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A STUDY OF THE RELATIVE FREQUENCY OF THE TYPES OF PHONICS ERRORS
FOUND IN THE FIFTH AND EIGHTH GRADES IN THE PUBLIC
SCHOOLS OF MISSOULA, MONTANA

by

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Presented in partial fulfillment of the requirements for the degree of
Master of Arts

Montana State University

1956

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CHAPTER I

INTRODUCTION

Spelling, reading and writing are closely integrated skills. Without the ability to read, one is deprived of the key which opens most of the doors of learning. In order to read one must possess the knowledge to recognize as new, and to attack with intelligence, unfamiliar words as they come into his reading experience. In order to do this effectively the reader must know what sounds the letters and combinations represent. This knowledge is known as phonics. The combination of these letters and sounds into known words constitutes spelling.

The close integration of spelling, reading and writing and their basic phonetic connection are well recognized. Arthur L. Gates states:

Spelling, reading, speaking and hearing words are all dependent upon the child's phonetic skills and phonics thus becomes a problem in every area. The pupil's spelling abilities are affected by the ways in which he reacts to words during reading, and by the word analysis skills he is taught in reading. Similarly, the child's reading is affected by the techniques, visual, auditory and motor which he learns to use in the study of spelling. In brief, the various language arts belong to a big family with very complex inter-relations.¹

Other writers and educators express themselves in a similar vein. Clifford P. Archer says: "General failure in other language arts seems often to be associated with poor spelling."²

¹Arthur L. Gates, "Developing the Basic Spelling Techniques in the language Arts Program," Education, 76:275, January, 1956.

²Clifford P. Archer, "Readiness for Spelling," Education, 76:281, January, 1956.

Emmett A. Betts offers the following observation:

Many of the individuals with reading difficulties also experience difficulty with spelling. Frequently the spelling difficulty can be corrected simultaneously with the reading deficiency. Davis found the most common difficulties to be (a) faulty technique in learning how to spell a word, (b) poor quality of writing, (c) faulty pronunciation, (d) undesirable attitude toward spelling, and (e) failure to associate the sounds of the letters or the syllables with the spelling of the words.³

Early in the twentieth century the "phonics method" of teaching reading and spelling was in wide use in the United States. Later, in about 1925 to 1930, the "word recognition method" of teaching reading and spelling was introduced. Since then the "word recognition method" has spread and is now in use in most of the elementary schools in the United States and is the method which is generally taught to the elementary teachers in this country.⁴

The "phonics method" in use early in the twentieth century was synthetic in its approach and made use of the following procedures as the first five steps:

- Step one: The five short vowels and all consonants spelled by single letters,
- Step two: Consonants and consonant combinations spelled with two or three letters,
- Step three: Vowels and vowel combinations spelled with two or three letters,
- Step four: The five long vowels,
- Step five: Irregular spellings.⁵

³Emmett A. Betts, The Prevention and Correction of Reading Difficulties: (Evanston, Illinois: Row, Peterson Company, 1936), p. 231.

⁴Rudolph Flesch, Why Johnny Can't Read and What You Can Do About It, (New York: Harper and Brothers, 1955), p. 12.

⁵Ibid., p. 27.

Flesch quotes as his authorities for the above rules for instruction in spelling and reading authorities whose works appeared in the eighteenth and nineteenth centuries and also current writers. Among the texts and methods cited are Noah Webster's Blue Backed Speller, The McGuffey Readers, today's Hay-Wingo Method, and the Hegge-Kirk Method. He found in all of them "a great family resemblance" and "a common sequency underlying them all."⁶

In its approach the "word recognition method" is analytical although sound analysis does not receive much emphasis until the child is in the second grade. The following procedures for teaching children to read are found in Teacher's Guide for Grade One which is used with this method:

1. Picture clues are used as the first aid in word recognition. The child is shown that he can recognize words by studying the pictures. It will aid in enabling him to anticipate whom he is going to read about, what the person is doing and the like.

2. Context clues are introduced as soon as the child has sufficient sight vocabulary to enable him to estimate the value of the new words from the meaning of the passage in which they appear. Context clues are among the most usable clues in word recognition and their early introduction encourages the child to read meaningfully.

3. General visual characteristics of words are important aids to recalling words previously introduced. The child is led to altered word forms, their general shape, and striking characteristics so he will know the word when he sees it again.

4. Phonetic analysis is recognized as an aid to word recognition. It is not advisable, however, during the pre-primer reading program, to introduce the relationship between word sound elements and their printed symbols. It is advisable to continue growth in attending to word-sound elements as the child listens to spoken words. The introduction to phonetic analysis as such can profitably be delayed until the child has become somewhat

⁶Ibid., p. 26.

proficient in the use of context clues and general visual characteristics of words. At the pre-primer level some experience is given with initial sounds.⁷

In addition to using the above methods many schools used the vocabulary lists of Dolch⁸ and Stone⁹ and others, using these lists of sight words until about the middle of the third grade.

From time to time there have been slight modifications in the "word recognition method," and slightly more emphasis on sounds has been made. Basically, however, the method remains the same. The child is introduced first to the whole word. The "phonics method" introduces the child first to the letters and letter sounds.

Over the years since the "word recognition method" has been taught, there has been some dissatisfaction. Remedial reading programs which have developed have evoked some comment. Recognizing this, Dolch advises:

A. The remedial idea has to be "sold" to the system and community.

The very idea that remedial work is needed will be new to many teachers and members of the community. If the principal will think of his own experience he will realize that he took some time himself to appreciate the need for remedial work and the benefits it will bring. Others will also take time to get the idea. The mere fact that an idea is new will prejudice many against it. Then many teachers' first reactions will be that they are being criticized. They may for a long time have been convinced that they were doing things just right and now someone suggests that there is a need to remedy something. The

⁷Guy L. Bond, Grace L. Alder, Marie C. Curdy, Kathleen Wise, Teacher's Guide for Grade One (in Developmental Reading Series. San Francisco: Lyons and Carnahan, 1949), pp. 95-96.

⁸E. W. Dolch, Teaching Primary Reading, (Champaign, Illinois: The Garrard Press, 1941), pp. 205-207.

⁹Clarence R. Stone, Better Primary Reading, (St. Louis: Webster Publishing Company, 1936), pp. 50-53.

superintendent needs to put over the idea that a remedial program is one of the marks of a good program, not a poor one.

B. The remedial idea must be sold to parents.

While some may consider it a reflection upon the system others may consider it a reflection upon the children selected for the work. Instead, everyone concerned must come to realize that the plan will help children who very badly need help. Parents especially have their pride involved in children's success in school. Unless led to see otherwise, many parents will refuse to let their children be aided.¹⁰

In 1955, Rudolph Flesch, who had won much favorable comment as a writer for his book The Art of Plain Talk, published Why Johnny Can't Read and What You Can Do About It. In this book, Flesch claimed that many children in the United States are poor readers and stated that in his opinion this poor reading was largely caused by inefficient teaching methods. He advocated the teaching of reading by a method very similar to the one used early in the twentieth century, the "phonics method."¹¹

Reaction¹² in educational circles resulted upon the publication of Flesch's book. A year later the question is still being hotly discussed, and shows little sign of abating at the present time. Since parents, pupils and educators are all concerned in the question, it is quite possible that studies, to evaluate results of teaching by these methods, will be undertaken. If this is done, the results will doubtless receive much publicity.

Flesch's book has brought the problem of reading and its sister

¹⁰Edward W. Dolch, A Manual for Remedial Reading, (second edition; Champaign, Illinois: The Garrard Press, 1946), pp. 316-317

¹¹Rudolph Flesch, op. cit., p. 2.

¹²Arthur I. Gates, A Review of Rudolph Flesch, Why Johnny Can't Read, (New York: The Macmillan Company, (.

problem of spelling into sharp focus in public thought. Mastery of these skills affects everyone and everyone's children.

How well do the children in the United States read and spell? How well do they know the sounds in words? It is with these questions in mind that the following study was undertaken in Missoula, Montana.

Setting of the problem. In the Missoula public elementary school system there are thirteen elementary schools, twelve of which contain all eight grades. In connection with this system there is a department of Special Education. This department employs four full-time teachers and a director. One teacher is a consultant in speech therapy and the other three are reading consultants. All four visit the public elementary schools and give special help to vocally handicapped children and to those in need of remedial reading aid.

