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An experiment in spaced recall as a technique for learning to spell at the ninth grade (college) level.

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Andem, P.  
1957

AN EXPERIMENT IN SPACED RECALL AS A TECHNIQUE  
FOR LEARNING TO SPELL AT THE NINTH GRADE (COLLEGE) LEVEL

ES 803s Seminar in the Teaching of English

Pollyanna Andem

April 19, 1957



"Learning how to attack the spelling of new words, sensing how words are put together, and developing power to see and hear them, to compare what one sees with what one hears, to write words accurately, and to use them with due regard for meaning are as important skills for mastery as the learning of specific words. Most important of all is a sense of responsibility for spelling words correctly in order to make one's communication intelligible. Ability to use the dictionary is a necessary skill, but it can never take the place of an interest in words and insight into how they are built."

THE ENGLISH LANGUAGE ARTS

(National Council of  
Teachers of English)

pp. 325-6.

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CHAPTER I

REPORT OF RESEARCH IN THE AREA OF SPELLING DISABILITY

"Correct spelling is neither a fad nor a dispensable luxury. It is one of the prime essentials, a two-fold duty that each individual owes to himself and to others."<sup>1</sup>

Introduction

Professor Mawson's words make a challenging motto. Can everyone learn to spell accurately, or must we expect to have poor spellers, like the poor, always among us? or, rewording the question slightly, why are some pupils poor spellers? What methods of teaching spelling have proved most successful? How valuable are spelling rules? What significance shall we attach to the types of spelling errors? And, finally, of what value is spaced recall in learning to spell particular words?

The experiment described in this paper is concerned with the last question. However, the other questions must be dealt with briefly in order to show what part they did or did not play in this experiment.

Suggested Causes of Spelling Disabilities

Hagerman and Laslett administered the Sixteen Spelling Scales

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<sup>1</sup> Mawson, C. O. Sylvester, THE DICTIONARY COMPANION, Garden City, New York (Doubleday, Doran & Company, Inc.), 1932, p. 1.

(New York, Bureau of Publications, Teachers College, Columbia)  
 to two hundred and four high school pupils, freshmen, sophomores,  
 juniors, and seniors being equally represented. They found the  
 spelling of these two hundred and four "not very commendable." <sup>1</sup>  
 Correlation between the number of spelling errors and the intelli-  
 gent quotients was  $-.37$ . Hageman and Laslett did not excuse the  
 two hundred and four!

"The difficulty of learning to spell the many irregularly  
 formed English words has often been given as an excuse  
 for poor spelling, but it is not a valid excuse because  
 so many people do learn to spell correctly without feel-  
 ings of hardship." <sup>2</sup>

Furness has this to say about spelling:

"Spelling requires words to be examined individually.  
 Therefore, it employs a method almost opposite to cur-  
 rent reading methods and techniques and must be con-  
 sidered a separate and independent skill." <sup>3</sup>

Lack of drill in the lower grades and the accent on speed in read-  
 ing have helped to make poor spellers of some pupils, Furness  
 believes. Having said this in defense of the poor speller, how-  
 ever, Furness goes on to state that probably carelessness and  
 laziness are two major reasons for misspellings by pupils of  
 high I.Q. Furness also cites mental and social immaturity and  
 emotional disturbance as causes of spelling inaccuracies.

Ernest Horn suggests that mispronunciations and various  
 articulatory defects are related to spelling disabilities. The

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<sup>1</sup> Hageman, Doris, Laslett, H. R., "The Spelling Ability of High-  
 School Pupils," School and Society, Vol. 73, June 2, 1951,  
 p. 347.

<sup>2</sup> Ibid., p. 348.

<sup>3</sup> Furness, E. L., "Why John Can't Spell," School and Society,  
 Vol. 82, December 24, 1955, pp. 199, 200.

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word government is a good example. Pupils who do not pronounce the n when saying the word are likely to omit that letter when spelling the word. Therefore, "Most modern methods of teaching spelling include correct pronunciation as an essential step in learning." <sup>1</sup> Handwriting, too, is an important consideration.

Horn says:

"Pupils who write legibly and with reasonable speed have an advantage in taking tests in spelling because they can write the words in the time allowed, are not penalized because of illegible letters, and can give their entire attention to spelling without being distracted by handwriting difficulties. Furthermore, poor handwriting is frequently cited among the factors that cause difficulty in spelling." <sup>2</sup>

Gates and Russell say that good spellers

"- - use syllabication, - - see pronunciation units in words, recognize common phonograms or other words within longer words, and - - have a rhythm in oral or written spelling - - ." <sup>3</sup>

These two writers also suggest that in diagnosing spelling disability one should give the pupil an opportunity to explain how he studies a word for himself.

### Spelling Rules and Groupings

Fairly recent research seems to indicate that there is some value in teaching a few, specific rules, but very little value in teaching many rules.

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<sup>1</sup> Horn, Ernest, Teaching Spelling, N.E.A., Department of Classroom Teachers and the American Educational Research Association, Washington, D.C., January, 1954, p. 13.

<sup>2</sup> Ibid., p. 14.

<sup>3</sup> Gates, Arthur I., Russell, David H., Diagnostic and Remedial Spelling Manual, New York (Teachers College, Columbia University), Revised edition, April, 1940, p. 15.

