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COLLETT, LaVerna Salyer, 1924-
EFFECTS OF AUDITORY AND VISUAL METHODS ON TEACHING AN INDIVIDUALIZED PROGRAM OF SPELLING AT THE JUNIOR COLLEGE LEVEL.

The University of Oklahoma, Ph.D., 1975
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GRADUATE COLLEGE

EFFECTS OF AUDITORY AND VISUAL METHODS ON TEACHING AN INDIVIDUALIZED PROGRAM OF SPELLING AT THE JUNIOR COLLEGE LEVEL

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

BY

LAVERNA SALYER COLLETT

Norman, Oklahoma

1975

EFFECTS OF AUDITORY AND VISUAL METHODS ON TEACHING AN INDIVIDUALIZED PROGRAM OF SPELLING AT THE JUNIOR COLLEGE LEVEL

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DISSERTATION COMMITTEE

DEDICATION

To my deceased grandmother, Cora Harrison, who taught me that all God expects of man is a dedicated commitment toward Life; to my mother and father, Lynn and Ocie Harrison, who encouraged me to make that commitment; to my grandsons, Lynn and Shane Salyer, whom I challenge to make the commitment.

ACKNOWLEDGMENT

This author wishes to express her sincere appreciation to Dr. Robert L. Curry, chairman of the doctoral committee and director of this study, for his continuous guidance, patience, and encouragement during the preparation and development of this investigation.

Appreciation is extended also to Dr. Mary Clare Petty, Dr. Robert F. Bibens, and Dr. Omer J. Rupiper for the invaluable assistance in the planning and conducting of the study.

With special gratitude the author acknowledges: Dr. Helen Carter not only for her help but for giving up her summer vacation to participate in the study; Bill Brown and Mike King for both their help in the study and for their moral support and encouragement; Vera Goldsby for her support and extra effort; and Bonnie Barrett, Hilda Bess, Nancy Long, and Emily Weiss for their help.

The writer further extends appreciation to other colleagues and to the administrators of Oscar Rose Junior College for their contribution in making the study possible.

To my husband, Gordon; my children, Mary Beth and D'Lynn; mother and father, Lynn and Ocie; and sisters, Louise

and Betty, I am forever indebted for their continuous encouragement and understanding throughout the years of graduate school.

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

Spelling has long been considered to have a significant relationship to reading. In fact, reading begins with the formation of words and sounds from letters and continues by linking words and phrases into an intelligible flow. For this reason spelling, at the elementary level, may be taught in conjunction with other language arts skills. When students fail to grasp the principles of spelling at this level, then additional instruction must be given before reading and writing skills can develop.

Since both reading and writing skills become more complex as the individual moves upward in school, so do spelling skills. While spelling classes are a rarity beyond the elementary and junior high grades, the importance of good spelling is never denied. Spelling has been and continues to be handled in the upper grades in various ways. Several auto-instructional techniques for teaching spelling are used at the present time. There is, however, a lack of evidence that one technique of teaching spelling is superior to another. Certainly, there is insufficient evidence to suggest such a superiority at the college level.

Because of lack of research at the college level, several issues need to be examined. What effect does the mode of presentation have on spelling achievement at the college level? If materials are presented visually or aurally, which method will result in more achievement? If spelling achievement is greater among those taught by one mode, is the mode equally effective at all ability levels? These are the primary areas of concern which were investigated in the present study.

Statement of the Problem

The problem was to determine whether there were significant differences in mean gain scores in spelling when junior college students were taught by the visual or auditory approach.

Purpose of the Study

Most reading programs at the college level are geared toward the specific techniques of teaching reading. Spelling is considered to be a minor but necessary part of the reading program, but spelling instruction is usually treated as an ancillary activity which students must master on their own. Perhaps this is as it should be. Some systems of learning and/or teaching spelling, however, should be superior to others. If such a superiority can be established, it could simplify the teaching of spelling for both the teacher and the student. The purpose of this study was to compare two methods of teaching spelling to determine whether one was superior to the other.

Hypotheses to be Tested in the Study

In order to accomplish the purposes of the study, the following hypotheses were tested for significance.

Ho_1 There are no statistically significant differences between the Auditory and Visual groups' pretest-posttest spelling achievement mean gain scores.

Ho_2 There are no statistically significant differences between the spelling achievement mean gain scores of the above-average intelligence Auditory group and the spelling achievements mean gain scores of the above-average intelligence Visual group.

Ho_3 There are no statistically significant differences between the spelling achievement mean gain scores of the above-average intelligence Auditory group and the spelling achievement mean gain scores of the below-average intelligence Auditory group.

Ho_4 There are no statistically significant differences between the spelling achievement mean gain scores for the below-average intelligence Auditory group and the spelling achievement mean gain scores of the below-average intelligence Visual group.

Ho_5 There are no statistically significant differences between the spelling achievement mean gain scores of the above-average intelligence Visual group and the spelling achievement mean gain scores of the below-average intelligence Visual group.

Definitions of Terms

In order to avoid multiple interpretations of certain terms used in the present study, the following explanations and definitions are given:

1. Veterans/Students: Those male veterans who were enrolled in Special Reading Classes offered by the

Humanities Division of Oscar Rose Junior College (Midwest City, Oklahoma) during the 1975 summer school.

2. Programmed Spelling Materials Series: Those materials contained in the series selected for the present study, Programmed Spelling Demons.[1]
3. Visual Group: Those veterans/students who were taught spelling by reading and completing the programed (printed) spelling materials.
4. Auditory Group: Those veterans/students who were taught spelling by listening to cassette recordings of the programed spelling materials. These materials were identical to those read by the Visual group.
5. Above-Average Intelligence Groups: Those veterans/students who were above the median IQ in the Auditory and Visual group.
6. Below-Average Intelligence Groups: Those veterans/students who were below the median IQ in the Auditory and Visual groups.
7. Spelling Achievement Scores: Veterans/students' scores taken from the two administrations of the McGraw-Hill Basic Skills Series: Spelling Test.[2]

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[1]George W. Feinstein, Programmed Spelling Demons (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1973). By permission of Prentice-Hall, Inc.

[2]Alton L. Ragor, McGraw-Hill Basic Skills Series: Spelling Test (New York: McGraw-Hill Publishing Co, 1970).

8. Pretest Spelling Achievement Scores: Veterans/ students' scores taken from the first administration of the McGraw-Hill Basic Skills Series: Spelling Test.
9. Posttest Spelling Achievement Scores: Veterans/ students' scores taken from the second administration of the McGraw-Hill Basic Skills Series: Spelling Test.
10. Spelling Achievement Mean Gain Score: The arithmetic difference between the pretest and the posttest spelling achievement scores.

Limitations of the Study

Certain limitations were placed on the study in order to make it a reality. Without these limitations the parameters of the data collection could not be properly set. The following limitations were established for the study.

First, the two student populations were limited to those veterans who were enrolled in and attending Special Reading Classes for Veterans being offered by the Humanities Division of Oscar Rose Junior College (at Midwest City, Oklahoma) during the summer of 1975.

Second, the veterans/students' achievement scores were limited to a pretest-posttest administration of the McGraw-Hill Basic Skills System: Spelling Test (MHBSS: Spelling Test). There was a good possibility that the spelling materials presented to the Auditory and Visual groups were more extensive than the areas tested by the MHBSS:

Spelling Test. However, this instrument was more representative of the spelling materials presented than any other standardized test of spelling achievement.

Third, the veterans/students' mental abilities were determined by a single administration of the Slosson Intelligence Test (SIT). It was anticipated that the average IQ score for the participants would be higher than the national average of 100, since all veterans were college students.

Assumptions Made in the Study

Certain assumptions were made about the students, the data collection instruments, and the teaching methods used in the study. The most important of these assumptions were as follows:

(1) The two populations of veterans who were taught by the two different methods were representative of veterans enrolled in Special Reading Classes at junior and community colleges.

(2) The mental ability of the two groups of veterans was representative of the mental ability level of individuals enrolled in Special Reading Classes at junior and community colleges.

(3) The instrument chosen for measuring the mental ability level of the veterans, the Slosson Intelligence Test (SIT),

was adequate for measuring the ability of the students included in the study.

(4) The instrument chosen for measuring the spelling achievement experienced by the two groups of veterans, the McGraw-Hill Basic Skills System: Spelling Test (MHBSS: Spelling Test), was adequate to measure accurately the participant's spelling achievement.

(5) The research design and the random selection of participants controlled the effects of extraneous independent variables.

CHAPTER II

REVIEW OF RELATED RESEARCH

The intellectual climate of the Eighteenth Century was conducive to the standardization of the English language; therefore, in 1755 Samuel Johnson's Dictionary of The English Language, which was obviously superior to its predecessor, provided the standard for English spelling.[1] This standardization encouraged those who strove for literacy to know the correct form of every word.

