks were the most difficult by both formulas with the exception of one college textbook.

Both formulas rated the same books as the easiest and the same ones as being most difficult. There was a difference of two grades in the levels which the formulas established for the books. This is a matter that would be well for users of these formulas to know.

One researcher, Kodet,[86] was concerned with the difficulty the student of shorthand encountered in learning to read shorthand. He studied the three phases of the process of learning to read outlines.

Phase I applied to homework material assigned to be read from shorthand plates only. Phase II applied to reading homework which had been copied by the student from shorthand plates presented in the text. Phase III applied to reading from shorthand plates which had not been previously seen or previewed.

The errors made by the students in each of the three phases were classified according to Silverthorn's list of high frequency words. A study of the results[87] showed that errors and hesitancies clustered

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[86]Ambrose Stanley Kodet, "An Analysis of Factors Contributing to Difficulty of Reading Materials in Gregg Shorthand Diamond Jubilee Series" (unpublished Master's thesis, Mankato State College, 1964).

[87]Ibid., p. 15.

around the words in the first 100 common words used in dictation and those low frequency words which are beyond the 1,500 most common words. The low frequency words presented the greatest problem in all three phases of reading.

Kodet[88] recommended that Flesch's Reading Ease formula and Hillestad's Prediction formula be applied to the reading materials to determine whether materials in the textbook are scientifically graded.

The first semester textbook in shorthand should be carefully prepared with attention given to the level of vocabulary used, the frequency of its use in business dictation, and the clearness with which carefully selected words present the shorthand theory.

Henshall[89] (1971) studied the effectiveness of four selected readability formulas in determining the difficulty levels of shorthand dictation materials. She compared the results of each of these formulas with the effectiveness of the Uthe formula, which was designed specifically to measure difficulty in the recording of shorthand.

The four readability formulas selected for use in this study were the following:

1. The Dale-Chall Readability Formula
2. The Flesch Reading Ease Formula
3. The Gunning Fog Index
4. The Farr-Jenkins-Peterson Formula

Henshall[90] justified her analysis of both shorthand and readability formulas because the two shorthand formulas (Hillestad and Uthe)

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[88]Ibid., p. 51.

[89]Joy L. Henshall, "An Application of Readability Techniques to Prediction of Difficulty Level of Shorthand Dictation Materials" (unpublished Ph.D. dissertation, North Texas State University, Denton, Texas, 1971), p. 17.

[90]Ibid., p. 7.

and the four adult readability formulas contained a common difficulty factor, the vocabulary index, and both types of formulas analyze language structure.

Henshall[91] selected 15 test letters, each 160 actual words in length, from the original 100 letters used by Hillestad, and used them for testing. The letters chosen corresponded most closely with Uthe's difficulty scale. Three letters each were selected at the mean difficulty score of the scale and at ±1 Standard Deviation and ±2 Standard Deviations from the mean. The 15 letters were recorded at 80 words per minute on 5 tapes with 3 letters on each tape. Each test group used the original tape so the dictation was the same for all participants. A total of 71 students completed all the letters.[92]

Three of the 15 letters were selected as being representative of the mean and the two extremes of the Uthe difficulty index.[93] These three letters were scored according to the five research formulas by 40 prospective shorthand teachers. Scores and time necessary to produce the scores were recorded.

The study investigated the correlation between each of the five variables and the criterion of student performance. Not one of the four readability formulas was found to have a simple coefficient of correlation as high as that of the Uthe formula.[94] Since the 15 letters used by Henshall were drawn from the 100 letters of the Uthe study, this result was predictable. It was built into the study from the outset.

Henshall put two of the readability formulas together, the Gunning Fog Index and the Farr-Jenkins-Patterson, and achieved an R of .81.

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[91]Ibid., p. 58.

[92]Ibid., p. 60.

[93]Ibid., p. 63.

[94]Ibid., p. 99.

This compared with the r of .84 achieved from using the Uthe formula.[95] Having to figure two readability formulas would not simplify the problem of determining the difficulty of dictation material. The use of the Uthe formula would be just as easy. It predicted best at the mean and higher levels. Readability formulas predicted best at lower levels of difficulty.[96]

Henshall[97] concluded that a simple, easily applied measure of difficulty for shorthand materials remains to be found.

There is a whole new era of research opening in the future for readability measurement through the use of the computer and string-processing language. The amount of difficulty which is based on the structure of the language and is quantitative will be counted and compiled easily with the aid of the computer. The difficulty of a book can be ascertained, not by a few hundred word samples, but in its entirety. It will not be necessary to discard a formula simply because it is time-consuming to handle.

The part of difficulty that is qualitative does not lend itself to easy measurement.

OTHER STUDIES IN DIFFICULTY

A few researchers have studied student reaction to writing words of low frequency. Rowe[98] developed the scriptochron to measure the time pauses in writing and where those hesitations took place. Three kinds of information were obtained: (1) the time consumed before touching the

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[95]Ibid., p. 94. [96]Ibid., p. 92. [97]Ibid., p. 104.

[98]Clyde E. Rowe, The Writing of Infrequently Used Words (New York: Teachers College, Columbia University, 1943), p. 47.

pencil to the paper; (2) the total writing time for the word, inclusive of pauses within the word; and (3) the total pausing time within the word. Rowe also compared the writing of high-frequency words with low-frequency words through the use of motion pictures. He concluded:[99]

> The problem of writing shorthand rapidly is apparently as much a matter of decreasing the time between strokes and while holding the pen stationary as it is a matter of increasing the rapidity of the stroke. . . . only 52 percent of the total time is used in actually writing shorthand. . . . the pausing time before writing infrequently used words is about 50 percent more than before the writing of frequently used words . . .

Rowe also studied the errors made in shorthand notes of the two groups of words and found twice as many errors on the low-frequency words as on the high-frequency words.[100] Rowe defined high-frequency words as those in the first 500 frequency on the Horn-Peterson list, and the low-frequency words as those beyond the first 500 on the list.

Klein[101] studied the writing habits of three expert shorthand writers (Swem, Dupraw, and Rifkin) with the writing habits of ten non-expert shorthand reporting students. The experts were writing at 210 to 220 words a minute, and the students wrote at 140 words a minute. Pictures taken by a 16 mm motion-picture camera showed that the students paused about five times as frequently as the experts. Approximately half the pauses made by the students were initial pauses, whereas those made by the experts were about evenly divided among initial, medial, and final pauses.

Klein concluded that the experts had overcome the mental and physical barriers to high-speed writing.

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[99]Ibid., p. 62. [100]Ibid., p. 42.

[101]Abraham Klein, "Variations in the Speed of Writing of Symbol combinations in Gregg Shorthand" (unpublished Ph.D. dissertation, New York University, 1949), National Business Education Quarterly 18 (October), 35-44.

SUMMARY OF THE REVIEW OF LITERATURE

Three elements of the language which are factors of difficulty in shorthand dictation materials were reviewed in this chapter. These factors are: (1) syllabic intensity, (2) vocabulary level, and (3) readability.

Syllabic intensity was the first method devised to measure the difficulty of dictated copy. The number of syllables in words was the first measurable difference apparent to researchers of the early 1920's. By 1931 The Gregg Publishing Company had established the "standard word" as being 1.4 syllables in length. Lower figures, such as 1.2 and 1.3, indicated easier material and higher figures, such as 1.6 and 1.7, indicated more difficult copy.

Complete agreement did not exist among the members of The Gregg Publishing Company concerning the complete validity of syllabic intensity as a measure of difficulty, but it was easy to compute and practical for use by a publishing house.

By the late 1930's researchers were beginning to add factors which also contributed to difficulty and one of these factors was vocabulary frequency. The word lists available to these researchers were not particularly helpful because the early lists were not based on business communications. As new word frequency counts have been published, interest in vocabulary as a measure of difficulty became the theme of a number of studies. Some researchers designed their own dictation materials with words chosen from low or high frequency word lists and subsequently proved vocabulary level to be the best measure of difficulty. Other researchers were not ready to eliminate syllabic intensity.

Instead, a second factor, words beyond the 1,500 most commonly used business words, was added and prediction formulas were developed containing two factors used together to determine difficulty.

One prediction formula was developed which contained three factors, omitting syllabic intensity entirely. The three factors were words beyond the 1,500 most commonly used business words, word endings, and brief forms. When validated, this formula did distinguish between "easy" and "difficult" copy but did not clearly distinguish the "medium" difficulty material.

One researcher attempted to validate four prediction formulas. The formula which contained two factors, syllabic intensity and words beyond the 1,500 most commonly used business words, proved to be the best predictor of difficulty in dictation copy.

Studies made in the early 1970's have tried to show that vocabulary level should be the basis of instructional materials and the single determinant in assessing the difficulty of stenographic materials. These studies did not use materials based on normal running English, but created special materials through the use of controlled vocabulary.

More recent studies state that what is needed is a complete identification of the level of words contained in a piece of dictation as well as the syllabic intensity.

Because of the availability of readability scales developed by reading specialists, some researchers have tried to establish their usefulness as a means of determining difficulty of shorthand materials. None of these scales has proved to be any more successful than the shorthand formulas already developed. The value of readability scales has been their use as a tool in examining the reading range of instructional materials being used by students of shorthand.

Mechanical means have also been used to study where time is lost in writing shorthand at high speed. Although some hesitation appeared in the writing of the shorthand outlines, the greatest amount of hesitation was shown to occur between shorthand outlines. Experts tended not to lose time in moving from one shorthand outline to the next.

The time-consuming task of counting low frequency words has been rejected as too slow and expensive by publishing houses to undertake. The computer is now being used by some publishers to analyze the vocabulary of dictation materials and to provide teachers with vocabulary controlled materials for beginning students.

Chapter 3

METHODOLOGY AND PROCEDURES

A description of the materials which were collected for a content analysis and an explanation of how the analysis was conducted are presented in this chapter.

BOOKS

The books from which the student prepares homework and the books from which the teacher chooses tests were examined. The students' books were referred to as textbooks, and the teacher's test materials were called books of tests.

Textbooks

The textbooks which are in regular use in the colleges and secondary schools in the study of Gregg Shorthand were used. The college textbooks were the following:

1. Gregg Shorthand for Colleges, Diamond Jubilee Series, Second Edition, Volume 1, by Leslie, Zoubek, Lemaster, and Hosler (McGraw-Hill Book Company) 1973.

2. Gregg Shorthand for Colleges, Diamond Jubilee Series, First Edition, Volume 2, by Leslie, Zoubek, and Hosler (McGraw-Hill Book Company) 1965.

3. Gregg Shorthand for Colleges, Transcription, Diamond Jubilee Series, by Hosler, Grubbs, and Wagoner (McGraw-Hill Book Company) 1966.

4. Gregg Shorthand for Colleges, Speed Building, Diamond Jubilee Series, by Gregg, Blanchard, Baldwin, and Popham (McGraw-Hill Book Company) 1966.

5. Shorthand Dictation Studies, Third (Jubilee) Edition, Bowman and Oliverio (South-Western Publishing Company) 1966.

The secondary textbooks which are in regular use in high school in the study of Gregg shorthand were sampled for difficulty. The five secondary textbooks used were as follows:

1. Gregg Shorthand, Diamond Jubilee Series, Second Edition, by Gregg, Leslie, Zoubek (McGraw-Hill Book Company) 1971.

2. Gregg Dictation, Diamond Jubilee Series, Second Edition, by Leslie, Zoubek, Strony (McGraw-Hill Book Company) 1971.

3. Gregg Transcription, Diamond Jubilee Series, Second Edition, by Leslie, Zoubek (McGraw-Hill Book Company) 1972.

4. Gregg Speed Building, Diamond Jubilee Series, Second Edition, by Leslie, Zoubek, Mitchell (McGraw-Hill Book Company) 1972.

5. Shorthand Transcription Studies, Fourth Edition (Jubilee) Balsley and Wanous (South-Western Publishing Company) 1968.

Samples made up of blocks of approximately 100 words were taken from the beginning, middle, and end of each one of the college and secondary textbooks. As a result, approximately 300 words were studied from each textbook.

The 300-word samples were typed on data cards, which were coded to identify the source.

Books of Tests

The same books of tests are available to both secondary and college teachers of shorthand. Because there is very little dictation material available, teachers revise these books by changing the prices and amounts in line with current values. The most recent books of tests are published in paperback form once a year. They have been available for use in September of each year. The following books of tests were examined in this study:

1. Previewed Dictation, by Charles E. Zoubek (McGraw-Hill Book Company) 1950.

2. Progressive Dictation With Previews, by Charles E. Zoubek (McGraw-Hill Book Company, Inc.) 1956.

3. Speed Dictation With Previews in Gregg Shorthand, Diamond Jubilee Series, By Charles E. Zoubek (McGraw-Hill Book Company, Inc.) 1963.

4. Gregg Tests and Awards, 1971-1972, by Donna Zack, Editor, (McGraw-Hill Book Company, Inc.) 1971.

5. Gregg Tests and Awards, 1972-1973, by Gayle Covey Glazebrook, Editor, (McGraw-Hill Book Company, Inc.) 1972.

The same procedure was used to collect samples of the test material as was used with the textbooks. Blocks of approximately 100 words were taken from the beginning, middle, and end of each book. The 300 words taken from each book were then put on data cards and coded to identify the book.

Non-Statistical Analysis of the Books of Tests

The reading level of each textbook and book of tests was determined by the SMOG Grading formula. This method selects ten sentences from the beginning, middle, and end of each book and totals the words with three or more syllables. Polysyllable words include hyphenated words also. When the number of polysyllable words have been determined, the square root of this number is estimated and three is added to the total. The result is the grade level of the book. Numbers 10 through 12 indicate secondary material and 13 through 17 indicate college reading level. This readability scale is equated with the Gates-MacGinitie Reading Survey which is used in the secondary schools to determine the reading ability of students. The reading level of all instructional materials as well as letters dictated and unsolicited was determined, and the results were presented in table form.

A more extensive examination of the books of test was desired. Consequently, the tests at 60, 80, 100, and 120 speed levels were singled out for further study. A block of 100 words was taken from the first test at 60 words a minute, the middle test at 60, and the last test at 60. Thus, a 300-word sample was obtained from the part of the book containing tests marked off for dictation at 60 words a minute. These words were put on data cards and coded to identify the source of the sample and the speed level. This procedure was followed for the tests counted for dictation at 80 words a minute, at 100 words a minute, and at 120 words a minute.

Each of the five books of tests was sampled in this manner, and the words were put on data cards. The results of the study of these four speed levels taken from each of the five books of tests were presented by means of a graph for each dependent variable.

LETTERS

The letters which were used in this study were drawn from three sources. The executive letters were written by top-management level, such as bank presidents, senators, and corporation vice presidents. The mid-management letters were written by office managers, branch managers, and department chairmen. The unsolicited letters were written by advertising management personnel. The three sources of letters are described under the headings: top-level management, mid-management, and unsolicited.

In order to develop an orderly procedure in the studying of a large number of letters, categories of common business areas were used. The letters were placed into five categories as follows:

1. Industry
2. Government
3. Finance
4. Education
5. Transportation

The objective was to secure letters from top-level management in all five of the categories, to get letters in all categories from mid-management personnel, and to have the five categories in the unsolicited letters.

Top-Level Management Letters

To obtain letters from executives in industry, the list of the one thousand largest industrial corporations published in Fortune magazine during the months of May and June, 1973, was used. The one thousand corporations were numbered and ten names were chosen with the aid of a list of random numbers. The addresses for these ten corporations were obtained from Moody's Industrial Manual, 1973. A letter was sent to the president of each corporation asking for a sample of five letters which had been dictated in the normal course of daily business correspondence. At the same time, each company was asked to return up to five letters of unsolicited mail composed of direct-mail advertising pieces.

Ten states were chosen through random numbers and a list of fifty names was made by listing the name of the governor, the names of the two senators from each of those states and two of each of the state's representatives. From this list of fifty names, ten were randomly chosen and letters were sent to each of their offices asking for samples of letters dictated and unsolicited.

In order to obtain correspondence which would represent top-level executives in finance, the names and addresses of bank presidents were obtained from Moody's Bank and Financial Manual, 1973. Ten banks were chosen from the list of fifty largest banks in the United States, listed in order of permanent capital funds, December 31, 1972. A letter

was sent to the address given in Moody's Bank and Financial Manual requesting five samples of dictated correspondence and five of unsolicited advertising letters.

The same ten states which were randomly drawn for use in locating government letters were used in the search for letters to represent education. One university or state college was chosen from each of the ten states. A letter was sent to the president of the school, asking for five samples of dictated correspondence and five samples of unsolicited mail.

The letters representative of transportation were obtained through consulting Moody's Transportation Manual, 1973. Railroad companies were randomly chosen from the alphabetical List of Class 1 Line-Haul Railroads in United States, December 31, 1972. Names and addresses of 16 air transport companies, 5 trucking companies, and 3 miscellaneous companies, including waterborne transportation, were also selected and from these combined lists ten names were randomly selected to represent transportation.

A total of fifty letters were mailed to executives in the five categories. Replies were received from 29 companies.

Mid-Management Level Letters

To obtain letters from mid-management personnel, the president of the local chapter of the Administrative Management Society was asked to help to design a method of obtaining letters nationwide through the chapters of the Society. There were 165 chapters in the 15 districts in the United States, which included parts of Canada. It was decided to contact the presidents of three chapters in each of the 15 districts in the United States, but not to contact any of the chapters in Canada.

The chapters were listed in each of the districts, and three chapters were chosen by means of random numbers.

A letter requesting the president of each selected chapter to gather samples of letters from chapter members who were engaged in industry, government, finance, education, or transportation activities. The letter asked for five letters representative of the businesses in the area and five unsolicited letters, which arrive with the daily mail and advertise products or services. The president of the local Administrative Management Society also wrote a letter, which was enclosed with the original request, urging members of the Society to support this educational effort. Copies of these letters are given in Appendix A.