More valuable research has been conducted since Ernest Horn made the suggestion in 1919 that

"the teaching of rules be abandoned until more conclusive evidence is presented to show that the time spent in teaching them is as productive of efficiency as the same amount of time spent in teaching words directly." 1

Before that time W.A. Cook had conducted a survey in 1912 to determine the ability of both high school and college students to quote and use correctly spelling rules that they had learned. The students themselves offered the opinion that rules were of little value and proceeded to demonstrate that they could recall and use very few. Although the validity of the survey has since been questioned (there was no control group), Cook declared the results indicate "that the teaching of rules should be abandoned."2

W. F. Tidyman in his book THE TEACHING OF SPELLING (New York, World Book Company, 1919) presents a pessimistic view of the value of spelling rules. He feels that in formulating spelling rules we are attempting the impossible, namely, the systematizing of a very unsystematic orthography.

Arthur I. Gates conducted two interesting experiments. The first involved 2160 pupils in Public School 210, Brooklyn, New York, in the fall of 1929. The second involved 1646 pupils in the same school during the fall of 1930. Detailed instructions were given for the teaching of rules to the Generalization Group. No spelling rules were to be included in the teaching procedure

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1 Horn, Ernest, "Principles of Method in Teaching Spelling as Derived from Scientific Investigation," Eighteenth Yearbook, National Society for the Study of Education, Part II., Chapter 3, 1919, p. 55.

2 Cook, W.A., "Shall We Teach Spelling by Rule?" Journal of Educational Psychology, Vol. III., May, 1912, p. 325.

for the Control Group. Grades three, four, five, six, seven, and eight participated in the experiments. The results of the two experiments are as follows:

- 1. Spelling words studied during the term.
  - a. Differences in the mean gains were so small as to indicate that learning rules gave the Generalization Group no advantage over the Control Group.
  - b. Scores on tests involving words spelled by rule were only slightly higher for the Generalization Group than for the Control Group.
- 2. New words. Scores on tests involving new words were much higher for the Generalization Group than for the Control Group.
- 3. Base forms and suffixes. Scores on tests measuring the ability to add suffixes (s, es, d. ed, or ing) correctly to base forms that had not been studied were, again, much higher for the Generalization Group than for the Control Group.

In summarizing Gates indicates what he feels is the significant finding of the experiments:

"In general, then, it may be said that a broad and varied program of generalization, while it does not increase ability to spell the words studied during the term - - does tend to increase to some extent the power to spell new words and especially to handle the specific derivatives and other elements to which the generalization program was especially directed." <sup>1</sup>

In 1930 Ina Sartorius made a study of twenty-seven rules commonly found in spelling texts. She discovered that (1) the total number of words covered by these rules is small, (2) some rules have nearly as many exceptions as applications, (3) other rules apply to as few as sixteen words, and (4) too many of the rules are worded in a complicated, awkward manner.

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<sup>1</sup> Gates, Arthur I., GENERALIZATION AND TRANSFER IN SPELLING, New York (Teachers College, Columbia University), 1935, p. 78.

One of the few spelling rules that has no exceptions is "u always follows q." Most of our rules have many exceptions. Consider this one: "Words of one syllable having the long sound of the vowel usually end in silent e." What virtue is there in teaching this rule when we realize that there are 248 applications of the rule and 339 exceptions!

Luella King conducted a study in grades three to eight to determine the value of teaching seven specific rules. Three classes in each grade participated. All participants had I.Q.'s between 90 and 110.

Rule One: Most nouns form their plurals by adding s or es to the singular. Es is added to make the word easier to pronounce.

King found the trouble spot in this rule to be es, and as there are only eight nouns that form their plurals in this way, she is in favor of eliminating this part of the rule.

Rule Two: Drop the final e before adding a suffix beginning with a vowel.

Pupils had the most difficulty with the suffix ing, frequently adding it without dropping a final e. King suggests teaching this suffix separately.

Rule Three: When final y is preceded by a consonant, change y to i before adding any suffix that does not begin with i.

"When y is preceded by a consonant" seemed to mean nothing to most children who changed y to i regardless of whether it was preceded by a consonant or a vowel.

Rule Four: Q is always followed by u.

This rule is easily taught and grasped, but it governs so few words that its value is negligible.

Rule Five: I before e except after c or when sounded as a as in neighbor and weigh.

King found that this rule was easy to recite but difficult to apply because of its many parts and exceptions. She doubts that it is worth teaching.

Rule Six: The sound of i at the end of a word is usually spelled by the letter y.

King does not entirely approve of this rule because she feels it gives the impression that words ending in ey are incorrectly spelled.

Rule Seven: Words of one syllable and words with the accent on the last syllable ending in one consonant preceded by one vowel double the final consonant when adding a suffix beginning with a vowel.

King feels that this rule is difficult to remember and difficult to apply. She would not teach it.

Research, then, does not lean too heavily in favor of teaching spelling rules. Foran suggests that very few rules be taught, and they, one at a time. He cautions that

"- - rules are not a substitute for adequate instruction in the spelling of words but serve only as guides to supplement specific instruction."<sup>1</sup>

Horn would teach four of the rules evaluated by Luella King, namely, rules two, three, four, and seven, and include one that deals with capitalization: proper nouns and proper adjectives begin with a capital letter. These he would accept because they do not conflict with his belief that "The only rules that should be taught are those that apply to a large number of words and have

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<sup>1</sup> Foran, Thomas George, THE PSYCHOLOGY AND TEACHING OF SPELLING, Washington, D.C., (The Catholic Education Press), 1934, p. 148

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few exceptions."<sup>1</sup> If a rule is concrete enough, simply worded, has few or no exceptions, and if the pupil truly understands the principle behind the rule before he memorizes it, then that rule is worth teaching.

