AN INVESTIGATION INTO FIRST GRADE AWARENESS OF

ORAL WORD BOUNDARIES AS A PREDICTOR OF

READING SUCCESS

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ABSTRACT

The purpose of this investigation was to obtain empirical

evidence to determine, at the Grade I level, the relationship between

awareness of oral word boundaries and future reading success and to

investigate the relationship of this awareness to the sex of the sub-

jects. To achieve this main purpose, an oral word boundaries test was

created, and the oral word boundaries awareness and letter naming ability

of beginning grade one pupils was tested; reading ability was tested at

the end of grade one. The scores obtained were correlated for boys,

for girls and for the total sample.

The two main questions for study then were: 1) Is there a cor-

relation between awareness of oral word boundaries and future reading

success? 2) What is the relationship between this awareness and the

sex of the subject?

The sample used in the study consisted of 51 subjects, 28 boys

and 23 girls, the entire grade one population of a school considered

to be representative of a middle-class socioeconomic area in a Western

Canadian city.

The Oral Word Boundaries Test developed by the investigator and

the letter naming subtest of the Harrison-Stroud Reading Readiness Pro-

files were administered to the subjects in mid-October of 1977. The

reading subtest of the Metropolitan Achievement Test, Primary I Battery,

Form A, was administered to the subjects by the classroom teacher at the

end of May.

After a descriptive analysis of the data, Pearson Product Moment correlations were used to determine the relationship between the letter naming subtest, the Oral Word Boundaries Test and the reading subtest. A regression analysis was used to determine whether the Oral Word Boundaries Test adds significantly to the letter naming subtest in predicting reading success. A T-test was used to determine whether there is a significant difference between scores of boys and scores of girls in each test. Finally, a descriptive analysis of the segmentation pattern of the Oral Word Boundaries Test was done.

On the basis of the findings and the limitations imposed by the study, the following main conclusions were drawn:

1. There is a significant positive correlation between letter naming ability and future reading success.

2. There is a significant positive correlation between awareness of oral word boundaries and future reading success.

3. There is a significant relationship between letter naming ability and awareness of oral word boundaries for boys and for total sample. For girls, correlation is not significant.

4. The Oral Word Boundaries Test adds significantly to letter naming in predicting future reading success for boys, for girls and for the total sample.

5. There is no significant difference between scores of boys and scores of girls in letter naming and in reading ability. However there is a significant difference in scores for the Oral Word Boundaries Test.

6. There is a segmentation pattern in subjects' responses to the Oral Word Boundaries Test.

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NATURE OF THE STUDY

Children who are beginning to read bring to that task a reper-

tory of linguistic, cognitive, auditory and visual processing skills

which are in varying stages of development.

> In most instances... a teacher faces a class
> comprised of children who show considerable
> variation in their readiness to learn. Although
> they might share a certain chronological age, they
> differ not only in family background but also in
> such relevant factors as prior experiences, in-
> telligence, motivation, interests, health, and
> personality. (1)

These children also bring to the task of beginning to read a varying

awareness of what reading is all about and frequently they show poor

understanding of terms related to reading such as "letters" and "words"

which teachers commonly use in teaching reading.[2] These individual

differences in development of the processing skills and in awareness

of reading related terminology could affect a child's beginning reading.

The relationship of this repertory of skills to the reading

process has generated considerable research. In examining the research

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[1]Dolores Durkin, _Teaching Them To Read_, 2nd ed., (Boston:
Allyn and Bacon, Inc., 1974), p. 6.

[2]John Downing, "Children's Developing Concepts of Spoken and
Written Language, "_Journal of Reading Behavior_, Vol. 4, No. 1, (Winter,
1971-72), p. 1-10.

on reading readiness, MacGinitie[3] finds that such research has two

purposes: understanding the nature of the process of learning to

read and making useful predictions.