Of the 45 chapters receiving the letters, 21 chapters returned letters for use in this study. It was necessary to send one follow-up letter to obtain this number of responses.

Unsolicited Letters

The letters, which were mailed to businessmen in the five categories requesting samples of normal business dictation, also requested any unsolicited or direct-mail advertising letters which might be available. Although companies were willing to forward the advertising circulars they had on hand, many of them stated that they were sending only what was available since most circulars were disposed of immediately unless they contained something of special interest.

COLLECTING THE DATA

The books and letters were sampled in 100-word blocks. Three hundred words were considered a total sample from any one textbook. Letters were stapled in groups of three in order to have 300-word samples

for ease in handling. The following section explains in detail how the samples were prepared for counting by the computer.

Books

A sample of one hundred words was taken from the beginning, from the middle, and from the end of each textbook and book of tests. The first one-hundred-word block was taken from the beginning of a letter, the second one-hundred-word sample was taken from the middle of a letter, and the third sample was taken from the end. In this way, opening or closing words and phrases were not included in every sample.

In this study, a sample of one hundred words did not include proper names of persons or companies. It did not include trade names or numbers written as figures. The sample did, however, include figures if they were written as words. The days of the week and the months of the year were included along with the names of cities and states.

For purposes of identification on the data cards, each college book was coded from 1 through 5; each secondary book, 6 through 10; and each book of tests, 11 through 15. In addition to the code number identifying each book, a continuation number up to three digits in length was put into each data card to keep all the cards for one book in sequence.

The three one-hundred-word samples were put on data cards in the following manner. Starting in Column 6 on each card, a word was put on and followed by a comma but no space. After the last word on the card, a space was left. A word had to fit on the card and could not be hyphenated and carried to the next card.

The books of tests were examined in addition on four of the ten speed levels contained in each book. These four speed levels were 60-,

80-, 100-, and 120-words a minute. One hundred words were taken from the first, middle, and last test for each of these speed levels in each of the five books of tests. These data cards were coded with the same first two digits used for the book of tests (11 through 15), but an additional digit was added in the third column for identification of the speed level. The 60-speed level was coded 1; the 80-speed level was coded 2; the 100-speed level, 3; and the 120-speed level, 4. The continuation numbers followed in the fourth and fifth columns. Starting in Column 6, the words were entered with a comma and no space following each word. A blank was left after the last word on each card. Words could not be hyphenated and carried over to the next card.

Letters

The letters from each of the three sources, top-level management, mid-management, and unsolicited, were separated. Each source was then divided into the five categories: industry, government, finance, education, and transportation. Fifteen letters were chosen as being representative of a category. These 15 letters were stapled together in groups of three. A sample of one hundred words was marked on each letter. A one-hundred-word block was taken from the beginning of the first letter, a second one hundred words were taken from the middle of the second letter, and a third one hundred words were taken from the end of the third letter. This method eliminated all opening or closing terms from being included continuously.

These one-hundred-word samples were put on data cards. The first digit on the data card coded the source of the letter; the second digit coded the category; and the third digit indicated which group of three letters was recorded. The fourth and fifth digits were the

continuation numbers used to keep the data cards in order. Starting with Column 6, the words of the sample were entered with a comma and no space following each word.

Syllabic Intensity

The syllabic intensity was determined for each one-hundred-word sample. All of the syllables in the sample were counted. The total number of syllables were then divided by the total number of words to give the syllabic intensity of the sample. The formula was as follows:

$$\frac{\text{Total syllables}}{\text{Actual words}} = \text{Syllabic intensity}$$

The syllabic intensity of each book and of each group of three letters was entered on the summary data cards only.

Reading Level

The secondary schools are using SMOG Grading as the means of determining the reading level of the material used in the classrooms. SMOG Grading permits the rapid assessment of readability by using the number of words of three or more syllables in 30 sentences picked in groups of ten from the beginning, middle, and end of a textbook. The estimated square root of the polysyllables counted plus three is the grade level of the textbook.

The SMOG Grading system was used to determine the reading level of the five college textbooks, the five secondary textbooks, and the five books of tests.

In determining the reading level of the letters, the necessity of using ten sentences in SMOG Grading proved difficult because a number of the individual letters did not contain as many as ten sentences.

For this reason, the reading level was determined for a category of letters by taking ten sentences from the first group of three letters, ten sentences from the third group of three letters, and ten sentences from the fifth group of letters. This provided the thirty sentences necessary for the computation.

THE DEPENDENT VARIABLES

Four of the six dependent variables were based on Perry's list of The 500 Most Frequently Used Word Combinations and the 5,000 Most Frequently Occurring Words in Business Letters.[1] The remaining two variables were brief forms and syllabic intensity. A description of the six dependent variables follows:

Brief Forms

The brief forms are frequently written business words for which shortened outlines have been developed to increase the speed with which each word can be written. In some cases, the shortened form facilitates phrasing or the combining of two or more brief forms into one outline for speed purposes. The brief forms of Gregg Shorthand Diamond Jubilee are 129 in number. Some of these outlines stand for more than one common word. When all of the words are included in the count, there are a total of 148 words which are written as brief forms. Words which are written with a brief form as a part of a new outline are referred to as brief form derivatives. Such words are not included in this dependent variable.

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[1]Devern J. Perry, The 500 Most Frequently Used Word Combinations and the 5,000 Most Frequently Occurring Words in Business Letters, Research and Science Project No. 1, Delta Pi Epsilon, Alpha Omega Chapter, Brigham Young University, Provo, Utah, April 1970.

Perry's 1 - 100 Words

The second dependent variable was the one hundred most commonly used words in business correspondence as stated by Perry in his list. Pullis[2] called these one hundred words the high-frequency words and stated that they represented approximately 53.43 percent of our business vocabulary. Of these one hundred words, 56 are brief forms in the Diamond Jubilee edition of Gregg Shorthand. In this study, the first one hundred words will be referred to as Perry's 1 - 100.

Perry's 101 - 500

The four hundred most commonly used words which lay beyond the one hundred words and including the fifth hundred on Perry's list were used as the third dependent variable. Pullis[3] referred to these words as common words and stated that they are used in approximately 18.5 percent of business correspondence. The first one hundred words in addition to these four hundred words account for approximately 71.93 percent of all the words used in business letter writing. Among these four hundred words are 29 brief forms. These four hundred words will be referred to in this study as Perry's 101 - 500.

Perry's 501 - 1,500

The one thousand commonly used business words which lay beyond the first 500 high-frequency and common words and which included the fifteenth hundred words on Perry's list were used as the fourth dependent variable. These words are said to represent 13.65 percent of all business correspondence.[4] In this study these one thousand words will be referred to as Perry's 501 - 1,500.

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[2]Joe M. Pullis, "A New Standard Word in Shorthand?" The Journal of Business Education, 52 (January, 1971), 144-145.

[3]Ibid. [4]Ibid.

Perry's Over 1,500

All of the words in the approximately 300-word samples, which were not brief forms, the one hundred high frequency words, the four hundred common words, or the one thousand words beyond the first five hundred commonly used business words on Perry's list were put into the fifth variable. These words contribute about 14 percent of the vocabulary used in business letter writing. They are referred to as Perry's over 1,500 in this study.

Syllabic Intensity

The syllabic intensity of a letter has been the only measure of difficulty provided by publishing companies in the instructional materials used by shorthand teachers. In a study which attempts to compare the difficulty of business letters with instructional materials, the syllabic intensity of all the materials was of sufficient interest to be included as the sixth dependent variable.

The syllabic intensity was determined for each one-hundred-word sample. The three samples, which were taken from each book, were then averaged to give the syllabic intensity of the book. The letters were stapled together three in a group. A one-hundred-word sample was taken from each letter. The syllabic intensity was determined for each letter and the mean intensity determined for each group of three letters. Finally the five groups of three letters which made up a category were averaged to determine the syllabic intensity for each category of 15 letters.

The standard word as defined by Leslie[5] is 1.4 syllables. This was used as the criterion of average difficulty as measured by syllabic intensity in this study.

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[5]Louis A. Leslie, "The Difficulty of Shorthand Dictation Material," Business Education World, 28 (September, 1947), p. 16.

THE RESEARCH DESIGN

A one-way analysis of variance was developed using the six dependent variables described on pages 58 - 60 as the criteria, and the books and letters as the independent variables.

One-Way Analysis of Variance

The analysis of variance is a procedure for the simultaneous comparison of many means in order to decide if some statistical relation exists between the experimental and dependent variables. The independent or experimental variables stand for a qualitatively different treatment applied to the dependent variables.[6] The problem in this study was to compare groups differing in only one way; that is, vocabulary content. Therefore the research design included a one-way fixed effects analysis of variance. The fixed effects model was used since inferences from this analysis will be drawn to the materials used in the study only.

Independent variables used in this study were the college and secondary textbooks, the books of tests, and the letters from five categories of businesses in three areas, top-level management personnel, mid-management personnel, and unsolicited letters. The brief forms used in Gregg Shorthand, the syllabic intensity of the one-hundred-word samples, and four categories of frequently used words in business correspondence were the dependent variables.

Level of statistical significance set for this study was .05. Practically speaking, this meant that a statistically significant result

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[6]William L. Hays, Statistics (New York: Hold, Rinehart and Winston, 1963) p. 356.

would actually be in error, or truly insignificant, only once in every 20 cases.

Two-Way Analysis of Variance for Letters

In addition to the one-way analysis of variance described above, using books and letters as the independent variables, a two-way analysis of variance was performed, using the letters only and comparing them by origin in level of management across the business and industrial classification with the dependent variables.

Scheffé Post Hoc Comparisons

When an F-ratio from the analysis of variance signaled a significant difference, the Scheffé Post Hoc Technique was used to examine pairs of means to pinpoint where differences existed. The object of the Scheffé technique was to discover which linear combination of means made the greatest contribution to the significance of the over-all F-ratio.[7]

ANALYZING THE DATA

A total of 28,647 words were prepared for analysis. Approximately three hundred words were taken from each group of three letters and there were 75 groups of letters. In addition, the first 1,500 words of Perry's list of most commonly used business words were included as well as the 148 brief forms.

A COBOL program was written to count the number of words in each dependent variable. Using Perry's 1,500 words and the 148 brief

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[7]Ibid., pp. 485-486.

forms as criteria, each three-hundred-word sample was compared and the number and proportion of words emanating from each of the five dependent variables was determined. These variables were:

1. Brief Forms
2. Perry's 1 - 100
3. Perry's 101 - 500
4. Perry's 501 - 1,500
5. Perry's Over 1,500

These summary data were included with syllabic intensity and reading level, which were determined by hand methods. Cell means and standard deviations computed in the analysis of variance for these summary data are given in Appendix B. Based on the statistical design, summary data were grouped into 18 cells as shown in Illustration 3.1.

In preparation for the two-way analysis of variance, means and standard deviations were developed for each of the three sources (top-level management personnel, mid-management personnel, and unsolicited) by categories within sources (industry, government, finance, education, transportation). These cell means and standard deviations are given in Appendix C.

Finally, data from the 90 three-hundred-word samples were further condensed into five areas for each of the six dependent variables and the reading level. The five areas were:

1. College textbooks
2. Secondary textbooks
3. Books of tests
4. Letters dictated
5. Letters unsolicited

The Statistical Design

The one-way analysis of variance design contained 18 independent variables, each with a cell size of five (Illustration 3.1). The five

college textbooks included in the first cell were Gregg Shorthand for Colleges, Volume 1; Gregg Shorthand for Colleges, Volume 2; Gregg Shorthand for Colleges, Transcription; Gregg Shorthand for Colleges, Speed Building; and Gregg Dictation Studies. The five secondary textbooks in the second cell were Gregg Shorthand, Gregg Dictation, Gregg Transcription, Gregg Speed Building, and Transcription Studies. The third category contained five tests: Previewed Dictation, Progressive Dictation, Speed Dictation, Gregg Tests and Awards, 1971-1972, Gregg Tests and Awards, 1972-1973. Categories 4 - 8 included five groups of three letters from top-level management in five sectors of business (Industry, Government, Finance, Education, Transportation). The categories 9 - 13 and 14 - 18 were parallel to the first set of categories (4 - 8) except that the second categories contained five groups of three letters from mid-management personnel and the third group consisted of five groups of three letters from unsolicited sources.

The one-way analysis of variance was performed to answer the hypotheses and subhypotheses as stated on pages 4 and 5. In addition, the two-way analysis of variance addressed the difference in business letters by source and category (Illustration 3.1). All letters in each source were combined across all business categories so that differences in difficulty factors between top-level management dictated letters, mid-management dictated letters, and unsolicited letters could be determined. The differences between the five business categories of letters was observed by combining all the letters in each category across the three sources in an effort to make paired comparisons of difficulty factors for the five areas of business activity.

Illustration 3.1

Research Designs

One-Way Analysis of Variance

			V_1	...	V_6
C-1	College Textbooks	T-1 to T-5			
C-2	Secondary Textbooks	T-6 to T-10			
C-3	Tests	T-11 to T-15			
C-4	Top-Management Letters: Industry	G-16 to G-20			
C-5	Government	G-21 to G-25			
C-6	Finance	G-26 to G-30			
C-7	Education	G-31 to G-35			
C-8	Transportation	G-36 to G-40			
C-9	Mid-Management Letters: Industry	G-41 to G-45			
C-10	Government	G-46 to G-50			
C-11	Finance	G-51 to G-55			
C-12	Education	G-56 to G-60			
C-13	Transportation	G-61 to G-65			
C-14	Unsolicited Letters: Industry	G-66 to G-70			
C-15	Government	G-71 to G-75			
C-16	Finance	G-76 to G-80			
C-17	Education	G-81 to G-85			
C-18	Transportation	G-86 to G-90			

Two-Way Analysis of Variance

		V_1	...	V_6
S-1 Top-Management Letters	C-1 Industry			
	C-2 Government			
	C-3 Finance			
	C-4 Education			
	C-5 Transportation			
S-2 Mid-Management Letters	C-1 Industry			
	C-2 Government			
	C-3 Finance			
	C-4 Education			
	C-5 Transportation			
S-3 Unsolicited Letters	C-1 Industry			
	C-2 Government			
	C-3 Finance			
	C-4 Education			
	C-5 Transportation			

Legend:

C = Category
G = Group
S = Source
T = Text or Tests
V = Dependent Variable

Nonstatistical Analysis

The reading level of the books and letters was a matter of interest in addition to the six dependent variables. The difficulty of the instructional materials was determined through the use of the SMOG Grading Formula. This method of determining reading difficulty is currently in wide use in American secondary schools.[8] It is easy to calculate since it requires only the number of polysyllabic words found in a sample of 30 sentences, ten of which are taken from the beginning of the book, ten from the middle, and ten from near the end of the book.

The nonstatistical analysis also included an intensive study of the books of tests described on page 50. The five difficulty factors and syllabic intensity were graphed separately by variables across all four shorthand speed levels for each book to determine qualitatively the relative difficulty of the tests for classroom use.

Pullis[9] defined the frequency with which common business words are used in the everyday business communication. He created a four-factor index which described the typical letter as follows:

1. 1.6 Syllabic Intensity
2. 42.00% Brief Forms
3. 53.43% First 100 Words (High-Frequency)
4. 71.93% First 500 Words (Common Words)

Pullis limited his index to four factors only since he discovered in his research that to include the next one thousand basic business

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[8]Based on a telephone conversation between Dr. Lois Bader, Consultant in Reading, Michigan State University, and the researcher, March 27, 1975.

[9]Joe M. Pullis, "A New Standard Word in Shorthand?" The Journal of Business Education, 52 (January, 1971), 144-145.

vocabulary words accounted for only 13.65 percent additional words used in the business correspondence he analyzed. This study adhered to Pullis's research, using his four-factor index as an indicator of common business language.

In addition, this study extended the analysis to use Pullis's index on the instructional materials. Each of the five college and secondary books and the tests were examined as to whether they were the same as, easier, or more difficult than Pullis's four-factor index.

SUMMARY

The sources of the data and its analysis regarding the hypotheses have been explained in this chapter.

The materials studied were 15 books of instructional materials in use in colleges and secondary schools, and 225 letters collected nationwide from three sources. These sources were letters dictated by top-level management personnel, mid-management personnel, and unsolicited letters used in direct-mail advertising, which may or may not have been dictated. The letters were further categorized into five fields: Industry, Government, Finance, Education, and Transportation.

Approximately three-hundred-word textual content samples of each book were taken for study by randomly selecting 100 words from the beginning, middle, and end of each book.

From a total of 500 letters received, 15 letters were drawn from each source for each category. These 15 letters were stapled together by threes and approximately 100 words were taken from each to make up a three-hundred-word sample for each group of three. These three-hundred-word samples were analyzed for each of 75 letter groups.

Frequency of five of the six dependent variables was counted by use of a COBOL program. These five variables were the 148 brief forms and a systematic classification of Perry's 1,500 words. The sixth dependent variable, syllabic intensity, was determined manually.

A one-way analysis of variance was performed using an alpha level of .05. On those variables which showed a probability of error of less than .05, the Scheffé Post Hoc Technique of comparing means and combinations of means was used to determine where paired differences were large enough to be significant. Using the Scheffé technique, conclusions were drawn concerning the six hypotheses and the six subhypotheses in this study.

The letters also were studied using a two-way analysis of variance. Differences were sought between the five categories (Industry, Government, Finance, Education, and Transportation) and between the sources (top-level management letters, mid-management letters, and unsolicited or direct-mail advertising letters).