#### Classification by Types of Errors

There are four general types of spelling errors: omission, addition, transposition, and substitution. Mendenhall is more specific and lists fifteen different types of errors:<sup>2</sup>

1. Doubling a consonant.
2. Omitting the second of a double consonant.
3. Omitting the second of a double vowel.
4. Omitting the final e.
5. Omitting a silent letter which is not a final letter.
6. Omitting the i of the phonogram ai.
7. Substituting i or ey for final y.
8. Omitting the c of the phonogram ck.
9. Transposing a final le to el.
10. Omitting the a of the phonogram ea.
11. Substituting k for hard c.
12. Substituting s for soft c.
13. Omitting the e or ed in words ending in ed.
14. Interchanging ie and ei.
15. Substituting a vowel for another vowel (thay for they, etc.)

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<sup>1</sup> Horn, Ernest, "Spelling," Encyclopedia of Educational Research, New York (The Macmillan Company), 1950, Rev. Ed., p. 1256.

<sup>2</sup> Gates, Arthur I., Russell, David H., Diagnostic and Remedial Spelling Manual, New York (Teachers College, Columbia University), Revised edition, April, 1940, p. 12.

Grant in her analysis of spelling errors made by ninth and eleventh grade pupils found that the highest percentage of error was made in three types: omission, substitution, and addition, in that order. Grant also found that boys made a significantly larger percentage of errors than girls.

In another study involving one hundred seventh grade pupils Mackey made a tabulation of the one hundred and forty-two most frequently misspelled words during the eight-weeks period. Her tabulation shows that there were sixty-five errors of omission, thirty-seven errors of substitution, twenty-three errors of addition, and nine errors of transposition. Mackey's finding, then, agrees with the finding made by Grant.

Of what value is this information? Mackey suggests that

"A study of spelling errors will provide the necessary information to serve as a basis for individual remedial work." <sup>1</sup>

Greene, Jorgensen, and Gerberich have different ideas, however:

"Many investigators of spelling disabilities have abandoned the procedure of deducing the causes of spelling difficulties from an analysis of errors and are now devoting their time and energies to studying the work habits of pupils by means of careful observation and tests. One of the chief causes of poor spelling achievement lies in the failure of the student through no fault of his own to utilize an adequate method of study." <sup>2</sup>

Spaced Recall

Sandberg conducted an experiment at Wartburg College,

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<sup>1</sup> Mackey, Jane L., A Compilation, Tabulation and Analysis of Spelling Errors of Seventh Grade Pupils, Ed.M. Thesis, Boston University School of Education, 1950.

<sup>2</sup> Greene, Harry A., Jorgensen, Albert N., Gerberich, J. Raymond, MEASUREMENT AND EVALUATION IN THE SECONDARY SCHOOL, New York (Longmans, Green and Company), 1943, p. 321.

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Waverly, Iowa.<sup>1</sup> He dictated a passage containing many of the problem letter combinations to sixty-seven students. There were no perfect papers. In all, Sandburg counted three hundred and forty-two misspellings or 5.104 misspellings per student. As a remedial measure, students were asked to write each misspelled word ten times. One month later, without warning, Sandberg dictated another passage containing the same words. This time there were only one hundred and sixty-four misspellings or an average of 2.448 per student. Eleven students had perfect papers. Only three students failed to show improvement. Unfortunately, Sandberg does not indicate whether or not he attempted the experiment again. Neither does he state whether or not any of the sixty-seven students spent more time on their own studying the words they had failed beyond the required writing of each misspelled word ten times. For these two reasons, I would say the evidence was inconclusive.

Foster tried an experiment with tenth grade pupils at Union High School in Phoenix, Arizona.<sup>2</sup> He dictated twenty words on Monday, the same twenty words on Wednesday, and the same twenty words on Friday. Only Friday's score counted. To make a game of the procedure, Foster had the pupils use the same paper for all three attempts, creasing it in thirds on Monday and folding the paper over before each successive test so that the previous

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<sup>1</sup> Sandberg, Edwin T., "Written Repetition - An Aid in Spelling Improvement," COLLEGE ENGLISH, Vol. 16, Feb., 1955, pp. 305-7.

<sup>2</sup> Foster, Guy L., "15 Minutes a Week for Motivated Spelling," CLEARING HOUSE, Vol. 29, September, 1954, pp. 48-49

attempts were covered. In between tests pupils could study the words on their own, using any method they wished. Although Foster quoted no statistics in his report, he stated that very few pupils misspelled more than one word on Friday.

Oliver conducted an experiment in Spaced Learning Versus Unspaced Learning in Spelling<sup>1</sup> in order (1) to compare growth in spelling achievement when using spaced learning with growth in spelling achievement when using unspaced learning, and (2) to find at what interval -- a twenty-minute interval three times a week or a thirty-minute interval twice a week -- the most gain seems to be found.

One hundred and eighteen junior high pupils participated in the experiment which lasted twelve weeks. Three groups were organized. Group One had a sixty-minute spelling session once a week. Group Two had two thirty-minute spelling sessions during a week. Group Three had three twenty-minute spelling sessions during the week. Of course spelling words were introduced and taught in the same manner with all three groups. During the first six weeks ninety words were taught. Then all groups were tested with the same sentence test. During the last six weeks another ninety words were taught. Again, all three groups took the same sentence test. The results of this second test were compared with the results of the first test. Oliver found that there was no statistically significant gain in spelling achievement when using spaced learning as compared with unspaced learning; and that

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<sup>1</sup> Oliver, Marjorie Armitage, Spaced Learning Versus Unspaced Learning in Spelling, Ed.M. Thesis, Boston University School of Education, 1947.

there was no more statistically significant gain to be found in learning at intervals of three times a week than at intervals of twice a week. However, Oliver suggests that it might be valuable to conduct a similar experiment using larger groups of children and extending the project over a much longer period of time.

