

LEARNING TO READ¹

JOSEPHINE HORTON BOWDEN

The adult gives no more thought to his reading than he gives to his walking. The process has become automatic; when he sees the printed symbols he reads in spite of himself. He can no more tell how he reads than he can tell how he walks; he simply reads. He has so far forgotten the time and energy he spent mastering the process that he is not even aware of its complexity. Reading sometimes tires his brain and sometimes tires his eyes; further in the analysis he does not go. He may think that his eyes do not move across the page with each line but that he takes in two or more lines at once; he may believe that the movement is a continuous one and that he experiences no difficulty in gauging the length of the line or in fixating any given point in the line. When the psychologist tells him that he reads but a line at a time, that the movement across the page is a succession of short movements and brief pauses, and that even after the movements have become automatic, the eyes sometimes fail to fixate the correct point, he realizes that learning to read is a difficult task for the eyes, and he understands why the beginner's finger follows the line word by word as he reads. Tachistoscopic readings and photographic records of the movements of the eyes tell him that instead of reading whole sentences or even whole phrases at a glance, in those brief reading pauses he takes in, on the average, but a word or two regardless of sentence structure. He is not so much at a loss to understand why the child reads haltingly, a word at a time. He knows that there is a relation between reading and speech, though he may not realize how close it is. He may have observed lip-movement in others and have been unconscious of the inner speech that accompanies his own silent reading. He may even have believed himself to be a pure visual reader, though there is no proof that that type exists. When he has become conscious

¹ From the Laboratory of Experimental Education, The University of Chicago.

of that form of inner speech which is present in all his reading, he ceases to marvel that the beginner should, when he reads to himself, whisper the words or at least go through the motions of pronouncing them. Add to these processes that still more difficult one by which the printed words arouse thought in the mind of the reader and one realizes in a way the problem that confronts the child when he begins to read.

We have been learning to read for so many centuries that one might think that the technique had long since been perfected but primary reading still presents its problems and there are almost as many methods as there are teachers and almost as many theories as there are psychologists and educators interested in the matter.

There is still opportunity and need for careful observation and analysis of the way in which children learn to read under the various methods employed. We know surprisingly little about the methods that *children* use in contrast to the abundance of teacher's methods. Observant teachers of reading have doubtless accumulated in their own experience many pertinent facts, but they have not written them down or attempted to relate their observations, so that there are no accounts of the ways, to be specific, in which beginners learn to recognize words as wholes. When the children were taught their letters first, they supposedly learned words by recognizing some of the letters and letter combinations, building up the word concepts on the basis of their previous analysis. What happens now that they are supposed to recognize the words as wholes from the start, or with only such analysis as, for example, the drill in phonics necessarily supplies? It was with the hope of making some contribution to the study of such a question that these experiments were undertaken.

A number of experimental studies in recognition of words by adults has been made. The purpose of the following experiments is to determine how children recognize words. There are two experiments: first, an individual study; and second, a class study.

The child in the first study was a girl six years old, a normal child, who was interested in learning to read, but who had had almost no instruction in reading. She was not attending school

and had never attended school; she was receiving no instruction during the period of the experiment save the instruction in reading. The problem was to determine how a child learns to read with only printed words in context and out of context, with no assistance save the direction of the work. There was no analysis, either letter or phonic, and no use of script. The time of the experiment was eight weeks, from February 7 to April 13, with a week's vacation; the study period was from 10:30 to 11, five days in the week. The material, which was home-made, i.e., made primarily by the child, had as its subject-matter incidents of home-life—dolls, etc. The story, made one day, was typewritten for the next day's lesson with each new word on a separate card. The story was first read by the child; the words she did not know were given her, then the words were read from the cards. This was repeated until the lesson was mastered or until the child asked for new material. A record of each day's work was kept in which were recorded the rate of learning, any interesting comments of the child, and the tests that were given. At the end of each week the child read the material of the week and a record of the words known and not known was kept. Then all of the words of the week on the separate cards were gone through and the words known and not known recorded. At the end of each month a similar test was given of the work of the month.