Since that time literacy has become somewhat a status symbol, and even though it is not considered a major subject in most secondary education curricula, the fact remains that spelling errors detract from the effectiveness of any written work. The disadvantages of poor spelling ability and the advantage of good spelling ability certainly justify careful, extensive research and planning for methods and techniques to improve the teaching of spelling.

In spite of the value placed on the importance of good spelling ability, most educators have not promoted the teaching of spelling beyond the elementary grades; therefore, researchers have been able to establish and conduct limited

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[1]Ralph Williams, "Teaching of Spelling," Encyclopedia of Education, (1971), p. 387.

research studies beyond this level. The critical examination of elementary education during the early part of the century questioned the haphazard approach to teaching spelling. Cornman,[1] Ayres,[2] Dolch,[3] and Fitzgerald[4] began to search out and test words which appeared most frequently and which made up the common curriculum. Hildreth[5] summarized "objections to the traditional method of teaching spelling." Three of her main objections were failure to relate to curriculum, use of conventional lists, use of words unrelated to student's needs.[6]

Tussell, Murphy, and Durrell conducted a study of the effects of visual and auditory perception training on spelling achievement of students in eighteen middle grade classes--six classes each from grade levels four, five, and six. Results of their investigation led to the conclusion that the fourth

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[1]Oliver Cornman, Spelling in the Elementary School: An Experimental and Statistical Investigation (Boston: Girm, 1902).

[2]Leonard P. Ayres, A Measuring Scale for Ability in Spelling, Pamphlet E 139 (New York: Russell Sage Foundation, 1915).

[3]Edward William Dolch, Better Spelling (Champaign, Ill.: Gerrard Press, 1942).

[4]James A. Fitzgerald, A Basic Life Spelling Vocabulary (Milwaukee: Bruce, 1951).

[5]Gertrude Hildreth, Teaching Spelling: A Guide to Basic Principles and Practices (New York: Holt, 1955).

[6]Karlene V. Russell, Helen A. Murphy, and Donald D. Durrell, Developing Spelling Power (Yonkers, New York: World Book Company, 1956).

grade pupils in their experimental group gained ten months in spelling achievement in a three month period. The fifth and sixth grade pupils in the experimental group made six months gain. On the other hand, pupils in the control group made slightly less than normal gain.[1] While these results were enlightening for those associated with the elementary grades, they have very little ramification for the secondary and adult levels of education.

Hudson and Toler conducted a somewhat comparable study of auditory and visual discrimination as means of improving spelling. They found that improved auditory-visual discrimination enhanced spelling achievement gains. Posttest scores doubled pretest scores in most cases. Their experiment, however, was limited to the use of "reasonably phonetic words." Therefore, the results could be generalized only to apply to instructions in the mastery of phonetic words. Even though the study used a large sample, it lacked many of the controls necessary for conclusive research.[2] There was no evidence to support generalizing these findings to adult or secondary students.

The extent to which intelligence is related to spelling achievement has been revealed through the findings of the comparison of modes of presentation. Hancock found that

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[1] Ibid.

[2] Jess S. Judson and Lola Toler, "Instruction in Auditory and Visual Discrimination as Means of Improving Spelling," Elementary School Journal 49 (1949):466-469.

analyses of individual performances "suggest a relationship between intelligence, reading comprehension and relative achievement among modes of presentation."[1] Hartman found that spelling is not an exclusive property of high or low intelligence.[2] Carrol found that dull children make fewer phonetic errors in spelling than do bright.[3] Schonell found a low positive correlation between spelling ability and intelligence.[4] On the other hand, Gates found that word perception as tested on intelligence tests correlated positively with spelling ability.[5]

Studies of the development of intelligence of children, done by Piaget, indicated the significance that the role of multisensory learning plays in conceptual

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[1]John C. Hancock, "Level of Achievement, Retention, and Transfer of Training in Spelling as a Function of Mode of Presentation," NDEA Report No. VIIA-1024 (June 1964): 1-60.

[2]G. W. Hartman, "The Relative Influence of Visual and Auditory Factors in Spelling Ability," Journal of Educational Psychology XXII (1931):691.

[3]H. A. Carrol, "Generalization of Bright and Dull Children: A Comparative Study with Special Reference to Spelling," Journal of Educational Psychology XXI (1930): 489-499.

[4]F. J. Schonell, "Ability and Disability in Spelling amongst Educated Adults," British Journal of Educational Psychology VI (1936):123-146.

[5]Arthur I. Gates, "A Study of the Role of Visual Perception, Intelligence, and Certain Associative Processes in Reading and Spelling," Journal of Educational Psychology XVII (October 1926):433-445.

development.[1] In the area of spelling several studies have been done that would support these findings concerning multisensory learning. For example, Humphrey,[2] Nolde,[3] and Tidyman[4] found that spelling abilities were developed around three basic types of imagery: auditory, visual, and kinesthetic.[5] Hunt, however, supported the position that oral language was primal to written language and that the written code reflected the oral code; therefore, aural-oral abilities have the highest priority in the spelling process.[6] Thus, the oral foundation upon which American English orthography rests indicates the need for children to develop effective aural-oral abilities.[7]

Hodge defined the act of spelling as one of "encoding the phonemes of speech into graphemes of the writing

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[1]J. M. Hunt, Intelligence and Experience (New York: Ronald Press, 1961).

[2]K. D. Humphrey, "Similarities in the Teaching of Shorthand in Spelling," Elementary School Journal XXV (1945): 295-297; 334-337.

[3]E. Nolde, "Outline for a Possible Consideration of the Psychological Factors Involved in Spelling, Journal of Educational Psychology XXXIX (1948):117-121.

[4]W. F. Tidyman, The Teaching of Spelling (Yonkers-on Hudson, New York: World Book Co., 1919).

[5]Jack A. Holmes, "Substrata Analysis of Spelling Ability for Elements of Auditory Images," Journal of Experimental Education XXII (1954):329-349.

[6]Hunt, Intelligence and Experience, p. 363.

[7]Ibid., p. 634.

system."[1] Traditional spelling programs have over-emphasized the visual process. This emphasis indicates that traditional educators have not fully understood the act of encoding and decoding. When the two acts are done individually, it becomes obvious that the "aural-oral processes initiate the individual's act of spelling with subsequent visual reinforcement of what is written."[2] Another study disclosed that when phoneme-grapheme correspondences were examined in terms of each structural component of oral language, these components appeared much more consistent than had previously been thought.[3]

In relation to structure Garvin,[4] Hall,[5] Lloyd and Warfel[6] found written American English to be essentially alphabetic. Through a study done by computer programming, Hodges found that if the computer were fed all of the correct information, it could spell eighty-seven percent of the words

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[1]Richard E. Hodges, "The Psychological Basis of Spelling," Elementary English Journal 42 (October 1965): 629-635.

[2]Ibid., p. 631.

[3]USOE Cooperative Research, Phoneme-Grapheme Relationship Basic to Cues for Improvement of Spelling Project no. 1991 (Stanford, California: Stanford University).

[4]Paul L. Garvin, ed., Natural Language and The Computer (New York: McGraw-Hill Book Co., 1963).

[5]Robert A. Hall, Sound and Spelling in English (Philadelphia: Chilton Co., 1961).

[6]Donald J. Lloyd and Harry R. Warfel, American English in Its Cultural Setting (New York: Alfred A. Knapf, Inc., 1956).

correctly; therefore, there is a relationship between the sound of spoken language and its alphabetic counterpart.[1] Moore found a one-to-one correspondence between letter and significant sound phonemes and an overall eighty percent regularity in phoneme-grapheme correspondence.[2] Horn's findings, however, contradicted those of Moore. He found that one-third of the words in American English show more than one accepted pronunciation. In other words, most sounds can be spelled in many ways and over one-half of the words contain silent letters. Most letters spell more than one sound.[3]

The extent to which sound discrimination and perception influence spelling ability has been studied by Gates,[4] Hudson and Toler,[5] Russell,[6] and Templin[7] who found a

---

[1]Richard E. Hodges, "What's New In Language Arts-Spelling." No. 282-08828 (Washington, D. C.: National Education Association).

[2]James T. Moore, Jr., Phonetic Elements Appearing in a Three Thousand Words Spelling Vocabulary (Unpublished dissertation, School of Education, Stanford University, 1951).

[3]Ernest Horn, "Spelling," Encyclopedia of Educational Research (New York: Macmillan, 1960), pp. 1337-1354.

[4]Arthur I. Gates, The Psychology of Reading and Spelling with Special References to Disability (Columbia University Teachers College, 1922), pp. 1-108.

[5]Jess S. Hudson and Lola Toler, "Instruction in Auditory and Visual Discrimination as a Means of Improving Spelling," Elementary School Journal 49 (1949): 466-469.

[6]David H. Russell, "A Diagnostic Study of Spelling Readiness," Journal of Educational Research 37 (1943):276-283.