Summary

It is surprising and perhaps significant the number of times there is no correlation between intelligence and the ability to spell. A so-called "bright" student may be a poor speller.

Fewer rather than more spelling rules should be taught. Research seems to indicate that the learning of spelling rules has little value unless the rule taught applies to a larger number of words and has few exceptions.

Of the four general classifications of spelling errors, omission leads the list followed by substitution, addition, and transposition, in that order.

Authorities differ as to the causes of spelling disabilities and the best methods of teaching spelling. Laziness, carelessness, mental and social immaturity, emotional disturbances, lack of drill in the lower grades, poor handwriting, auditory and visual handicaps have been suggested as some of the causes.

Some experiments in spaced recall have proved helpful, but others have not. At best the evidence is inconclusive because it is meager. Much more experimentation and research needs to be done in this area of spelling disability.

CHAPTER II

DESCRIPTION OF PROPOSED EXPERIMENT IN SPACED RECALL

The purpose of this experiment was to discover the value, if any, of spaced recall in learning to spell specific words.

This experiment was conducted over a six-weeks period from March 4, 1957, through April 12, 1957, at Central Junior High School in Weymouth, Massachusetts. Two college divisions of ninth graders participated. There were thirty-one pupils in each division, making a total of sixty-two pupils who took part in the experiment.

The experiment consisted of six weekly pre-tests, each one followed by a weekly final test, with special help being given to the experimental group and no help being given to the control group. Also, during the course of the six weeks a surprise progress test was given. (See Table III.) This test was made up of the twenty-five words misspelled the most number of times on final tests one, two, and three.

In September of 1956 the Guidance Department of Central Junior High administered the Differential Aptitude Tests<sup>1</sup> to all ninth graders. Included in this battery was Language Usage, Form A. Part I of this section is a spelling test consisting of one hundred words, some of which are misspelled. Pupils indicate whether or not each word is correctly or incorrectly spelled.

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<sup>1</sup> Bennett, George K., Seashore, Harold G., Wesman, Alexander G., "Language Usage," Form A, from Differential Aptitude Tests, New York (The Psychological Corporation), 1947.

Table I shows the spelling percentile score of each of the sixty-two pupils who participated in the experiment. A careful study of this chart indicates curious things. The control group had a far greater range, showing a spread from the 10th percentile to the 100th percentile. The range of the experimental group was from the 30th percentile to the 95th percentile. The control group had nine pupils, that is over one-fourth of the class, below the 50th percentile, while the experimental group had only two pupils below the 50th percentile. However, if we include the 50th percentile in our comparison, we discover that the experimental group had eight pupils at or below the 50th percentile and the control group, ten pupils at or below the 50th percentile. The median for the experimental group was the 70th percentile. The median for the control group was the 80th percentile. The control group, then, might seem to have a slight edge over the experimental group, but this edge could be offset by the nine exceptionally poor spellers. All things taken into consideration, the two groups were probably as equal in ability as it is possible to obtain groups in a public school situation when you have a limited number of groups to choose from and regrouping is not possible.

The one hundred and twenty spelling words used in this experiment were taken from all the written work done by members of the experimental group and the control group in English class during the months of September, October, November, December, January, and February. A tabulation of all the misspelled words from these papers revealed the one hundred and twenty spelling

"demons." No attempt was made to arrange these words in any order of difficulty. Instead the list was purely alphabetical.

The one hundred and twenty words comprising this list suggest an interesting study. Only two of them are found in "List A - 350 Most Useful Spelling Words" as reported by Fitzgerald.<sup>1</sup> Only five of them appear in "List B - 450 Most Useful Spelling Words," again as reported by Fitzgerald.<sup>2</sup> But fifty-four of them are included in another basic list by Fitzgerald entitled "Basic Life Spelling Vocabulary for Child and Adult."<sup>3</sup> And eight of them are among those twenty-seven words which Pollock discovered to be most frequently misspelled by college students.<sup>4</sup> (See Appendix A for tabulation.)

Twenty words were studied each week in the following manner. A pre-test was given each Monday to both the experimental and the control group. After the test pupils of both groups received duplicated copies of the twenty-word list and recorded their misspellings on these sheets. (See Appendix A.)

The tests were administered in an identical manner. Each word was pronounced, used in a sentence, and pronounced again. No word was repeated once the list had been dictated. After the pre-test was corrected, there was some discussion in the experimental group about the difficult parts of some words, and the rules governing the adding of prefixes and suffixes. However, this group was not required to learn any spelling rules. There

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<sup>1</sup> Fitzgerald, James A., THE TEACHING OF SPELLING, Milwaukee, (The Bruce Publishing Company), 1951, p. 15.

<sup>2</sup> Ibid., page 18.

<sup>3</sup> Fitzgerald, James A., A BASIC LIFE SPELLING VOCABULARY, Milwaukee, (The Bruce Publishing Company), 1951, p. 18

<sup>4</sup> Pollock, Thomas Clark, "Spelling Report," College English, Vol. 16, #2, November, 1954, pp. 102-109.

was no discussion in the control group unless a pupil asked a question or volunteered information.

The final test for marking purposes was given on Friday of each week. The experimental group prepared for this test in a special way, as is described later on in this chapter. The control group did not. In fact, the control group was put strictly on its own. Members of this group were not asked to make any written preparation for this test. They were simply told to study for the test on Friday.

The final test each Friday was marked as follows:

- A - no spelling errors
- B - one wrong
- C - two wrong
- D - three wrong
- F - more than three wrong

All tests -- pre-tests, final tests, and the progress test -- were exchanged and corrected in class by the pupils.