A nonstatistical study was made of the reading level of all books and letters using the SMOG Grading Formula. An intensive examination was made of the 60-, 80-, 100-, and 120-words-a-minute speed levels in each of the five books of tests. Pullis's four-factor index of typical business correspondence was compared with the letters used in this study. Finally, a content analysis of 15 books was made using the Pullis four-factor index as a criterion of what is "average" in business correspondence.

The findings of the statistical and nonstatistical analyses are reported in Chapter 4.

Chapter 4

THE ANALYSIS OF THE DATA

Results of this study are presented in the following sequence:

PART I. STATISTICAL ANALYSIS OF THE DATA

ANALYSIS OF HYPOTHESES
- Normal Business Dictation and the Textbooks
- Unsolicited Mail and the Textbooks
- Unsolicited Mail and Normal Business Dictation
- Books of Tests and Textbooks
- Books of Tests and Letters Dictated
- Books of Tests and Unsolicited Letters

ANALYSIS OF SUBHYPOTHESES
- Normal Business Dictation and Secondary Textbooks
- Unsolicited Business Letters and Secondary Textbooks
- Normal Business Dictation and College Textbooks
- Unsolicited Business Letters and the College Textbooks
- Books of Tests and College Textbooks
- Books of Tests and Secondary Textbooks

SUMMARY OF FINDINGS

PART II. TWO-WAY ANALYSIS OF VARIANCE OF LETTERS BY SOURCE AND CATEGORY
- The Differences Among the Sources of Letters
- The Differences Among the Categories of Letters

SUMMARY OF LETTERS BY SOURCE AND CATEGORY

PART III. NONSTATISTICAL ANALYSIS

READING LEVEL
- Reading Level of the Books
- The Grade Reading Level of the Letters
- Summary of Findings on Reading Level

THE BOOKS OF TESTS
- Summary of Graphs of the Dependent Variables

A COMPARISON OF THE INSTRUCTIONAL MATERIALS AND THE LETTERS WITH THE FOUR-FACTOR INDEX
- Pullis's Index Compared With Instructional Materials
- Summary of Selected Variables in the Books
- Pullis's Index Compared With Letters
- Summary of Percentage of Words by Categories of Letters

SUMMARY OF THE ANALYSIS OF DATA

PART I. ONE-WAY ANALYSIS OF VARIANCE OF THE DATA

Three one-hundred-word samples were randomly chosen from the beginning, middle, and end of each college textbook, secondary-level textbook, and each book of tests. One-hundred-word samples were taken from each of the fifteen letters which made up a category of business letters. The fifteen letters were stapled three to a group so that there were three-hundred-word samples from five groups of letters. The frequency of each dependent variable in the three-hundred-word samples from letters, books, and tests were counted by means of a COBOL program. Mean values and standard deviations were computed for all of the dependent variables (Appendix B).

ANALYSIS OF HYPOTHESES

The cell means are an average of the five items contained in each cell. The 90 three-hundred-word samples resulted in 18 cell means on each dependent variable. The material was examined under five headings for the hypotheses as follows:

1. College textbooks
2. Secondary textbooks
3. Books of tests
4. Letters dictated
5. Letters unsolicited

The table which follows summarizes the one-way analysis of variance for each dependent variable (Table 4.1). The F ratio and "p" or probability of error is given for each variable. The tabled F value for 4 and 85 degrees of freedom was 2.49.

Table 4.1

One-Way Analysis of Variance for Textbooks, Books of Tests, and Letters

Dependent Variable	Source of Variation	Degrees of Freedom	F	P
Brief Forms	Textbooks, Books of Tests, Letters	4	4.3	003*
	Error	85		
Perry's 1 - 100	Textbooks, etc.	4	5.5	0006*
	Error	85		
Perry's 101 - 500	Textbooks, etc.	4	.36	838
	Error	85		
Perry's 501 - 1,500	Textbooks, etc.	4	.59	670
	Error	85		
Perry's Over 1,500	Textbooks, etc.	4	5.1	001*
	Error	85		
Syllabic Intensity	Textbooks, etc.	4	11.6	0001*
	Error	85		

*Indicates significance at the .05 level

Four of the dependent variables showed significant differences. These variables were the following: Brief Forms, Perry's 1 - 100, Perry's Over 1,500, and Syllabic Intensity. These four variables were examined further by means of the Scheffé Post Hoc Technique. The means of the textbooks were compared with the means of the letters by collapsing the letter means into three classes: letters dictated by mid-management, letters dictated by top-level management, and direct-mail advertising or unsolicited letters. The means were combined across all categories (Industry, Government, Education, Finance, and Transportation) in each of these classes.

The Normal Business Dictation and the Textbooks

The first hypothesis was restated for statistical purposes in the null form as follows: There is no difference between the normal business dictation and all the textbooks on all the difficulty factors studied. Combined means of the college textbooks and the secondary textbooks with the combined means of the letters dictated by mid-management and those dictated by top-level management are presented below (Table 4.2).

Table 4.2

The Difficulty of College Textbooks and Secondary Textbooks Compared with Letters Dictated by Mid-Management and Dictated by Top-Level Management (Hypothesis 1)

Dependent Variable	Textbooks	Dictated Letters	Difference	Interval
Brief Forms	130.0	124.8	5.2	± 10.81
Perry's 1 - 100	165.6	160.6	5.0	± 12.64
Perry's 101 - 500	50.1	53.2	NS	
Perry's 501 - 1,500	39.4	29.6	NS	
Perry's Over 1,500	42.1	45.5	3.4	± 11.07
Syllabic Intensity	1.479	1.593	11.4	± 9.7*

*Indicates significance at the .05 level

The four significant variables (brief forms, Perry's 1 - 100, Perry's Over 1,500 words, and syllabic intensity) from the one-way analysis of variance were subjected to the Scheffé technique. Of these, only syllabic intensity had a significant Scheffé contrast. The syllabic intensity of the dictated letters was greater than the syllabic intensity

of the college and secondary textbooks. The dictated letters contained 11 more syllables per 100 words. The first hypothesis of no difference was accepted since only one variable, syllabic intensity, of the six analyzed was significantly different.

Unsolicited Mail and the Textbooks

The second research hypothesis was restated in the null form as follows: There is no difference between the unsolicited mail and all the textbooks on all of the difficulty factors studied. When Scheffé contrasts were computed, the direct-mail or unsolicited letters were significantly different on four variables; namely, brief forms, Perry's 1 - 100, Perry's Over 1,500, and syllabic intensity (Table 4.3).

Table 4.3

The Difficulty of College Textbooks and Secondary Textbooks Compared with Unsolicited Letters (Hypothesis 2)

Dependent Variable	Textbooks	Dictated Letters	Difference	Interval
Brief Forms	130.0	117.4	12.6	± 11.71*
Perry's 1 - 100	165.6	150.2	15.4	± 13.69*
Perry's 101 - 500	50.1	53.24	NS	
Perry's 501 - 1,500	39.4	42.04	NS	
Perry's Over 1,500	42.1	54.4	12.3	± 11.99*
Syllabic Intensity	1.479	1.622	14.3	± 10.5 *

*Indicates significance at the .05 level.

The greater difficulty of the unsolicited letters was shown by the fact that these letters contained a significantly fewer number of brief forms and Perry's 1 - 100 high-frequency words. On the other hand, the textbooks contained a significantly greater number of the first one hundred words but significantly fewer number of the words beyond the 1,500 most commonly used words.

The second hypothesis of no difference was accepted since there were only four of the six variables which revealed significant differences.

Unsolicited Mail and Normal Business Dictation

The third hypothesis was restated in the null form for statistical purposes as follows: There is no difference between the unsolicited mail and normal business dictation on all of the difficulty factors studied. The Scheffé Post Hoc intervals showed that there was a significant difference between the combined means of the letters dictated by mid-management and top-level management and the unsolicited or direct-mail advertising letters on two variables (Table 4.4). The unsolicited letters contained significantly fewer of Perry's 1 - 100 words but contained a greater number of words beyond the 1,500 on Perry's list.

Table 4.4

Letters Dictated by Mid-Management and Top-Level Management Compared with Unsolicited (Direct-Mail Advertising) Letters (Hypothesis 3)

Dependent Variables	Letters Dictated	Letters Unsolicited	Difference	Confidence Interval
Brief Forms	124.8	117.4	7.4	± 7.67
Perry's 1 - 100	160.6	150.2	10.4	± 8.97*
Perry's 101 - 500	53.2	53.24	NS	
Perry's 501 - 1,500	39.6	42.04	NS	
Perry's Over 1,500	45.5	54.40	8.9	± 7.85*
Syllabic Intensity	1.593	1.622	3	± 6.88

*Indicates significance at the .05 level.

However, the hypothesis that there is no difference between the unsolicited mail and the normal business dictation on all of the difficulty factors was accepted since only two of the variables showed statistically significant differences.

Books of Tests and Textbooks

The fourth hypothesis was restated in the null form as follows: There is no difference between the books of tests and the textbooks on all of the difficulty factors studied. The table shows that there were no significant Scheffé contrasts between the combined means of the books of tests and the combined means of the college and secondary textbooks on all the variables studied (Table 4.5). Therefore the hypothesis which stated that there is no difference between the books of tests and the textbooks on all the variables studied was accepted.

Table 4.5

The Books of Tests Compared With the College and Secondary Level Textbooks (Hypothesis 4)

Dependent Variables	Books of Tests	Textbooks	Difference	Confidence Interval
Brief Forms	128.8	135.0	6.2	± 17.16
Perry's 1 - 100	163.6	165.6	2.0	± 20.07
Perry's 101 - 500	53.8	50.1	NS	
Perry's 501 - 1,500	39.2	39.4	NS	
Perry's Over 1,500	41.4	42.1	.7	± 17.58
Syllabic Intensity	1.384	1.479	9.5	± 15.40

Books of Tests and Letters Dictated

The fifth hypothesis was restated in the null form for statistical purposes as follows: There is no difference between the books of tests and the dictated letters on all of the difficulty factors studied.

Only one variable, syllabic intensity, was significantly different when examined using the Scheffé Post Hoc Technique (Table 4.6).

Table 4.6

The Books of Tests Compared With the Combined Means Across All Categories of Letters Dictated by Mid-Management and Top-Level Management (Hypothesis 5)

Dependent Variables	Books of Tests	Letters Dictated	Difference	Confidence Interval
Brief Forms	128.8	124.9	3.9	± 14.68
Perry's 1 - 100	163.6	160.6	3.0	± 17.17
Perry's 101 - 500	53.8	53.2	NS	
Perry's 501 - 1,500	39.2	29.6	NS	
Perry's Over 1,500	41.4	45.5	4.1	± 15.04
Syllabic Intensity	1.384	1.593	20.9	± 13.17*

*Indicates significance at the .05 level.

If the Scheffé Interval (13.17) for syllabic intensity is added to or subtracted from the difference between the combined means of the books of tests and the dictated letters (20.9), the result does not cross zero. Therefore, the difference is significant. The shorthand writer must write 20 more syllables in every 100 words.

Since only one significant contrast was located, the hypothesis that there is no difference between the books of tests and the dictated letters on all the variables was accepted.

Books of Tests and Unsolicited Letters

The sixth hypothesis was restated in the null form for statistical purposes as follows: There is no difference between the books of tests and the unsolicited letters on all of the difficulty factors studied.

The comparison of combined means shows that the Scheffé contrast between the books of tests and the unsolicited letters was different on one variable, syllabic intensity (Table 4.7).

Table 4.7

The Books of Tests Compared With Unsolicited Letters (Hypothesis 6)

Dependent Variables	Books of Tests	Unsolicited Letters	Difference	Confidence Interval
Brief Forms	128.8	117.4	11.4	± 15.47
Perry's 1 - 100	163.6	150.2	13.4	± 18.09
Perry's 101 - 500	53.8	53.24	NS	
Perry's 501 - 1,500	39.2	42.04	NS	
Perry's Over 1,500	41.4	54.4	13.0	± 15.84
Syllabic Intensity	1.384	1.622	23.8	± 13.88*

*Indicates significance at the .05 level.

The difference between the combined means of the books of tests and the unsolicited letters (23.8) on the variable, syllabic intensity, is enough greater than the size of the Scheffé Interval (13.88) that when the interval is added to or subtracted from this difference, the result is greater than zero. The shorthand writer of unsolicited letters must write 23 more syllables in every 100 words.

The hypothesis that there is no difference between the books of tests and unsolicited letters on all the dependent variables was accepted.

ANALYSIS OF SUBHYPOTHESES

There were six subhypotheses to be analyzed. The findings are examined in the section which follows.

Normal Business Dictation and Secondary Textbooks

The first subhypothesis given in the null form for statistical purposes stated: "There is no difference between the normal business dictation and the secondary textbooks on each of the dependent variables."

The only dependent variable which showed a significant difference between the combined means of the dictated letters and secondary textbooks was syllabic intensity (Table 4.8).

Table 4.8

Letters Dictated by Mid-Management and Top-Level Management Personnel Across All the Categories Compared With the Secondary Level Textbooks (Subhypothesis 1)

Dependent Variables	Letters Dictated	Secondary Textbooks	Difference	Confidence Interval
Brief Forms	124.9	133.4	8.5	± 14.68
Perry's 1 - 100	160.7	172.0	11.3	± 17.17
Perry's 101 - 500	53.2	49.8	NS	
Perry's 501 - 1,500	39.6	40.8	NS	
Perry's Over 1,500	45.5	37.0	8.5	± 15.04
Syllabic Intensity	1.59	1.43	16.	± 13.17*

*Indicates significance at the .05 level.

The dictated letters were significantly more difficult than the high school textbooks on this variable. In every one hundred words in

the letters, there were 16 more syllables for the shorthand writer to write in shorthand symbols than what had been expected of that writer as a high school student using the secondary textbooks.

The null subhypothesis that there is no difference between the normal business dictation and the secondary textbooks was accepted.

Unsolicited Business Letters and Secondary Textbooks

The second subhypothesis stated in the null form for statistical purposes said, "There is no difference between the unsolicited business letters and the difficulty of the secondary textbooks on each of the dependent variables."

The table below shows that there were four variables on which the Scheffé contrasts were significant (Table 4.9).

Table 4.9

Unsolicited Letters Across All the Categories Compared With Secondary-Level Textbooks (Subhypothesis 2)

Dependent Variables	Unsolicited Letters	Secondary Textbooks	Difference	Confidence Interval
Brief Forms	117.4	133.4	16.0	± 15.47*
Perry's 1 - 100	150.2	172.0	21.8	± 18.09*
Perry's 101 - 500	53.24	49.8	NS	
Perry's 501 - 1,500	42.04	40.8	NS	
Perry's Over 1,500	54.40	37.0	17.4	± 15.84*
Syllabic Intensity	1.622	1.432	19.0	± 13.88*

*Indicates significance at the .05 level.

Two of these variables were the brief forms and Perry's 1 - 100 most commonly used business words. The secondary textbooks contain a significantly greater number of brief forms and of Perry's 1 - 100 words than do the unsolicited letters. On the other hand, the unsolicited letters were significantly more difficult than the textbooks on the variables Perry's over 1,500 and syllabic intensity. The unsolicited letters had 20 more syllables in every one hundred words for the shorthand writer to take in notes than the high school student was prepared to write. In addition, there were 17 more low-frequency words to write in every three hundred words of dictation in the unsolicited letters. Conversely, the unsolicited letters contained 21.8 fewer of the one hundred most commonly used words.

The null subhypothesis that there is no difference between the unsolicited business letters and the difficulty of the secondary textbooks on each of the dependent variables was accepted. Therefore, the research hypothesis that unsolicited business letters were more difficult than the secondary textbooks was rejected.

Normal Business Dictation and College Textbooks

The third subhypothesis stated in the null form for statistical purposes said, "There is no difference between the normal business dictation and the college textbooks on each of the dependent variables."

An examination of the Scheffé Intervals for the combined means of the letters dictated by both mid-management and top-level management personnel across all the categories of letters and the combined means of the college textbooks in Table 4.10 shows that there were no differences on any of the dependent variables between the normal business dictation and the college textbooks.

Table 4.10

Letters Dictated by Mid-Management and Top-Level Management Personnel Across All Categories Compared With College Textbooks (Subhypothesis 3)

Dependent Variable	Letters Dictated	College Textbooks	Difference	Confidence Interval
Brief Forms	124.9	126.6	1.7	± 14.68
Perry's 1 - 100	160.6	159.2	1.4	± 17.17
Perry's 101 - 500	53.2	50.4	NS	
Perry's 501 - 1,500	39.6	38.0	NS	
Perry's Over 1,500	45.5	47.2	1.7	± 15.04
Syllabic Intensity	1.593	1.526	6.4	± 13.17

Not one of the differences in means was significant. Therefore, the subhypothesis that there is no difference between the normal business dictation and the college textbooks on each of the dependent variables was accepted.

Unsolicited Business Letters and the College Textbooks

The fourth subhypothesis given in the null form for statistical purposes stated, "There is no difference between the difficulty of the unsolicited business letters and the difficulty of the college textbooks on each of the dependent variables."

The table (4.11) shows that there was no significant Scheffé contrast between the difficulty of college textbooks and the unsolicited letters across all the categories of letters on all of the dependent variables (Table 4.11).

Table 4.11

The Unsolicited Letters Across All Categories
Compared With College Textbooks
(Subhypothesis 4)

Dependent Variable	Unsolicited Letters	College Textbooks	Difference	Confidence Interval
Brief Forms	117.4	126.6	9.2	± 15.47
Perry's 1 - 100	150.2	159.2	9.0	± 18.09
Perry's 101 - 500	53.24	50.4	NS	
Perry's 501 - 1,500	42.04	38.0	NS	
Perry's Over 1,500	54.40	47.2	7.2	± 15.84
Syllabic Intensity	1.622	1.526	9.6	± 13.89

The subhypothesis that there is no difference between the difficulty of the unsolicited business letters and the difficulty of the college textbooks on each of the dependent variables was accepted.