[7]Mildred E. Templin, "A Comparison of the Spelling Achievement of Normal and Defective Hearing Subjects," Journal of Educational Psychology 39 (1948): 337-346.

significant relationship. Spache[1] and Horn[2] found good spellers to excel poor spellers in phonetics and auditory discrimination. Russell found that normals did significantly better than poor spellers on auditory discrimination of words of similar sounds.[3] Gates and Russell found memory for sounds to be one of the inherent difficulties in spelling.[4] Dolch stressed the dependence on word sounds as a contributory factor in spelling.[5] McGovney found the most significant difference between good and poor spellers to be in ability to give sounds for letters.[6] Clifford agreed that students responded well to the consideration of how speech sounds were recorded in writing.[7] While Worcester found auditory method of presentation to be intrinsically superior for retention to the

---

[1]George Spache, "Characteristic Errors of Good and Poor Spellers," Journal of Educational Research XXXIV (1940): 182-189.

[2]Ernest Horn, "The Child's Early Experience with the Letter A," Journal of Educational Psychology XX (1929): 161-168.

[3]David H. Russell, Characteristics of Good and Poor Spellers (Columbia University Teachers College, 1937).

[4]Arthur I. Gates and David H. Russell, Diagnostic and Remedial Spelling Manual (New York: Bureau of Publication, Teachers College, Columbia University, 1940).

[5]E. W. Dolch, Better Spelling (Champaign, Ill.: Garrard Press, 1942).

[6]M. McGovney, "Spelling Deficiency in Children of Superior Quality," Elementary English Review VII (1930): 146-148.

[7]Mary Clifford, "Teaching Spelling in High School," Illinois School Journal 48 (1968): 253-262.

visual method of presentation, he suggested that this should be verified by further experimentation.[1]

In a study of the effects of physical defects on the ability to spell, Kiefer found many poor spellers to have defective vision but none to have defective hearing.[2] On the other hand, Gates and Chase found deaf children, under controlled conditions, to be almost four years superior to normals in spelling.[3]

By far the majority of scientific studies which have been done on modality in teaching spelling have been done on the verbal aspects of learning. Research suggests the theory that visual perception, visual discrimination, and visual memory are closely related to spelling ability: Aaron,[4]

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[1]D. A. Worcester, "Memory By Visual and By Auditory Presentation," The Journal of Educational Psychology 16 (1925): 31.

[2]F. A. Kiefer and P. V. Sangren, "An Experimental Investigation of the Causes of Poor Spelling Among University Students With Suggestions for Improvement," Journal of Educational Psychology XVI (1925): 38-47.

[3]A. I. Gates and E. H. Chase, "Methods and Theories of Learning to Spell Tested by Studies of Deaf Children," Journal of Educational Psychology XVII (1926): 289-300.

[4]Ira E. Aaron, "The Relationship of Auditory-Visual Discrimination of Spelling Ability" (Unpublished Doctoral Dissertation, University of Minnesota, 1954).

DeBoer,[1] Gates,[2] Hartman, Hudson and Toler,[3] Newton,[4] Phelan,[5] and D. Russell.[6] On the other hand, Russell found ability in visual acuity did not appear to distinguish between good and poor spellers.[7]

In general, there is more extant research literature concerned with the verbal processes than with aural processes of receiving verbal material. Schulz, in his survey, found that between 1894 and 1950 there were approximately thirty-four reports that dealt with rural learning in any remote way. Most of these were conducted prior to 1930. He concluded that since that time, there have been at least several hundred studies of the learning of visually presented materials since 1950 alone.[8]

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[1]John J. DeBoer, "Oral and Written Language," Review of Educational Research 25 (1955): 107-120.

[2]Gates and Chase, "Methods and Theories of Learning to Spell Tested by Studies of Deaf Children," pp. 289-300.

[3]Hudson and Toler, pp. 466-469.

[4]Bertha M. Newton, A Study of Certain Factors Related to Achievement in Spelling (Doctoral Dissertation, University of Missouri, 1960).

[5]Sister Mary Benedict Phelan, Visual Perception in Relation to Variance in Reading and Spelling (Catholic University, 1940).

[6]David H. Russell, "Characteristics of Good and Poor Spellers."

[7]Ibid.

[8]Rudolph W. Schulz, Learning of Aurally Received Verbal Material (Bethesda, Md.: Eric Document Reproduction Service, ED 027591, 1969).

Limited research has been conducted on the methods of teaching spelling at the college level. Hartman did an early study in which he used college students to investigate the relative influence of visual and auditory factors in spelling. Sixty-three college students, representing respectively the best, the worst, and the middle levels of performance were given eight laboratory tests singly. These tests fell into two groups, one requiring the use of visual pathways and the other depending on the receptor for sound. Findings were that the visual battery did not discriminate among the groups any better than the auditory battery. "Spelling ability is largely dependent upon one special form of visual reaction and not upon general superiority in any sense modality or upon a common integrative capacity."[1] Perhaps these were conflicting results because the face validity of the study itself appears to be misleading. The researcher suggested that he was dealing with relative influences of visual and auditory factors in spelling, while in essence the study appears to have dealt more specifically with modality. The study did not take into account immediate and long-term recall in discriminating between visual and auditory learning.[2]

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[1]George W. Hartman, "The Relative Influence of Visual and Auditory Factors in Spelling Ability," Journal of Educational Psychology 22 (1931): 691-699.

[2]Albert Bandura, Social Learning Theory (New York: General Learning Press, 1971), pp. 3-4.

Holmes investigated spelling ability at the high school and university level for elements of auditory images and found that spelling ability at these levels depended to a large extent upon the ability to handle phonetic associations. Another outcome of the investigation indicated auditory images made an independent contribution to spelling at the high school and college level.[1]

While Holmes' study was more relevant to the present research effort, he indicated that limitations preclude sweeping generalizations which might go beyond the population sampled. The study dealt with two types of intelligence which he labeled "L" or linguistic and "Q" or quantitative. He concluded that there was a relationship between the "L" factor and spelling ability; therefore, his primary difference did not involve modality. He suggested that the fact was established that there existed a definite relationship between auditory images and spelling ability, but he left it to further research to determine whether or not "teaching for improvement in these elements (would) improve a student's ability in them and consequently improve his spelling."[2]

In summarizing the literature dealing with the relationship between auditory and visual learning, there is no general consensus of the superiority of one modality over

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[1]Jack A. Holmes, "A Substrata Analysis of Spelling Ability for Elements of Auditory Images," Journal of Experimental Education XXII (June, 1954): 329-349.

[2]Ibid., pp. 329-349.

another. Balmuth concluded that: (1) some studies show general support for a combination of auditory and visual modes; (2) some studies show support of visual modality among children; (3) no consensus regarding effectiveness of modality among adults.[1]

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[1]Mirion Balmuth, Visual and Auditory Modalities: How Important Are They? (Bethesda, Md.: ERIC Document Reproduction Service, ED 024 525, 1968).

CHAPTER III

PROCEDURES AND RESULTS OF STUDY

Selection of Subjects

In the present study, Vietnam veterans enrolled in the summer school Special Reading Classes of the Humanities Division were used to determine the effects of presenting programed spelling materials by two different methods. A total of thirty-five (N=35) participants were randomly selected for each group at the beginning of the experiment. While it had been determined that only thirty (N=30) were needed to test the hypotheses, thirty-five were selected to allow for subject attrition. Fifteen products were randomly selected for each of the intellectual and instructional groups.

At the end of the eight-week study, three had been eliminated from the Visual group--one dropped out of school, one missed to many classes to receive the benefits of the instructional program, and one refused to complete the program. This reduced the number in the Visual group to thirty-two, and two were randomly eliminated leaving a total of thirty (N=30) in the Visual group.

The Auditory group also began with thirty-five participants. Four, however, were eliminated during the course

of the experiment; two dropped out of the Reading Classes; one dropped out of school; and one refused to take the Slosson Intelligence Test (SIT). This reduced the original number to thirty one, and one was randomly eliminated leaving a total of thirty (N=30) in the Auditory group.

Measuring Instruments

Selection of an Instrument for Measuring the Student/Veterans' IQ

In selecting an instrument for measuring student/veterans' mental ability levels (IQ) the primary criteria taken into consideration were as follows:

1. Validity of the test
2. Reliability of the test
3. Normed Technical Excellence
4. Examinee Appropriateness
5. Length of time of administration

After considering these criteria, the Slosson Intelligence Test for Children and Adults (SIT) was selected.

The Slosson Intelligence Test was devised by Slosson in 1963. The SIT can be administered in ten to twenty minutes (10-20 minutes) and yields an intelligence quotient. The SIT is composed primarily of items adapted from the Stanford-Binet Intelligence Test (Form L-M) and mathematics items adapted from How to Prepare for College Entrance Examinations. Age ranges of examinees vary from birth to adulthood.