On the other hand, the process of learning to read is not

very well understood and not enough is known about its components

skills:

> Researchers do not yet know enought about the
> developed skills of the fluent reader, the end
> product of the instructional process, let alone
> the process of acquiring these skills. But re-
> searchers are beginning to realize that reading
> will not be completely understood until there is
> an understanding of the perceptual, cognitive,
> linguistic, and motivational aspects not just of
> reading, but of living and learning in general.　(4)

Because not enough is known about learning to read, it is not known

which component skills might be the most useful predictors of reading

success:

> ... in spite of the considerable volume of re-
> search on all kinds of predictive measures, as
> yet there is not a very clear understanding of
> the specific roles and the interaction of the
> various predictors ...　(5)

There is need, then, for a greater understanding of the process of

learning to read so that knowledge of developmental component skills

might provide a sounder rationale for the prediction of reading success.

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[3]Walter H. MacGinitie, "Evaluating Readiness for Learning to
Read: a Critical Review and Evaluation of Research," Reading Research
Quarterly, IV, 3 (Spring, 1969), p. 399.

[4]Frank Smith, Understanding Reading A Psycholinguistic Analysis
of Reading and Learning to Read, (New York: Holt, Rinehart and Winston,
Inc., 1971), p. vii.

[5]MacGinitie, op. cit. p. 399.

> Reading becomes a more complex process over time
> since it reflects the increasing complexity of
> language usage that accompanies learning, matu-
> ration, and experience. Given this developmental
> process in reading, it is likely that early skills
> may vary in their relationship to it (Lowell, 1971).
> Some skills may predict only early reading per-
> formance, some may emerge as predictors of later
> performance; and some may prove to be consistent
> predictors over a considerable developmental span.
> Knowledge about this developmental relationship
> should add to understanding the reading process. (6)

In particular, more investigation is needed of the specific language

used for reading instruction. The problem as stated by Kingston almost

a decade ago remains of major concern to teachers today:

> Teachers of reading, particularly teachers of begin-
> ning reading, tend to use the "word" as a major
> goal in reading pedagogy and for judging pupil
> progress. Constantly we see and hear reference
> to work recognition, word attack skills, and sight
> vocabulary whenever reading is discussed. (7)

Thus the study of children's awareness of specific instructional terms

in aural form may be helpful in understanding how children learn to

read and may serve as a useful predictor of reading success.

STATEMENT OF THE PROBLEM

It has been found that there is a correlation between letter

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[6] Siegmar Muehl and Mario C. DiNello, "Early First-Grade Skills
Related to Subsequent Reading Performance: A Seven Year Follow up Study,"
Journal of Reading Behavior, 8, (1976), p. 69.

[7] Albert J. Kingston, Wendall W. Weaver and Leslie E. Figa,
"Experiments in Children's Perception of Words and Word Boundaries,"
Paper presented at the Annual Convention of the National Reading Con-
ference, Florida, (1971), p. 91.

naming ability at the grade one level and reading success.[8] It has

also been found that there is little research into the area concerning

children's awareness of specific terms used for reading instruction.[9]

Some studies of this awareness of specific terms have been done through

an oral word boundaries test but such a test has not yet been refined.[10]

In addition, very little work has been done to determine whether children's

awareness of oral word boundaries as indicated by an oral word boundaries

test would predict reading success. Thus an area of study was identi-

fied: Does oral word boundaries awareness predict reading success?

This question was then considered under several hypotheses.

<div align="center">HYPOTHESES</div>

Hypothesis 1. There is a significant correlation between be-

ginning Grade I letter naming ability and end of Grade I scores on the

Reading subtest of the Metropolitan Achievement Test for:

 a. boys

 b. girls

 c. total sample

Hypothesis 2. There is a significant correlation between be-

ginning Grade I scores on an Oral Word Boundaries Test and end of Grade I

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[8]Siegmar Muehl and Mario C. DiNello, "Early First-Grade Skills Related to Subsequent Reading Performance. A Seven Year Follow up Study," Journal of Reading Behavior, viii, 1, (1976).