The rate of learning in words for each week was as follows: 11, 6, 12, 10, 17, 14, 12, 18. The first week's record was rather high because it included the words the child had already learned. During the first month 53 words were presented, of which the child knew in context 45, or 83 per cent, and out of context 28, or 52.8 per cent. The second month 96 words were presented, of which she knew in context 85, or 88.5 per cent, and out of context 60, or 62.5 per cent. These figures show the significance of context as a cue in the recognition of words. Even from the first, when she did not know the word on the card, she asked for the story, that she might find it in context. If this was not allowed, she sometimes said the sentence to herself until she came to the word.

As evidence of the methods employed by the child the following may be cited. First, incidents; for example, one day when the

child was given the cards to read from, it was observed that she read with equal ease whether the card was right side up or upside down. This incident suggested a test which was later given. Second, comments of the child; for example, when she was asked to find in the context the word "shoes," she said that "dress" looked so much like "shoes" that she was afraid she would make a mistake. Third, questioning; for example, she had trouble to distinguish between "sing" and "song." When she had mastered the words she was asked how she knew which was which. Her reply was, "by the looks." When questioned further she put her finger on the "i" and the "o." These three types of evidence correspond to introspection with the adult. The fourth type of evidence is a comparison of the words learned with the words not learned as to the parts of speech, geometric form, internal form, and length. Fifth, misreadings; for example, "dogs" was read "twigs," and "feathers," "fur." Sixth, mutilations; for example, "dogs" was printed "digs," "lilac" was written "lalci."

The class consisted of five children, six years old, just from the kindergarten, who had had no experience in reading. The problem was the same as in the former study though the conditions were different. The words were presented in both script and print; there was no phonics, but the names of the letters were freely used, though without an effort to teach them. The time of the experiment was the same; but there were two study periods, one from 8:45 to 9:15, when the material was presented by the teacher in charge, and the other from 10:20 to 10:40, when the writing exercise took place and when word drill and testing were given by the experimenter. The method of teaching reading in this school is the imitation method, the basis of which is that reading should be learned as talking is learned. There is no reading period but words are presented in connection with all the work given, though particularly with nature-study and history. The teacher presented the material for the day, writing the words on the board as she used them. When the presentation was finished, the matter was put into sentences which were written on the board and then read by the children. Sometimes these groups of sentences were printed on charts and read a second or third time. The teacher

also had the important words printed on cards which she showed the children as she presented the material. The testing and recording were similar in method to those in the former experiment except that not all the words presented in context were used as drill words.

This experiment gave opportunity for the study of the influence of writing upon the learning of words, however, since the writing lesson was not under the control of the experimenter and since oftentimes words that were already known were written, the results are not so reliable as they might be. It was the impression of the experimenter that the writing did not assist in the learning, probably because the child was concerned with the operation of writing so far that he did not think about what he was writing. The number of words written by the class during the period was 25. Of this number "C" learned 17, or 68 per cent; "S" learned 15, or 60 per cent; "D" learned 12, or 48 per cent, "P" learned 14, or 56 per cent; and "Sp" learned 15, or 60 per cent—an average of 58.4 per cent, a figure which does not tell anything in particular about the influence of writing. With the idea in mind that possibly a comparison of the whole number of words learned with those learned and written might show more definite results, the following percentages were worked out. "C" learned 41 words of which 17, or 41.4 per cent were written; "S" learned 30 words of which 15, or 50 per cent were written; "D" learned 21 words of which 12, or 57.1 per cent were written; "P" learned 25 words of which 14, or 52 per cent were written; and "Sp" learned 27 words of which 15, or 55.5 per cent were written. The average is 51.2 per cent, which gives even less influence to writing than the preceding percentages.

The results of the experiments are discussed in the following order: parts of speech; word form, significance of misreadings, significance of mutilations, and methods of learning.

Table I gives results with regard to parts of speech and word form. Since the drill words of the class were selected, there is not enough variety in parts of speech to give definite results. In the case of "E," the child of the individual study, there is variety enough to show that nouns and adjectives are more easily

learned than other parts of speech. This would seem to indicate that the content of the word and its use in the sentence are factors which influence the ease with which it is learned.