Statement of the problem. The children of the Missoula public elementary school system, as evidenced by Stanford Achievement Tests, have, for the years 1951 through 1955, rated well in all the grade school subjects, having been above national norms for those subjects. However, as evidenced by analyses of Stanford Achievement Tests from 1951 to 1954, the local norms in spelling were lower than they were locally in any other subject. This was also true in March 7, 1955,¹³ when the Missoula and national norms for spelling in the fourth and seventh grades were as follows:

¹³Statement of S. J. Knudsen, to the effect that Stanford Achievement tests were given to Missoula students on that date. (Permission to quote secured.)

Missoula seventh grade spelling norm, 1955, 7.7

National seventh grade spelling norm, 1955, 7.6

Missoula fourth grade spelling norm, 1955, 5.0

National fourth grade spelling norm, 1955, 4.6

Reading and spelling are taught in the Missoula Public Elementary Schools by the "word recognition method" with a phonetic approach. In other words, the word is first studied as a whole unit, but some phonics instruction enters in as needed. Manuals are used containing some phonics instruction.

Since a knowledge of phonetic sounds is recognized as necessary to enable one to spell properly,¹⁴ the position was taken that a study of tests of spelling words as written by the Missoula Public Elementary children in the fifth and eighth grades might shed some light on the reasons why their spelling grades were lower than their grades in other subjects. Tests given to these grade children on words which were familiar to them could indicate, possibly, some connections between their spelling difficulties and their knowledge of phonics.

An agreement was reached in October, 1955, between Mr. S. J. Knudsen, Curriculum Co-ordinator of the Missoula Public Elementary School System, Mr. George Sayer, principal of the Washington Elementary School and the investigator that such spelling tests would be given.¹⁵

¹⁴Op. cit., p. 1.

¹⁵Meeting in the Washington School, October, 1955, S. J. Knudsen, George Sayer and Margaret Gibson being present. (Reference permission secured.)

Mr. Knudsen remarked, "We want to know if our teaching of phonics is adequate to the extent that the pupil will be able to use his knowledge of phonics in spelling, although we recognize that there is more to spelling than a knowledge of phonics."¹⁶

The decision was made to give tests to all the fifth grades (the fourth grades of the previous spring) on a list of words - words with which they were familiar at the end of the fourth grade. At the same time, a test of words was to be given to the eighth grades (the seventh grades of the previous spring) on words with which they were familiar at the end of the seventh grade.

Purposes of the study. In choosing the words for the tests, a careful selection of words was used. These words included the ones common to the Rinsland,¹⁷ Dolch,¹⁸ Thorndike,¹⁹ and Ayer²⁰ lists for these grades as well as a few others in common use and familiar to the grades who took them. They were listed in the curriculum guide for the Missoula Elementary Schools.²¹

¹⁶permission to quote secured.

¹⁷Henry Daniel Rinsland, A Basic Vocabulary of Elementary School Children, (New York: Macmillan Co., 1945).

¹⁸G. W. Dolch, Teaching Primary Reading (revised; Champaign, Illinois: The Garrard Company, 1950).

¹⁹Edward Lee Thorndike, Reading Vocabulary, (New York: Teachers College, Columbia University, 1944).

²⁰Fred Carleton Ayer, A Study of High School Spelling Vocabulary, (Austin, Texas: Steck Company, 1945).

²¹S. J. Knudsen, Spelling, Curriculum Guide, Grades 2-8. Missoula Public Schools. (Missoula, Montana: Missoula Public Schools), p. 21 and p. 24. (Mimeographed.)

The tests were administered for the following purposes:

1. To furnish school officials with data on the relative frequency of the kinds of spelling errors made by the students in these grades.
2. To furnish school officials with data on the frequency with which the spelling errors occurred among the individual schools. In reporting this study, the writer has identified the individual schools only by symbol.
3. To determine if any implications existed in the data that would tend to indicate a "carry-over" or similar ratio of certain phonic errors from the fifth grade to the eighth grade.
4. To determine the relationship between phonetic sounds and the frequency of spelling errors by the students, in words with which these pupils were familiar as to word meaning.

Limitations of this study:

1. "Turn over" of teachers was not considered in this study nor was transfer of pupils.
2. That teachers may pronounce and teach words differently was admitted.
3. Although it was recognized that bright students learn well and slow learners experience difficulty, intelligence quotients were not considered.
4. Since different lists of spelling words were used in the fifth and eighth grades, there may have been a difference in degree of difficulty of the words as well as in the length of words. The influence of this factor was not considered since data concerned with it were neither known nor available.

CHAPTER II

PROCEDURES

Method of securing data. During the period from November 28 to December 2, 1955, inclusive, tests were given to twelve fifth grades and to the twelve eighth grades in the Missoula Public Elementary Schools.

The procedure was as follows:

1. A two-hundred-thirty-word test from the Rinsland-Dolch-Thorndike-Ayres list (words with which the pupils were familiar and had had as spelling words by the end of the fourth grade) was given to the children in the twelve fifth grades in Missoula. (See List 1, page 11.)

2. At the same time, a one-hundred-eighty-word test from the Rinsland-Dolch-Thorndike-Ayer list of words (words with which the pupils were familiar and which they had had as spelling words by the end of the seventh grade) was given to the pupils in the corresponding eighth grades. (See List 2, page 12.)

3. These papers were signed with code letters and numbers only. The investigator was given neither code nor key.

Treatment of the data.

1. Only complete tests were included in the tabulation.
2. All tests were checked, but not graded, before they left the schools, all misspelled words having been marked with a check mark.
3. All papers were rechecked by the investigator, and all words which were misspelled due to non-phonics errors were marked with a blue pencil mark; those misspelled due to phonics errors were given a red

List 1

Spelling List - Fourth Grade - 230 Words.

act	climb	flag	laugh	proud	through
afraid	clock	flour	lead	prove	Thursday
age	close	found	leaf	pupil	tired
alone	clothes	fourth	learn		together
always	coast	freeze	leave	quarter	tomorrow
April	comb	fresh	listen	quick	tore
August	company	Friday	lose	quiet	trade
	cost	front	lose	quit	travel
bank	count	fruit	lunch	quite	true
bare	cream				Tuesday
base	cross	gather	March	raise	twelve
bear		gentle	May	reach	
beat	dance	gift	measure	real	until
began	danger	grand	middle	reason	
begin	December	grass	minute		village
between	deer	guard	Monday	Saturday	void
block	die	guess	month	second	
board	dirt		mouth	self	waist
born	divide	half	music	September	weak
break	doctor	happened		shoes	weather
breakfast	dozen	handle	nickel	shoot	Wednesday
breath	dream	health	nine	should	West
bridge	duty	heard	noise	since	which
build		heart	north	sound	while
busy	earth	heavy	notice	south	whole
	East	hid	November	speak	whose
candle	easy	hide	number	spend	world
careful	edge	hole		stand	worth
carry	either	honest	ocean	stream	wrong
case	eleven	hour	October	study	wrote
catch	else	hundred	often	suit	
caught	engine	hungry	ought	Sunday	zero
cause	extra				
center		ink	paint	talk	
chain	February	instead	people	taste	
chance	felt		perfect	teach	
change	fence	January	piano	team	
charge	field	juice	picture	tear	
cheap	fifth	July	pint	teeth	
cheese	fight	June	pitcher	ten	
chief	figure		place	their	
choose	finger	kitchen	plenty	think	
church	finish	knife	pound	those	
circle	first	knock	present	thousand	

List 2

Spelling List - Seventh Grade - 180 Words

ability	comparison	employ	location	satisfactory
absolute	compel	energy		sauce
accent	conceal	establish	magazine	sensible
accomplish	concern	exceed	manual	series
accurate	conclusion	experience	modern	service
accuse	confidence	extreme	multiply	similar
acquaintance	congratulate		muscle	situation
acquire	consist	familiar	mutual	soul
actual	construct	favorite		stationary
alphabet	consult	fiction	nervous	steel
ambition	continent	foreign	numerous	student
ample	continue	fortunate		style
amusement	conversation	fragrant	obedient	superior
ancient	correspond	frequent	object	suspect
angle	courtesy	furious	occupation	
announce	credit		occur	temperature
annual	curious	generous	opportunity	tendency
apology		genius	ordinary	territory
appetite	debate	genuine	original	through
argue	decay	glimpse	oxygen	treasure
assume	decrease	globe		
audience	defense	glorious	particular	various
auditorium	definite		patience	verse
awkward	delicious	horizon	per cent	vicinity
	demonstrate	hostile	pierce	visible
ballot	dense		possess	
banquet	deny	illustrate	presence	yield
basis	depth	indicate	production	youth
beast	description	individual	proportion	
behavior	desperate	industrial	publish	
beyond	destination	insist		
brilliant	determine	instrument	quality	
	develop	interfere	quantity	
capacity	difficult	interior	quote	
caution	director	interrupt		
cease	discussion		refer	
celebration	distinct	judgment	reign	
character	distribute		religion	
circular	district	lease	resemble	
civil		leisure	residence	
comment	ease	liberty	responsible	
commerce	electricity	license		
community	empire	literature	sanitary	

pencil mark.