[9]John Downing, "Children's Concepts of Language in Learning to Read," Educational Research, 12, (1970).

[10]Albert J. Kingston, Wendell W. Weaver, Leslie E. Figa, "Experiments in Children's Perceptions of Word and Word Boundaries," 21st Yearbook of the National Reading Conference, (1972).

scores on the Reading subtest of the Metropolitan Achievement for:

    a. boys

    b. girls

    c. total sample

Hypothesis 3. There is a significant correlation between beginning Grade I letter naming ability scores on an Oral Word Boundaries Test for:

    a. boys

    b. girls

    c. total sample

Hypothesis 4. An Oral Word Boundaries Test adds significantly to letter naming scores in predicting reading success for:

    a. boys

    b. girls

    c. total sample

Hypothesis 5. There is no significant difference between the scores of boys and the scores of girls on the:

    a. Reading subtest of the Metropolitan Achievement Test

    b. Letter Naming Test

    c. Oral Word Boundaries Test

Hypothesis 6. There is a segmentation pattern in the subjects' responses to the Oral Word Boundaries Test.

DEFINITION OF TERMS

The following terms are used in this study with these meanings:

1. Word. A lexical unit that is conventionally preceded and followed by a space in written language.

2. <u>Word Boundary</u>. In written language conventionally indicated by a
   space between two consecutive words.

3. <u>Letter naming</u>. Upon being presented with a printed letter the
   subject gives the appropriate name.

4. <u>Reading success</u>. Indicated by an average or above average score
   on a standardized reading achievement test for the subjects' grade.

5. <u>Segmentation</u>. The division of a sentence or word into smaller parts.

PROCEDURES

The Letter Naming subtest of the <u>Harrison-Stroud Reading Readiness Profiles</u> and an Oral Word Boundaries Test developed specifically
for this study were administered individually during the second half
of October to fifty-one Grade I students of a suburban elementary
school. The Reading subtest of the <u>Metropolitan Achievement Test</u>,
Primary I Battery, Form A, was administered to the same subjects at the
end of May of their Grade I year. The data collected were analyzed
using the Pearson Product Moment Correlation for Hypotheses 1, 2, and 3.
Multiple correlation and regression analysis was used to test Hypothesis
4 and the T-Test was used to test Hypothesis 5. Hypothesis 6 was
examined in descriptive form.

LIMITATIONS

There are two limitations operating in this study.

Only one school was used. Because it is in a suburban middle
class socioeconomic area, the findings cannot be generalized beyond
this population.

The study was under the direct control of the investigator and may have been unconsciously biased.

ASSUMPTIONS

The Oral Word Boundaries Test which was developed for this study contains sentences which are assumed to be part of the subjects typical speech patterns.

SIGNIFICANCE OF THE STUDY

A summary of research into beginning reading indicates that more information is needed about the process of learning to read and about the skills a beginning reader must bring to this task in order to be successful. This study should shed some light on both needs.

More specifically, this study may confirm conclusions of previous research that there is a significant relationship between letter naming abilities and future reading success. In addition, it may indicate that there is a significant relationship between awareness of word boundaries and reading success. Should this be the case, a means of testing for this awareness would be of benefit to the classroom teacher.

The results of this study should have direct application to classroom instruction and should open avenues for further investigation in the area of beginning reading.

OVERVIEW OF THE STUDY

This study is designed to investigate at the grade one level the students awareness of oral word boundaries as a predictor of reading success and to explore the relationship between this awareness and the sex of the subject. Though much has been written about youngsters'

awareness of instructional terms, there has not been much research

available to this researcher. Chapter 2 reviews the related literature.

Chapter 3 describes the design of the study, and the data is analyzed

in Chapter 4. Chapter 5 gives a summary, the conclusions reached,

implications, and recommendations for further research.