TABLE IA
COMPARISON OF WORDS LEARNED WITH WORDS NOT LEARNED

	E			C			S		
	Cases	Learned	Per-centage	Cases	Learned	Per-centage	Cases	Learned	Per-centage
<i>Parts of Speech—</i>									
Nouns.....	64	51	76.9	44	29	65.8	44	20	45.4
Verbs.....	33	11	33.3	10	6	66.6	10	4	40.
Adjectives.....	21	17	80.9	6	3	50.	6	3	50.
Pronouns.....	9	8	88.9	3	2	.....	3	2	.....
Adverbs.....	8	1	12.5	1	.....	.....	1	.....	.....
Prepositions.....	4	1	.....	2	1	.....	2	1	.....
Conjunctions.....	2	1	.....	.....	.....	.....	.....	.....	.....
<i>Geometric Form—</i>									
Linear.....	20	9	45	11	7	63.6	11	6	54.5
Superlinear.....	76	48	63.1	37	22	56.7	36	16	43.2
Sublinear.....	19	14	73.6	2	1	.....	2	1	.....
Super- and sub-linear.....	26	19	73.	16	11	62.5	16	71	45.
<i>Internal Form—</i>									
Straight.....	43	32	74.4	20	16	80.	20	13	65.
Curved.....	36	21	58.3	19	9	47.3	19	7	36.7
Neither.....	62	37	59.6	27	16	59.2	27	10	37.
<i>Length—</i>									
One.....	2	2	.....	1	1	.....	1	1	.....
Two.....	7	6	85.7	4	2	.....	4	2	.....
Three.....	23	16	69.5	11	8	72.7	11	7	63.6
Four.....	39	22	56.4	20	10	50.	20	8	40.
Five.....	26	14	53.8	12	7	58.3	12	5	41.6
Six.....	17	10	58.8	7	4	57.1	7	2	25.9
Seven.....	13	9	62.2	3	3	.....	3	2	.....
Eight.....	1	1	.....	4	3	.....	4	.....	.....
Nine.....	8	5	62.5	4	3	.....	4	3	.....
Ten.....	3	3	.....	.....	.....	.....	.....	.....	.....
Eleven.....	1	1	.....	.....	.....	.....	.....	.....	.....
Twelve.....	1	1	.....	.....	.....	.....	.....	.....	.....

Messmer² makes two classes of words, according to geometric form. The first class is linear words, like "acorns," "saw," and "were," words with no high letters. Into this group he also puts

²Oskar Messmer, "Zur Psychologie des Lesens bei Kindern und Erwachsenen," *Archiv für die gesamte Psychologie*, Bd. II, Hefte 2 u. 3; cf. Huey, *Psychology of Reading*, pp. 93 ff.

words with letters that extend below the line because, he says, the eye does not notice the projection and the effect is as though the letters were all letters of the line. The second class is superlinear,

TABLE IB
COMPARISON OF WORDS LEARNED WITH WORDS NOT LEARNED

	D			P			SP			Average
	Cases	Learned	Per-centage	Cases	Learned	Per-centage	Cases	Learned	Per-centage	
<i>Parts of Speech—</i>										
Nouns.....	41	15	36.5	44	21	47.7	41	20	48.7	53.5
Verbs.....	5	1	.....	8	..	.....	3	1	.....	34.9
Adjectives.....	6	3	.....	6	1	16.6	6	4	66.6	52.8
Pronouns.....	2	2	.....	3	2	.....	2	1	.....	.....
Adverbs.....	..	..	.....	1	..	.....	..	..	.....	.....
Prepositions.....	1	..	.....	2	1	.....	1	1	.....	.....
Conjunctions.....	..	..	.....	..	1	.....	..	..	.....	.....
<i>Geometric Form—</i>										
Linear.....	8	3	37.5	9	5	55.5	6	5	83.3	56.5
Superlinear.....	34	15	44.1	36	15	41.6	33	16	48.4	50
Sublinear.....	..	..	.....	2	..	.....	1	1	.....	.....
Super- and sub-linear.....	13	3	23	16	5	31.2	13	5	38.4	45.8
<i>Internal Form—</i>										
Straight.....	16	7	43.7	19	10	52.6	15	10	66.6	65.3
Curved.....	17	6	35.2	18	5	27.7	16	7	43.7	41.4
Neither.....	22	8	36.3	26	10	38.4	21	10	47.6	45.4
<i>Length—</i>										
One.....	1	1	.....	1	1	.....	1	..	.....	.....
Two.....	3	1	.....	1	1	.....	3	2	.....	.....
Three.....	9	4	44.4	9	3	33.3	9	5	55.5	56.5
Four.....	15	8	53.3	20	8	40	15	8	53.3	48.8
Five.....	11	1	9.9	12	3	25	11	3	27.2	35.9
Six.....	6	3	50	7	3	42.8	6	3	50	48.1
Seven.....	3	1	.....	3	2	.....	3	2	.....	.....
Eight.....	4	..	.....	4	..	.....	4	1	.....	.....
Nine.....	4	2	4	4	3	.....	4	3	.....	.....
Ten.....	..	..	.....	..	..	.....	..	..	.....	.....
Eleven.....	..	..	.....	..	..	.....	..	..	.....	.....
Twelve.....	..	..	.....	..	..	.....	..	..	.....	.....