4. For purposes of this study, words were not considered incorrect if erroneously capitalized.

5. Since not all spelling errors are phonics errors, some conclusion as to what did or did not constitute phonics errors was necessary. The general rule agreed upon by the coordinator, Mr. Knudsen, and the investigator was that when a child had used a correct sound, even though he misspelled a word, he would not have made a phonics error and the word would receive a blue pencil mark. The list below shows the sounds which were not listed as phonics errors in this study:

(a) Ie and ei were not considered as phonics errors regardless of the order in which they appeared since they do not always follow clearly defined rules. However, if ei or ie were indicated and the child used other than those, or ee and ea, or e with a final e, he was considered to have made a phonics error.

(b) Ough occurred only in through. Since ough is variously pronounced, any of its sounds would have been considered a non-phonics error had that sound been called for.

(c) When oy, oe, or oi were called for, either, and also oie and oye, were considered phonetically correct.

(d) If g or k were omitted before n, or if w were omitted before r, no phonics error was counted since the letters are not pronounced in such cases.

(e) When tion or sion were required, either, as well as shun, was considered phonetically correct.

- (f) If silent h was omitted, it was not considered a phonics error.
- (g) When ai was pronounced like short e (said) the child could use short e or ea (as in head).
- (h) When ea was pronounced like short e (bread) the child could use short e or ai (said).
- (i) When ea was pronounced as long a (break) a and final e could be used.
- (j) If ear was pronounced as er (earn) er, ir, ur plus n was permissible.
- (k) When ear had the sound of ar (heart) the child could use ar.
- (l) When se was pronounced as s, s could be used.
- (m) When words like school or scheme occurred, sk or sc were permitted.
- (n) The child could use aw or au when al, as in chalk, was called for and vice versa.
- (o) Ph or f were interchangeable.
- (p) When wh was pronounced like h, h was permitted except in cases where h alone would make a different word (whose - hose; who - ho).
- (q) Inversions were counted as errors. The position was taken that a fifth grade child with adequate phonics training should know the difference between girl and gril, for example.

6. Phonetically misspelled words were given a red pencil mark. Phonics errors were made when the person did not use the sound called for in the word, or where he added a sound. In the incorrectly spelled

word, literture, short a is called for but is omitted. Therefore, a short a error occurs. In literaterture, all the correct sounds are there but t and an er are added and are counted as a t and er error.

7. The list of phonics sounds is a list agreed on by the Coordinator and the investigator. The list of long and short vowels is commonly accepted everywhere in the United States, as are the single vowels governed by r and the vowel diagraphs. The single consonant sounds are likewise generally accepted. The beginning consonant blends are also in general acceptance. Since there exists some difference among educators as to what word endings should be taught, only ay, oy and y were included in this study. Tion, sion, and so forth, only appeared in the eighth grade test. Soft g and soft c are the same no matter where they occur in a word. All the sounds included in this list are given in Webster's Dictionary.¹ They were taken for this list from two sources: (1) the initial consonant blends and the ay ending from the Teacher's Edition (Fourth Grade) of High Roads² and (2) the vowel sounds, long and short, vowel diagraphs, and vowels governed by r from a list published by the University of Washington³ but now out of print. Dr. Munro uses it at present at Montana State University. From this latter list, wr was omitted since the omission of the w would be considered a non-phonics error.

¹Webster's New International Dictionary, Springfield, Mass., G. & C. Merriam Company, 1945.

²Paul Gordon McKee and others, Teacher's Edition of High Roads. Fourth grade basic reader of the Reading for Meaning Series, (New York: Houghton Mifflin Company, 1953).

³James J. R. Munro, "Auditory Discrimination Exercises," Education S155, Remedial Reading, pp. 1-6. (Unpublished, mimeographed.)

List 3

List of Phonics Sounds Considered in the Tests of the Fifth and Eighth
Grade Students in the Public Elementary Schools
of Missoula, Montana^a

Consonant Sounds

b, c (hard), d, f, g (hard), h, j, k, l, m, n, p, qu, r, s, t,
v, w, x, y (consonant), z, c (soft), g (soft)

Consonant Blends

bl, br, cl, cr, dr, fl, fr, gl, gr, pl, pr, st, str, sc, sk, sl,
sm, sn, sp, spr, sw, tr, thr, ch, sh, th, wh

Vowel Sounds

Short vowels - a, e, i, o, u

Long vowels - a, e, i, o, u

y, as in city

y, as in multiply^b

silent e

Vowel Diagraphs^c

ai, ea, oa, ei (or ie), ee, au, aw, ew, oi, oy, ou, ow (ō),

ow (cow), ay, oo (short, as in cook), oo (long, as in root),

ea, as in bread, ea, as in break

Vowels Governed by r

ar, er, ir, or ur

^aUnclassified and not in this list were sounds put in by students or omitted, such as d, s, ing, and so forth.

^bBoth y's were listed together in the test, y, as in multiply, occurring in only one word.

^cSounds like oe in shoe, eo in people, ue in guess, were tabulated but not included in the final count. They are unusual and did not occur in both lists.

8. All words containing one or more phonics errors were considered to be phonetically incorrect and were given a red pencil mark.

9. In each grade, all the misspelled words were totalled and tabulated as phonetically or non-phonetically misspelled words.

10. The results of these tabulations are shown in Tables I, II, and III, pages 20-25.

11. The treatment of the phonics errors was somewhat complicated but appeared to the investigator to be about the simplest and most accurate way of handling this data:

- (a) Four schools, X, Q, U, and S were selected as representative samples of all the city elementary schools.
- (b) For each grade an error sheet was constructed. Each phonic sound listed in List 3 was listed on each of these sheets and sufficient space was allowed under each phonics sound for all the errors made on that sound in the grade under consideration. All phonics errors in each of the eight grades were listed and totalled.
- (c) The total number of papers in the grade was indicated on the tabulation sheet also.
- (d) The per cent of error needed to be determined for each type of error in order to estimate the rate of increase or decrease, if any, of the eighth grades errors over the fifth grade errors. To secure this data, the procedure was as follows:
 - (1) The services of Mr. Clarence Norwood, a graduate of Montana State University with a Bachelor's Degree in

Business Administration, were secured. He is well versed in phonics.

- (2) Mr. Norwood took the lists of words in the spelling tests and, using the phonics sounds indicated in List 3 and Webster's Dictionary, he checked and listed all the sounds in each word in each test. This was difficult. Some sounds were short in length; but if the case was one of shortening of the short vowel, a short vowel was listed. When a letter had the sound e, the letter in the word had to be listed.
- (3) The number of times a sound appeared in a test times the actual number of papers in each grade gave the number of possible errors in each grade in each sound.
- (4) The actual percent of error for each sound in each grade was determined by checking the actual number of errors made against the possible number of errors.
- (5) The results of this checking were tabulated in Tables V, VI, VII, VIII, IX and X, pages 33-38. The belief is that these represent a fair picture of the percent of phonics errors in the Missoula public elementary fifth and eighth grades as evidenced by these tests.

CHAPTER III

EVALUATION OF THE DATA

Evaluation of frequency of phonics and non-phonics errors. Tables I, II, and III, pages 20-25, seem to indicate a definite trend. With the exception of schools M and Y, a greater percent of words were missed in the eighth grades than were missed in the fifth grades. The fifth grade in school M had two sets of papers but only the "higher" set of papers was tabulated in this study. In some way the other set of papers was lost. A check revealed that the other set of papers had lower grades and the belief is that this set of papers would only confirm the general trend.

There was a preponderance of phonics errors over non-phonics errors in both the fifth and eighth grades with a slightly wider range in the eighth grades.

Rudolph Flesch states that 87 percent of our words in the English language follow "fixed rules." In other words, he means that they are spelled phonetically. The other 13 percent, he believes, are exceptions to the general rules for spelling.¹

If Flesch is correct and Missoula children were well versed in the general phonics rules, the expectation might be that they would make more errors in words which do not follow phonics rules. The reverse, however, seemed to be true. Even with the wide latitude allowed them, they made about twice as many errors on words which followed

¹Rudolph Flesch, Why Johnny Can't Read and What You Can Do About It, (New York: Harper and Brothers, 1955), p. 13.