The concurrent validity of the SIT is reported as ranging from .90 with the Stanford-Binet (Form L-M) to .84 with the Wechsler Adult Intelligence Scale (WAIS). The test-retest reliability is reported as ranging from .94 to .96. Buros reports the concurrent validity as ranging from .79 with the Wechsler Intelligence Scale for Children (WISC) to .89 with the Stanford Binet (Form L-M). Buros reports the test-retest reliability as ranging from .89 for ages 0-1.0 yr. to .96 for ages 15.0-20.0 yrs.

At the time the SIT was administered, the researcher calculated the participant's IQ score and percentile rank. These data are presented in appendix G along with the medians, means and standard deviations of each group.

Selection of an Instrument for Measuring Spelling Achievement Gain

The next step in the procedures was the selection of an instrument for measuring the student/veterans' spelling achievement. The criteria used for selecting the standardized spelling achievement test were as follows:

1. Validity of the Test
2. Reliability of the Test
3. Degree of relationship between programmed materials and test items
4. Normed Technical Excellence
5. Examinee appropriateness

After considering these criteria, the McGraw-Hill Basic Skills System: Spelling Test was chosen (appendix B).

Each form of this test consists of 50 items; form A requires 219 word judgments and form B requires 219 word judgments. "In the case of homonyms and easily confused words, one spelling occurs in form A and the other in form B." Each test item appears as one or two sentences. The student determines "which one, if any of the four underlined words in each item, is misspelled; a 'none wrong' response is provided for each item." Homonyms and easily confused words are forced into context by the sentence in which they appear.

The MHBSS Spelling Test is not complex; therefore, explicit directions in the manual make test administration quite clear and simple to follow. A raw score of total correct responses is easily converted to a standard T score, stanine, and percentile ranking. No subscales were developed for diagnosis of specific problems, because the test authors were not able to find reliable information on diagnostic schemes. Thus, the test authors suggest that, on the basis of total score results, "A student's advisor must make a subjective judgment in selecting...an activity for the student."

The authors report the test-retest reliability of the MHBSS: Spelling Test as ranging from .89 to .93, while the concurrent validity is reported as ranging from .77 to .84. Buros reported slightly lower reliability and validity

figures at .84 to .88 (reliability) and .70 to .80 (validity).

Instructional Procedures

All instructions in the study were programmed. In choosing a text several criteria were used in making the selection:

1. Content of text material
2. Ancillary materials such as unit quizzes, pretest and posttests
3. Appropriateness of materials for student use
4. Degree of individualization allowed by the materials
5. Adaptability of the materials to a recorded format
6. Availability of materials
7. Student cost

The text chosen for the study was Programmed Spelling Demons.

Teaching the Visual Group

Students/veterans selected for the Visual group were taught by the procedures suggested by the publishers of Programed Spelling Demons. First, all participants were administered a pretest of spelling proficiency to determine specific areas of spelling deficiency. Next, participants corrected their proficiency tests and began to collect the

materials needed to study those words which were misspelled. Numbers of the misspelled words correspond with the numbers in those chapters to be studied in correcting spelling deficiencies. For instance, if a particular student missed words numbered 3, 7, 9, and 10 on the Diagnostic Test, he (or she) would study programmed chapters numbered 1-3 in the text materials. These lessons contain words like or similar to those missed on the proficiency pretest.

When the student had studied a lesson indicated by pretest results, he completed a Review Test. A score of ninety or higher (90%) allowed students to go on to the next unit of study. Those who scored below ninety percent (90%), however, were referred back to the final lessons of the unit for more study.

Teaching the Auditory Group

The procedures used to teach those students/veterans in the Auditory Group were quite similar to those used in teaching the Visual Group. Both groups were given a pretest of spelling proficiency and allowed to correct their own papers. Differences between the teaching techniques began when lesson materials were selected. Students/veterans in the Visual group studied lessons from the programed spelling text, while the Auditory group listened to tape recordings of the same material. Both groups were required to pass unit tests and proficiency exams. The procedural steps shown in figure 1 apply to both the Visual and Auditory groups.

The researcher recorded units of the materials contained in the spelling program on eighteen (18) cassette tapes. Each tape contained 60 minutes of recorded material.

All instructions were taped. Students were given instructions as to how to number the worksheets. Examples of the units and quizzes are presented in appendix A.

Collecting the Spelling Achievement Data

The data collected were measures of spelling achievement through a pretest administration of the McGraw-Hill Basic Skills Series: Spelling Test (form A) during the second week of the study (pretest) and the administration of form B of the same test eight weeks later (posttest). Administration of the MHBSS: Spelling Test should not be confused with those tests which were part of the spelling program used in the study. The MHBSS: Spelling Test is shown in appendix B, while the "Proficiency Tests," "Unit Tests," and "Lesson Quizzes" contained in the programmed spelling materials are shown in appendices C, D, E, and F.

Data Analysis Procedures

The final phase of the methods and procedures consisted of all those tasks which were completed after all tests had been administered to the study participants. The data analysis procedures are described in the following sections.

Statistical Analysis of the Data

The pretest-posttest gain scores recorded for the students in the Visual and Auditory groups were compared after the final administration of the McGraw-Hill Basic Skills System: Spelling Test. The five hypotheses were tested with a Students t-test for two independent sample means. Additional descriptive and inferential statistics were calculated on the gain scores if such analyses were considered essential to a thorough explanation of the results of the study. The pretest, posttest, and gains in raw scores are presented in appendix G.

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[1]Student, "Errors of Routine Analysis," Biometrika 19 (1927): 151-164.

[2]Donald L. Bruning and B. L. Kintz, Computational Handbook of Statistics (Glenview, Illinois: Scott, Foresman, and Co., 1968).

Results of Testing Hypothesis One

The null proposition of hypothesis number one was tested as follows:

Ho_1 These are no statistically significant differences between the Auditory and Visual groups' pretest-posttest spelling achievement mean gain scores.

The first null hypothesis was tested by comparing the pretest-posttest mean gain scores of the Auditory group with the pretest-posttest mean gain scores of the Visual group. The mean values and standard deviations used in the statistical analysis are presented in table 1. This table also contains the calculated t-value and the significance level of the results.

The results presented in table 1 show that the pretest-posttest raw score gains made by the Auditory group were not significantly greater than the gains made by the Visual group ($t=1.912$, $df=58$; $p > .05$). These results would not allow the researcher to reject the first hypothesis.

Results of Testing Hypothesis Two

The null proposition of hypothesis number two was tested as follows:

Ho_2 There are no statistically significant differences between the spelling achievement mean gain scores of the above-average intelligence Auditory group and the spelling achievement mean gain scores of the above-average intelligence Visual group.

TABLE 1

DESCRIPTIVE STATISTICS AND CALCULATED t-VALUE COMPARING THE MEAN GAIN SCORES OF THE AUDITORY GROUP AND THE VISUAL GROUP

Student/Veteran Group	Pretest-Posttest Gain Scores		Calculated t-Value
	Mean	Standard Deviation	
Auditory Group (N=30)	4.167	4.719	
			t = 1.912
Visual Group (N=30)	1.567	5.766	

df = 58; $p > .05$

The second null hypothesis was tested by comparing the pretest-posttest mean gain scores of the above-average intelligence Auditory group with the pretest-posttest mean gain scores of the above-average intelligence Visual group. The mean values and standard deviations used in the statistical analysis are presented in table 2. This table also contains the calculated t-value and the significance level of the results.

The results presented in table 2 show that the above-average intelligence Auditory group made greater achievement gains than the above-average intelligence Visual group, but the differences between the two groups' scores were not significant ($t=1.395$, $df=28$; $p > .05$). These results would not allow the researcher to reject the second null hypothesis.

Results of Testing Hypothesis Three

The null proposition of hypothesis number three was tested as follows:

Ho_3 There are no statistically significant differences between the spelling achievement mean gain scores of the above-average intelligence Auditory group and the spelling achievement mean gain scores of the below-average intelligence Auditory group.

The third null hypothesis was tested by comparing the pretest-posttest mean gain scores of the above-average intelligence Auditory group with the pretest-posttest mean gain scores of the below-average intelligence Auditory group. The mean values and standard deviations used in the statistical analysis are presented in table 3. This table also

TABLE 2

DESCRIPTIVE STATISTICS AND CALCULATED t-VALUE COMPARING THE MEAN GAIN SCORES OF THE ABOVE-AVERAGE-INTELLIGENCE AUDITORY GROUP AND THE ABOVE-AVERAGE-INTELLIGENCE VISUAL GROUP

Student/Veteran Group	Pretest-Posttest Gain Scores		Calculated t-Value
	Mean	Standard Deviation	
Above-Average I.Q. Auditory Group (N=15)	4.530	3.444	
			t = 1.395
Above-Average I.Q. Visual Group (N=15)	2.467	4.575	
df = 28; p > .05			

TABLE 3

DESCRIPTIVE STATISTICS AND CALCULATED t-VALUE COMPARING THE MEAN GAIN SCORES OF THE ABOVE-AVERAGE-INTELLIGENCE AUDITORY GROUP AND THE BELOW-AVERAGE-INTELLIGENCE AUDITORY GROUP

Student/Veteran Group	Pretest-Posttest Gain Scores		Calculated t-Value
	Mean	Standard Deviation	
Above-Average I.Q. Auditory Group (N=15)	4.530	3.444	
			t = 0.425
Below-Average I. Q. Auditory Group (N=15)	3.800	5.692	

df = 28; $p > .05$

contains the calculated t-value and the significance level of the results.