Chapter 2

REVIEW OF RELATED LITERATURE

One purpose of this study was to investigate at the grade one
level pupils' awareness of oral work boundaries as a predictor of reading
success and to investigate the relationship between this awareness and
the subjects' sex. This chapter will establish the basis for this
study by discussing teacher usage of reading related terms in teaching
beginning reading and the beginning readers' understanding of this
terminology. Then research related to the beginning reader's awareness
of word boundaries will be reviewed. This will be followed by an out-
line of research into the area of letter naming abilities of beginning
readers which has been shown to be a reliable predictor of reading
success. Finally, procedures used to test awareness of oral word
boundaries will be explored.

Teacher Usage of Reading Related Terminology with Beginning Readers

In beginning reading instruction, classroom teachers commonly
use such terms as "sentence", "word", "letter" and "sound" when talking
about reading. In examining a representative sample of teacher's man-
uals currently in use in primary schools, it was found that these terms
are used very early in reading instruction and that it is sometimes as-
sumed that children understand them.

For example, the Introduction to the Collier-MacMillan Reading
Program[1] states that pupil involvement and skill in word attack are of

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[1]Albert J. Harris and Mae Knight Clark, Teacher's Annotated Edition
and Guide to accompany Opening Books, A Magic Box, Things You See, Canadian
editor Grace S. Walby, (New York: Collier-MacMillan Canada, Ltd., 1968).

prime importance.

> From the beginning level, where he first learns
> that word symbols have visible differences which
> enable him to tell them apart, he begins a con-
> tinuing quest for new and better ways of dis-
> tinguishing words. (2)

The instructions to the teacher assume that the child knows what a

word is: On the fourth page of the first reader the teacher is

directed to ask "How many times can you find the word and?"[3]

In another reading series, the author, in his introduction,

refers to "sentence sounds" and "a chance to connect oral and printed

language" when describing the presentation of Happy Birthday to You,

the first selection in his first book, Sounds I Remember.[4] The in-

structions to the teacher on the second page of the reader call for

sentence transformation: the teacher is directed to ask, "Children,

suppose we didn't want to say the word 'here', what other words could

we use?"[5] Again, it is assumed the child is aware of what a "word" is.

In another series, The New Open Highways,[6] the concepts of

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[2]Ibid., p. 11.

[3]Ibid., p. 6.

[4]Bill Martin Jr., Pre-Primer Teacher's Edition Sounds I Remember, (New York: Holt, Rinehart and Winston, Inc., (1974).

[5]Ibid., p. 12.

[6]Ida Mae Johnson et al., A Manual for use with My Starter Book, The New Open Highways, (Glenview, Illinois: Scott, Foresman and Company, 1974).

"sentence", "word", and "letter" are directly taught. This series is

intended for those "who need repeated review, reteaching, and practice

in the skills required to get meaning from print."[7] The instructions

to the teacher are very clear: After developing the notion of what a

fish is and does while examining a picture, the teacher, in prepara-

tion for reading a sentence about a fish, says "I'm going to say a

sentence about a fish. Listen to the sentence." When the sentence is

written on the board:

> To help pupils comprehend part-whole relationship
> (words as parts of a sentence), return to the
> sentence on the board. Frame the sentence with
> your hands and remind children that this is a
> sentence. Then frame each word in the sentence
> in turn with your hands. For each word say:
> This is a word. Point out that the sentence is
> made up of words and that the spaces between
> words make it clear where each word begins and
> ends. Ask a child to frame the first word in
> the sentence.   (8)

The sequence of procedures following this statement is: The

teacher displays the picture of the fish above the word "fish", frames

the word and says "This is a word. The word is 'fish'." The word is

then framed in the sentence and the teacher says, "This word is 'fish',

too." This sequence is reinforced as follows:

> To help children comprehend another part-whole
> relationship (letters as part of a word), display
> the picture of the fish again. Ask:--What is this
> a picture of?
> Point to the word below the picture and ask:--What
> is this word?
> Tell youngsters that the word fish is made up of

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[7]Ibid., p. 18.