Explanation of the Spelling Card and Its Use

The experimental group was to spend some part of class time on Tuesday, Wednesday, and Thursday each week, studying the words they had misspelled on the pre-test. For this purpose the spelling card was devised. (See Appendix B.) Each pupil had a spelling card for each word he had misspelled. After the pre-test he followed this procedure. First, he looked up each misspelled word in the dictionary so that he could divide it into syllables correctly. Then he entered it upon the spelling card showing the syllabic division. Second, he checked meaning to be sure he knew

exactly what the word meant. Third, he used it in a sentence. That much only he did on Monday immediately after the pre-test had been corrected in class. Then the spelling cards were collected.

On Tuesday the spelling cards were given out. Taking each one in turn, the pupil covered the word and wrote it from memory in the space provided on the spelling card. Then he checked his spelling. Whether or not he had spelled the word correctly, he then wrote it five times in the practice area provided on the spelling card. He followed the identical procedure on Wednesday and again on Thursday.

Members of the experimental group were not restricted to the spelling card alone. They could devote more time outside of class to study of these words and could use other methods if they wished.

CHAPTER III

RESULTS OF EXPERIMENTAL STUDY IN SPACED RECALL

A tabulation of the spelling errors made by the experimental group and the control group shows some surprising results. (See Appendix A.) The experimental group had a total of 753 misspellings on the six pre-tests; the control group had a total of 659 misspellings on the pre-tests. However, both groups misspelled a total of 85 words on the six final tests. As the experimental group misspelled almost 100 more words than the control group on the pre-tests, this identical total of misspellings on the final tests would seem to indicate a slight gain for the experimental group. This gain is indeed slight as other statistics will show.

The experimental group consistently had more misspellings on the pre-tests than the control group. Only on pre-test three did the control group make a poorer showing than the experimental group.

	<u>Misspellings</u>	
	<u>Experimental Group</u>	<u>Control Group</u>
Pre-Test 1	111	98
Pre-Test 2	132	99
Pre-Test 3	77	89
Pre-Test 4	93	52
Pre-Test 5	132	128
Pre-Test 6	<u>208</u>	<u>193</u>
Totals:	753	659

The experimental group scored slightly better on the final tests than did the control group but, curiously enough, fell down badly on the first and the last final tests. Only on two final tests (three and five) did the experimental group score considerably higher than the control group.

Misspellings

	<u>Experimental Group</u>	<u>Control Group</u>
Pre-Test 1	12	2
Pre-Test 2	3	10
Pre-Test 3	13	17
Pre-Test 4	2	16
Pre-Test 5	13	13
Pre-Test 6	<u>42</u>	<u>27</u>
Totals:	85	85

The control group did equally as well as the experimental group on the surprise progress test. Although the range was greater for the experimental group, the median for both groups was the same, one wrong. (See Table III.) This progress test was made up of the twenty-five words which had been misspelled the most number of times on final tests one, two, and three, and it was administered, without warning, to both groups on the same day during the fourth week of the experiment. The control group met first that day and, consequently, took the progress test first. This should have given the experimental group a slight advantage, for a surprise test is seldom a surprise to the second group that takes it!

The growth of the exceptionally poor spellers from both groups makes an interesting study also. Table IV shows the progress made by eight spellers from the experimental group and ten spellers from the control group. These were the eighteen pupils who obtained a percentile score of 50 or below on the standard spelling test administered by the Guidance Department in September. (See Appendix D.) As Table IV indicates, these poor spellers in the control group improved their scores as remarkably as the poor spellers in the experimental group.

The results of this experimental study were disappointing in that the experimental group did no better than the control group. A comparison of the pre-test and final test results show that both groups improved in their ability to spell a particular list of one hundred and twenty words. (See Table II.) The improvement was marked in both cases. The pre-test median for the experimental group was twenty-three wrong; the final test median for the same group was two wrong. The pre-test median for the control group was twenty-two wrong; the final test median for the same group was one wrong.

The results of the experiment would seem to indicate that we cannot give unreserved credit to the spelling card and spaced recall technique for the improvement made by the experimental group as the control group did just as well without them.

Upon being quizzed the control group volunteered that they had studied the spelling words in the following manner:

1. Written difficult words ten or twenty times each.

- 2. Quizzed each other orally on the words they were to be tested on.
- 3. Usually spent five to ten minutes reviewing the words silently just before test time.

Members of the experimental group had also used these three methods besides accomplishing the spelling card requirement.

The results would also seem to indicate that marks still motivate pretty strongly, especially in college divisions. Both groups knew that more than three misspellings on the final test would fail them and that more than one misspelling would give them less than an honor grade.

The control group has been in competition with the experimental group in other areas of the English work this year and has always been the winner. This is one reason it was chosen to be the control group.

The results may also indicate that when one wants to learn to spell he can! We use the terms social, physical, and mental maturity. Is there perhaps an age when we reach a spelling maturity?

There is no way of telling now just how lasting will be the achievement made by these two groups in the past six weeks. An interesting test would be to assemble these two groups again next fall, dictate the one hundred and twenty words used in this experiment, and tabulate the results.

If a similar experiment were conducted over a longer period of time and involved a larger number of pupils, the results would undoubtedly be more significant.