Books of Tests and College Textbooks

The fifth subhypothesis stated in the null form for statistical purposes was as follows: "There is no difference between the books of tests and the college textbooks on each of the dependent variables." The table which follows (4.12) shows the findings concerning the books of tests and the college textbooks.

Table 4.12

The Books of Tests Compared With the College Textbooks (Subhypothesis 5)

Dependent Variable	Books of Tests	College Textbooks	Difference	Confidence Interval
Brief Forms	128.8	126.6	2.2	± 19.82
Perry's 1 - 100	163.6	159.2	4.4	± 23.17
Perry's 101 - 500	53.8	50.4	NS	
Perry's 501 - 1,500	39.2	38.0	NS	
Perry's Over 1,500	41.4	47.2	5.8	± 20.30
Syllabic Intensity	1.384	1.526	14.2	± 17.78

A study of the figures given above indicated that the college books were not significantly more difficult than the books of tests. The null subhypothesis that there is no difference between the books of tests and the college textbooks was therefore accepted.

Books of Tests and Secondary Textbooks

The sixth subhypothesis stated in the null form for statistical purposes was as follows: "There is no difference between the secondary textbooks and the books of tests on each of the dependent variables." The table which follows (4.13) gives the findings concerning the secondary textbooks and the books of tests.

Table 4.13

The Secondary Textbooks Compared With the Books of Tests (Subhypothesis 6)

Dependent Variable	Secondary Textbooks	Books of Tests	Difference	Confidence Interval
Brief Forms	133.4	128.8	4.6	± 19.82
Perry's 1 - 100	172.0	163.6	8.4	± 28.17
Perry's 101 - 500	49.8	53.8	NS	
Perry's 501 - 1,500	40.8	39.2	NS	
Perry's Over 1,500	37.0	41.4	4.4	± 20.30
Syllabic Intensity	1.423	1.384	3.9	± 17.78

As can be observed from a study of the Scheffé Intervals, there was no significant difference in the difficulty on any of the dependent variables between the combined means of the secondary textbooks and the combined means of the books of tests.

The subhypothesis that there is no difference between the secondary textbooks and the books of tests on any of the dependent variables was therefore accepted.

SUMMARY OF FINDINGS

Although all six major research hypotheses and the six subhypotheses were rejected, there were certain differences revealed concerning individual variables. The following is a summary of these differences:

1. The combined means of the syllabic intensity of the letters dictated by both mid-management and top-level management were significantly

greater than the combined means of the syllabic intensity of the college and secondary textbooks.

2. The unsolicited letters were significantly more difficult than the secondary and college textbooks on the variables of syllabic intensity and Perry's words beyond the 1,500 most commonly used business words. The textbooks used a significantly greater number of brief forms and the one hundred most common words than were used in the unsolicited letters.

3. The syllabic intensity of the letters dictated by mid-management and top-level management was significantly greater than the syllabic intensity of the books of tests used in the classrooms on both the college and secondary levels.

4. The books of tests and the unsolicited letters were significantly different on one variable. The syllabic intensity was higher in the unsolicited letters.

5. The letters dictated by both mid-management and top-level management were more difficult than the secondary textbooks in syllabic intensity. There were 16 more syllables in approximately every one hundred words in the dictated letters.

6. The college textbooks were equally as difficult as the dictated letters.

7. The unsolicited letters were more difficult than the secondary textbooks on two variables: Perry's Over 1,500 and syllabic intensity. Secondary textbooks contained a greater number of brief forms and Perry's 1 - 100 words.

8. The books of tests were not significantly more difficult than the secondary textbooks on any of the dependent variables.

9. The books of tests were also not significantly more difficult than the college textbooks.

10. The unsolicited letters were more difficult than the dictated letters. The unsolicited letters contained fewer brief forms and fewer of Perry's 1 - 100 words, but contained a significantly greater number of the low-frequency words beyond the 1,500 on Perry's list and a greater number of syllables in every one hundred words.

11. The two variables, Perry's 101 - 500 words and 501 - 1,500 words, did not reveal significant differences between any combination of the books of tests, textbooks, or letters.

Table 4.14 which follows summarizes the differences which were found through this statistical analysis.

Table 4.14

Summary of the Differences* Found
Throughout the Statistical Analysis

Dependent Variables	Letters Dictated and College and Secondary Textbooks	Unsolicited Letters and College and Secondary Textbooks	Letters Dictated and Books of Tests	Unsolicited Letters and Books of Tests	Letters Dictated and Secondary Textbooks	Unsolicited Letters and Secondary Textbooks	Letters Dictated and Unsolicited Letters
Brief Forms		S				S	S
Perry's 1 - 100		S				S	S
Perry's 101 - 500							
Perry's 501 - 1,500							
Perry's Over 1,500		S				S	S
Syllabic Intensity	S	S	S	S	S	S	

*The letter "S" indicates significant difference on a variable at the .05 level.

PART II. TWO-WAY ANALYSIS OF VARIANCE OF LETTERS BY SOURCE AND CATEGORY

The letters were obtained from three sources; namely, letters dictated by the members of The Office Management Society nationwide, letters dictated by top-level management personnel nationwide, and letters unsolicited (direct-mail advertising), which came into the offices of both the mid-management and top-level management personnel. The letters were separated into five categories: (1) Industry, (2) Government, (3) Finance, (4) Education, and (5) Transportation. The following table (4.15) reports the two-way analysis of variance results of the letters by source and by category. The tabled F-ratio at the .05 level for 2 and 60 degrees of freedom was 3.15 for the source of letters. The tabled F-ratio at the .05 level for 4 and 60 degrees of freedom was 2.52 for the categories of letters.

Table 4.15

Analysis of Variance for Letters
by Source and Category

		Brief Forms		Perry's 1 - 100		Perry's 101-500		Perry's 501 - 1,500		Perry's Over 1,500		Syllabic Intensity	
Source	df	F	P	F	P	F	P	F	P	F	P	F	P
Source of Letter	2	7.4	001*	6.1	004*	.4	654	1.8	176	7.0	001*	.8	425
Business Category	4	1.0	434	1.1	367	4.4	004*	.3	880	4.0	006*	2.3	071
Interaction	8	.4	891	.7	689	1.4	236	1.1	364	.4	924	1.5	186
Error	60												

*Indicates significance at the .05 level.

The analysis of variance table shows that there was a difference among the sources of letters on the following dependent variables: brief forms, Perry's 1 - 100 words and Perry's over 1,500 words. Two dependent variables in the categories of letters had a probability of error (P) of less than .05; namely, Perry's 101 - 500 words and Perry's over 1,500 words. These differences were examined further using the Scheffé Post Hoc Technique.

The Differences Among the Sources of Letters

The sources of letters differed on three dependent variables: brief forms, Perry's 1 - 100 words, and Perry's over 1,500 words. The following table (4.16) reports Scheffé contrasts for these three variables in the letters dictated by mid-management personnel and top-level management personnel.

Table 4.16

Scheffé Contrasts Between Letters Dictated by Mid-Management and Top-Level Management on Six Variables

Dependent Variable	Mid-Management Letters	Top-Level Management Letters	Difference	Confidence Interval
Brief Forms	121.7	128.1	6.4	± 7.01
Perry's 1 - 100	161.1	160.2	.9	± 8.60
Perry's 101 - 500	52.28	54.20	NS	
Perry's 501 - 1,500	41.20	38.04	NS	
Perry's Over 1,500	45.24	45.76	.5	± 6.85
Syllabic Intensity	1.590	1.597	NS	

There were no significant differences between the letters dictated by mid-management personnel and those dictated by top-level management personnel on any of the variables under examination.

Table 4.17, which follows, compares the letters dictated by mid-management personnel with the unsolicited letters on the three variables: brief forms, Perry's 1 - 100 words, and Perry's over 1,500 words. These are the three variables which had F values greater than the tabled F for the sources of letters.

Table 4.17

Scheffé Contrasts Between Letters Dictated by Mid-Management Personnel and Unsolicited Letters

Dependent Variable	Mid-Management Letters	Unsolicited Letters	Difference	Confidence Interval
Brief Forms	121.7	117.4	4.3	± 7.01
Perry's 1 - 100	161.1	150.2	10.9	± 8.60*
Perry's 101 - 500	52.28	53.24	NS	
Perry's 501 - 1,500	41.20	42.04	NS	
Perry's Over 1,500	45.24	54.40	9.16	± 6.85*
Syllabic Intensity	1.590	1.622	NS	

*Indicates significance at the .05 level.

Significant differences were shown on two variables, Perry's 1 - 100 and Perry's over 1,500 words. The letters dictated by mid-management personnel contained a greater number of words from the first one hundred common words and fewer of the words beyond the 1,500 on Perry's list.

The analysis of variance (Table 4.15) on page 88 showed the probability of error greater than .05 for each of the variables marked "NS" (Not Significant) in Table 4.17. The use of the Scheffé Post Hoc Technique to examine the three remaining variables did not produce an interval of significance for the one variable, brief forms. However, Scheffé's Theorem states that if an F ratio is significant, there is at least one set of contrasts that is also significant. For the purposes of this study, a further search for this set of contrasts was impractical due to problems of computation and interpretation.

The following table (4.18) reports the comparison of letters dictated by top-level management personnel with the unsolicited letters on the three variables which had an F ratio greater than the tabled F for the sources of letters.

Table 4.18

Scheffé Contrasts Between Letters Dictated by Top-Level Management and Unsolicited Letters

Dependent Variable	Top-Level Management Letters	Unsolicited Letters	Difference	Confidence Interval
Brief Forms	128.1	117.4	10.7	± 7.01*
Perry's 1 - 100	160.2	150.2	10.0	± 8.60*
Perry's 101 - 500	54.20	53.24	NS	
Perry's 501 - 1,500	38.04	42.04	NS	
Perry's Over 1,500	45.76	54.40	8.64	± 6.85*
Syllabic Intensity	1.597	1.622	NS	

*Indicates significance at the .05 level.

Significant differences existed on all three variables. The unsolicited letters had a greater number of words beyond the 1,500 most common business words but fewer brief forms and fewer of the one hundred most common words.

The Differences Among the Categories of Letters

The letters for this study were drawn from five business areas: (1) Industry, (2) Government, (3) Finance, (4) Education, and (5) Transportation. Statistically significant differences occurred on two of the six variables; namely, words in Perry's 101 - 500 words and Perry's words over 1,500. For the entire tables of means of letters by source and category, see Appendix C.

Table 4.19 presents only the two significant variables and lists the categories of letters where significant differences might exist.

Table 4.19

Scheffé Contrasts Between the Categories of Letters on Two of the Dependent Variables

Dependent Variable	Business Category	Combined Mean	Difference	Confidence Interval
Perry's 101 - 500	Industry Government	51.40 55.87	4.47	± 8.44
	Industry Finance	51.40 57.20	5.80	± 8.44
	Industry Education	51.40 54.47	3.07	± 8.44
	Industry Transportation	51.40 47.27	4.13	± 8.44
	Government Finance	55.87 57.20	1.33	± 8.44

Table 4.19 (continued)

Dependent Variable	Business Category	Combined Mean	Difference	Confidence Interval
	Government Education	55.87 54.47	1.40	± 8.44
	Government Transportation	55.87 47.27	8.60	± 8.44*
	Finance Education	57.20 54.47	2.73	± 8.44
	Finance Transportation	57.20 47.27	9.93	± 8.44*
	Education Transportation	54.47 47.27	7.20	± 8.44*
Perry's Over 1,500	Industry Government	50.00 53.07	3.07	± 11.12
	Industry Finance	50.00 40.33	9.67	± 11.12
	Industry Education	50.00 47.27	2.73	± 11.12
	Industry Transportation	50.00 51.67	1.67	± 11.12
	Government Finance	53.07 40.33	12.74	± 11.12*
	Government Education	53.07 47.27	5.80	± 11.12
	Government Transportation	53.07 51.67	1.40	± 11.12
	Finance Education	40.33 47.27	6.94	± 11.12
	Finance Transportation	40.33 51.67	11.34	± 11.12*
	Education Transportation	47.27 51.67	4.40	± 11.12

*Indicates significance at the .05 level.

On both variables, the Finance Letters contained a greater number of words from Perry's 101 - 500 word list, which are easier to write, and a smaller number of words from Perry's words over 1,500, which are more difficult for the shorthand writer.

The Transportation and Government Letters were significantly more difficult than the Finance letters on the variable, Perry's words over 1,500.

The Transportation letters were significantly low in number of words from Perry's 101 - 500 list and second to the Government letters in number of words beyond the 1,500.

SUMMARY OF LETTERS BY SOURCE AND CATEGORY

The differences among the three sources of letters were studied. On the analysis of variance table (4.15), the letters dictated by mid-management, the letters dictated by top-level management, and the unsolicited letters showed differences on three of the variables:

1. Brief Forms
2. Perry's 1 - 100 Words
3. Perry's Words Over 1,500

The use of the Scheffé Post Hoc Technique showed the following differences:

1. The top-level management letters contained a significantly greater number of brief forms (128.1) than did the unsolicited letters (117.4) (Table 4.18).

2. Both the letters dictated by mid-management personnel (161.1) and those dictated by top-level management personnel (160.2)

contained a significantly greater number of the first one-hundred words than did the unsolicited letters (150.2) (Tables 4.17 and 4.18).

3. The letters dictated by both mid-management (45.24) and top-level management (45.76) had significantly fewer of the words over 1,500 on Perry's list than did the unsolicited letters (54.40).

The letters dictated by mid-management personnel and top-level management personnel were not significantly different in difficulty based on the Scheffé Post Hoc Technique (Table 4.16). However, the unsolicited direct-mail advertising letters were significantly more difficult than the two other sources for two reasons:

1. The unsolicited letters contained fewer brief forms and fewer of the one-hundred most commonly used business words on Perry's list (Tables 4.17 and 4.18).

2. The unsolicited letters contained a significantly greater number of words beyond the 1,500 on Perry's list (Tables 4.17 and 4.18).

A study of the categories of letters (Industry, Government, Finance, Education, and Transportation) showed that differences in difficulty existed on the following two dependent variables:

1. Perry's 101 - 500 Words
2. Perry's Over 1,500 Words

Based on the Scheffé Post Hoc Technique, the Government (55.87) and Finance (57.20) letters contained significantly greater numbers of the words on Perry's 101 - 500 list. On the other hand, the Finance letters (40.33) contained significantly fewer of the words over 1,500 than did either the Government letters (53.07) or the Transportation letters (51.67). If this variable were the sole criterion of difficulty, Government letters would have been the most difficult of all the categories.

PART III. NONSTATISTICAL ANALYSIS

The nonstatistical analysis of this study made inquiry into the following three areas:

1. The reading level of the instructional materials used in the classroom by college and secondary teachers and also the reading level of the letters by source and category.

2. The difficulty of the dictation materials used in the five books of tests being examined in this study on four selected speed levels.

3. The difficulty of the instructional materials and the categories of letters as compared with Pullis's[1] four-factor index.

READING LEVEL

The section which follows is a description of the findings concerning the reading level of the instructional materials and the letters.

Reading Level of the Books

Using the SMOG Grading Readability Formula,[2] ten sentences were chosen at random from the beginning, ten from the middle, and ten more sentences from the end of each book. The number of polysyllable words were counted in these thirty sentences, the square root of the answer was taken, and three was added to the answer to determine the grade level of the books (Table 4.20).

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[1]Joe B. Pullis, "A New Standard Word in Shorthand?" The Journal of Business Education, Volume 52 (January, 1971), pp. 144-145.

[2]G. Harry McLaughlin, "SMOG Grading--a New Readability Formula," Journal of Reading, 12 (May, 1969), pp. 639-646.

Table 4.20

SMOG Reading Level of the Instructional Materials

	Instructional Materials	Reading Level	Mean Reading Level
	College Textbooks		
Book 1.	Gregg (College) Volume 1	10.2	
Book 2.	Gregg (College) Volume 2	11.1	
Book 3.	Gregg Transcription	10.4	
Book 4.	Gregg Speed Building	10.4	
Book 5.	Shorthand Dictation Studies	11.7	10.76
	Secondary Textbooks		
Book 1.	Gregg Shorthand, Second Edition	8.4	
Book 2.	Gregg Dictation, Second Edition	10.0	
Book 3.	Gregg Speed Building, Second Edition	10.4	
Book 4.	Gregg Transcription, Second Edition	10.3	
Book 5.	Shorthand Transcription Studies	10.3	9.88
	Books of Tests		
Book 1.	Previewed Dictation	9.0	
Book 2.	Progressive Dictation	9.0	
Book 3.	Speed Dictation	9.0	
Book 4.	Gregg Tests and Awards for 1971 - 72	8.5	
Book 5.	Gregg Tests and Awards for 1972 - 73	10.0	9.10
	Combined Mean for All Instructional Materials		9.91

The college textbooks had the highest mean reading level of all the books studied. The secondary textbooks had a higher mean level than did the books of tests. Of all the books of tests, Gregg Tests and Awards for 1972 - 73 had the highest reading level according to the SMOG Grading Formula. The Gregg Tests and Awards for 1971 - 72 had the lowest grade reading level of all five of the books of tests (8.5). Of the ten textbooks examined, the beginning secondary book, Gregg Shorthand, was 1.6 grade levels lower than any of the other books (8.4).

The mean grade reading level for the books of tests (9.10) is lower than the mean grade reading level of the secondary textbooks (9.88) or the college textbooks (10.76).