The results presented in table 3 show that the above-average intelligence Auditory group made greater achievement gains than the below-average intelligence Auditory group, but the differences between the two groups' scores were not significant ($t=0.425$, $df=28$, $p > .05$). These results would not allow the researcher to reject the third null hypothesis.

Results of Testing Hypothesis Four

The null proposition of hypothesis number four was tested as follows:

Ho_4 There are no statistically significant differences between the spelling achievement mean gain scores of the below-average intelligence Auditory group and the spelling achievement mean gain scores of the below-average intelligence Visual group.

The fourth null hypothesis was tested by comparing the pretest-posttest mean gain scores of the below-average intelligence Auditory group with the pretest-posttest mean gain scores of the below-average intelligence Visual group. The mean values and standard deviations used in the statistical analysis are presented in table 4. This table also contains the calculated t-value and the significance level of the results.

The results presented in table 4 show that the below-average intelligence Auditory group made greater achievement

TABLE 4

DESCRIPTIVE STATISTICS AND CALCULATED t-VALUE COMPARING THE MEAN GAIN SCORES OF THE BELOW-AVERAGE-INTELLIGENCE AUDITORY GROUP AND THE BELOW-AVERAGE INTELLIGENCE VISUAL GROUP

Student/Veteran Group	Pretest-Posttest Gain Scores		Calculated t-Value
	Mean	Standard Deviation	
Below-Average I.Q. Auditory Group (N=15)	3.800	5.692	
			t = 1.387
Below-Average I.Q. Visual Group (N=15)	0.670	6.630	

df = 28; $p > .05$

gains than the below-average intelligence Visual group, but the differences between the two groups scores were not significant (t=1.387, df=28; p > .05). These results would not allow the researcher to reject the fourth null hypothesis.

Results of Testing Hypothesis Five

The null proposition of hypothesis number five was tested as follows:

Ho_5 There are no statistically significant differences between the spelling achievement mean gain scores of the above-average intelligence Auditory group and the spelling achievement mean gain scores of the above-average intelligence Visual group.

The fifth null hypothesis was tested by comparing the pretest-posttest mean gain scores of the above-average intelligence Visual group with the pretest-posttest mean gain scores of the below-average intelligence Visual group. The mean values and standard deviations used in the statistical analysis are presented in table 5. This table also contains the calculated t-value and the significance level of the results.

The results presented in table 5 show that the above-average intelligence Visual group made greater achievement gains than the below-average intelligence Visual group, but the differences between the two groups' scores were not significant (t=0.864, df=28; p > .05). These results would not allow the researcher to reject the fifth null hypothesis.

TABLE 5

DESCRIPTIVE STATISTICS AND CALCULATED t-VALUE COMPARING THE MEAN GAIN SCORES OF THE ABOVE-AVERAGE-INTELLIGENCE VISUAL GROUP AND THE BELOW-AVERAGE-INTELLIGENCE VISUAL GROUP

Student/Veteran Group	Pretest-Posttest Gain Scores		Calculated t-Value
	Mean	Standard Deviation	
Above-Average I.Q. Visual Group (N=15)	2.467	4.575	
			t = 0.864
Below-Average I.Q. Visual Group (N=15)	0.670	6.630	

df = 28; $p > .05$

Summary of Results

The results of testing the hypotheses indicated that the pretest-posttest raw score gains made by the Auditory group were not significantly greater than the gains made by the Visual group. Further comparisons of the four subgroups' scores failed to produce any significant differences.

A comparison of the two above-average intelligence groups' scores indicated that the Auditory group made the greater gains. The difference between the two groups' scores was not significant.

The above-average intelligence Auditory group made greater achievement gains than the below-average intelligence Auditory group. The difference between the two groups' mean raw score gains was not significant.

The below-average intelligence Auditory group made greater achievement gains than the below-average intelligence Visual group. The difference between the two groups' scores was not significant.

The above-average intelligence Visual group made greater achievement gains than the below-average intelligence Visual group. The difference between the two groups' scores was not significant.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

The purpose of this study was to determine whether there were significant differences in mean gain scores in spelling when junior college students were taught by the Visual or Auditory approach. Specifically, the researcher attempted to determine whether spelling could be taught to adult junior college students (veterans) more efficiently by using a visual method of presentation than by using an aural method.

In the present study, Vietnam veterans enrolled in Special Reading Classes at a community junior college were used to determine the effects of presenting programed spelling materials by two different methods. Two groups of thirty (N=30) each were randomly selected from a total veteran/student population enrolled in the reading classes of approximately one-hundred twenty (N=120) veterans. One group, the Visual group, was taught spelling with Programed Spelling Demons. The second group, the Auditory group, used a cassette-recorded version of the same programed materials utilized by the Visual group. The Auditory and Visual groups were further subdivided into above-average intelligence (N=15)

and below-average intelligence (N=15) based on IQ scores taken from the Slosson Intelligence Test (SIT).

Spelling achievement gain was determined by a pretest-posttest administration of the McGraw-Hill Basic Skills System: Spelling Test. The pretest was given during the first week of Summer School classes, and the achievement posttest was given eight weeks later at the end of the experiment. Changes in the raw scores of Visual and Auditory groups were compared collectively and as subgroups at both levels of IQ. Five hypotheses were tested for significance at the .05 level.

The results of testing the hypotheses showed that the pretest-posttest raw score gains made by the Auditory group were not significantly greater than the gains made by the Visual group. In addition, further comparisons of the four subgroups' scores failed to produce any significant differences.

A comparison of the two above-average intelligence groups' scores indicated that the Auditory group made the greater gains, but the difference between the two groups' scores was not significant. The above-average intelligence Auditory group made greater achievement gains than the below-average intelligence group, but the difference between the two groups' scores was not significant. The below-average intelligence Auditory group made greater achievement gains than the below-average intelligence Visual group, but the difference between the two groups' scores was not significant.

The above-average intelligence Visual group made greater achievement gains than the below-average intelligence Visual group, but the differences between the two groups' scores was not significant.

Conclusions

Several conclusions were drawn from the results of the study. These conclusions were as follows:

(1) The results of testing the first hypothesis led to the conclusion that the auditory method of presenting programed spelling materials to the student/veterans was no more effective than the visual method.

(2) The results of testing the second hypothesis led to the conclusion that there was no real difference between the effectiveness of the auditory and visual methods of presenting the programed materials to the student/veterans who were classified as above average intelligence.

(3) The results of testing the third hypothesis led to the conclusion that the auditory method of presenting the programed materials to the student/veterans was no more effective for the above-average intelligence group than for the below-average intelligence group.

(4) The results of testing the fourth hypothesis led to the conclusion that there was no real difference between the effectiveness of the auditory and visual methods of presenting the programed materials to the student/veterans who were classified as below-average intelligence.

(5) The results of testing the fifth hypothesis led to the conclusion that the visual method of presenting the programed materials to the student/veterans was no more effective for the above-average intelligence group than for the below-average intelligence group.

Implications for Further Study

During the conduct of the present study, many other research problems became apparent. Most of these studies were somewhat related to the present effort, but with changes in the population, instruments, and design. Some suggestions for further research studies are given in the following sections.

First, a study could be conducted which would be similar to the present study, but with a different student population. The population for an additional study should include females as well as male students. Results from such a study could be generalized to a much wider population than the results of the present study.

Another study which could be very beneficial to the area would be similar to the present study, but the spelling achievement tests would be administered in a time series instead of on a pretest-posttest basis. In the present study the researcher considered the eight-week period of the study to be too long for most students. Tests should be administered every four or six weeks for a period of twenty-four weeks or more in order to measure the maximum effects of the spelling instruction program. The results of such a study would greatly enhance the quality of the experiment, and the effects of forgetting and short term retention would be minimized.

A third implication for further research would involve a change in the measure of spelling achievement. The McGraw-Hill Basic Skills System: Spelling Test, the instrument used to measure spelling achievement in the present study, was not very compatible with the materials taught in the experimental spelling program. An additional spelling achievement test should be given as a means of measuring all areas of spelling achievement contained in the program materials.

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APPENDIX A

EXAMPLES OF LESSON QUIZZES AND WORKSHEETS PREPARED FOR THE AUDITORY GROUP (PROGRAMED SPELLING DEMONS)

HOW TO USE THESE TAPES

(This material all on cassettes)

1. Listen carefully and follow all directions given on the tapes.

2. At the beginning of each unit listen carefully and number your paper according to directions given by the instructor whose voice you will hear on the tapes.

3. At the beginning of each lesson the instructor will pronounce and spell for you each word that is dealt with in the lesson.