T A B L E S

TABLE I  
 TABULATION OF PERCENTILE RANGE ON STANDARD TEST\* FOR EXPERIMENTAL  
 GROUP AND CONTROL GROUP

Percentile	Number of Students Experimental Group	Number of Students Control Group
100		1
95	3	6
90	4	2
85	1	4
80	5	3 (Median)
75	1	
70	2 (Median)	1
65	2	
60	2	1
55	3	2
50	6	1
45		1
40	1	2
35		1
30	1	
25		1
20		
15		2
10		2
5		

\* Bennett, George K., Seashore, Harold G., Wesman, Alexander G.  
 "Language Usage," Form A, from Differential Aptitude Tests,  
 New York (The Psychological Corporation), 1947

TABLE II

TABULATION SHOWING RANGE OF SCORES ON PRE-TESTS AND FINAL TESTS BY BOTH EXPERIMENTAL GROUP AND CONTROL GROUP

<u>Pre-Tests</u>			<u>Final Tests</u>		
0	+		0	+++      +++	
1x		Median	1x	+++ +++	
2x		Median	2x	+++ +++	
3x			3x		
4x			4x		
5x			5x		
6x			6x		
7x			7x		
8x			8x		
9x			9x		
10x			10x		
11x			11x		
12x			12x		
13x			13x		
14x			14x		
15x			15x		
16x			16x		
17x			17x		
18x			18x		
19x			19x		
20x			20x		
21x			21x		
Median	22x		22x		
Median	23x		23x		
	24x		24x		
	25x		25x		
	26x		26x		
	27x		27x		
	28x		28x		
	29x		29x		
30 or more	x	+++      +++	30 or more	x	

KEY: x - number wrong  
 Blue ink - Experimental Group  
 Red ink - Control Group

TABLE III  
 TABULATION SHOWING RANGE OF SCORES ON PROGRESS TEST BY BOTH  
 EXPERIMENTAL GROUP AND CONTROL GROUP

Number Wrong	Experimental Group	Control Group
0	12	11
1	7 (Median)	7 (Median)
2	6	6
3	3	
4	2	2
5		1
6		1
7	1	1
8		
9		1
10	1	

(There were twenty-five words on the test, but no one in either group misspelled more than ten words.)

TABLE IV

TABULATION SHOWING GROWTH IN SPELLING ACHIEVEMENT OF EIGHTEEN PUPILS AT THE 50TH PERCENTILE OR BELOW\*

Percentile Score (Standard Test)	Pupil from Experimental Group		Pupil from Control Group	
	Total Misspellings: Pre-Tests	Total Misspellings: Final Tests	Total Misspellings: Pre-Tests	Total Misspellings: Final Tests
50	33	14	24	2
	25	0		
	21	3		
	36	7		
	60	7		
	26	1		
45			23	2
			28	2
40	29	2	28	2
35			22	1
30	35	1		
20			42	3
15			62	29
			39	4
10			46	16
			44	1

\* Percentile score taken from standard test administered in Sept. Bennett, George K., Seashore, Harold G., Wesman, Alexander G. "Language Usage," Form A, from Differential Aptitude Tests.

A P P E N D I X E S

APPENDIX A

I. Appendix A consists of the six duplicated spelling lists on which the results of each pre-test and each final test were tabulated. The record of the experimental group and the control group appears on these sheets.

The tabulation shows:

1. The number of times each word was misspelled by the experimental group and the control group in each pre-test and each final test.
2. The range of scores from 100 per cent down for the experimental group and the control group in each pre-test and each final test.

Every student had a set of these lists on which to keep a record of his own progress during the experiment.

II. Appendix A also shows which of the one hundred and twenty words used in the experiment appear on one or more basic vocabulary lists. Below is the key:

- \_\_\_\_\_ List A - 350 Most Useful Spelling Words <sup>1</sup>
- ===== List B - 450 Most Useful Spelling Words <sup>2</sup>
- \_\_\_\_\_ A Basic Life Spelling Vocabulary for Child and Adult <sup>3</sup>
- \_\_\_\_\_ Twenty-seven Words Most Frequently Misspelled by College Students

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<sup>1</sup> Fitzgerald, James A., THE TEACHING OF SPELLING, Milwaukee, (The Bruce Publishing Company), 1951, p. 15.

<sup>2</sup> Ibid., p. 18.

<sup>3</sup> Fitzgerald, James A., A BASIC LIFE SPELLING VOCABULARY, Milwaukee, (The Bruce Publishing Company), 1951, p. 18.

<sup>4</sup> Pollock, Thomas Clark, "Spelling Report," College English, Vol. 16, #x, November, 1954, pp. 102-109.

SPELLING LIST ONE

<u>Spelling Words</u>	Experi- mental Group		Control Group	
	Pre-Test	Test	Pre-Test	Test
1. a lot _____	14		12	
2. accede _____	20		16	
3. <u>accidentally</u> _____	8		13	5
4. accurately _____	5		4	
5. achieving _____	5			
6. <u>ache</u> _____	2		7	
7. <u>across</u> _____	6		1	
8. <u>adventurous</u> _____	6		6	2
9. <u>against</u> _____	1			
10. <u>among</u> _____	2		2	
11. <u>anyway</u> _____	1		2	
12. <u>aren't</u> _____	6		4	1
13. appositive _____	2		3	
14. <u>arose</u> _____	8		5	
15. attempt _____	2		2	
16. autobiographies _____	6		2	
17. <u>bathing</u> _____				
18. <u>bicycle</u> _____	9		10	3
19. breach _____	5		6	1
20. brief _____	3		3	
<b>Totals:</b>				
	111		98	12
				2

# TEST ONE

## PRE-TEST TOTALS

### Experimental Group

100 - 11  
 1X - IIII  
 2X - IIII  
 3X - IIII  
 4X - III  
 5X - IIII  
 6X - 11  
 7X - III  
 8X - 1  
 9X  
 10X - 1

### Control Group

100 - 11  
 1X - 1  
 2X - IIII  
 3X - IIII  
 4X - III  
 5X - IIII  
 6X - 11  
 7X - 11  
 8X - 1  
 9X  
 10X  
 11X  
 12X - 1