TABLE I

SCORES BY NUMBER OF PUPILS IN GRADES AND SCORES
BY PERCENT OF PUPILS IN GRADES

Schools and Grades	Number Taking Test	Total Number Of Words ^a	Total Number of Misspelled Words	Number of Cases						Percent of Cases							
				100%	99%	75- 99%	50- 74%	Under 50%	100%	99%	75- 99%	50- 74%	Under 50%				
1	2	3	4	5	6	7	8	9	10	11	12						
T5	30	6,900	675	3	24	2	1	10	80	6	3						
T8	34	6,120	1,236	0	21	11	2	0	62	32	6						
L5	28	6,383	1,609	0	17	5	6	0	61	18	21						
L8	23	4,111	1,525	0	7	9	7	0	30	39	30						
N5	20	4,583	1,233	0	9	8	3	0	45	40	15						
N8	23	4,099	1,335	0	9	11	3	0	39	48	13						
Q5	36	8,258	2,087	0	22	9	5	0	61	25	14						
Q8	47	8,394	2,846	0	21	15	11	0	44	33	23						
R5	34	7,820	1,032	0	30	3	1	0	89	7	3						
R8	59	10,613	2,112	0	40	17	2	0	67	28	4						
O5	44	10,097	2,971	0	27	9	8	0	61	20	18						
O8	34	6,078	1,847	0	17	11	6	0	50	32	18						
U5	26	5,973	1,053	0	20	5	1	0	77	19	4						
U8	27	4,844	1,256	0	13	11	3	0	48	41	11						

^aNumber of pupils times number of words in the test.

TABLE I (continued)

Schools and Grades	Number Taking Test	Total Number of Words	Total Number of Misspelled Words	Number of Cases										Percent of Cases									
				100%					75-99%					50-74%				Under 50%					
				5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4
1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4
Y5	35	8,021	2,801	0	16	10	9	9	0	45	28	26											
Y8	39	7,008	2,031	0	19	12	7	7	0	49	33	18											
X5	26	5,949	921	0	22	3	1	1	0	85	11	4											
X8	30	5,392	1,343	0	20	5	5	5	0	67	17	17											
M5	26	5,971	841	0	22	4	0	0	0	84	15	0											
M8	37	6,572	2,520	1	14	9	13	13	3	38	24	35											
W5	40	9,175	2,141	0	24	12	4	4	0	60	30	10											
W8	36	6,475	2,040	0	15	13	8	8	0	41	36	22											
S5	34	7,806	1,488	0	26	5	3	3	0	76	15	9											
S8	30	5,389	1,376	0	20	6	4	4	0	66	20	14											

In school M5, only the upper section of the papers was tabulated. The other section was lost.

TABLE II

TOTAL NUMBER OF MISPELLED WORDS IN TWELVE FIFTH AND TWELVE EIGHTH GRADES
IN MISSOULA, MONTANA, BY PERCENT LEVELS

Schools and Grades	Total Number of Words	Total Number Misspelled	Percent of Pupils Receiving					Average Number of Words Missed	Percent of Words Missed
			100%	75-99%	50-74%	Under 50%	Missed		
1	2	3	4	5	6	7	8	9	
T5	6,900	675	10	84	3	3	22.5	9	
T8	6,120	1,236	0	68	26	6	36	18	
L5	6,383	1,609	0	60	18	21	57	25	
L8	4,111	1,525	0	30	39	30	66	34	
N5	4,583	1,233	0	45	40	15	61	27	
N8	4,099	1,335	0	39	48	13	58	31	
Q5	8,258	2,087	0	61	25	14	58	25	
Q8	8,394	2,846	0	44	33	23	60	34	
R5	7,820	1,032	0	87	9	3	30	12	
R8	10,613	2,112	0	48	45	6	43	25	
O5	10,097	2,971	0	61	20	18	67	29	
O8	6,078	1,847	0	50	32	18	54	30	
U5	5,973	1,053	0	77	19	4	40	17	
U8	4,844	1,256	0	48	41	11	46	25	
V5	8,021	2,801	0	46	28	26	80	33.3	
V8	6,963	2,023	0	51	31	18	53	29	

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TABLE II (continued)

Schools and Grades	Total Number of Words	Total Number Misspelled	Percent of Pupils Receiving					Average Number of Words Missed	Percent of Words Missed
			100%	75-99%	50-74%	Under 50%	8		
1	2	3	4	5	6	7	8	9	
X5	5,949	921	0	84	11	4	35	15	
X8	5,392	1,343	0	67	17	17	45	25	
M5	5,971	841	0	84	15	0	32	14	
M8	6,572	2,520	0	38	24	35	68	34	
M5	9,175	2,140	0	60	30	10	54	23	
M8	6,475	2,040	0	41	36	22	56	31	
S5	7,806	1,488	0	76	15	9	44	16.6	
S8	5,389	1,376	0	66	20	14	47	25	

TABLE III
 NUMBER AND PERCENT OF SPELLING ERRORS DUE TO PHONICS AND
 NON-PHONICS MISPELLINGS

Schools and Grades	Total Number of Words Spelled		Total Words Misspelled		Total Words Misspelled due to Non-Phonics Errors		Percent of Words Misspelled due to Non-Phonics Errors	
	2	3	4	5	6	7	6	7
T5	6,900	675	527	148	78	22		
T8	6,120	1,236	814	424	66	34		
L5	6,383	1,609	1,301	308	81	19		
L8	4,111	1,525	1,174	351	77	23		
N5	4,583	1,233	811	422	66	34		
N8	4,099	1,335	985	350	73	26		
Q5	8,258	2,087	1,478	607	71	29		
Q8	8,394	2,846	2,246	600	79	21		
R5	7,820	1,032	725	344	69	31		
R8	10,613	2,112	1,265	807	59	38		
O5	10,097	2,971	2,085	886	70	29		
O8	6,078	1,847	1,456	391	79	21		
U5	5,973	1,053	699	354	66	34		
U8	4,844	1,256	826	430	65	34		
V5	8,021	2,801	2,041	760	73	27		
V8	6,963	2,023	1,390	648	68	32		

TABLE III (continued)

Schools and Grades	Total Number of Words Spelled		Total Words Misspelled		Total Words Misspelled due to Non-Phonics Errors		Total Words Misspelled due to Phonics Errors		Percent of Words Misspelled due to Non-Phonics Errors		Percent of Words Misspelled due to Phonics Errors	
	2	3	4	5	6	7	6	7	6	7	6	7
X5	5,949	921	591	330	64	35						
X8	5,392	1,343	940	403	69	31						
M5	5,971	841	481	360	57	42						
M8	6,572	2,520	1,875	645	74	25						
W5	9,175	2,141	1,450	691	67	32						
W8	6,299	1,977	1,375	602	69	30						
S5	7,806	1,488	940	548	63	37						
S8	5,389	1,376	1,060	316	77	23						

phonics rules.

Flesch's estimates were not reached in this study but substitute sounds were often permitted although they seldom occur in words (as ai for short e which occurs in said and possibly once or twice more in the language). Without this latitude, Flesch's figures might have been more nearly approached.

From a close study of Tables I, II, III, pp. 20-25, the indications seemed to reveal that some connection existed between the knowledge and understanding of phonics and the spelling errors of the Missoula children in the fifth and eighth grades. The most commonly missed words were the ones which followed the spelling rules and which permitted use of only one phonics sound to give the proper sound required.

Regarding the reasons for poor spelling, authorities have much to say. Eleanor M. Johnson states:

Through a systematic, well-organized spelling program, children can learn and use a group of phonic and word analysis skills which are necessary for success in reading and spelling. If these skills are not acquired, there is evidence that failures and maladjustments are sure to result.²

As a foundation for all work in spelling and reading, the child must be able to recognize the sounds that he hears in a word and to associate those sounds with the appropriate letter symbol.³

To achieve success and independence in spelling and reading, the child must learn and use phonics and a variety of word analysis skills.⁴

²Eleanor M. Johnson, "Key Factors in Spelling," Education, 76:274, January, 1956.

³Ibid., p. 274.

⁴Ibid., p. 273.

Edward Dolch has this to say regarding sounding:

Sounding is learned by sounding, that is, saying or thinking sounds and not by using only the looks of letters or combinations. If a child does a work book silently, he may mark all the exercises correctly and still be found to have learned no sounding.⁵

The spelling books, My Spelling,⁶ are used in the public elementary schools in Missoula. While these do give some phonics instruction, it is not done systematically. An examination of these texts showed tendencies to teach phonics as the new words brought in new difficulties in the same manner that phonics is taught in reading in the "word recognition method."