4. Fill in all blanks of a frame with complete correct spellings, choices, or other answers as indicated.

5. After listening to the whole frame, listen for the correct answers.

6. If your answers are correct, go on to the next frame.

7. If you have made an error, be sure to correct it. Go back, if necessary, and listen to the explanation again before you go on. Any word that gives you special spelling trouble should be entered in your Personal List of Demons (a sheet with which you have been provided).

8. Complete an entire quiz or entire review test - the same as with each frame - before you check or grade your answer to it.

9. Write neatly and clearly. The act of careful writing, as well as the repetition, will help the learning process.

KEY TO DIAGNOSTIC TEST

Check your answers by the following key. Deduct 2% per error from a possible 100%. Note that answers 17, 18, and 19 must be capitalized to be correct and that only answers 20 and 22 should have apostrophes.

1.	lose	13.	writing	25.	loaves	38.	quantity
2.	affect	14.	criticism	26.	noticeable	39.	vacuum
3.	led	15.	grammar	27.	using	40.	library
4.	whose	16.	occasionally	28.	argument	41.	parallel
5.	descent	17.	Senator	29.	received	42.	sergeant
6.	its	18.	English	30.	niece	43.	height
7.	foreword	19.	Mountains	31.	seize	44.	nickel
8.	principal	20.	ladies'	32.	dropped	45.	visible
9.	piece	21.	hers	33.	committed	46.	eligible
10.	role	22.	you're	34.	transferred	47.	definitely
11.	business	23.	cemeteries	35.	prejudiced	48.	incidentally
12.	among	24.	Henrys	36.	recognize	49.	similar
				37.	explanation	50.	ignorant

Score: _____ %

A score below 90% in the diagnostic test means that you need spelling help. Careful study of this programed textbook should raise your spelling grades above that level.

Turn back to the Contents page and draw a circle around the number of each chapter from which you misspelled a sample word. From now on, as you study, give particular attention to the chapters that deal with your specific problems.

REVIEW TEST

Fill the blanks with words that end in *able* or *ible*.

1. Fritz has _____ [remark-] ears.
2. She loves me--is it _____ [poss-]?
3. Your spiked heels don't seem _____ [suit-] for hiking.
4. A bridge to the moon isn't _____ [feas-].
5. Grandpa's snoring was _____ [aud-].
6. Your ability to spell is very _____ [val-].
7. He's no doctor. His writing is _____ [leg-].
8. The cannibals figured I wouldn't be _____ [digest-].
9. The power of gossip is _____ [incred-].
10. When Lulu drives, a crash is _____ [inev-].
11. One bloody czar was named Ivan the _____ [Terr-].
12. Our nation is one and _____ [indivis-].
13. Water beds are _____ [comfort-].
14. Locking the puppy into a hot car is _____ [contempt-].
15. My value to the team was _____ [debate].

Fill the blanks with words that end in *ly* or *ally*.

16. The tackler _____ [fin-] let go of my leg.
17. Romeo _____ [evid-] liked Juliet.
18. My new sports car is _____ [basic-] a lemon.
19. The fish that got away was _____ [cert-] big.
20. Zelda plays the zither _____ [artist-].
21. He told me _____ [specif-] where I could go.
22. Vic's bald head, _____ [incid-], was sunburned.
23. Punchy _____ [defin-] loosened my teeth.
24. The cook _____ [accid-] spilled the beans.
25. Algy _____ [common-] drank six cups of tea.

KEY TO REVIEW TEST

Check your answers by the following key. Deduct 4% per error from a possible 100%.

1. remarkable
2. possible
3. suitable
4. feasible
5. audible
6. valuable
7. legible
8. digestible
9. incredible
10. inevitable
11. Terrible
12. indivisible
13. comfortable
14. contemptible
15. debatable
16. finally
17. evidently
18. basically
19. certainly
20. artistically
21. specifically
22. incidentally
23. definitely
24. accidentally
25. commonly

Score: _____%

SUPPLEMENTARY LIST D

Study each word carefully, noting the ending in particular. Pronounce the word several times, syllable by syllable.

EXERCISE. On separate paper (a) write each word three times and then (b) use the word in a short sentence.

1. adorable
2. available
3. breakable
4. creditable
5. deplorable
6. detestable
7. enviable
8. excitable
9. expandable
10. indescribable
11. memorable
12. peaceable
13. perishable
14. personable
15. predictable
16. presentable
17. profitable
18. reliable
19. remarkable
20. taxable
21. combustible
22. compatible
23. convertible
24. indelible
25. perfectible
26. plausible
27. reversible
28. sensible
29. susceptible
30. tangible
31. actually
32. accurately
33. adequately
34. annually
35. apologetically
36. consequently
37. considerably
38. especially
39. financially
40. fundamentally
41. generally
42. grammatically
43. hungrily
44. individually
45. leisurely
46. naturally
47. optimistically
48. particularly
49. poetically
50. realistically

ANALYSIS OF SPELLING ERRORS

Some students tend to make particular kinds of errors. They have an unhappy talent for leaving letters out or for turning letters around or, perhaps, for mixing up homonyms (sound-alikes). Yet if they knew their favorite faults, they could be on their guard against them. Knowing a special weakness is half the battle.

Analyze your own personal demons. Find out whether your errors have been due mainly to 1. homonyms, 2. capital letters, 3. apostrophes, 4. noun plurals, 5. missing letters, 6. extra letters, 7. wrong letters, 8. reversed letters, 9. penmanship, or 10. miscellaneous.

In the appropriate spaces below, list the words that you have misspelled, according to the nature of the errors that you made. That is, write the word correctly in the group where it belongs.

I. HOMONYMS (for example, *their*--spelled by error like *there*)

1. _____	6. _____	11. _____
2. _____	7. _____	12. _____
3. _____	8. _____	13. _____
4. _____	9. _____	14. _____
5. _____	10. _____	15. _____

II. CAPITAL LETTERS (for example, *English*--spelled by error with a small *e*)

1. _____	6. _____	11. _____
2. _____	7. _____	12. _____
3. _____	8. _____	13. _____
4. _____	9. _____	14. _____
5. _____	10. _____	15. _____

III. APOSTROPHES (for example, *says*--spelled by error with an apostrophe)

1. _____	6. _____	11. _____
2. _____	7. _____	12. _____
3. _____	8. _____	13. _____
4. _____	9. _____	14. _____
5. _____	10. _____	15. _____

IV. NOUN PLURALS (for example, *enemies*--spelled by error with a *y*)

1. _____	6. _____	11. _____
2. _____	7. _____	12. _____
3. _____	8. _____	13. _____
4. _____	9. _____	14. _____
5. _____	10. _____	15. _____

V. MISSING LETTERS (for example, *studying*--spelled by error without the *y*)

1. _____	6. _____	11. _____
2. _____	7. _____	12. _____
3. _____	8. _____	13. _____
4. _____	9. _____	14. _____
5. _____	10. _____	15. _____

VI. EXTRA LETTERS (for example, *writing*--spelled by error with an extra *t*)

1. _____	6. _____	11. _____
2. _____	7. _____	12. _____
3. _____	8. _____	13. _____
4. _____	9. _____	14. _____
5. _____	10. _____	15. _____

VII. WRONG LETTERS (for example, *escape*--spelled by error with an *x* instead of an *s*)

1. _____	6. _____	11. _____
2. _____	7. _____	12. _____
3. _____	8. _____	13. _____
4. _____	9. _____	14. _____
5. _____	10. _____	15. _____

VIII. REVERSED LETTERS (for example, *tragedy*--spelled by error with the *g* and *d* turned around)

1. _____	6. _____	11. _____
2. _____	7. _____	12. _____
3. _____	8. _____	13. _____
4. _____	9. _____	14. _____
5. _____	10. _____	15. _____

IX. PENMANSHIP (for example, *receive*--scrawled with the *e*'s looking like *i*'s, and a bubble floating somewhere above, like a moon over a series of waves)

1. _____	6. _____	11. _____
2. _____	7. _____	12. _____
3. _____	8. _____	13. _____
4. _____	9. _____	14. _____
5. _____	10. _____	15. _____

X. MISCELLANEOUS (for example, *a lot*--spelled by error as one word instead of two)

1. _____	6. _____	11. _____
2. _____	7. _____	12. _____
3. _____	8. _____	13. _____
4. _____	9. _____	14. _____
5. _____	10. _____	15. _____

APPENDIX B

THE INSTRUMENT USED TO MEASURE SPELLING ACHIEVEMENT: THE McGRAW-HILL BASIC SKILLS SERIES: SPELLING TEST

PLEASE NOTE:

Pages 56-69, "Basic Spelling Tests--Forms A and B", copyright 1970 by McGraw-Hill, Inc. not microfilmed at request of author. Available for consultation at University of Oklahoma Library.

UNIVERSITY MICROFILMS.