like "Eskimo" and "coat," words with high letters. Since the child's eye has not been trained to follow the line, two other classes not proposed by Messmer have been added: sublinear—like "primrose," "my," and "going," words containing letters that extend below the line; and super- and sublinear—like "dogs," "polar-

bear," and "yesterday," words with letters that extend both above and below the line. Messmer says that the linear words are less easily recognized because the contour is unbroken. However, four of the six children learned more of the linear words than of the other groups. Except in the case of "E," the child of the individual study, there were not sublinear words enough to show any results; but in her case, these words were read somewhat more readily than those of any other group. In only one case were the superlinear words, which Messmer holds to be more easily recognized, learned more readily than those of any other group.

Messmer makes a second classification of words according to internal form based on the type of line of which the letters of the word are made. He speaks of letters of straight lines like "n" and "f," letters of curved lines like "o" and "s," letters of curved and straight lines, like "d" and "p," and letters of oblique lines, like "w" and "y." He holds that words in which straight lines predominate are least easily recognized because most of the letters belong to this class and the word has no distinctive character. He holds that words containing both letters of straight lines and letters of curved lines are most easily recognized. In the table given, by preponderance of straight lines is meant that more than one-half of the letters of the word are straight-line letters, like "fern" which contains three straight-line letters and two curved-line letters. By preponderance of curved lines is meant that more than one-half of the letters of the word are curved-line letters, like "dog" which contains no straight-line letters, three curved-line letters, and one straight- and curved-line letter. By preponderance of neither is meant that the letters of the word are distributed among the classes, no one of which contains more than one-half, like "worm," which has two straight-line letters, one curved-line letter, and one oblique letter. Without exception words of straight lines were most easily learned; words of curved lines less easily learned; and words of neither just a little more readily than those of curved lines.

The significance of the length of the word does not come out very plainly in this comparison, except in the case of the child in the individual study, probably because there was not variety enough

in the length of the drill words. In the case of "E" the figures show that the short words and the long words were most readily learned and that the words of five letters gave most difficulty.

TABLE II
POINTS OF RESEMBLANCE BETWEEN THE WORD AND ITS MISREADING

PUPIL	MISREADINGS	LENGTH		COMMON LETTER		INITIAL LETTER		FINAL LETTER		CONTOUR		ASSOCIATION		TOTAL POINTS OF RESEMBLANCE
		Cases	Percentage	Cases	Percentage	Cases	Percentage	Cases	Percentage	Cases	Percentage	Cases	Percentage	
C	38	16	23.5	16	23.5	17	25	9	13.2	5	7.4	5	7.4	68
S	37	26	41.9	17	27.4	2	3.2	7	11.2	6	9.6	4	6.7	62
D	30	17	36.1	13	27.6	13	27.6	1	2.1	3	6.4			47
P	27	13	35.2	7	19.4	8	22.2	4	11.1	2	5.5	2	5.5	36
Average			34.1		24.4		19.5		12.6		7.2		4.9	
E	45	27	27.5	12	12.2	17	17.3	24	24.4	10	10.1	8	8.5	98

The significance of misreadings is brought out in Table II. The misreadings of each child were tabulated and points of resemblance between the word and its misreading were recorded. Of these points of resemblance, length is most common, with an average of 34.1 per cent for the class, and 27.5 per cent for "E." The common letter, for example, the "g" and "o" in "igloo," which was read "dogs," comes second for the class with an average of 24.4 per cent, though not for "E," probably because she knew the names of no letters. The initial letter is third; the final letter is fourth with the class and second with "E." The contour of the word and the association of one word with another, for example, "horse" and "wagon," are of little significance. The table brings out, however, that length, which Messmer says the child does not appreciate, is appreciated more than any other feature of the word.