The tests indicated that the better papers, with but very few exceptions, had a larger percent of non-phonics errors and a smaller percent of phonics errors. As the number of misspelled words increased, almost invariably the number of phonics errors rose also. This would seem to support the belief of recent thought and experiment. Ralph C. Staiger quotes as follows:

Horn has suggested that the evidence appears to indicate that those who learn best through one form of imagery tend to learn best through others, except for pupils with highly specialized disabilities. This method would seem to indicate a high relationship between spelling and academic aptitude. But correlations between intelligence test scores and spelling ability, as reported by Loutit, show a range between .08 and .85 with a median at .51. These correlations are lower than those reported between reading and intelligence, and Loutit cites Carroll's study to support his thesis that the superior child is not willing to spend time in the mechanical drill which is necessary to good spelling, while this

⁵Edward William Dolch, A Manual for Remedial Reading, (Champaign, Illinois: The Garrard Press, 1945), p. 35.

⁶Gerald A. Yoakam and Seward E. Daw, My Spelling, Grade 5; My Spelling, Grade 6; My Spelling, Grade 7; My Spelling, Grade 8, (revised; New York: Ginn and Company, 1955).

sort of drill is suitable for children with low intelligence. Carroll found that bright children were more likely to spell phonetically and concluded that the difference appears to be in the marked superiority of the bright over the dull in phonetic generalization ability."⁷

Table IV, page 29, shows the average number and percent of children in the fifth and eighth grades who missed more than 36 percent of the words in the tests. The number and percent of failures in the fifth grade would doubtless be higher than indicated because of the loss of the "lower" section of the papers in the divided grade of school M5. The Table shows that 19 percent of the students in the fifth grades missed 36 percent or more of the words with which they were familiar. This average rose to an average of 30 percent of the pupils missing 36 percent of more familiar words in the eighth grades.

Table IV indicates a wide range among the schools, from 7 percent in school T5 to 45 percent in school V5, and from 17 percent in T8 and R8 to 43 percent in Q8. However, the trend of higher percentages of errors in the eighth grades seemed general, in spite of the exceptions in schools V5 and W5.

From the study of Tables I, II, III and IV, one might conclude that the data would seem to indicate that:

1. Phonics errors seem to account for, roughly, about two-thirds of the errors made in spelling in the fifth and eighth grades in the Missoula public elementary schools.

2. Phonics errors do not, in general, tend to disappear but rather to increase from the fifth to the eighth grades.

⁷Ralph C. Staiger, "The Spelling Problem in High School," Education, 76:281, January, 1956.

TABLE IV
 NUMBER AND PERCENT OF THOSE MISSING 36 PERCENT
 OR MORE, BY SCHOOLS AND GRADES

Fifth Grade Schools	Number of Papers	Number of Papers Missing 36 Percent or More	Percent of Failures	Eighth Grade Schools	Number of Papers	Number of Papers Missing 36 Percent or More	Percent of Failures
1	2	3	4	5	6	7	8
T5	30	2	7	T8	34	6	17
L5	28	7	25	L8	23	9	39
N5	20	4	20	N8	20	8	40
Q5	36	9	25	Q8	46	20	43
E5	34	4	12	R8	59	10	17
O5	44	14	31.6	O8	34	12	35
U5	26	4	15	U8	27	6	22
V5	35	16	45	Y8	38	11	29
X5	26	2	7.7	X8	30	7	23
M5	26	0	0	M8	38	15	39
W5	40	13	32.5	W8	36	11	30
S5	34	5	14.5	S8	30	8	26.6
Totals	379	80	233	Totals	415	123	360.6
Average	31	7.5	19	Average	34	10	30

One set of papers from School M5 was missing. According to the instructor, these were low in grade. Hence, it is assumed that the average percent of failures for grades 5 was nearer 20%.

3. By the time Missoula's children are in the eighth grade, they miss, on an average, one out of every 3.6 words on a spelling test of familiar words.

A large percent of the errors in both grades occurred in short words: charge, chain, chance, music, noise, pint, quiet, quit, quite, were very frequently misspelled in the fifth grades; angle, ballot, ease, horison and obedient were often wrong in the eighth grade. Most of these words follow clearly defined rules.

The implication is made from the data that these children have not learned the phonics skills sufficiently well to use them as well as they need to to attack new words.

As has been stated earlier, many schools use standard word lists for sight recognition in the first through the third grades. Missoula's tests were taken from the standard word lists of Kineland, Dolch, Thorndike and Ayres, with a few other familiar words added.

Dolch states that where a child knows his (Dolch's list of two hundred twenty eight words, he is about half way through the third grade in reading level.⁸

In many schools, (Missoula's schools⁹ are among them) formal silent reading begins in the latter part of the third grade, soon after the time when, according to Dolch, his list of eight words has been learned.

Is it possible that children may learn to recognize words by sight, learn to spell them "by heart" and still not be able to know the scouris

⁸Edward M. Dolch, op. cit., p. 29.

⁹Statement of Mr. S. E. Knudsen. (Permission to quote secured.)

composing them?

If Missoula children are typical, and they are apparently better than the average, indications would seem to be, as supported by the data, that our children in the nation are having trouble with the sounds, whatever the cause.

Staiger seems to feel that children can memorize and quickly forget. He states:

In a great many schools, spelling is taught under a more formal system. Usually no formal spelling is attempted in the first grade. Formal spelling instruction is initiated in the second grade and spelling workbooks giving practice with selected lists of words are used. One difficulty with this type of teaching is that spelling becomes a ritualized procedure for all second graders to follow, whether or not they profit from it. Often words are memorized by children for a weekly test only to be forgotten as soon as the test is given. Nevertheless, when the child enters the third grade he studies the third grade words in his speller, and so on until the spellers are no longer provided.⁹

Staiger's point of view seems to be shared by Barbe and Gannaway, for they say:

In some instances, children of above average intelligence may learn a list of words each week and appear to be good in spelling but still be poor in reading. This is deceptive, however, for the words are only learned for the test and there is little retention of them.¹⁰

Evaluation of frequency of the types of phonics errors. Further evaluation of the data concerned itself with the frequency of occurrence of the different kinds of phonics errors. What sounds seemed to give the pupils the most difficulty? In what sounds, if any, did they seem

¹⁰Ralph Staiger, op. cit., p. 283.

¹¹Walter B. Barbe and Virginia Gannaway, "Spelling to Learn," Education, 76:303, January, 1956.

to show improvement by the eighth grade? In what sounds did they seem to be having more trouble? In what sounds did they seem to remain at about the same level?

From a study of Tables V, VI, VII, VIII, IX and X, pages 33-38, a trend seems to be indicated. However, since these tests were given merely on words which the pupils use frequently, not all of the phonics sounds occurred in both lists, and in these there is no basis for comparison. However, these phonics errors were tabulated. Some other sounds, like oe in shoe, eo in people, ue in guess, follow no known rule, and while they were tabulated, they were not counted as phonics errors if an equivalent sound was given.

The tabulation seemed to indicate that:

1. Of the sixty phonics sounds occurring in both tests, forty-one sound errors occurred more frequently, on a percentage basis, in the eighth grades than in the fifth grades. In some instances, the margin of increase was so slight that indications seemed only to be of a "carry-over." In other cases, a considerable increase seemed evident.

(a) The simple consonant errors in b, d, g (hard), h, l, m, n, p, qu, r, s, t, x, w, z, c (soft) and g (soft), were more frequent. Of these, many of the increases were slight, but a "carry-over" was clearly implied. In the case of d, g (hard), h, l, m, r, s, t, w and g (soft) there was an increase, slight, but real, in the number of errors. (Congratulate was frequently spelled congradulate.)

(b) The consonant blend st errors showed a very slight increase, whereas with cl, cr, gr, sp, str, tr, pl and pr, the trend was more marked (instrument was frequently misspelled).