APPENDIX C

AN EXAMPLE OF THE DIAGNOSTIC TEST GIVEN AS PRETEST AND POSTTEST (PROGRAMED SPELLING DEMONS)

Diagnostic Text

Halt! Get a pencil. Be sure to take this diagnostic test before you start working your way through the manual.

This test will help you find out about your special weaknesses or talents in spelling. It will also tell you which chapters in PROGRAMED SPELLING DEMONS are most important for you to study.

Don't peek at the test answers until you are done. Otherwise you may become an expert at peeking and not at spelling.

* * *

Fill the fifty blanks, writing each word in full. The words have been picked at random from the sixteen chapters.

CHAPTERS 1-3

1. Our team always finds a way to _____ [l-se] a game.
2. Falling in love began to _____ [-ffect] my sleep.
3. Our nation was _____ [l-d] into an exhausting war.
4. I wonder _____ [who-] car hit my fender.
5. Paul's parachute didn't open--and he made his _____ [d-c-nt] to earth in record time.
6. Joe's jackass broke _____ [it-] leg.

7. A book's preface is also known as a _____ [fo-w-rd].

8. What is the _____ [princip-] reason you hate snakes?

9. Jeeter broke a tooth on a _____ [p-ce] of Betty's cake.

10. A real ham played the _____ [rol-] of Hamlet.

CHAPTERS 4-5

11. Your love life is none of my _____ [b-s-ess].

12. I'm not happy _____ [am-ng] mosquitoes.

13. Every freshman should be _____ [writ-g] a novel.

14. My themes are rewarded by bitter _____ [crit-m].

15. To survive today one must know spelling and _____ [gram-r].

16. "Drop in _____ [oc-s-n-ly]," said the well digger.

CHAPTER 6

17. And so I nominate _____ [-enat-r] Blintz.

18. Flem is as smart in history as in _____ [-ngl-sh].

19. This bike won't get over the Rocky _____ [-ount-ns].

CHAPTER 7

20. Take Sheila to the _____ [lad-] restroom.

21. This shoe is Joe's; that shoe is _____ [her-].

22. He's guilty, but _____ [you-] innocent.

CHAPTER 8

23. A grave problem: Our _____ [cem-t-r-s] are full.

24. Our class has two Toms and two _____ [Henr-].

25. The fullback ate two _____ [loa-s] of bread.

CHAPTER 9

26. The ink on my nose might be _____ [not-c-ble].

27. Stop _____ [us-ng] my hairbrush on your shoes.

28. At midnight our cats had a noisy _____ [arg-m-t].

CHAPTER 10

29. Duke's girls all _____ [rec-ved] the same love letter.

30. He gave dimes to his nephew and his _____ [n-ce].

31. Never _____ [s-ze] a skunk by the tail.

CHAPTER 11

32. It's the plastic clock that gets _____ [drop-d].

33. Little Buster _____ [com-ted] a foul deed.

34. The bandit _____ [transfer-d] my money to his pocket.

CHAPTERS 12-13

35. W. C. Fields was _____ [pr-j-d-c-] against children.

36. Do you _____ [rec-nize] the girl in the wig?

37. Lipstick! I demand an _____ [expl-n-tion].

38. Shorty ate a huge _____ [qu-n-ty] of popcorn.

39. Our new _____ [vac-] cleaner just spits dust.

40. Jake was reading a sexy book at the _____ [lib-ry].

CHAPTERS 14

41. Those two streets are _____ [par-l-l].

42. It's healthier to salute a _____[s-rg-nt].

43. Our basketball center is four feet in _____ [h-gh-].

44. Here are five pennies for a _____ [ni-k-].

CHAPTERS 15-16

45. At night Ed's pimples are hardly _____ [v-s-ble].

46. Usually our best football player isn't _____ [el-g-ble].

47. Einstein was _____ [def-n-t-ly] a genius.

48. Your eyes, _____ [inc-den-ly], are diamonds.

49. Those Siamese twins do look _____ [sim-l-r].

50. A student can graduate and still be _____ [ign-r-nt].

APPENDIX D

AN EXAMPLE OF THE UNIT STUDY MATERIALS CONTAINED IN THE PROGRAMED SPELLING MATERIALS (PROGRAMED SPELLING DEMONS)

HOW TO USE THIS MANUAL

1. Cover the answers at the left side of each page with a strip of paper or with your hand.

2. Take up one "frame," or numbered box, at a time.

3. Note carefully any spelling words, explanations, or directions at the beginning of a frame. Have a dictionary near you and look up any term that is not completely clear.

4. Fill in all the blanks of a frame with complete correct spellings, choices, or other answers as indicated.

5. After finishing the whole frame, uncover enough of the key at the left to check your answers. The answer key is numbered the same as the frame and will be found in front of the following frame.

6. If your answers are correct, go on to the next frame.

7. If you have made an error, be sure to correct it. Go back, if necessary, and study the explanations again before you go on. Any word that gives you special spelling trouble--whether in this manual or in your English compositions--should be entered into your Personal List of Demons at the end of this book. Later you will review your personal demons.

8. Complete an entire quiz or entire review test--the same as with each frame--before you check or grade your answers to it.

9. Write neatly and clearly. The act of careful writing, as well as the repetition, will help the learning process.

10. Take additional chapter pretests and review tests as your teacher decides, based on the Instructor's Manual.

Words with Tricky Endings (I)

15

COVER
THIS STRIP

1 comfortable horrible

Examine carefully the roots to which we add *able* and the roots to which we add *ible*.

able		ible	
acceptable	excusable	audible	incredible
advisable	fashionable	divisible	permissible
considerable	laughable	edible	possible
comfortable	receivable	eligible	terrible
debatable	suitable	feasible	visible
dependable	valuable	horrible	
desirable			

a. If the root is a full word--for example, *accept, comfort, fashion*--we usually add _____ [able/ible].

b. If the root is not a full word--for example, *aud, ed, horr, terr*--we usually add _____ [able/ible].

1

a. *able*

b. *ible*

2

a. The root *suit* is a full word, so we add _____.

b. The root *vis* is not a full word, so we add _____.

2

a. *able*

b. *ible*

3

Fill the blanks as shown. If the root is a full word add *able;* otherwise add *ible*.

accept	acceptable	acceptable	acceptable
aud	_____	_____	_____
comfort	_____	_____	_____
consider	_____	_____	_____
vis	_____	_____	_____
elig	_____	_____	_____

3

audible (3)
comfortable (3)
considerable (3)
visible (3)
eligible (3)

4

We usually add *able* to a root that is a _____ [full/incomplete] word.

4

full

5

The root *terr* is not a full word, so we give it what ending? _____ [*able/ible*]

5

ible

6

Write the words in full, adding *able* or *ible*.

fashion	fashionable	suit	_____
divis	_____	laugh	_____
poss	_____	incred	_____

6

divisible
possible
suitable
laughable
incredible

7 excusable valuable

But suppose the root is a full word that ends in *e:*

excuse + able = excusable
value + able = valuable

When *able* is added to a word like *excuse* or *value* that ends in *e*, the *e* is _____ [kept/dropped].

7 dropped	8 advisable Fill the blanks as shown. Note that the roots are full words ending in *e*, and that you must drop the *e* before adding *able*. advise *advisable* *advisable* *advisable* debate _____ _____ _____ desire _____ _____ _____ excuse _____ _____ _____ receive _____ _____ _____
8 debatable (3) desirable (3) excusable (3) receivable (3)	9 Let us review the basic rules for adding *able* or *ible*. a. When the root is a complete word--for example, *depend*, *perish*, *profit*, or *remark*--we usually add _____. b. When the root is a complete word that ends in *e*--for example, *deplore*, *describe*, or *excuse*--we drop the letter _____ and then add _____. c. When the root is not a complete word--for example, *divis*, *permiss*, *feas*, *dirig*, or *incred*--we usually add _____.
9 a. *able* b. *e*, *able* c. *ible*	10 Fill the blanks with words ending in *able* or *ible*. a. A secretary must be _____ [depend-]. b. Athletes study to stay _____ [elig-]. c. A tunnel to France--is it _____ [feas-]? d. Gambling in church isn't _____[excuse].

10

a. dependable

b. eligible

c. feasible

d. excusable

11

Continue as in Frame 10.

a. If Fido lives, the mushrooms are _____ [ed-].

b. Our sins are _____ [consider-].

c. Grandma's sweatshirt isn't _____ [suit-].

d. The best of wars is _____ [horr-].

11

a. edible

b. considerable

c. suitable

d. horrible

12

Continue as in Frame 10

a. Skinny's appetite is _____ [incred-].

b. Whether man can survive is _____ [debate].

c. His trunks fell off. How _____ [laugh-]!

d. Smoking in class isn't _____ [permiss-].