Reading Level of the Letters

The 225 letters assessed in this study were drawn from three sources (top-level management dictated letters, mid-management dictated letters, and unsolicited or direct-mail advertising letters). The letters were placed into five categories (Industry, Government, Finance, Education, and Transportation). There were 75 letters from each source and 15 letters in each one of the five categories. The 15 letters were stapled together in groups of three. Only the first, the middle, and the last group of three letters were used to determine the grade reading level of the category. Ten sentences were taken from the first group of three letters, ten sentences from the middle group, and ten sentences from the last group were taken to make up the thirty sentences necessary to determine the grade reading level of the category.

The grade reading level by sources of letters in each business category are given in Table 4.21.

Table 4.21

SMOG Grade Reading Level of Business Letters

Business Category	Source of Letters: Mid-Management Dictated	Top-Level Management Dictated	Unsolicited or Direct-Mail Advertising
Industry	12.91	10.77	12.50
Government	13.20	9.90	10.40
Finance	11.60	10.70	14.70
Education	12.10	12.00	12.80
Transportation	8.20	12.20	12.10
Mean Level by Source:	11.6	11.11	12.5
Combined Mean for All Measures:		11.73	

The mean reading level of the unsolicited letters (12.5) was higher than the mean of either source of dictated letters (11.6 and 11.11). Unsolicited letters in the Finance category had the highest over-all reading level (14.70).

There was no marked difference in grade reading level between the letters dictated by mid-management personnel and those dictated by top-level management personnel. The letters in the Transportation category dictated by mid-management personnel had a reading level of Grade 8.2. When the variation in reading level of letters in the Transportation category is considered (Appendix B, lines 8, 13, 18), this over-all reading level of 8.2 may be caused by the considerable range of reading levels found in the Transportation letters.

Summary on Findings on Reading Level

The combined mean of the reading level of the letters (11.7) was greater than the combined mean of the instructional materials (9.91).

The grade reading level of the college textbooks (10.76) was higher than that of the secondary textbooks (9.88) or the books of tests (9.10). The college textbooks were 1.66 grades more difficult than the reading level of the books of tests, whereas the secondary textbooks were only slightly higher than the books of tests (.78). The most recent book of tests which was included in the study, Gregg Tests and Awards for 1972 - 73, had the highest grade reading level of any of the five books of tests studied (10.0).

A close study of the grade reading level of the letters showed that the unsolicited letters had a higher reading level than those of the other two sources of letters. Among the unsolicited letters, the Finance letters were the most difficult to read with a grade level of 14.7. There was no measurable difference between the reading level of the letters dictated by mid-management personnel and those dictated by top-level management personnel as indicated by the averages for each, which were 11.6 and 11.11. The lowest grade reading level among the letters occurred in the Transportation category of the letters dictated by mid-management personnel, which was 8.5. The wide variation in reading level of the letters samples, however, may make this result atypical.

THE BOOKS OF TESTS

A test in shorthand consists of copy not previously studied by the students through homework assignments or used in classroom practice

exercises. The tests provided the teacher are available in bound volumes and in paperback booklets. The bound volumes were published more than a decade ago. The paperback booklets are published yearly and provide tests at five different speed levels for each of the ten months of the school year.

For this study, speed levels which were common to both bound volumes and paperback booklets were chosen for examination. Test materials were sampled from four speed levels: 60-words-a-minute tests, 80-words-a-minute tests, 100-words-a-minute tests, and 120-words-a-minute tests. These speed levels are used in both college and secondary classes.

The following books of tests were used:

Book No. 1. Previewed Dictation, by Charles E. Zoubek, New York: McGraw-Hill Book Company, Inc., 1950

Book No. 2. Progressive Dictation, by Charles E. Zoubek, New York: McGraw-Hill Book Company, Inc., 1956

Book No. 3. Speed Dictation, by Charles E. Zoubek, New York: McGraw-Hill Book Company, Inc., 1963

Two of the books of tests were paperback booklets:

Book No. 4. Gregg Tests and Awards 1971 - 72, by Donna Zack, Editor, New York: McGraw-Hill Book Company, Inc., 1971

Book No. 5. Gregg Tests and Awards, 1972 - 73, by Gayle Covey Glazebrook, Editor, New York: McGraw-Hill Book Company, Inc., 1972

A sample of three hundred words was taken from each speed level in each book by taking approximately one hundred words from the first test, one hundred words from the middle test, and one hundred words from the last test. Four 300-word samples were taken from each one of the five books.

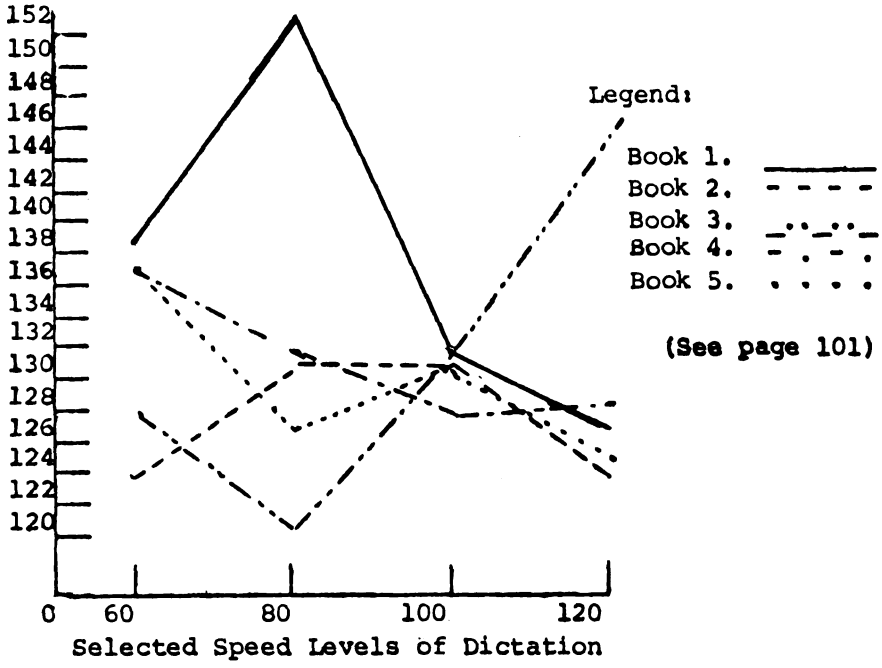
The words of the samples were counted and classified according to the six dependent variables used in this study. The graphs which follow show the results of that classification (Illustration 4.1). Speed levels are across the bottom of each graph; number of words counted are on the left.

Illustration 4.1

Books of Tests Classified by Difficulty

Brief Forms

Number of Brief Forms in each 300-word sample:



(See page 101)

Perry's 1 - 100 Words

Number of 1 - 100 words in each 300-word sample:

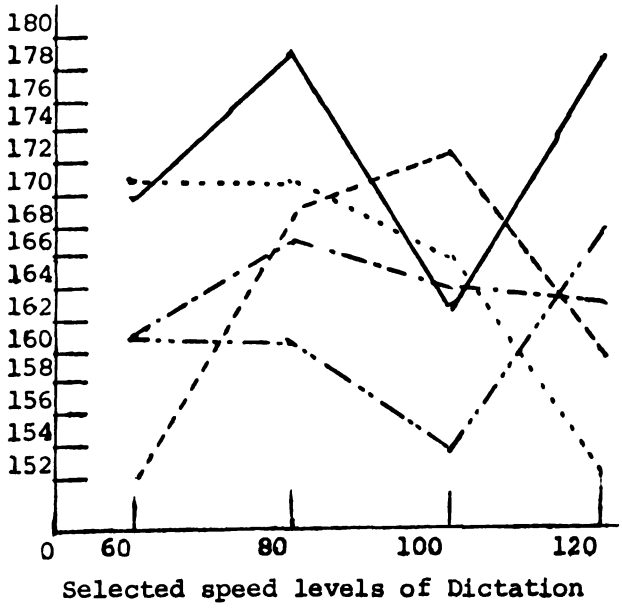
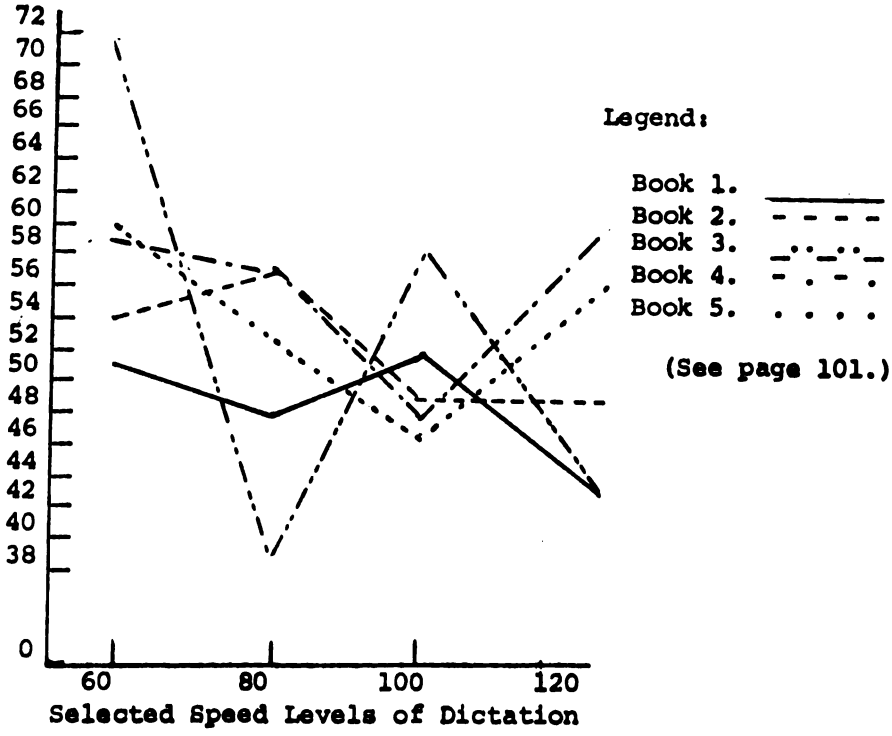


Illustration 4.1--Continued

Perry's 101 - 500 Words

Number of 101 - 500 words in each 300-word sample:



(See page 101.)

Perry's 501 - 1,500 Words

Number of 501 - 1,500 words in each 300-word sample:

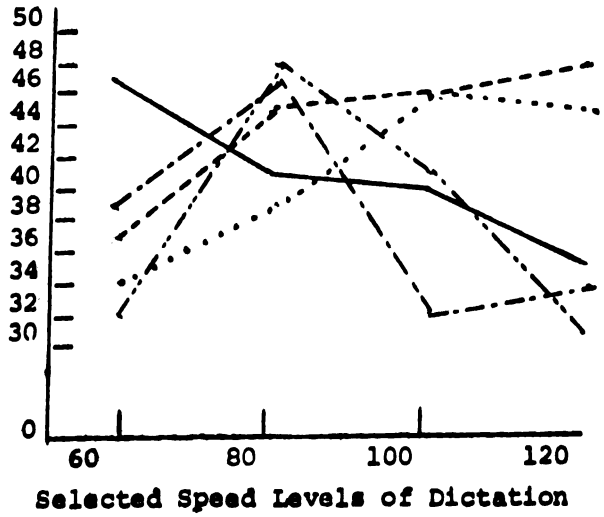
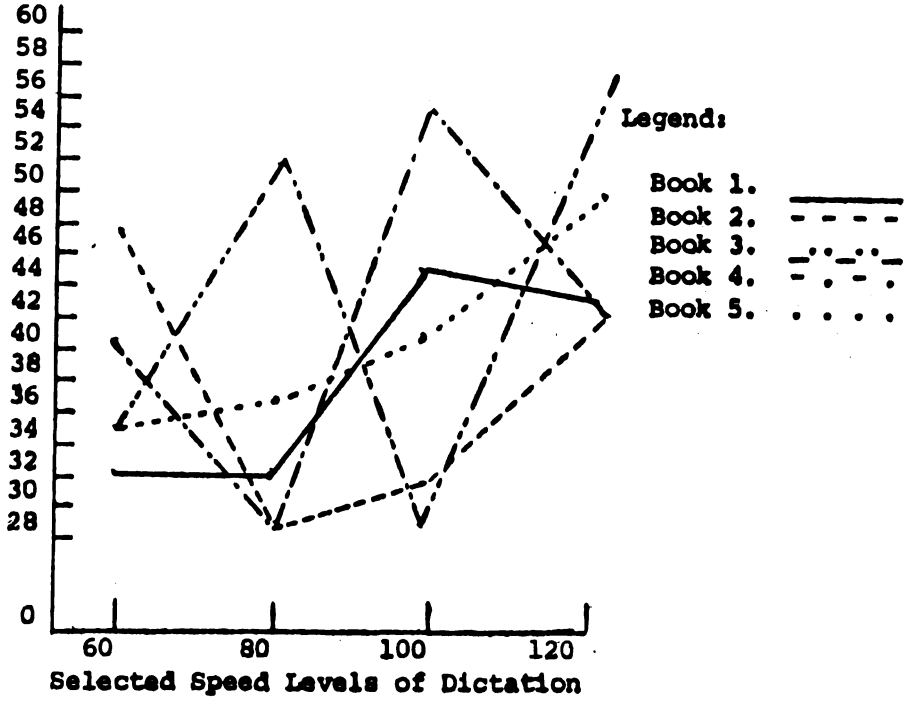


Illustration 4.1--Continued

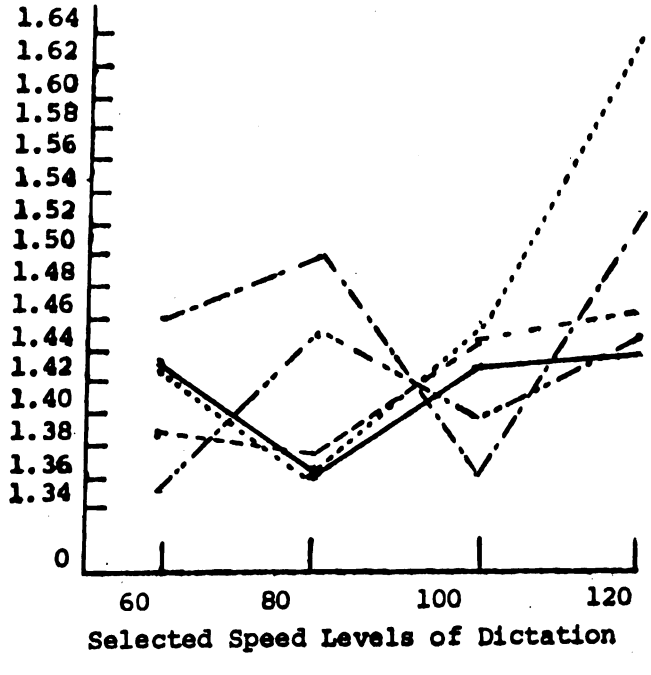
Perry's Over 1,500 Words

Number of words over 1,500 in each 300-word sample:



Syllabic Intensity

Average based on three 100-word samples from each book:



Summary of Graphs of the Dependent Variables

The oldest book of tests, Previewed Dictation, copyright 1950, contained the greatest number of brief forms except at the 120-word-a-minute speed level. This book also contained the greatest number of words in Perry's one hundred commonly used business words. However, Previewed Dictation was next to the lowest in usage of words over the 1,500 with 43 words in a sample of three hundred words. These words have the greatest potential of difficulty for the shorthand writer. The average syllabic intensity of the four speed levels, 60, 80, 100, and 120 was 1.42, which was the lowest of the five books of tests.

The newest book, Gregg Tests and Awards 1972 - 73, had fewer brief forms at all speed levels and fewer of the first one hundred words at three of the speed levels. The newest book contained more of the words over 1,500 of the commonly used business words at all speed levels except the 100 words-a-minute speed. The over-all syllabic intensity was higher (1.475) and was markedly higher at the 120-speed level, where it was 1.64 as compared with the 1.44 of the oldest book of tests.

Tests in Gregg Tests and Awards, 1971 - 72 were similar to the 1972 - 73 tests in brief forms used and in over-all syllabic intensity (1.46). This book showed a trend toward using a higher syllabic intensity throughout. It had the highest syllabic intensity at the 60-words and 80-words-a-minute speed levels of all of the five books and was next to the highest syllabic intensity on the 120 words-a-minute speed level.

Speed Dictation, copyright 1963, was noticeable for extremes. At the 120-word speed level, it contained the greatest number of brief forms and the greatest number of difficult words on the variable, Perry's over 1,500 words. The 80-words-a-minute speed level was very low in

brief forms used and very high in the use of words beyond the 1,500 most commonly used business words. The syllabic intensity of both of these speed levels, however, was only 1.45.

Progressive Dictation, copyright 1956, did not show unusual results on any variable. The 60-words-a-minute speed level contained 48 words which were beyond the 1,500 commonly used words, and this figure was high for a 60-words-a-minute speed level. The over-all syllabic intensity of the tests studied in Progressive Dictation was 1.425.

On the 120-word speed levels, the two paperback books appeared to have a higher syllabic intensity than the bound books. Also at the 120-word speed level, the three most recently published books appeared to have a greater number of words in Perry's list over 1,500 commonly used business words.

A COMPARISON OF THE INSTRUCTIONAL MATERIALS AND THE LETTERS WITH PULLIS'S FOUR-FACTOR INDEX

In describing the "average" business communication, Pullis[3] stated that letters and memoranda were made up of the following:

42 percent brief forms
53 percent high frequency words
72 percent common words
1.6 syllabic intensity

In defining brief forms, Pullis included not only all the brief forms but also their derivatives and compounds. Using Perry's[4] dissertation as the source in determining word frequency, Pullis referred to Perry's one hundred most common words as high-frequency words and Perry's first five hundred words as common words. The average syllabic intensity

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[3]Pullis, loc. cit.