TABLE V

THE PERCENT OF PHONETIC CONSONANT ERRORS, BY SCHOOLS AND GRADES,
ON THE BASIS OF POSSIBLE ERRORS

Consonant Sound	Fifth Grades					Eighth Grades				
	Number of Possible Errors	Percent of Phonics Errors				Number of Possible Errors	Percent of Phonics Errors			
		School X5	School Q5	School U5	School S5		School X8	School Q8	School U8	School S8
1	2	3	4	5	6	7	8	9	10	11
B	17	.45	.64	1.13	.52	21	4.76	3.34	.53	2.22
C (hard)	19	4.45	8.53	3.24	.46	50	2.13	4.26	2.3	2.87
D	47	1.55	3.34	2.29	1.88	32	4.17	7.51	2.43	5.0
F	27	1.25	2.6	2.77	3.49	13	1.03	2.29	0.0	1.54
G (hard)	11	2.45	2.46	1.75	1.6	5	9.33	11.49	2.96	2.67
H	14	.55	.79	.28	.42	3	1.11	2.84	2.47	4.44
J	4	0.0	0.0	0.0	0.0	2	1.58	0.0	0.0	5.0
K	14	2.75	4.05	2.48	1.68	1	0.0	6.38	0.0	0.0
L	39	1.76	3.19	2.34	1.81	49	9.34	4.21	1.44	3.39
M	21	1.41	2.96	1.59	1.86	31	.97	5.56	.72	2.8
N	73	1.26	3.66	2.21	2.09	88	3.6	2.28	1.48	4.92
P	15	.77	.72	1.03	1.18	23	1.3	6.11	2.42	3.62
Qu	5	3.07	6.49	3.08	1.18	7	4.29	5.47	2.12	4.76
R	21	1.83	2.57	3.48	2.77	16	10.21	8.64	2.22	6.00
S	39	1.87	3.81	2.66	2.41	55	3.58	5.46	1.55	4.61
T	52	1.78	4.05	3.11	3.28	80	5.29	9.65	4.31	3.67
V	10	1.15	2.7	2.69	2.65	12	2.78	4.61	2.47	3.33
W	8	2.88	6.42	3.37	2.57	1	6.67	6.38	3.7	6.67
X	1	7.69	2.7	3.8	5.88	4	1.69	6.91	1.85	4.17
Y	0	0.0	0.0	0.0	0.0	3	4.44	7.09	4.94	1.11
Z	3	0.0	1.8	1.29	3.42	4	1.67	3.72	.93	2.5
C (soft)	11	.7	7.61	2.8	2.67	28	3.1	6.79	1.46	4.52
G (soft)	9	2.13	9.31	1.71	4.25	9	4.82	3.37	2.88	6.67

TABLE VI
THE PERCENT OF CONSONANT BLEND ERRORS, ON THE BASIS OF POSSIBLE ERRORS,
BY SCHOOLS AND GRADES

Consonant Blend Sounds ^a	Fifth Grades										Eighth Grades												
	Number of Possible Errors		Percent of Error		School		School		School		School		Number of Possible Errors		Percent of Error		School		School		School		
	2	3	X5	Q5	U5	S5	U5	S5	U5	S5	U5	S5	U5	S5	U5	S5	X8	Q8	U8	S8	U8	S8	
1																							
sh	5	4.62	8.11	4.62	2.74	3	4.62	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	6.67	4.96	0.0	0.0	0.0	7.77	
wh	2	23.08	18.92	25.0	20.52	2	25.0	20.52	20.52	20.52	20.52	20.52	20.52	20.52	20.52	20.52	0.0	0.0	0.0	0.0	0.0	0.0	
th	21	1.85	2.84	3.3	2.44	21	3.3	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	.67	2.12	0.0	0.0	0.0	1.67	
eh	18	2.14	4.05	3.63	9.18	18	3.63	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	0.0	0.0	0.0	0.0	0.0	0.0	
st	13	.3	2.9	0.0	1.13	13	0.0	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	2.42	1.55	.34	1.21	1.21	1.21	
str	1	0.0	8.11	0.0	2.88	1	0.0	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88	6.19	7.3	4.23	10.0	10.0	10.0	
sp	2	0.0	1.35	0.0	0.0	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.17	2.3	0.0	1.67	1.67		
tr	4	1.96	5.41	1.96	2.94	4	1.96	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	4.44	5.67	0.0	6.67	6.67		
thr	1	19.23	16.21	19.23	23.53	1	19.23	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	23.53	3.33	14.89	2.41	6.67	6.67		
bl	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.17	5.41	2.78	7.5	7.5		
br	5	12.31	12.97	12.31	7.06	5	12.31	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	1.67	2.13	0.0	3.33	3.33		
dr	2	3.85	8.01	5.77	5.88	2	5.77	5.88	5.88	5.88	5.88	5.88	5.88	5.88	5.88	5.88	0.0	0.0	0.0	0.0	0.0		
fr	6	3.85	1.8	3.21	2.45	6	3.21	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	0.0	0.0	0.0	0.0	0.0		
gr	3	0.0	4.5	7.69	7.84	3	7.69	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	1.67	2.12	1.87	5.0	5.0		
pl	2	0.0	4.05	1.92	0.0	2	1.92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.33	4.25	5.56	8.33	8.33		
pr	4	4.8	8.01	1.32	1.92	4	1.32	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	4.17	.63	5.56	6.67	6.67		
tw	2	3.85	8.01	7.69	8.82	2	7.69	8.82	8.82	8.82	8.82	8.82	8.82	8.82	8.82	8.82	0.0	0.0	0.0	0.0	0.0		
cl	5	1.54	4.86	5.39	.59	5	5.39	.59	.59	.59	.59	.59	.59	.59	.59	.59	13.33	2.13	0.0	6.67	6.67		
cr	2	0.0	1.35	1.92	0.0	2	1.92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.22	2.84	0.0	3.33	3.33		

^aThe consonant blends spr, sch, ew, sc, sn, sm, sl, and ph did not occur in either spelling word list.

TABLE VII
THE PERCENT OF SHORT VOWEL, FINAL E, AND Y ERRORS
OCCURRING IN THE FIFTH AND EIGHTH GRADES

Short Vowel Sounds	Fifth Grades						Eighth Grades								
	Number of		Percent of Error		Number of		Percent of Error		Number of		Percent of Error				
	Possible Errors	School X5	School Q5	School U5	School S5	Possible Errors	School X8	School Q8	School U8	School S8	Possible Errors	School X8	School Q8	School U8	School S8
1	2	3	4	5	6	7	8	9	10	11					
a	35	5.16	8.49	4.18	6.05	56	6.31	12.08	7.73	10.65					
e	38	6.68	9.83	8.6	9.06	60	4.89	9.08	5.99	10.22					
i	41	4.22	10.48	6.94	6.67	107	9.13	16.09	9.62	12.9					
o	26	2.81	6.76	6.21	5.55	36	6.85	9.1	7.61	10.09					
u	10	7.31	1.08	8.85	10.0	20	6.0	11.49	4.63	8.15					
Final e	62	5.46	9.63	6.82	6.64	46	7.68	1.42	5.96	3.41					
y (vowel)	12	5.13	11.71	4.17	3.68	23	7.25	1.12	4.35	10.14					

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TABLE VIII

THE PERCENT OF LONG VOWEL ERRORS IN THE
FIFTH AND EIGHTH GRADES

Long Vowel Sounds	Fifth Grades						Eighth Grades								
	Number of		Percent of Error		Number of		Percent of Error		Number of		Percent of Error				
	Possible Errors	School X5	School Q5	School U5	School S5	Possible Errors	School X8	School Q8	School U8	School S8	Possible Errors	School X10	School Q10	School U10	School S10
1	2	3	4	5	6	7	8	9	10	11					
a	2	0.0	1.35	0.0	0.0	18	2.8	4.49	3.49	1.37					
e	9	.86	2.7	0.0	2.94	21	3.49	2.52	1.59	.61					
i	5	2.31	5.95	4.62	2.47	7	2.38	.94	.53	.03					
o	7	1.1	4.63	5.49	3.36	10	2.67	1.7	1.48	1.76					
u	8	3.85	6.08	5.29	3.31	23	8.99	13.41	8.86	15.0					

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TABLE IX
THE PERCENT OF ERRORS ON VOWEL DIAGRAMMS IN
THE FIFTH AND EIGHTH GRADES