## FINAL TEST TOTALS

### Experimental Group

100 - IIII IIII IIII IIII IIII  
 1X - IIII  
 2X - 1  
 3X - 1  
 4X - 1

### Control Group

100 - IIII IIII IIII IIII IIII IIII  
 1X - IIII

SPELLING LIST TWO

Spelling Words	Experi- mental Group	Control Group	Experi- mental Group	Control Group
	Pre-Test	Pre-Test	Test	Test
1. bruise _____	7	4		
2. buccaneer _____	10	4		
3. <u>burned</u> _____	5			
4. capsized _____	1	1	1	1
5. carbine _____	7	3		
6. career _____	2	3		
7. caterpillar _____	25	25	2	1
8. changeling _____	5	4		
9. <u>character</u> _____	1	1		
10. chivalry _____	13	15	2	1
11. <u>choosing</u> _____	7	5		1
12. <u>chosen</u> _____	7	3		
13. <u>college</u> _____		2		
14. <u>color</u> _____				
15. <u>common</u> _____	2			
16. <u>completely</u> _____	3			2
17. conjunction _____	4	4	1	2
18. Connecticut _____	16	14	2	2
19. <u>courageous</u> _____	12	5		
20. cranberries _____	5	6		

Totals : 132 99 8 10

- |       |      |       |
|-------|------|-------|
| 100 - | 5x - | 10x - |
| 1x -  | 6x - | 11x - |
| 2x -  | 7x - | 12x - |
| 3x -  | 8x - |       |
| 4x -  | 9x - |       |

# TEST TWO

## PRE-TEST TOTALS

### Experimental Group

100 - II  
1X - IIII  
2X - II  
3X - IIII  
4X - IIII  
5X - I  
6X - IIII  
7X  
8X - IIII  
9X  
10X  
11X - II

### Control Group

100 - I  
1X - IIII  
2X - IIII III  
3X - IIII  
4X - IIII  
5X - IIII  
6X - II  
7X - I  
8X  
9X - II  
10X  
11X - I

## FINAL TEST TOTALS

### Experimental Group

100 - IIII IIII IIII IIII IIII II  
1X - IIII  
2X - I  
3X - I

### Control Group

100 - IIII IIII IIII IIII IIII IIII  
1X - I  
2X -  
3X - I  
4X  
5X  
6X - I

SPELLING LIST THREE

<u>Spelling Words</u>	Experi- mental Group	Control Group	Experi- mental Group	Control Group
	<u>Pre-Test</u>		<u>Test</u>	
1. crest _____				
2. Crusades _____	27	25		
3. customer _____	2	2	1	
4. decent _____	7	7	1	1
5. declaration _____	2	3		
6. <u>described</u> _____	4	4	3	1
7. despite _____	4	10	3	2
8. disappeared _____	5	3		2
9. <u>disappointed</u> _____	6	5	1	2
10. disaster _____	2		1	1
11. discussion _____	3	3	1	2
12. disorderly _____	2	1	1	1
13. distort _____	1	1		
14. <u>divide</u> _____	1			
15. <u>don't</u> _____				
16. drone _____	2	1		
17. <u>during</u> _____	1	2		
18. eager _____	1			
19. eliminate _____	7	17	2	4
20. emperor _____		5		1
<b>Totals:</b>				
	77	89	13	17

TEST THREE

PRE-TEST TOTALS

Experimental Group

100 - II  
1X - III III  
2X - III III  
3X - III  
4X - III  
5X - I  
6X  
7X - I  
8X  
9X  
10X  
11X  
12X - I

Control Group

100  
1X - III  
2X - III III  
3X - III I  
4X - II  
5X - III I  
6X  
7X - II

FINAL TEST TOTALS

Experimental Group

100 - III III III III III  
1X - III  
2X - II  
3X  
4X - I

Control Group

100 - III III III III I  
1X - III  
2X - II  
3X - I  
4X  
5X - I

## SPELLING LIST FOUR

Spelling Words	Experi- mental Group	Control Group	Experi- mental Group	Control Group
	Pre-Test		Test	
1. <u>enemies</u> _____	1	2		3
2. <u>enjoyable</u> _____				
3. <u>especially</u> _____	4	1		1
4. <u>essential</u> _____	6	1		1
5. <u>everybody</u> _____		1		
6. <u>excuse</u> _____	2			1
7. <u>experience</u> _____	10	3		
8. <u>facet</u> _____	11	4		1
9. <u>February</u> _____	6	4		1
10. <u>foreign</u> _____	13	4		2
11. <u>forest</u> _____	2	2		
12. <u>fourth</u> _____	3	3		
13. <u>fragile</u> _____	1	1		1
14. <u>fright</u> _____	1			
15. <u>front</u> _____	1	1	1	
16. <u>furiously</u> _____	1	2	1	1
17. <u>gerund</u> _____	1			
18. <u>Gettysburg</u> _____	10	13		2
19. <u>ghastly</u> _____	3	6		
20. <u>giggle</u> _____	1	4		2
Totals:	93	52	2	16

# TEST FOUR

## PRE-TEST TOTALS

### Experimental Group

100 - III  
 1x - ~~###~~ ~~###~~ 1  
 2x - ###  
 3x - III  
 4x - ~~###~~ 1  
 5x - III

### Control Group

100 - ~~###~~ III  
 1x - ~~###~~ ~~###~~ III  
 2x - III  
 3x - 1  
 4x - II  
 5x - II  
 6x - 1  
 7x  
 8x  
 9x - 1