[4]Perry, loc. cit.

was determined by Pullis to be 1.6 for his data. These four measures of difficulty were termed the four-factor index by Pullis.

Pullis's Index Compared With Instructional Materials

Pullis's study dealt only with business letters, but in teaching students to write business letters, instructional materials are used. Therefore, Pullis's index was used to analyze typical classroom materials.

College textbooks. The content of the five college textbooks, given in percentage of words based on the sample of approximately three hundred words taken from each book, is presented below (Table 4.22). The brief forms in this study do not include derivatives and compounds. Perry's 1 - 100 words are the high-frequency words; the 1 - 500 words are the common words; and Perry's 501 - 1,500 words are the one thousand business words which made up about 14 percent of business correspondence according to Pullis's results.

Table 4.22

Relative Proportions of Selected Variables Found in Five College Textbooks

Selected Variable	Book 1	Book 2	Book 3	Book 4	Book 5
Brief Forms	39.86	46.86	43.19	41.00	43.60
Perry's 1 - 100	50.89	54.46	54.49	53.67	56.40
Perry's 1 - 500	67.62	73.60	66.78	70.67	76.82
Perry's 501 - 1,500	11.39	12.87	12.96	14.00	13.15
Perry's Over 1,500	21.00	13.53	20.27	15.33	10.03
Syllabic Intensity	1.51	1.54	1.51	1.52	1.55

Note: Categories in the table overlap; therefore percentages do not add to 100.

The college books showed a high degree of agreement with Pullis's four-factor index. One explanation that the brief forms found in the books did not in all cases equal the 42 percent may be due to the fact that Pullis's brief forms category included derivatives and compound forms, while the present study does not do so. The high-frequency words found in the college books closely followed the 53 percent given in the four-factor index. The common words found in the variable Perry's 1 - 500 approximate the 72 percent stated by Pullis. Book 1 had 14 percent of words in the one thousand words beyond the common words.

On the variable, Perry's over 1,500, Book 1 (21.00) and Book 3 (20.27) appear to be the most difficult of the college books. Book 5 (10.03) appeared to be the least difficult, on the basis of this variable.

Secondary Textbooks. The percentage of words in the selected variables which were found in the approximately three hundred word samples taken from each of the five secondary books used in this study are given below (Table 4.23).

Table 4.23

Relative Proportion of Selected Variables Found in Five Secondary Textbooks

Selected Variables	Book 1	Book 2	Book 3	Book 4	Book 5
Brief Forms	50.50	41.00	40.20	47.28	43.75
Perry's 1 - 100	60.87	58.00	57.14	55.10	55.92
Perry's 1 - 500	75.92	77.00	75.75	72.11	69.41
Perry's 501 - 1,500	14.05	12.67	12.62	12.93	15.79
Perry's Over 1,500	10.03	10.33	11.63	14.97	14.80
Syllabic Intensity	1.44	1.47	1.48	1.44	1.33

In comparing the secondary books with the Pullis four-factor index for average business communication, brief forms in Books 1 and 4 were greater than the 42 percent of the index; and the high-frequency words in all five of the secondary textbooks exceeded the 53 percent of the four-factor index. Four of the books had a greater number of common words than the 72 percent which was indicated in the index as being typical. Three of the books contained less than the 14 percent of words found in average dictation from the one thousand words on Perry's list from 500 to 1,500.

The greatest differences between the college and secondary textbooks appeared in the variables, Perry's over 1,500 and in the syllabic intensity. The college textbooks contained a higher percentage of words beyond the 1,500 on Perry's list; and the syllabic intensity of college books was 1.50 and higher, whereas the secondary books were 1.48 or less. Neither college nor secondary textbooks equaled the 1.6 syllabic intensity indicated as standard by the four-factor index for business communications.

Books of Tests. The percentage of words in selected variables found in the books of tests are presented below (Table 4.24).

Table 4.24

Relative Proportion of Selected Variables
Found in Five Books of Tests

Selected Variable	Book 1	Book 2	Book 3	Book 4	Book 5
Brief Forms	42.01	46.67	43.52	41.53	42.33
Perry's 1 - 100	54.86	60.33	57.50	51.16	56.67
Perry's 1 - 500	71.18	77.67	72.43	69.44	74.04
Perry's 501 - 1,500	11.46	14.33	11.30	15.61	13.00
Perry's Over 1,500	17.36	8.00	16.28	14.95	13.00
Syllabic Intensity	1.30	1.40	1.40	1.37	1.45

In comparing the books of tests with the four-factor index, the brief forms were close to the 42 percent which make up average business communications. All of the books of tests except Book 4 contained more than the expected 53 percent of the high-frequency words and 72 percent of common words. The books run low in percentage of words in Perry's one thousand words from 501 - 1,500, but they tend to run higher than 14 percent of words beyond the 1,500 on Perry's list. Only Book 2 was noticeably low (8.00) on the latter variable. The syllabic intensity of the books of tests was lower over-all than either the college or secondary textbooks.

Summary of Selected Variables in the Books

Pullis[5] recommended the use of a four-factor index to label the content of each item used for dictation purposes. This index, which was descriptive of "average" business correspondence, was as follows:

42 percent brief forms
53 percent high-frequency words
72 percent common words
1.6 syllabic intensity

In his research brief forms included their derivatives and compounds. The high-frequency words were the first one hundred words on Perry's list. The common words were the first five hundred words on Perry's list. Pullis limited his definition of "average" correspondence to these four factors since the next one thousand words on Perry's list contributed only about 14 percent to the average business communication.

Following these percentages, the three-hundred-word samples taken from the college books, the secondary books, and books of tests were examined to determine how closely these books were to being of average difficulty.

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[5]Pullis, loc. cit.

The college textbooks followed the percentages stated in the four-factor index closely on the first three factors. However, only one book contained the 14 percent of words from 501 - 1,500. Two of the books had a large percentage of words over the 1,500. The syllabic intensity of all the college books critiqued was less than 1.6.

The secondary books showed percentages which were higher in brief forms, higher on the high-frequency words, and higher in three of the five books on the common words found in Perry's 1 - 500 words. Three of the secondary books contained less than the 14 percent of words in Perry's 501 - 1,500 words, and three books were low in percentage of words beyond the 1,500. The syllabic intensity of the secondary books studied was less than the 1.6 of Pullis's index. Using the four-factor index as a criterion, the secondary books were less difficult than typical business communications.

The five books of tests followed the percentages of the four-factor index closely on brief forms, on high-frequency words (Perry's 1 - 100), and on common words (Perry's 1 - 500). Two of the bound books of tests contained less than 14 percent of the one thousand words in Perry's 501 - 1,500 words. One bound book of tests (Progressive Dictation) was very low in percentage of words beyond the 1,500 on Perry's list. The syllabic intensity of the books of tests was approximately 1.4, which was less than the syllabic intensity of the four-factor index of 1.6.

Pullis's Index Compared With Letters

The content of the letters was also figured in percentages in order to determine how closely the letters by source and by categories followed the four-factor index established by Pullis.

Top-Level Management. The percentage of words in each selected variable in the letters from top-level management were as follows (Table 4.25):

Table 4.25

Pullis's Index Applied to Letters
Dictated by Top-Level Management

Selected Variable	Industry	Govern-ment	Finance	Education	Trans-portation
Brief Forms	43.11	41.87	43.31	44.51	42.08
Perry's 1 - 100	52.95	52.67	54.01	55.38	53.43
Perry's 1 - 500	70.71	71.17	72.68	75.38	69.59
Perry's 501 - 1,500	13.21	11.92	13.93	11.21	13.50
Perry's Over 1,500	16.08	16.91	13.39	13.41	16.91
Syllabic Intensity	1.56	1.60	1.58	1.63	1.61

Letters written by top-level management personnel followed closely the four-factor index for "average" business communications. Brief forms were approximately 42 percent; the high-frequency words, 53 percent; and the common words, 72 percent. The syllabic intensity of each category was close to the 1.6 set forth in the four-factor index as being "average" in business correspondence.

The category containing the least difficult letters was Education. Even though the syllabic intensity was comparatively high (1.63), there were fewer words in the thousand from 501 to 1,500 and in Perry's over 1,500 words than in any of the other categories of letters. The letters from both Industry and Transportation contained a greater number of words in both of these variables, which would tend to make these categories of letters more difficult for the shorthand writer.

Mid-Management. The percentage of words in each of the selected variables in the letters from mid-management were similar (Table 4.26).

Table 4.26

Pullis's Index Applied to Letters Dictated by Mid-Management Personnel

Selected Variable	Industry	Govern-ment	Finance	Education	Trans-portation
Brief Forms	40.58	39.92	40.68	41.54	40.18
Perry's 1 - 100	54.69	52.43	54.44	53.80	53.26
Perry's 1 - 500	71.58	69.39	74.82	70.56	69.49
Perry's 501 - 1,500	12.70	14.76	12.62	13.96	14.66
Perry's Over 1,500	15.71	15.84	12.55	15.48	15.85
Syllabic Intensity	1.54	1.70	1.53	1.64	1.53

The letters in the Education category followed the percentages for "average" business correspondence more closely than any of the other categories. In this category the 41.54 percent of brief forms, 53.80 percent of high-frequency words, 70.56 percentage of common words, and 1.64 syllabic intensity follow closely the percentages of the four-factor index with 42 percent brief forms, 53 percent high-frequency words, 72 percent common words, and 1.6 syllabic intensity.

The letters in the Government category were the most difficult of the five categories when judged by four-factor index. These letters contained 39.92 percent brief forms, 53.43 percent high-frequency words, 69.93 percent common words, and 1.7 syllabic intensity. The letters in the Transportation category were almost equal to the Government letters in difficulty except for the syllabic intensity which was 1.53.

The least difficult letters of the five categories were in the Finance category. In this category the brief forms accounted for 40.68

percent of the words; the high-frequency words, 54.44; the common words, 74.82; and the syllabic intensity was 1.53.

The letters from Industry followed the four-factor index closely except for the syllabic intensity which was less (1.54).

Unsolicited letters. More difficult than either the letters dictated by top-level personnel or by mid-management personnel were the unsolicited letters (Table 4.27).

Table 4.27

Pullis's Index Applied to Unsolicited Letters

Selected Variable	Industry	Govern-ment	Finance	Education	Trans-portation
Brief Forms	38.67	37.01	39.12	40.19	40.68
Perry's 1 - 100	50.68	46.72	52.36	48.57	52.07
Perry's 1 - 500	67.37	67.22	70.95	66.53	67.11
Perry's 501 - 1,500	14.45	12.34	14.49	14.97	13.83
Perry's Over 1,500	18.17	20.43	14.54	18.49	19.05
Syllabic Intensity	1.68	1.61	1.56	1.61	1.61

The percentage figures for the unsolicited letters are less than the figures given in the four-factor index for "average" business communications. In all of the categories of letters, the percentage of brief forms was less than 42 percent, the high-frequency words were less than 53 percent, and the percentage of common words was less than 72 percent. In the selected variable, Perry's 501 - 1,500, the percentage was only slightly higher than for either the mid-management letters or the top-level management dictated letters. However, the

selected variable, Perry's over 1,500, contained an average of 18.13 percent of the words in a three-hundred-word sample as compared with mid-management letters (15.09) and top-level management (15.34). The mean of the syllabic intensity of the unsolicited letters was 1.61, which was higher than either the top-level management dictated letters (1.596) or mid-management dictated letters (1.588).

Of all the unsolicited letters, the Government category was the most difficult. These letters contained the lowest percentage of brief forms (37.01), high-frequency words (46.72), common words (20.50), and of words on Perry's 501 - 1,500 (12.34), but the greatest percentage of words over 1,500 (20.43). The syllabic intensity of these letters, although not the highest, is still high at 1.61.

The letters in the Finance category were the least difficult with the percentage of words in brief forms (39.12), high-frequency words (52.36), common words (70.95), and Perry's 501 - 1,500 and Over 1,500 each with 14.5 percent. The syllabic intensity was 1.56. These letters were only slightly above Pullis's[6] four-factor index for "average" business correspondence.

Summary of Percentages of Words by Categories of Letters

Using Pullis's four-factor index as the criterion of what is considered to be of "average" difficulty in business communications, the three sources of letters, top-level management dictated letters, mid-management dictated letters, and unsolicited or direct-mail advertising letters, were evaluated as to their difficulty in terms of the mean percentage of words in a three-hundred-word sample which occurred in each variable of the index.

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[6]Pullis, loc. cit.

The study indicated that the unsolicited letters were above "average" difficulty. The percentage of words beyond the 1,500 on Perry's list was greater in the unsolicited letters than in the other sources. The syllabic intensity of the unsolicited letters was generally closer to the 1.6 of the four-factor index than were the two other sources of letters.

The letters written by top-level management personnel were only slightly more difficult than those written by mid-management personnel. The percentage of words beyond the 1,500 on Perry's list was slightly higher for the top-level management personnel, and the syllabic intensity of these letters was 1.596 as compared with 1.588 for the letters dictated by mid-management personnel.

A study of the five categories of letters (Industry, Government, Education, Finance, and Transportation) showed that letters from the categories of Finance and Education were less difficult than from the other three categories (Government, Transportation, and Industry). In two of the sources, mid-management dictated letters and unsolicited letters, Finance letters were the least difficult with Government and Transportation letters being the most difficult. In the letters dictated by top-level management personnel, those from Education were the least difficult and those from Industry and Tansportation were the most difficult.

SUMMARY OF THE ANALYSIS OF THE DATA

All six research hypotheses and all six research subhypotheses were rejected in this study. At no time was there a difference on <u>all</u> the dependent variables being examined. However, among the paired

comparisons, individual variables showed significant differences. Of these, syllabic intensity differed most frequently. Whenever letters were compared with textbooks or books of tests, the syllabic intensity of the letters was significantly greater.

The number of difficult words in the variable, Perry's Over 1,500, became significant whenever unsolicited letters were compared with secondary textbooks or the unsolicited letters with dictated letters. The increase in difficult words was offset with a decrease in words of high frequency (Perry's 1 - 100) and brief forms. Among the categories of letters, the Government and Transportation letters contained a significantly greater number of words in Perry's Over 1,500 than did the Finance letters.

The reading level of the instructional materials and the letters were determined through the use of the SMOG Grading Readability Formula. The college textbooks had a higher grade reading level (10.76) than either the secondary textbooks (9.88) or the books of tests (9.10). Of the three sources of letters, the unsolicited letters had the highest reading level (12.50). The difference between top-level management dictated letters (11.11) and mid-management dictated letters (11.6) was only slight. Among the categories of letters, Finance letters had a slightly higher grade reading level (12.33) than Education letters (12.30) or Industry letters (12.06).

The study of four speed levels in each of the five books of tests was inconclusive. The books did not show any consistent pattern of being less difficult at the 60-words-a-minute speed level or more difficult at the 120-words-a-minute speed level. The graph of the variable, Perry's 501 - 1,500 words, showed the least dispersion,

indicating a constancy in the number of these words to be found at all speed levels.

Pullis's four-factor index describes "average" business communication as being composed of the following:

44 percent brief forms
53 percent high-frequency words
72 percent common words
1.6 syllabic intensity

Pullis further stated that the 1,500 most commonly used business words accounted for 86 percent of the vocabulary used in business letters. The remaining 14 percent were words beyond the first 1,500 on Perry's list.

In comparing the instructional materials with the four-factor index, the most apparent difference was the syllabic intensity. It was less than the 1.6 given in the index. The college textbooks contained a greater percentage of words beyond the 1,500. This, in turn, reduced the percentage of common words to less than 72 percent in three of the five textbooks. On the other hand, the letters contained a syllabic intensity averaging 1.6. Also, the words in Perry's Over 1,500 were above the 14 percent considered average. The average was over 16 percent, which resulted in a lower percentage of brief forms and high-frequency words.

Chapter 5

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

The nature of the study, the procedures used, and the findings which culminated as a result of this study are presented in this chapter along with conclusions and recommendations.

I. NATURE OF THE STUDY

The preparation of the shorthand student to enter the business world should begin with materials of little difficulty and extend to materials of difficulty equal to that in daily use by businessmen and women. The instructional materials in use in the classroom should ultimately be of the same difficulty level as the vocabulary which the student will encounter as a beginning stenographic employee.

Need for the Study

The need for an index indicating the difficulty of shorthand materials started with the first shorthand contest in 1887. Years later in 1922, syllabic intensity was considered to be the factor responsible for the differences in difficulty in shorthand dictation materials. In the years since 1922, a number of researchers have disputed the fact that syllabic intensity is the sole measure of difficulty but have held that it is one factor which should be used in combination with other factors. The frequency with which words occur in daily correspondence makes familiarity of vocabulary a factor to be considered as contributing to difficulty.

The need to have existing instructional and testing materials analyzed on the basis of vocabulary level was suggested by a recent researcher[1] who questioned whether these materials contained adequate coverage of the vocabulary currently used in business. An attempt should be made to determine whether the existing instructional and testing materials are of sufficient difficulty to prepare students for work in the business office. The materials examined empirically should include those normally dictated routinely and those occasionally dictated for special reasons.

Delimitations of the Study

Perry's list of the 500 most frequently used word combinations and the 5,000 most frequently occurring words in business letters, as presented in his dissertation, was the source used to determine the frequency of usage of the business vocabulary.

Letters referred to as normal business dictation were secured from top-level management personnel and mid-management personnel. Direct-mail or advertising or unsolicited letters were requested from the businessmen at the same time as the normal business dictation was requested.

Only shorthand books which were written in Gregg Diamond Jubilee shorthand were examined as the instructional materials in use in secondary and college shorthand classes.