Vowel Diagram Sounds	Fifth Grades										Eighth Grades											
	Number of		Percent of Error		School		School		School		School		Number of		Percent of Error		School		School		School	
	Possible	Errors	X5	Q5	U5	S5	U5	S5	U5	S5	U5	S5	Possible	Errors	X8	Q8	U8	S8	U8	S8	U8	S8
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
aI	5	12.31	11.35	13.08	10.59	1	20.0	27.66	14.81	20.0	1	14.81	20.0	27.66	14.81	20.0	20.0	14.81	20.0	27.66	14.81	20.0
ay	9	.43	.9	.85	2.29	1	0.0	2.12	0.0	1	0.0	2.12	0.0	2.12	0.0	0.0	3.33	0.0	3.33	2.12	0.0	3.33
ea	18	1.92	3.9	2.35	2.43	5	3.33	4.68	1.48	5	3.33	4.68	1.48	4.68	0.0	1.48	6.67	0.0	6.67	4.68	0.0	6.67
ee	3	6.41	6.31	3.85	5.88	2	0.0	2.13	0.0	2	0.0	2.13	0.0	2.13	0.0	0.0	5.0	0.0	5.0	2.13	0.0	5.0
oa	2	1.94	13.51	7.69	10.29	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
au	4	3.97	11.49	2.45	11.83	4	11.49	20.21	12.04	4	11.49	20.21	12.04	20.21	12.04	12.04	10.0	12.04	10.0	20.21	12.04	10.0
aw	0	0.0	0.0	0.0	0.0	1	36.67	25.53	22.22	1	36.67	25.53	22.22	25.53	22.22	22.22	10.0	22.22	10.0	25.53	22.22	10.0
ou	12	3.85	5.41	4.48	2.94	11	4.85	11.03	4.38	11	4.85	11.03	4.38	11.03	4.38	4.38	7.27	4.38	7.27	11.03	4.38	7.27
ow (o)	1	3.85	14.05	11.54	11.76	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ow (owl)	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
oo	1	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
oo	5	13.08	11.89	6.92	16.47	0	0.0	16.47	16.47	0	0.0	16.47	16.47	16.47	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ow	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
oi	2	25.0	31.08	19.23	14.71	0	0.0	14.71	14.71	0	0.0	14.71	14.71	14.71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
oy	0	0.0	0.0	0.0	0.0	1	6.7	10.64	3.7	1	6.7	10.64	3.7	10.64	3.7	3.7	10.0	3.7	10.0	10.64	3.7	10.0
ei or ie	4	0.0	24.33	3.8	2.9	6	2.28	0.0	17.28	6	2.28	0.0	17.28	0.0	17.28	15.55	17.28	15.55	0.0	17.28	15.55	15.55

TABLE X
 THE PERCENT OF ERRORS ON SINGLE VOWELS COVERED BY R
 IN THE FIFTH AND EIGHTH GRADES

Vowels Governed by R	Fifth Grades						Eighth Grades					
	Number of Possible Errors		Percent of Error		Number of Possible Errors		Percent of Error		Number of Possible Errors		Percent of Error	
	X5	Q5	U5	S5	X8	Q8	U8	S8	X8	Q8	U8	S8
1	2	3	4	5	6	7	8	9	10	11	12	13
ar	10	5.0	6.22	2.46	3.53	11	.91	11.79	5.05	8.79		
er	16	3.13	7.26	4.81	3.39	24	4.72	11.7	6.02	7.64		
ir	4	7.84	20.27	7.35	8.33	1	16.67	31.91	14.81	30.0		
or	5	8.46	18.38	10.0	9.41	16	7.92	11.04	6.24	8.75		
ur	5	8.46	18.92	13.08	10.59	6	2.22	12.77	1.85	10.0		

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(c) The short vowel sounds, a, i, o and u showed a marked increase. (As has been previously stated, ea and ai were allowed as correct when short e was called for. This lowered the number of short e phonics errors.)

(d) Errors in the use of the long vowels, a, u and e, showed an increase.

(e) The vowel diagraphs, ea, ai, au and ou were more frequently incorrect. Ay showed only a slight error increase as did ei.

(f) Among the vowels governed by r, ar, er and ir showed a noteworthy increase in mistakes, especially ir.

2. On the other hand, nineteen sounds tended to show a decrease in frequency of error occurrence in the eighth grade. They include:

(a) The consonants, c (hard), f, k and x, showed considerable decrease in error frequency.

(b) The consonant blends, sh, th, thr, br and fr, the improvement was very slight. However, it was sharp in the cases of th, thr and br.

(c) The short vowel e showed a decrease in error frequency. This was not regarded as necessarily an indication of improvement since, as previously stated, ea and ai were allowed in place of short e. Final e showed a decided improvement trend which was possibly noteworthy.

(d) The long vowels, i and o, showed error frequency decreases, which seemed sufficiently marked to be of possible importance.

(e) The vowel diagraph ee mistakes were markedly fewer. How important this decrease is is problematical. To mispronounce ee is almost an impossibility, yet this is possibly balanced by its importance and frequency of occurrence in words.

(f) Of the single vowels governed by r, the errors in or and ur decreased greatly in number. Probably the decrease in or errors can be traced directly to the fact that since or in doctor, worth and world is pronounced as er, er, ir and ur were allowed in these cases. There seemed no way to account for the decreases in ur errors except that the pupils seemed to know the sound better.

An "over-all" evaluation of the data tabulated in Tables V, VI, VII, VIII, IX and X would seem to indicate a need for a better understanding of most of the phonics sounds.

All of the consonant sounds are used frequently in our language with the exception of z, z and k (alone). Of these three, x and k are among the only four consonant sounds which showed a decrease in frequency of error occurrence in the eighth grade. All the other phonics sounds either increased in frequency of error or indicated a "carry-over." Since g (hard) and k were allowed interchangeably, there is a probability that the figures for these were not completely accurate. Most of the consonant blends, too, showed increases in error frequency.

The short vowels are extremely important in reading and spelling. These errors increased decidedly by the eighth grade with the exception of short e whose figures were open to question because ea and ai were allowed.

Soft c and soft g occur frequently in the English language. Errors in these carried over to the eighth grades.

Three frequently used long vowels increased in error frequency by the eighth grade. The other two, i and a, showed fewer errors.

Of the vowel diagraphs, only ee and ea (as in bread) decreased in frequency of error and substitutions accounted for some of the decrease in the latter.

Of the consonant blends which showed improvement, or decrease, only fr and thr showed much improvement. Of these, the thr is the one most used in English, and, at that, not very frequently.

The figures on the frequency of the final e errors indicated that the pupils quite evidently had a clearer picture of its function by the eighth grade.

Quite naturally in tests such as these some schools will not rate as highly as others will rate. School Q, for example, made a poor showing in the fifth and eighth grades. There might be many factors which could account for this. On the other hand, School X was a little above average in its grades. The fact that School X seemed to follow the general tendency of error frequency in as many instances as it did might, therefore, have importance in this study.

Some of the consonant blends showed a decrease in frequency of error in the eighth grade. This could be indicative of possible importance. In the "word recognition method," beginning consonants and consonant blends are stressed when the phonics instruction given is started.

Kathleen B. Hester says:

When the children recognize similarities in word beginnings and word endings, they unlock the new word by recognizing that it begins like a known word and is similar in ending to another known word. Then

they mentally substitute the known sounds to get the new word and use the new word in the sentence to see if it makes sense.¹¹

Tinker believes that:

Steps in a sequential program in the teaching of word analysis should follow a natural order that is logical and that is in harmony with successful teaching experience. It has already been suggested that training in the use of initial consonants be introduced soon after formal reading begins. The goals of the first level, after having learned to use initial consonants, consist of consonant substitution, use of certain inflectional endings, and analysis of certain compound words that are not in context.¹²

Dr. Flesch, however, takes a different approach. After stressing first the learning of all the alphabetical sounds, including the short vowels, he suggests taking three-letter words containing the short vowels. He then gives a list of words which can be built around these vowels.¹³

There was a decided increase in short vowel errors in the eighth grade, as can be seen in Table VII, page 35. The exception in the case of short e has been explained elsewhere (see page 39).

Among the educators who note that children seem to have difficulty with certain short vowel sounds is Clifford B. Archer who states that Bradford¹⁴ says:

Among the most difficult speech sounds for both first and second grade children to identify were those represented by i, as in dig, e, as in egg, a, as in fat, a, as in lady, w, as in wagon, g, as in gun, and consonant blends such as er in hammer, mp, as in stamp, dl, as in candle, tl, as in bottle, br, as in

¹¹Kathleen B. Hester, Teaching Every Child to Read, (New York: Harper and Brothers, 1955), p. 173.

¹²Siles A. Tinker, Teaching Elementary Reading, (New York: Appleton Century Crofts, Incorporated, 1952), p. 150.

¹³Rudolph Flesch, op. cit., p. 111.