The most significant table is that of mutilations (No. III). The classes of mutilations are arranged in order of least disturbance to the individual. In the first group, inversion, the words were shown to the children right side up, and after five or ten minutes they were shown again, upside down. This exercise took place in the sixth week. Only two of the five children noticed that the words

were upside down; and the other three when questioned said the words looked just as they had before. This mutilation, though

TABLE IIIA
MUTILATIONS OF THE WORD AS A WHOLE

PUPIL	INVERSION			TRANSPOSITION			SCRIPT			SUBSTITUTION		
	Cases	Read as Word	Percentage	Cases	Read as Word	Percentage	Cases	Read as Word	Percentage	Cases	Read as Word	Percentage
C.....	17	12	70.5	16	10	62.5	11	8	72.7	32	12	37.5
S.....	16	14	87.5	16	11	68.7	14	10	71.4	29	17	58.6
D.....	12	9	75.	6	4	66.6	11	9	81.8	24	7	29.1
P.....	13	10	76.9	11	9	81.8	14	9	64.2	17	7	41.1
Sp.....	16	16	100.	11	11	100.	13	10	76.9	17	8	47.
Average	14.2	12.5	81.5	12	9	75.9	12.6	9.6	73.4	23.8	10.2	42.6
E.....				8	3	37.5				21.	8.	38.4

Average without "D."

TABLE IIIB
MUTILATIONS

PUPIL	OF THE WORD AS A WHOLE						OF A PART OF THE WORD						AVERAGE
	Length and Addition, Omission or Substitution			Contour and Substitution or Transposition			Final Letter and Substitution or Transposition			Initial Letter and Substitution or Transposition			
	Cases	Read as Word	Percentage	Cases	Read as Word	Percentage	Cases	Read as Word	Percentage	Cases	Read as Word	Percentage	
C.....	20	4	20.	19	5	26.3	22	11	50.	9	2	22.2	45.2
S.....	16	6	37.5	10	9	47.3	22	12	54.5	21	14	66.6	61.5
D.....	15	6	40.	16	7	43.7	13	7	53.8	18	6	33.3	53.2
P.....	7	5	71.4	9	2	18.1	14	10	71.5	5	1	20.	55.6
Sp.....	7	2	28.5	9	2	18.1	14	8	57.1	5	1	20.	57.7
Average	11.4	4.8	37.4	14.4	5	30.7	16.8	9.4	57.1	11.6	4.8	32.2	
E.....	14	3	21.5	9.			13	2	15.3	21.	4.	19.	20.2

* Without P and Sp.

it gave the least difficulty to the children, would probably be most difficult for the adult. It would seem that the child sees the word as a whole and recognizes it upside down, just as he would recognize

a toy upside down. In the second group of mutilations, transposition, the letters of the word were shifted about, but the contour of the word was preserved; i.e., a letter of the line was put in place of a letter of the line and a high letter in place of a high letter, e.g., "nettims" for "mittens." This mutilation disturbed the children but little more than inversion. The reason may be that, up to this time at any rate, these children had made no connection between the letter and its sound and did not realize that by shifting the position of the letter a new word was made; they merely noticed that the whole word was there. From the first, script and print were used and no comment was made about the difference between the two. Almost from the first the pupils could match the word in script with the printed word and vice versa. The adult, without thinking about the matter, sees no particular resemblance between the word in script and the word in print but to the child evidently the script is merely another form of print. This may be the reason why children learn to read script and print with less effort when they are taught simultaneously than when one is taught after the other is learned and after children have come to examine word forms with some care. In the group of mutilations in which other letters were substituted for those of the word, the contour was preserved as it was in transposition, e.g., "lihac" for "lilac"; but the percentage of mutilations read as words falls from 75.9 per cent in transposition to 42.6 per cent in substitution. This would seem to show that while these children have some pretty definite conceptions of the appearance of the word as a whole, they are also conscious of the parts of the word and notice their presence or absence. In mutilations affecting the length and contour of the word more than one factor enters in, for one cannot change the length of the word without adding, omitting, or substituting a letter; e.g., "cat," "coast," and "coact" for "coat"; and he cannot change the contour of the word without transposing or substituting letters; e.g., "fed" and "der" for "red." It is to be expected that these mutilations would disturb the child more than the preceding ones and they do so—the percentages falling to 37.4 for length and 30.7 for contour. The last two groups of mutilations affected