Hypotheses Tested

The following six research hypotheses were tested:

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[1]Leonhard Paul Mickelsen, "The Relationship Between Word Frequency and the Difficulty of Shorthand Dictation Materials" (unpublished Ed.D. dissertation, University of North Dakota, 1970), p. 90.

1. There is a difference between the normal business dictation and all the textbooks on all of the difficulty factors studied.

2. There is a difference between the unsolicited mail and all the textbooks on all the difficulty factors studied.

3. There is a difference between the unsolicited mail and the normal business dictation on all of the difficulty factors studied.

4. There is a difference between the books of tests and the textbooks on all of the difficulty factors studied.

5. There is a difference between the books of tests and dictated letters on all of the difficulty factors studied.

6. There is a difference between the books of tests and the unsolicited letters on all of the difficulty factors studied.

Six subhypotheses were also tested. They were stated in research terms as follows:

1. There is a difference between the normal business dictation and the secondary textbooks on each of the dependent variables.

2. There is a difference between the unsolicited business letters and the difficulty of the secondary textbooks on each of the dependent variables.

3. There is a difference between the normal business dictation and the college textbooks on each of the dependent variables.

4. There is a difference between the difficulty of the unsolicited business letters and the difficulty of the college textbooks on each of the dependent variables.

5. There is a difference between the books of tests and the college textbooks on each of the dependent variables.

6. There is a difference between the secondary textbooks and the books of tests on each of the dependent variables.

II. SUMMARY OF PROCEDURES

The fifteen books in the study, which are referred to as instructional materials, consisted of five college books in current use in shorthand classes, five secondary books in current use in shorthand classes on the high school level; and five books of tests currently being used by both college and secondary teachers of shorthand.

The letters which were secured from top-level management personnel nationwide were randomly selected from firms in the following fields:

1. Industry
2. Government
3. Finance
4. Education
5. Transportation

The letters from mid-management personnel were secured with the aid of The Administrative Management Society through contacting three chapter presidents in each of the fifteen districts in the United States. Letters secured by the chapter presidents were to be from the same five fields of work as the letters from top-level management. The unsolicited mail was requested at the same time and in the same five fields as the normally dictated business letters.

The vocabulary used in the books and letters was sampled in 100-word blocks. Approximately three hundred words were secured by taking 100 words at the beginning, 100 words in the middle, and 100 words at the end of each book. Letters were stapled three together, and three 100-word samples were taken from each group of these letters. Because letters were less stable than books, fifteen letters were used as being representative of a category. Thus, 75 letters were studied which were written by top-level management personnel, 75 letters written by

mid-management personnel, and 75 unsolicited letters were studied, making a total of 225 letters used in the study.

The approximately three-hundred-word samples were punched on data cards, together with codes detailing the sources of the words. A COBOL program was written so that the number of words in the samples could be compared with Perry's list of words according to frequency of use.

The words in each three-hundred-word sample were counted according to the following breakdown, which was taken in part from Perry's list:

1. Brief forms
2. Perry's 1 - 100 words
3. Perry's 101 - 500 words
4. Perry's 501 - 1,500 words
5. Perry's Over 1,500 words

Later, the syllabic intensity of each three-hundred-word sample was determined, and this measure of difficulty became the sixth dependent variable.

A one-way analysis of variance was performed with the six aforementioned dependent variables as the criteria and the books and letters as the independent variables.

The areas of this study which were being compared were ultimately grouped as follows:

1. Textbooks
2. Books of tests
3. Letters dictated
4. Letters unsolicited

Wherever an F ratio was large enough to indicate significant differences existed, the Scheffé Post Hoc Technique was used to examine pairs of means to fix the location of the greatest differences.

After the books and letters had been examined for significant differences, the letters were taken alone in a two-way analysis of

variance in an effort to locate differences between sources and between the categories. Pairwise Scheffé Post Hoc comparisons were performed where significant F ratios were located.

A nonstatistical analysis was made covering three areas:

1. The reading level of the instructional materials and the letters.

2. The difficulty of the 60-, 80-, 100-, and 120-words-a-minute dictation tests in the five books of tests.

3. The difficulty of the instructional materials and the letters in comparison with Pullis's[2] four-factor index.

The SMOG Grading formula developed by McLaughlin[3] was used to determine the grade reading level of the books and the letters. This formula is widely used in the public schools because it is fast to calculate and because it results in a grade reading score which is usable with the Gates-MacGinitie[4] Reading Survey Tests. There are a series of these tests for use covering grades Kindergarten through 12. The results of the test show the grade level at which a student is reading.

In the five books of tests, the four speed levels used by both secondary and college teachers were chosen for examination. A 100-word sample was taken from the first, middle, and last test of the 60-, 80-, 100-, and 120-words-a-minute material to make the three-hundred-word

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[2]Joe B. Pullis, "A New Standard Word in Shorthand?" The Journal of Business Education, Volume 52 (January, 1971), pp. 144-145.

[3]G. Harry McLaughlin, "SMOG Grading--a New Readability Formula," Journal of Reading, 12 (May, 1969), pp. 639-646.

[4]Arthur I. Gates and Walter H. MacGinitie, Gates-MacGinitie Reading Tests, (New York: Teachers College Press, Teachers College, Columbia University, 1969).

sample which was counted on the six dependent variables by the COBOL program. The results of the count were graphed for each dependent variable.

Pullis[5] recommended a systematic approach to determining the difficulty of dictation. He defined the contents of the "average" business communication as follows:

42 percent brief forms
53 percent high-frequency words
72 percent common words
1.6 syllabic intensity

Pullis used Perry's list in his research and referred to the four items as a four-factor index of difficulty. Pullis stated that the brief forms also included brief form derivatives, that the high-frequency words were those words on Perry's 1 - 100 word list, and that common words were the same as Perry's 1 - 500 words.

A comparison was made of the content of the instructional materials and the letters in percentages and the four-factor index established in percentages by Pullis. This resulted in six tables showing the percentage of words in selected variables in the following:

1. College textbooks
2. Secondary textbooks
3. Books of tests
4. Top-level management personnel dictated letters
5. Mid-management personnel dictated letters
6. Unsolicited or direct-mail advertising letters

III. FINDINGS

The instructional materials and letters were combined under five headings for analysis; these headings were as follows:

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[5]Pullis, loc. cit.

1. College textbooks
2. Secondary textbooks
3. Books of tests
4. Letters dictated
5. Letters unsolicited

The one-way analysis of variance was computed using the six dependent variables; four variables showed differences at the .05 level of significance. These were the following:

1. Brief forms
2. Perry's 1 - 100
3. Perry's over 1,500
4. Syllabic intensity

Of the four dependent variables, syllabic intensity proved to be significantly different more frequently than the remaining three variables. Differences were examined using the Scheffé Post Hoc Technique. Syllabic intensity proved to be significantly greater in six of twelve pairwise comparisons. These six comparisons examined syllabic intensity in either dictated letters or unsolicited letters, as is shown in the following listing of pairwise comparisons:

1. Letters dictated and college and secondary textbooks
2. Unsolicited letters and college and secondary books
3. Letters dictated and books of tests
4. Unsolicited letters and books of tests
5. Letters dictated and secondary textbooks
6. Unsolicited letters and secondary textbooks

When letters dictated were compared with unsolicited letters, the results showed no significant differences in syllabic intensity.

The remaining three variables (brief forms, Perry's 1 - 100, and Perry's over 1,500) showed significant differences only when the unsolicited letters were a part of the pairwise comparison, as is shown in the following listing:

1. Unsolicited letters and college and secondary textbooks
2. Unsolicited letters and secondary textbooks
3. Unsolicited letters and letters dictated

No significant differences were found on any of the six dependent variables in the following comparisons:

1. Books of tests and college and secondary textbooks
2. Letters dictated and college textbooks
3. Unsolicited letters and college textbooks
4. Books of tests and college textbooks
5. Books of tests and secondary textbooks

The two dependent variables, Perry's 101 - 500 and Perry's 501 - 1,500 were not significant at the .05 level of significance. These variables appeared to be the fulcrum point with the words of high frequency and of low frequency varying significantly on either side.

The two-way analysis of variance of the letters included the following:

1. The sources of letters (top-level management personnel, mid-management personnel, and unsolicited)

2. The categories of letters (industry, government, finance, education, and transportation)

Among the three sources of letters, differences were found at the .05 level of significance on the following three variables only:

1. Brief forms
2. Perry's 1 - 100
3. Perry's over 1,500

Letters dictated by top-level management personnel were not significantly different from the letters dictated by mid-management personnel. Only when top-level management letters were compared with the unsolicited letters did differences appear on all three variables. The unsolicited letters had a significantly greater number of words beyond the 1,500 on Perry's list and fewer of the first one hundred words and brief forms. When the unsolicited letters were compared with mid-management dictated letters, one variable, Perry's over 1,500 words, was

significantly different. Therefore, the unsolicited letters are more difficult than either of the other sources due to the greater number of words which are beyond the 1,500 words on Perry's list.

A study of the differences among the categories of letters showed that only two of the dependent variables showed statistically significant differences. The two dependent variables were the following:

1. Perry's 101 - 500 words
2. Perry's over 1,500 words

The letters from the Transportation category contained significantly fewer of the words in Perry's 101 - 500 words than either the Government category of letters or the Finance category. The same three categories of letters showed significant differences on the variable, Perry's over 1,500. The Transportation letters and the Government letters had significantly more words beyond the 1,500 than did the letters in the Finance category.

The nonstatistical analysis examined the following three areas:

1. The reading level of the instructional materials and the letters
2. The difficulty of the dictation materials in the five books of tests on four selected speed levels.
3. A percentage comparison of the content of the instructional materials and the letters with Pullis's[6] four-factor index

The mean grade reading level of the college textbooks (10.76) was greater than the average for the secondary textbooks (9.88). The books of tests were less than either the college or secondary textbooks (9.10).

The mean grade reading level of the letters by sources was higher than the reading level of the instructional materials. The

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[6]Pullis, loc. cit.

average for top-level management dictated letters was 11.11; for mid-management dictated letters, 11.6; and for the unsolicited letters, 12.5.

The oldest book of tests, Previewed Dictation, published in 1950, gave evidence of being the least difficult of the five books of tests under consideration. The three-hundred-word samples from each of the four speed levels, the 60-, 80-, 100-, and 120-words-a-minute tests, contained a greater number of brief forms and Perry's 1 - 100 words and fewer words from Perry's over 1,500. The vocabulary, on the whole, was less difficult for the shorthand writer.

Gregg Tests and Awards, 1972 - 73 gave evidence of being the most difficult of the five books of tests. The number of brief forms and words in Perry's 1 - 100 was less, but the number of words beyond the 1,500 was greater. This combination would make for greater difficulty for the writer.

Since the percentage of words in each dependent variable was available from the COBOL program, the opportunity presented itself to compare these percentages with Pullis's four-factor index, which defined the difficulty of the "average" business communication as follows:

42 percent brief forms
53 percent high-frequency words
72 percent common words
1.6 syllabic intensity

The four-factor index is based on Perry's list. The high-frequency words are Perry's 1 - 100 words. The common words are Perry's 1 - 500 words.

One dependent variable of this study was changed from Perry's 101 - 500 to include Perry's words from 1 - 500 so that the percentages in the books and letters being examined could be compared with the items in the four-factor index. Because of this alteration, the dependent

variables were thereafter referred to as selected variables in the discussion concerning percentages. Also, the brief forms in this study did not include any brief-form derivatives. This omission, however, should not have made a substantive difference in results.

A study of the percentages in each of the selected variables showed that the college textbooks were slightly above average difficulty, the secondary books were of less-than-average difficulty, and the books of tests were close to average. The syllabic intensity of all the instructional materials was less than the 1.6 of the four-factor index.

Similarly, the percentages on the selected variables in the letters by source and category were compared with the percentages in the four-factor index. The letters dictated by top-level management personnel and mid-management personnel compared closely with the four-factor index on all items including the syllabic intensity. The percentage of words in Perry's over 1,500 was more than the 14 percent estimated as being average for these more difficult words.

An examination of the percentages in the selected variables of the unsolicited letters across all categories showed generally smaller totals on brief forms, high-frequency words, and common words. The syllabic intensity, however, was over 1.6 in four of the categories of letters. The percentages in the selected variable Perry's over 1,500 were all above the expected 14 percent for these words. The Finance letters exceeded this percentage by .54 percent and the Government letters by 6.43 percent. These increased percentages in words in Perry's over 1,500 indicate increased difficulty for the shorthand writer.

A study of the letters by categories indicated that letters obtained from the Finance and Education fields were less difficult than those from Government, Transportation, and Industry.

Both syllabic intensity and Perry's words over 1,500 were most frequently the indicators of difficulty among the six dependent variables used in this study.

The reading level of the letters as a measure of difficulty did not support the results which were obtained when the difficulty of the letters was examined by statistical methods.

IV. CONCLUSIONS

The following enumerated items are the conclusions evolving from this study:

1. Both college and secondary textbooks were of sufficient difficulty to prepare the student to take satisfactorily the tests published in the five books of tests examined in this study.

2. The college textbooks were of sufficient difficulty on all the variables studied to prepare the college student to write from dictation the letters dictated by businessmen in carrying on their normal routine of daily business as well as the unsolicited letters used in direct-mail advertising.

3. The secondary textbooks were not sufficiently difficult to prepare students of shorthand to write the unsolicited letters.

4. Syllabic intensity was one of the variables on which there was no significant difference when letters only were analyzed either by source or by category; therefore, the differences in difficulty among letters existed elsewhere than on this variable.

5. Of the four speed levels studied in each of the five books of tests, no developmental plan was discernible; the books appear to be a collection of test materials without any consistent organization of content.

V. RECOMMENDATIONS

1. It is recommended that a complete count of the words contained in each dictation test be made available to the shorthand teacher through the use of computer facilities.

2. Since the vocabulary of all the letters studied was made up of approximately 86 percent of words from the 1,500 most commonly used business words, students of shorthand should have extensive drill and dictation on materials which would lead to mastery of the basic 1,500 words used in business communications.

3. Textbooks in shorthand should be written with an increasingly difficult vocabulary, and the content of the materials should be indexed completely so that the reader would know the percentage of words above and below the 1,500 commonly used words in the content.

4. Further study which would use a method of establishing reading level for instructional materials compatible with the exact number of words in a sample is recommended.

5. A check of the reading level of 60 shorthand students showed 20 or one-third of them reading below ninth grade level;* therefore, shorthand textbooks which are ninth grade level and above should be simplified for the beginning student who is trying to learn the theory.

6. Percentages of words in each category of Perry's word list should be published along with each piece of dictation which is of three minutes' duration or longer. The syllabic intensity of the piece should be included, as well as a listing of the words which are beyond the 1,500 most commonly used business words.

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*Everett High School, Lansing School District, Lansing, Michigan, October 1974.

7. Further study is recommended to test the effectiveness of teaching materials which make use of controlled vocabulary of progressively increasing difficulty with shorthand students.

BIBLIOGRAPHY

BIBLIOGRAPHY

BOOKS

Blanchard, Clyde I. 20 Shortcuts to Shorthand Speed. New York: The Gregg Publishing Company, 1939.

Gates, Arthur I. and Walter H. MacGinitie. Gates-MacGinitie Reading Tests, Survey F. New York: Teachers College Press, Teachers College, Columbia University, 1969.

Gregg, John Robert. Gregg Shorthand. New York: The Gregg Publishing Company, 1916.

Gunning, Robert. The Technique of Clear Writing. New York: McGraw-Hill Book Company, 1952.

Hays, William L. Statistics. New York: Holt, Rinehart and Winston, 1963.

Horn, Ernest. A Basic Writing Vocabulary. Iowa City: University of Iowa, 1926.

_____ and Thelma Peterson. A Basic Vocabulary of Business Letters. New York: The Gregg Publishing Company, 1943.

Leslie, Louis A. Methods of Teaching Gregg Shorthand. New York: The Gregg Publishing Division, McGraw-Hill Book Company, Inc., 1953.

_____ and Charles E. Zoubek. Dictation For Mailable Transcripts. New York: The Gregg Publishing Division, McGraw-Hill Book Company, Inc., 1950.

Perry, Devern J. The 500 Most Frequently Used Word Combinations and the 5,000 Most Frequently Occurring Words in Business Letters, Research and Science Project No. 1, Delta Pi Epsilon, Alpha Omega Chapter, Brigham Young University, Provo, Utah, April 1970.

Rowe, Clyde E. The Writing of Infrequently Used Words in Shorthand. New York: Teachers College, Columbia University, 1943.

Thorndike, Edward L. The Teacher's Word Book (A List of 10,000 Words). New York: Bureau of Publications, Teachers College, Columbia University, 1921.

Tonne, Herbert A. Principles of Business Education. 2d ed. New York: McGraw-Hill Book Company, 1954.

Wellman, Rowena. An Examination of Certain Factors Involved in the Reporting and Transcribing of Stenographic Materials. New York: Teachers College, Columbia University, 1937.

Zoubek, Charles E. Speed Dictation. New York: The Gregg Publishing Division, McGraw-Hill Company, Inc., 1963.

PERIODICALS

Crandall, Lars G. "Word Frequency Applied to Stenography," Journal of Business Education, 36 (November, 1960), 67-68.

Dewey, Godfrey. "The Relativ[si]Frequency of English Speech Sounds," Harvard Studies in Education, Vol. IV. Cambridge: Harvard University Press, 1923.

Flesch, Rudolph F. "A New Readability Yardstick," Journal of Applied Psychology, XXXII (June, 1945), 228-230.

Klein, Abraham. "Variations in the Speed of Writing of Symbol Combinations in Gregg Shorthand." National Business Education Quarterly, 18 (October, 1949), 35-44.