¹⁴Henry Franklin Bradford, "Oral Aural Differentiation Among Speech Sounds as a Factor in Spelling Readiness," Elementary School Journal, LIV: 354-358, February, 1954.

bread, and ng, as in swing. Children find it difficult to discriminate between kl and gl, dl and tl, dr and tr and cr and gr.¹⁵

Many of the sounds mentioned by Bradford were not listed as phonics errors in this study. However, short i, short a, long a, w, g (hard), and er, all of which Bradford says cause difficulty, all show a "carry-over" or increase in error frequency in this study.

What causes poor spelling? Authorities differ on what causes poor spelling. It would be impossible to give in this study all the reasons for the failure of pupils to spell with skill. Of the many who have made studies of the subject, Harold G. Shane quotes a few as follows:

Why do (or don't) children spell well? Several workers have studied factors which strengthen or adversely influence spelling. Investigators include Apache, Wolff, Mack, Gilbert and Burton. Among the conclusions they have drawn:

- (a) Visual defects may or may not characterize poor spellers; vocabulary knowledge may, within limits, be more significant in determining spelling success than the I.Q., (although there was a +.45 correlation between I.Q. and ability according to Spache (44)), pronunciation, bilingualism, articulation and possibly changing schools affect spelling.
- (b) Failure to apply phonetic principles, poor visual imagery and faulty pronunciation may be sources of trouble (52).
- (c) There is a high positive relationship between spelling achievement and the following: phonetic ability and visual discrimination. It is less positive between spelling and mental age, and there seems to be no positive relation of significance with respect to auditory discrimination (34).
- (d) Good spellers have fewer and shorter eye fixations than do poor ones (17). Spelling improves as reading improves (18).
- (e) When compared (at the secondary level) no one of these methods of teaching spelling was categorically superior. The methods were: emphasis on a basic list; stress on rules with weekly reviews; and independent lists and contact with a basic list.¹⁶

¹⁵Clifford P. Archer, "Readiness for Spelling," Education, 76: January, 1956.

While the above excerpt indicates that there seem to be differences of opinion as regards the place that mental ability plays in spelling, two of the writers agree that a knowledge of phonics is definitely important to successful spelling achievement.

The "word recognition method" stresses configuration, which is a visual approach. Implications are that although the Missoula children do receive some phonics training it is not sufficient to enable them to apply these sounds very well to words which are not sight words learned during the first three years.

Dr. Flesch says that 87 percent of our English words are phonetic in their spelling and that 13 percent do not follow regular phonics rules.¹⁷ If the assumption is made that Dr. Flesch's figures are correct, it would seem that the figures obtained on this study may have some implications of interest and possible significance. Were no training at all in phonics given or were equal amounts of training placed upon phonically and non-phonically spelled words, it would seem logical to believe that the ratio of misspellings of the two types of words would be approximately 87 percent to 13 percent. Since a ratio of 66 percent to 34 percent occurs, one might infer that what phonics training has been given has been valuable in reducing the possible number of phonics errors.

¹⁶Harold G. Shane, Research Helps in Teaching the Language Arts, (Association for Supervision and Curriculum Development, Washington: National Education Association, 1955), p. 5.

¹⁷Op. cit., p. 19.

To know, as has been stated, how well children know their phonics by the end of the fourth grade is difficult. Until the middle of the third grade they have learned sight words largely. These they have learned by the "word recognition method" which employs phonics only as the child seems to need them. At the end of the third grade, they read silently and the teacher cannot hear what sounds bother them. As Dolch states, "Sound is learned by sounding, that is, saying or thinking sounds, and not by using only the looks of letters and combinations."¹⁸

Driscoll seems to feel that children change somewhat in their methods of learning as they grow older. He states:

As children grow older, the method they use to remember facts or principles changes. During the primary age they try to remember almost completely by rote. They carry the general image and recall it as accurately as possible. As they gain more and more experience, however, they find that this type of memory is inaccurate. They begin to organize their facts around certain cues. This is especially noticeable in the development of spelling ability. The primary child sees words as wholes and learns them more or less accurately. As he approaches the upper elementary grades and his spelling vocabulary increases, he must learn to break down these words into phonetic units, otherwise his spelling accuracy is unpredictable.¹⁹

Missoula's children ranked above the national norms on Stanford Achievement Tests in the spring of 1955, and yet the eighth graders missed one out of every 3.6 words on familiar, previously studied words in October, 1955. The national picture should be even more serious.

¹⁸Edward M. Dolch, op. cit., p. 35.

¹⁹Gertrude Driscoll, "How to Study the Behavior of Children," Practical Suggestions for Teaching, Number 2, Hollis L. Caswell, editor, (fourth printing; New York: Bureau of Publications, Teachers College, Columbia University, 1947), pp. 36-37.

The data in this study would seem to indicate that the Missoula children are having difficulties with phonics sounds. Is it unreasonable to suppose that the situation, nationally, is very different?

As stated earlier, there is a close integration between good reading and good spelling.²⁰ What, then, are the possible implications of the national spelling norms for the national reading situation?

Barbe and Gannaway speak rather emphatically:

If there were examples of poor spellers who were good readers and good spellers who were poor readers, logical conclusions would be that reading and spelling should be taught separately. But there is no such evidence, however. Poor spellers are never good readers. No child is able to spell above his reading level.²¹

The implications of this study might indicate that oral tests of reading in the schools of our nation would show phonics difficulties which somewhat parallel the spelling ones.

²⁰Op. cit., p. 2.

²¹Walter B. Barbe and Virginia Gannaway, op. cit., p. 303.

CHAPTER IV
SUMMARY AND RECOMMENDATIONS

Restatement of the problem. The purposes for undertaking this study were fourfold and were as follows:

1. To furnish school officials with data on the relative frequency of the kinds of spelling errors made by the fifth and eighth grade students in the public elementary schools of Missoula, Montana.

2. To furnish school officials with data on the frequency with which the spelling errors occurred among the individual schools.

3. To determine if any implications existed in the data that would tend to indicate a "carry-over" of certain phonic errors from the fifth grade to the eighth grade.

4. To determine the relationship between phonetic sounds and the frequency of spelling errors by the students in words with which these pupils were familiar as to meaning.

Summary. The Tables secured furnish school officials with the relative frequency of the kinds of spelling errors made by the school children of the fifth and eighth grades in the Missoula public schools. At the fifth grade level, as well as at the eighth grade level, phonics errors predominated at the proportion of about two to one over non-phonics errors. This is indicated in Table III, pages 24-25.

With the exception of School M, where the data on the fifth grade were not complete, the data on the frequency with which spelling errors occurred among the individual schools were clearly indicated as is shown

in Tables I and III, pages 20-25. The average percent of pupils missing more than 36 percent of the words was 19 percent in the fifth grade and 30 percent in the eighth grade. This is shown in Table IV, page 29.

A quite notable trend of "carry-over" of phonics errors was believed to be indicated by the data in Tables V, VI, VII, VIII, IX and X, pages 33-38, for a large number of phonic sounds.

The data would seem to imply that most of the spelling errors in these tests were phonics errors and that they occurred even though they were in words which were familiar to the pupils as to meaning. The possibility might be that familiarity with words and their sounds as words might not necessarily mean that the pupils could recognize the sounds which compose the words.

Recommendations for further study:

1. The data would seem to indicate a need for more phonics instruction. The recommendation is made that more phonics teaching be given in all the grades, but more especially in the first four grades.
2. Since the short vowel sounds accounted for a large proportion of errors, and since there was a heavy "carry-over" of errors to the eighth grade, a suggestion is made that stress on the teaching of the short vowels be started early in the first grade.
3. Since the data evidence that even by the fifth grade phonics errors are frequent, the suggestion is made that oral reading be continued through the fourth grade. As has been stated, in many schools the reading, until the middle of the third grade, is based on sight lists; very shortly after this time, formal oral reading decreases and

silent reading begins. The suggestion is that another year or more of oral reading might possibly indicate to the teacher which sounds are giving the pupils difficulty when they attack new and unfamiliar words and also give the teacher many opportunities to clear up these difficulties.

4. If subsequent studies show that the findings of this investigation are typical of schools in general there is an implication that more emphasis on the teaching of phonics should be given in training courses in University classes. Since, under present methods of instruction, phonics errors seem to persist, a more systematic and thorough approach might be advisable. Moreover, the present studies underway may indicate to the public a similar need and, in this case, colleges which were prepared to teach the "word recognition method" of reading and spelling, with possibly a strong "phonics approach," would be prepared to cope with this situation.

5. There is a possible need for more studies along the line of phonics, spelling and reading. Since the spelling test papers, from which this study was made, as well as the results of the study itself, are on file at the office of the City School Co-ordinator at Missoula, Montana, other students can perhaps use them as a "starting point" for further studies.

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