## FINAL TEST TOTALS

### Experimental Group

100 - ~~###~~ ~~###~~ ~~###~~ ~~###~~ ~~###~~ ~~###~~ IIII  
 1x - II

### Control Group

100 - ~~###~~ ~~###~~ ~~###~~ ~~###~~ ~~###~~ IIII  
 1x - IIII  
 2x - 1  
 3x  
 4x  
 5x - II

# TEST FIVE

## PRE-TEST TOTALS

### Experimental Group

100  
 1X - II  
 2X - IIII  
 3X - III  
 4X - III  
 5X - IIII III  
 6X - IIII  
 7X - II  
 8X  
 9X  
 10X - II  
 11X  
 12X  
 13X  
 14X - I

### Control Group

100 - II  
 1X - I  
 2X - IIII  
 3X - IIII  
 4X - III  
 5X - IIII  
 6X - II  
 7X - I  
 8X  
 9X - II  
 10X - III  
 11X - I

## FINAL TEST TOTALS

### Experimental Group

100 - III III III III I  
 1X - III II  
 2X - III

### Control Group

100 - III III III III I  
 1X - III II  
 2X - I  
 3X -  
 4X - I

SPELLING LIST SIX

<u>Spelling Words</u>	Experi- mental Group	Control Group	Experi- mental Group	Control Group
	<u>Pre-Test</u>		<u>Test</u>	
1. no one _____	3	5		
2. <u>occurring</u> _____	13	15	4	
3. omission _____	11	11	3	1
4. <u>parenthetical</u> _____	5	5	3	1
5. professor _____	6	1	1	1
6. quarantine _____	18	17	2	2
7. <u>quiet</u> _____	1	3	1	
8. <u>really</u> _____	3	1		
9. <u>receive</u> _____	10	8		1
10. ridiculous _____	12	16	3	5
11. <u>separate</u> _____	11	7	3	1
12. sergeant _____	24	19	2	6
13. <u>similar</u> _____	11	10	6	1
14. sorcerer _____	19	17	4	5
15. <u>surprisingly</u> _____	8	12	3	2
16. suspense _____	5	6		
17. teammate _____	17	16	2	
18. <u>tries</u> _____	4	2		
19. villain _____	23	22	4	
20. <u>weren't</u> _____	4		1	1
Totals:	208	193	42	27

# TEST SIX

## PRE-TEST TOTALS

### Experimental Group

100  
 1x  
 2x - II  
 3x - I  
 4x - II  
 5x - III  
 6x - II  
 7x - III  
 8x - II  
 9x - III  
 10x - III  
 11x  
 12x - II  
 13x  
 14x  
 15x  
 16x - I

### Control Group

100  
 1x  
 2x - I  
 3x - I  
 4x - I  
 5x - II  
 6x - III  
 7x - III  
 8x - III  
 9x - III  
 10x - I  
 11x - I  
 12x - III

## FINAL TEST TOTALS

### Experimental Group

100 - III III I  
 1x - III I  
 2x - III I  
 3x - III I  
 4x - I

### Control Group

100 - III III III  
 1x - III III  
 2x - III  
 3x - I  
 4x  
 5x  
 6x  
 7x  
 8x - I

APPENDIX B

Appendix B shows a sample spelling card, the device used by the experimental group to conquer spelling "demons."

SPELLING CARD

Carolyn Andrews

The word: villain

Date: April 8, 1957

Sentences (Write at length, interesting!): The villain wanted the money at five o'clock if they were to keep the house.

Tuesday 7 period

villain

Practice area:

villain

villain

villain

villain

villain

Wednesday 1 period

villain

villain

villain

villain

villain

villain

Thursday 7 period

villain

villain

villain

villain

villain

villain

## APPENDIX C

Appendix C shows a sample spelling record card on which members of both the experimental and control groups tabulated their individual scores.

## SPELLING

## RECORD

Carolyn Andrews  
 5th 9A

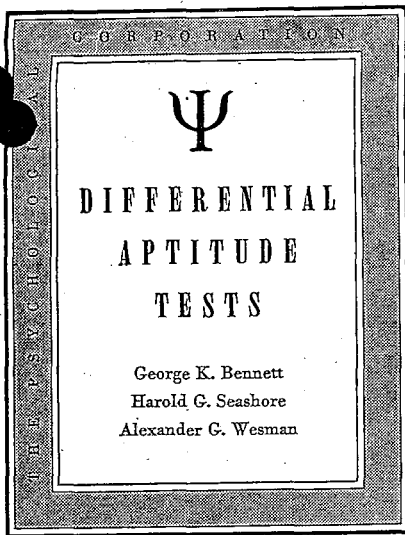
Date	Pre-Test	Date	Test	Date	Progress Test
March 4	2 x	March 13	1 x	March 22	100
March 8	4 x	March 11	100		
March 15	1 x	March 18	1 x		
March 25	1 x	March 29	100		
April 1	4 x	April 5	100		
April 8	5 x	April 12	3 x		
TOTALS	(17)		(6)		

APPENDIX D

Appendix D shows a sample copy of Language Usage, Form A, a part of the battery of tests known as Differential Aptitude Tests.<sup>1</sup> Spelling percentile scores for the experimental and control groups were obtained from this test.

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<sup>1</sup> Bennett, George K., Seashore, Harold G., Wesman, Alexander G., Language Usage, Form A, Differential Aptitude Tests, New York, (The Psychological Corporation), 1947



# LANGUAGE USAGE

FORM A

Do not open this booklet until you are told to do so.

On your SEPARATE ANSWER SHEET, print your name, address, and other requested information in the proper spaces.

In the space after Form, print an A.

Then wait for further instructions.

**DO NOT MAKE ANY MARKS IN THIS BOOKLET.**

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The Psychological Corporation  
522 Fifth Avenue  
New York 36, N. Y.

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