Leslie, Louis A. "The Difficulty of Shorthand Dictation Material," Business Education World, 28 (September, 1947), 12-16; (October, 1947), 35-37; (November, 1947), 162-166.

Madrid, Ernest William. "A Study of the Readability of Gregg Shorthand Textbooks." National Business Education Quarterly. 30 (October), 31.

McLaughlin, G. Harry. "SMOG Grading: A New Readability Formula," Journal of Reading, 12 (May, 1969), 639-646.

Mellinger, Morris. "Has the Syllabic Intensity Yardstick Lost Its Magic?" Business Education World, 45 (November, 1964), 9-11.

_____. "New High-Frequency Vocabulary." Delta Pi Epsilon Journal, XIV, No. 2 (February, 1972), 37.

Perry, Devern J. "An Analytical Comparison of the Relative Word-Combinations Frequencies of Business Correspondence With Phrase Frequencies of Selected Shorthand Textbooks." Journal of Business Education, 44 (May, 1969), 340.

Peterson, Richard. "A Study of Some of the Factors Which Affect Transcription Ability Through an Analysis of Error Frequency." National Business Education Quarterly, 33:56.

Pullis, Joe M. "A New Standard Word in Shorthand?" The Journal of Business Education, 52 (January, 1971), 144-145.

Turse, Paul L. "Standard Word vs. Shorthand Stroke in Shorthand Dictation," Business Education World, 24 (June, 1944), 541-542.

_____. "Validity of the Stroke Count," Journal of Business Education, 23 (March, 1948), 29-30, 32.

West, Leonard J. "The Vocabulary of Instructional Materials for Typing and Stenographic Training--Research Findings and Implications," Delta Pi Epsilon Journal, X, No. 3 (May, 1968), 13-25.

UNPUBLISHED SOURCES

Baggett, Harry William. "The Validity of a Measure of the Difficulty of Gregg Shorthand Materials." Unpublished PhD dissertation, University of Minnesota, Minneapolis, 1965, Dissertation Abstracts 26: 1648.

Curtin, Rita C. "The Relationship Between Selected Factors and Difficulty of Dictated Material." Unpublished Master's Thesis, University of Minnesota, Minneapolis, 1958.

Elsen, Sister Mary Elfrida. "Factors of Difficulty in Shorthand Dictation Material." Unpublished Master's Thesis, DePaul University, Chicago, Illinois, 1946.

Farmer, Geraldine Mary. "An Experiment to Test the Validity of a Measure of the Difficulty of Shorthand Dictation Materials," Unpublished PhD dissertation, University of Minnesota, Minneapolis, 1961, Dissertation Abstracts, 26 (1965), 1648.

Flood, Hazel, "Some Factors Involved in Learning Shorthand--Analysis of the Learning Load of Two Systems of Shorthand." Unpublished PhD dissertation, University of Minnesota, Minneapolis, 1953, Dissertation Abstracts 1953, 13/05, 720-721.

Henrie, Bill S. "A Comparative Analysis of Difficulty Prediction Formulas for Shorthand Dictation Material." Unpublished EdD dissertation, Utah State University (Logan), 1971.

Henshall, Joy Lanier. "An Application of Readability Techniques to Prediction of Difficulty Level of Shorthand Dictation Materials." Unpublished PhD Dissertation, North Texas State University, 1971.

Hillestad, Mildred C. "Factors That Contribute to the Difficulty of Shorthand Dictation Material." Unpublished PhD dissertation, University of Minnesota, Minneapolis, 1960.

Kodet, Ambrose S. "An Analysis of Factors Contributing to the Difficulty of Reading Materials in Gregg Shorthand Diamond Jubilee Series." Unpublished Master'sthesis, Mankato State College, 1964.

Larson, Nathan R. "The Terminal Effect of Emphasizing the Most Frequently Occurring Words in Intermediate and Advanced Gregg Shorthand." Unpublished Master's thesis, Brigham Young University, 1970.

Mickelsen, Leonhard Paul. "The Relationship Between Word Frequency and the Difficulty of Shorthand Dictation Materials." Unpublished PhD dissertation, University of North Dakota, 1970.

Meyer, Louis Irene. "A Test of the Validity of a Measure of Difficulty of Shorthand Dictation Materials." Unpublished PhD dissertation, University of Minnesota, Minneapolis, 1967. Dissertation Abstracts, 28/11A: 4536.

Silverthorn, James E. "The Basic Vocabulary of Written Business Communications." Unpublished EdD dissertation, University of Indiana, Bloomington, 1955, Dissertation Abstracts, 15/10; 1746.

Uthe, Elaine F. "An Evaluation of the Difficulty Level of Shorthand Dictation Materials." Unpublished PhD dissertation, University of Minnesota, Minneapolis, 1966.

APPENDIX A

LETTERS

LANSING SCHOOL DISTRICT
LANSING, MICHIGAN

EVERETT HIGH SCHOOL
3900 STABLER STREET

CALVIN C. ANDERSON
PRINCIPAL

April 17, 1973

Dr. Ronald K. Edwards
Lansing Community College
419 North Capitol Avenue
Lansing, Michigan 48914

Dear Dr. Edwards

May I enlist the aid of your Administrative Management Society Chapter in the research for my dissertation at Michigan State University? I am a secondary teacher of office occupations, and the topic of my research is "A Study to Compare the Difficulty of Materials Used in the Teaching and Testing of Shorthand With the Difficulty of Business Letters in Use in Business Offices."

In an effort to upgrade the teaching of shorthand, I wish to study the vocabulary used in business letters nationwide. Would you be willing to secure for me five dictated letters from businesses in your chapter and five unsolicited letters that come into business offices with the daily mail.

The five dictated letters and five unsolicited letters can be from five different companies or from different departments within a large company. However, the letters should be representative of the businesses within your chapter and as varied as possible.

Following are the five categories of business firms from which I hope to obtain letters, both dictated and unsolicited:

1. Finance (banks, credit unions, loan companies)
2. Government (all branches)
3. Industry (extractive, manufacturing, service)
4. Education (colleges, private and public schools)
5. Transportation (airways, railways, trucking firms)

The letters can be copies of some already in the files with all names blocked out. Only the vocabulary used to convey the message will be studied. I am hoping to spend the summer months making a comparison between letters, both dictated and unsolicited, and the instructional materials used by teachers in the classroom and in testing.

Enclosed is a self-addressed envelope for your convenience in returning the ten letters to me. May I hear from you by May 21?

Sincerely yours

Donalda Warner

Mrs. Donalda W.

LANSING CHAPTER

April 19, 1973

Chapter Presidents
Selected A. M. S. Chapters

REQUEST FOR RESEARCH DATA

Enclosed is a letter from a graduate student at Michigan State University. The student, who is also a full-time teacher, is requesting our assistance in obtaining business correspondence on a nationwide basis.

As President of the Lansing Chapter of Administrative Management Society, I am asking that you give this research study your support. We will attempt to publish the results of this study in either the Management World or Administrative Management magazine. Thus, you will know the outcome of the comparison between letters in business and instructional materials in use by business educators.

As each individual research study adds to the total body of knowledge available to those who work with students, we as business administrators can make our contribution from the empirical world to those who teach and study.

I hope you will take the few minutes necessary to request these letters from your Board or others in your chapter. We all benefit from any improvement in education.

Ronald K. Edwards

RONALD K. EDWARDS - PRESIDENT
Lansing Chapter, A. M. S.

dw

Enclosure

Follow-up Letter sent to Selected Chapter Presidents
of The Administrative Management Society

June 20, 1973

Dear

The last examination of the school year has been corrected, and the school year is over. One of those last examinations was the National Business Entrance Examination for Stenographers. It was published jointly with NBEA and AMS. I use it in June as the final examination for seniors in shorthand.

Because AMS has always supported our efforts in the classroom, I turned to you last April for assistance in obtaining real business letters, both dictated and unsolicited, for material for my dissertation. I am comparing real business correspondence with students' textbooks and teachers' tests.

The returns have been coming in, but I have not heard from your chapter. With summer school now in session, I will have computer time available to continue my study. Could I have ten letters, five dictated and five unsolicited, from your chapter by July 16?

As business educators, we do appreciate all the interest you have shown in our problems through the years.

Sincerely yours

Mrs. Donalda Warner
Business Teacher

P. S. Would you please have your secretary pick out the ten letters requested and send them to Mrs. Warner to help her complete this chapter-sponsored research.

Ronald K. Edwards, President
Lansing Chapter, AMS

MICHIGAN STATE UNIVERSITY
EAST LANSING

2615 Teel Avenue
Lansing, Michigan 48910
July 5, 1973

Mr. Norborne Berkeley, Jr., President
Chemical Bank
20 Pine Street
New York, New York 10015

Dear Mr. Berkeley

May I enlist your aid in the research for my dissertation at Michigan State University? I am a secondary teacher of office occupations in the Lansing Public Schools, and the topic of my research is "A Study to Compare the Difficulty of Materials Used in the Teaching and Testing of Shorthand With the Difficulty of Business Letters in Use in Business Offices."

In an effort to improve the teaching of shorthand, I am studying the vocabulary used in business letters nationwide. I am in urgent need of letters dictated by top-level executives whose vocabulary represents the most difficult words a prospective secretarial student will encounter. Would you be willing to send me five dictated letters with all names blocked out? Only the vocabulary in the message will be studied.

Also included in my study is the vocabulary used in direct-mail advertising or "junk" mail. I am looking for those long, advertising "come-on" pieces used in promoting a new product. Do you have five samples of these letters that are no longer of value to you?

Enclosed is a self-addressed envelope for your use in returning these letters to me. May I hear from you by August 1?

Sincerely yours

Mrs. Donalda Warner
Lansing Everett High School
Business Teacher

Enclosure

Letter of Thanks Sent to Respondents to Request for Dictated and Unsolicited Letters

October 25, 1973

Dear

Thank you for responding so promptly to my request for business letters for use in my study of business correspondence. I had a very busy summer at Michigan State University putting the material on data cards.

If I can draw some worthwhile conclusions from this study, it will be due to your generosity in sharing your correspondence with me.

Now that school has reppened, my senior secretarial students are typing my thank-you letters. It is good practice for them and most helpful to me.

Sincerely yours

Mrs. Donalda Warner
Business Teacher

APPENDIX B

TABLES SHOWING CELL MEANS AND STANDARD DEVIATIONS

APPENDIX B

OBSERVED CELL MEANS
ROWS ARE CELLS. COLUMNS ARE VARIABLES

Source	Cell	Brief Forms	Perry's 1-100	Perry's to 500	Perry's -1500	Perry's Over 15	Syllabic Int.	Reading Level
College Texts	1	126.6	159.2	50.4	38.0	47.2	152.6	107.6
Secondary Tests	2	133.4	172.0	49.8	40.8	37.0	143.2	98.8
Books of Tests	3	128.8	163.6	53.8	39.2	41.4	138.4	91.0
	4	122.0	164.4	50.8	38.2	47.2	154.6	129.0
Letters	5	120.0	157.6	51.0	44.4	47.6	170.2	132.0
Mid-Management	6	121.8	163.0	61.0	37.8	37.6	153.0	116.0
Personnel	7	124.0	160.6	50.0	41.6	46.2	164.0	121.0
	8	120.6	160.0	48.6	44.0	47.6	153.4	82.00
	9	116.6	152.8	50.4	43.6	54.8	168.0	125.0
Letters	10	110.2	139.2	61.0	36.6	60.8	163.6	104.0
Unsolicited	11	116.6	156.0	55.4	43.2	43.4	156.4	147.0
Mail	12	120.8	146.0	54.0	45.0	55.6	161.6	128.0
	13	122.8	157.2	45.4	41.8	57.4	161.4	121.0
	14	128.6	158.0	53.0	39.4	48.0	156.2	107.0
Letters	15	125.8	158.2	55.6	35.8	50.8	160.4	99.0
Top-Level	16	129.4	162.0	55.2	41.6	40.0	158.2	107.0
Management	17	132.4	164.8	59.4	33.4	40.0	162.6	120.0
Personnel	18	124.2	157.8	47.8	40.0	50.0	161.2	122.0

APPENDIX B

OBSERVED CELL STANDARD DEVIATIONS
ROWS ARE CELLS. COLUMNS ARE VARIABLES

Source	Cell	Brief Forms	Perry's 1-100	Perry's to 500	Perry's -1500	Perry's Over 15	Syllabic Int.	Reading Level
College Texts	1	10.8	9.1	8.9	3.6	13.23	1.8	6.2
Secondary Texts	2	12.2	7.2	6.9	4.3	7.1	5.9	8.4
Books of Tests	3	7.2	11.6	5.8	5.9	10.6	5.5	5.4
	4	5.7	11.1	8.3	8.5	12.9	6.3	0.0
Letters	5	13.6	8.6	7.2	5.8	9.4	17.1	0.0
Mid-Management	6	6.6	7.7	14.5	7.9	6.3	3.6	0.0
Personnel	7	7.9	16.2	8.7	12.9	10.3	5.2	0.0
	8	24.6	20.9	6.6	10.1	8.9	6.3	0.0
	9	4.1	5.4	5.5	4.3	4.2	10.4	0.0
Letters	10	12.9	20.0	6.8	7.6	11.7	14.2	0.0
Unsolicited	11	6.1	8.5	3.5	6.2	7.1	5.2	0.0
Mail	12	7.0	8.3	4.4	4.7	5.7	11.1	0.0
	13	6.9	15.4	3.8	7.0	11.9	6.1	0.0
	14	5.8	9.8	8.3	10.8	16.8	8.5	0.0
Letters	15	7.9	11.7	6.3	7.2	7.6	6.0	0.0
Top-Level	16	3.9	13.3	4.8	6.9	8.3	9.3	0.0
Management	17	8.5	3.4	8.9	4.9	8.5	8.3	0.0
Personnel	18	4.9	3.7	4.1	7.6	7.0	3.6	0.0

APPENDIX C

TABLES SHOWING CELL MEANS AND STANDARD DEVIATIONS OF LETTERS BY SOURCE AND CATEGORY

APPENDIX C

CELL MEANS OF LETTERS BY SOURCE AND CATEGORY

Brief Forms	Industry	Gov't	Finance	Education	Transportation	Average
Mid-Management	122.0	120.0	121.8	124.0	120.6	
Top-Level Management	128.6	125.8	129.4	132.4	124.2	
Unsolicited	116.6	110.2	116.6	120.8	122.8	
						122.4

Perry's 1 - 100	Industry	Gov't	Finance	Education	Transportation	Average
Mid-Management	164.4	157.6	163.0	160.6	160.0	
Top-Level Management	158.0	158.2	162.0	164.8	157.8	
Unsolicited	152.8	139.2	156.0	146.0	157.2	
						157.1

Perry's 101 - 500	Industry	Gov't	Finance	Education	Transportation	Average
Mid-Management	50.8	51.0	61.0	50.0	48.6	
Top-Level Management	53.0	55.6	55.2	59.4	47.8	
Unsolicited	50.4	61.0	55.4	54.0	45.4	
						53.2

Perry's 501 - 1,500	Industry	Gov't	Finance	Education	Transportation	Average
Mid-Management	38.2	44.4	37.8	41.6	44.0	
Top-Level Management	39.4	35.8	41.6	33.4	40.0	
Unsolicited	43.6	36.6	43.2	45.0	41.8	
						40.4

Perry's Over 1,500

	Industry	Gov't	Finance	Education	Transportation	Average
Mid-Management	47.2	47.6	37.6	46.2	47.6	
Top-Level Management	48.0	50.8	40.0	40.0	50.0	
Unsolicited	54.8	60.8	43.4	55.6	57.4	
						48.4

Syllabic Intensity

	Industry	Gov't	Finance	Education	Transportation	Average
Mid-Management	1.546	1.702	1.530	1.640	1.534	
Top-Level Management	1.562	1.604	1.582	1.626	1.612	
Unsolicited	1.680	1.636	1.564	1.616	1.614	
						1.602

STANDARD DEVIATIONS OF LETTERS BY SOURCE AND CATEGORY

Brief Forms

	Industry	Government	Finance	Education	Transportation
Mid-Management	5.744	13.619	6.610	7.968	24.613
Top-Level Management	5.856	7.949	3.911	8.590	4.969
Unsolicited	4.159	12.969	6.188	7.014	6.942

Perry's 1 - 100

	Industry	Government	Finance	Education	Transportation
Mid-Management	11.193	8.648	7.745	16.288	20.916
Top-Level Management	9.823	11.798	13.397	3.420	3.701
Unsolicited	5.403	20.029	8.573	8.336	15.449

Perry's 101 - 500

	Industry	Government	Finance	Education	Trans-portation
Mid-Management	8.318	7.280	14.525	8.717	6.655
Top-Level Management	8.306	6.348	4.868	8.988	4.147
Unsolicited	5.594	6.819	3.507	4.415	3.847

Perry's 501 - 1,500

	Industry	Government	Finance	Education	Trans-portation
Mid-Management	8.584	5.856	7.981	12.934	10.988
Top-Level Management	16.852	7.694	8.336	8.544	7.000
Unsolicited	4.266	11.755	7.162	5.770	11.970

Perry's Over 1,500

	Industry	Government	Finance	Education	Trans-portation
Mid-Management	12.911	9.423	6.348	10.353	8.988
Top-Level Management	16.852	7.694	8.336	8.544	7.000
Unsolicited	4.266	11.755	7.162	5.770	11.970

Syllabic Intensity

	Industry	Government	Finance	Education	Trans-portation
Mid-Management	6.387	17.195	3.605	5.244	6.308
Top-Level Management	8.526	6.066	9.364	8.324	3.633
Unsolicited	10.464	14.205	5.224	11.104	6.148