12

a. incredible

b. debatable

c. laughable

d. permissible

13 probable digestible responsible

Exceptions. Now let us study a few--darn it!--exceptions. Try to see why each of the following spellings is an exception to our rule.

irritable	*irritable*	_____	_____
inevitable	_____	_____	_____
probable	_____	_____	_____
contemptible	_____	_____	_____
digestible	_____	_____	_____
flexible	_____	_____	_____
responsible	_____	_____	_____

a. Note that *irrit*, *inevit*, and *prob* are <u>not</u> complete words; yet they take what ending? _____

b. Note that *contempt*, *digest*, *flex*, and *response* <u>are</u> complete words, yet take what ending? _____

c. Write each word three times in the spaces above.

13

a. *able*

b. *ible*

c. [copy]

14 Quiz on Exceptions

Write the words in full.

a. Raw fish can be _____ [digest-].

b. Vandals are _____ [contempt-].

c. Tight shoes make me _____ [irrit-].

d. Smash-ups are not _____ [inevit-].

e. That idiotic driver is _____[response].

f. The gossip's tongue is _____ [flex-].

g. An atomic war is _____ [prob-].

14

a. digestible

b. contemptible

c. irritable

d. inevitable

e. responsible

f. flexible

g. probable

15 certainly definitely evidently

In the frames that follow we will consider the endings *ly* and *ally* and how to decide which one to use.

You have often changed adjectives into adverbs, probably without realizing it: *swift, swiftly; bitter, bitterly; clever, cleverly.* More examples follow:

certain + ly = certainly
definite + ly = definitely
evident + ly = evidently

You can change most adjectives--such as *swift, certain,* and *evident*--into adverbs by adding _____.

15

ly

16 accidentally finally incidentally

Adjectives that end in *al* follow the same rule.

accidental + ly = accidentally
final + ly = finally
incidental + ly = incidentally

In short, you can change adjectives like *accidental* and *incidental,* that end in *al,* into adverbs by adding _____.

16

ly

17

Caution: Be sure to add the *ly* to the adjective forms, not to the noun forms. Write the adverbs in the spaces provided.

Noun	Adjective	Adverb
accident	accidental	_____
coincidence	coincidental	_____
incident	incidental	_____

17

accidentally

coincidentally

incidentally

18

Write the words in full.

a. Twain, _____ [incid-ly], was a pessimist.

b. Frank _____ [accid-ly] broke his flask.

c. We met _____ [coincid-ly] in Tibet.

18

a. incidentally

b. accidentally

c. coincidentally

19 artistically basically specifically

But see what happens to adjectives that end in *c*.

artistic + ally = artistically
basic + ally = basically
specific + ally = specifically

Adjectives that end in *c* (*artistic*, *basic*, etc.) become adverbs when you add the ending _____.

19

ally

20

In other words--

a. you usually add _____ [ly/ally] to an adjective;

BUT

b. if the adjective ends in *c*, you add _____ [ly/ally].

20

a. *ly*

b. *ally*

21

Write the adverb form three times. (Remember the rule: Add *ly* to the adjective, but if the adjective ends in *c*, add *ally*.)

accidental	accidentally	accidentally	accidentally
artistic	_____	_____	_____
basic	_____	_____	_____
certain	_____	_____	_____
definite	_____	_____	_____
evident	_____	_____	_____
final	_____	_____	_____
frantic	_____	_____	_____
specific	_____	_____	_____

21

artistically (3)

basically (3)

certainly (3)

definitely (3)

evidently (3)

frantically (3)

specifically (3)

22 Quiz

Fill the blanks with the adverbs studied.

The night club entertainer played his numbers quite _____ [artistic-] and _____ [fin-ly] took a bow. Then Pancho, who had _____ [evid-] been guzzling wine, stumbled _____ [accid-] to the piano bench and began to assault the keys. He _____ [defin-] had huge talent and his technique was _____ [basic-] excellent. The crowd _____ [cert-] cheered his lively rhumbas, but _____ [specif-] his singing. And, _____ [incid-], Pancho won a job at the night club.

22

artistically
finally
evidently
accidentally
definitely
basically
certainly
specifically
incidentally

23

Enter any words that you misspelled in this chapter into your Personal List of Demons at the end of the book.

APPENDIX E

AN EXAMPLE OF THE REVIEW TESTS CONTAINED IN THE PROGRAMED SPELLING MATERIALS (PROGRAMED SPELLING DEMONS)

REVIEW TEST

Fill the blanks with words that end in *able* or *ible*.

1. Fritz has _____ [remark-] ears.
2. She loves me--is it _____ [poss-]?
3. Your spiked heels don't seem _____ [suit-] for hiking.
4. A bridge to the moon isn't _____ [feas-].
5. Grandpa's snoring was _____ [aud-].
6. Your ability to spell is very _____ [val-].
7. He's no doctor. His writing is _____ [leg-].
8. The cannibals figured I wouldn't be _____ [digest-].
9. The power of gossip is _____ [incred-].
10. When Lulu drives, a crash is _____ [inev-].
11. One bloody czar was named Ivan the _____ [Terr-].
12. Our nation is one and _____ [indivis-].
13. Water beds are _____ [comfort-].
14. Locking the puppy into a hot car is _____ [contempt-].
15. My value to the team was _____ [debate].

Fill the blanks with words that end in *ly* or *ally*.

16. The tackler _____ [fin-] let go of my leg.
17. Romeo _____ [evid-] liked Juliet.
18. My new sports car is _____ [basic-] a lemon.
19. The fish that got away was _____ [cert-] big.
20. Zelda plays the zither _____ [artist-].
21. He told me _____ [specif-] where I could go.
22. Vic's bald head, _____ [incid-], was sunburned.
23. Punchy _____ [defin-] loosened my teeth.
24. The cook _____ [accid-] spilled the beans.
25. Algy _____ [common-] drank six cups of tea.

APPENDIX F

INTELLIGENCE SCORES AND PRETEST, POSTTEST, AND CHANGE SCORES OF SPELLING ACHIEVEMENT FOR THE FOUR STUDENT/VETERAN SUBGROUPS

TABLE 6

PRETEST, POSTTEST, AND GAINS IN RAW SCORES OF THE ABOVE-AVERAGE-INTELLIGENCE AUDITORY GROUP

Subject Number	I.Q. Score	Pretest Raw Score	Posttest Raw Score	Change in Raw Score
1	132	15	21	6
2	126	19	24	5
3	125	39	39	0
4	126	31	35	4
5	125	15	22	7
6	119	19	30	11
7	121	23	27	4
8	125	29	29	0
9	135	24	29	5
10	123	30	36	6
11	137	31	42	11
12	124	30	36	6
13	132	33	35	2
14	125	14	15	1
15	127	32	32	0
Mean	126.80	25.60	30.13	4.53
Standard Deviation	4.872	7.483	7.155	3.444

TABLE 7

PRETEST, POSTTEST, AND GAINS IN RAW SCORES OF THE BELOW-AVERAGE-INTELLIGENCE AUDITORY GROUP

Subject Number	I.Q. Score	Pretest Raw Score	Posttest Raw Score	Change In Raw Score
1	95	11	15	4
2	93	13	14	1
3	111	27	39	12
4	101	37	29	- 8
5	118	15	26	11
6	105	31	37	6
7	101	9	12	3
8	115	21	29	8
9	90	19	28	9
10	95	23	29	6
11	96	31	28	- 3
12	105	19	17	- 2
13	117	32	34	2
14	119	43	46	3
15	118	29	34	5
Mean	105.27	24.00	27.80	3.80
Standard Deviation	9.983	9.599	9.473	5.692

TABLE 8

PRETEST, POSTTEST, AND GAINS IN RAW SCORES OF THE ABOVE-AVERAGE-INTELLIGENCE VISUAL GROUP

Subject Number	I.Q. Score	Pretest Raw Score	Posttest Raw Score	Change In Raw Score
1	118	41	41	0
2	121	20	22	2
3	127	34	43	9
4	122	9	23	14
5	115	21	24	3
6	117	21	27	6
7	121	17	12	- 5
8	118	32	34	2
9	143	30	30	0
10	116	41	38	- 3
11	130	36	40	4
12	161	36	41	5
13	112	13	13	0
14	114	29	29	0
15	118	25	25	0
Mean	123.53	27.00	29.47	2.47
Standard Deviation	12.490	9.612	9.606	4.575

TABLE 9

PRETEST, POSTTEST, AND GAINS IN RAW SCORES OF THE BELOW-AVERAGE-INTELLIGENCE VISUAL GROUP

Subject Number	I.Q. Score	Pretest Raw Score	Posttest Raw Score	Change In Raw Score
1	100	28	35	7
2	86	28	15	- 13
3	99	21	23	2
4	68	26	19	- 7
5	112	27	22	- 5
6	110	5	12	7
7	83	11	16	5
8	110	21	37	16
9	112	25	22	- 3
10	109	21	19	- 2
11	103	13	12	- 1
12	104	28	28	0
13	109	25	24	- 1
14	103	33	38	5
15	75	11	11	0
Mean	98.87	21.53	22.20	0.67
Standard Deviation	13.660	7.746	8.858	6.630