the part of the word only, though in each case there was either substitution or transposition. The figures show that for these pupils up to the time of the tests the final letter is a little more significant than the initial letter; the opposite is true with adults, probably because through training they have come to depend on the first part of the word for its recognition. It is unfortunate that no mutilations of the middle of the word were presented to determine its significance. The conclusion drawn from these mutilations is that the children saw the words as wholes and, while not conscious of the position of the parts, were conscious of their presence or absence.

The comments and the questions, as well as the misreadings, seem to show that children learn to read words by the trial and error method. It may be the length of the word, the initial letter, the final letter, a characteristic letter, the position of the word in the sentence, or even the blackness of the type that serves as the cue. There were surprisingly few instances of learning by imitation. The first occurred in the fifth week, when one child pointed out the word "the" and two other children pointed out other "the's," though similar opportunities had been presented before. Suggestion, which is a noticeable element in the reading of young children, also played a minor part. There is no evidence in any of the cases studied that the child works out a system by which he learns to recognize words. That he does not work out phonics for himself comes out quite clearly in the transposition test. Furthermore, only once did a child divide a word even into its syllables. There is some evidence that the child is conscious of the letter, though there is none that he analyzes the word letter by letter, except in the case of "E," who so analyzed the word "six." Sometimes, when the child seemed to have made a letter analysis, he failed to recognize the word a second time, and in some cases did not learn it at all.

The scope of this study does not warrant general conclusions. The purpose has been to present some concrete observations of what children do in learning to read, and to suggest some means by which such observations may be analyzed and interpreted. Some considerations which seem to the writer to be at least suggested by the results of this study may, however, be mentioned.

Under the methods of instruction employed with this class as outlined above, it appears that these beginners in reading have after two months or more of instruction secured a sufficient conception of the general appearance of a very limited number of words to recognize them as wholes, that in doing this they made use of only very general cues or points of differentiation between words and have not noticed the finer points of distinction between words and parts of words. It appeared very doubtful to the experimenter whether, under this method of teaching words as visual wholes, the pupils would, of themselves, have come to make this latter necessary analysis with much success. Without some foregoing analysis and subsequent synthesis, the differences between words are not great enough to be recognized merely from the total visual appearance. The early introduction of phonics may supply, in some measure, this analysis. There is an undoubted advantage in having words presented at the start as units and wholes, as contrasted with the discarded teaching by letters. But that a word method can be used very long without some detailed analysis of the structure and parts of the words is altogether too common a notion in the theory if not in the practice of teaching.

Note From Internet Publisher: Donald L. Potter
Odessa, TX – November 19, 2005

My friend Paul Lukawski sent me this copy of Bowen's essay in April 2005. It is a very important early contribution to our understanding of the psychology of reading. Note especially her detailed reference to the earlier work of Oskar Messmer. The following quote is particularly interesting, "**There is no evidence in any of the cases that the child works out a system by which he learns to recognize words. That he does not work out phonics for himself comes out quite clearly in the transposition test.**" The whole-language contention that reading is a natural act like learning to speak a language is clearly refuted by this 1911 educational article.

Hat off to Miss Geraldine Rodgers who pointed me to the importance of this article. I have published several of her essays on my web site. There are also links to where you purchase her books, *The Hidden Story: How America's Present-day Reading Disabilities Grew Out of the Underhanded Meddling of America's First Experimental Psychologist*, and her magnum opus, *The History of Beginning Reading: From Teaching by "Sound" to Teaching by "Meaning"* where this article is discussed at length.

For more information on the psychology of reading and for effective phonics-first programs for teaching reading, visit my Education Page of my web site: www.donpotter.net.

I launched a Nationwide Educational Reform Campaign in 2007 featuring Hazel Loring's *Reading Made Easy with Blend Phonics for First Grade*.