[8]Ibid., p. 28.

letters. Point to each letter in turn as you say:
--This is a letter, this is a letter, this is a
letter, and this is a letter.
--Let's count the letters in the word 'fish'.
One, two, three, four. (9)

The lesson goes on to connect the name of "f" and its sound. Unit two

follows the name method and moves from sentence, to word to letter to

sound.

Another reading series, the Language Experience Reading Program

outlines its philosophy by stating that "... oral language factors are

considered the most important of the 'readiness' skills."[10] In dis-

cussing readiness and tieing philosophy to practice, the manual states:

Pupils can also be exposed to the printed word
without any pressure on them to remember word
form. This step in the total process of teaching
children to read is based on the statement made
earlier that one of the factors in reading
readiness is an understanding by the pupil of
what it means to read. Thus, the child has an
idea or an experience, he produces oral symbols
for the idea, the teacher writes the visual
symbols for the oral ones, and then shows him,
by reading, that he can get his own ideas by
decoding the marks on the board. (11)

The general procedure followed is to discuss a picture, with pupils

dictating a composition which the teacher writes on the board, and then

reads back. The reasoning is "... to introduce children to the idea

of reading and to some of the mechanics involved in the process."[12]

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[9] Ibid., p. 28.

[10] Elizabeth A. Thorn, et al., Teacher's Source Book Level I
Language Experience Reading Program, (Toronto: W. J. Gage Limited, 1970).

[11] Ibid., p. 4.

[12] Ibid., p. 5.

In the sample lesson, the teacher is directed to say, "Who can think of a good sentence to start?" and, when rereading the composition, the teacher is directed to say, "As I read, did you notice one word that we used many, many times?"[13] There had been no previous discussion or use of the terms "sentence" or "word" in the sample lesson.

The stated primary objective of the series <u>Starting Points in Language Arts</u> is the development of oral and written language.[14] Some of the skills of reading readiness are listed as "... the ability to match visual forms, to recognize letters, to hear the sounds represented by beginning consonants, to hear rhyme, to match words. ... Just as important, however, to the beginning reader is the knowledge of certain concepts."[15] These concepts are listed: left, right, next, first, last, over, under, high, low, more, some, all.

In this series the pre-reading check assumes children recognize the purpose of the printer's spaces. Instructions for the Visual Discrimination Words Check are: "Put your finger on the word near the tree and direct the children to focus their attention on that word. Say: "In the box next to this word there are three words. Can you find the word that looks like the word near the tree?" Have a pupil come up to the chalkboard and point out the matching word, then circle the word."

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[13]Ibid., p. 8.

[14]Martha Kambeitz and Coral Roth, <u>Teacher's Guidebook for Starting Points in Language Arts</u>, Level 1, Anna Gibbs ed., (Canada: Ginn and Company, 1976).

[15]Ibid., p. x.

Further, in the first reader of this series, lesson one suggests a discussion centering around the topic. The teacher is instructed to ask whether a letter is "capital" or "small", and the term "word" is used to elicit rhyming words to counter the possibility that children may get the idea that words are only alike if they begin alike.

In summary, of five reading series currently in use, all but one of the manuals directs the teacher to use the terms "sentence", "word", "letter" and "sound" as if the children understand what they mean. The one exception, The New Open Highways, specifically directs the teacher to illustrate and teach each of these concepts, and states that the reading series is intended for children who need reteaching and repeated review, in other words, the less than average.

Thus the authors of these reading manuals assume that, with the exception of the less than average, beginning readers understand the meanings of "sentence", "word", "letter" and "sound" and that teachers may use these terms with beginning readers.

Beginning Readers' Understanding of Reading Related Terms

Do the beginning readers understand this reading related language? A review of the literature indicates that any examination of this question is fairly recent and "... primitive at best."[16] However, the results of these studies makes it clear that children do not always understand the language used by teachers in teaching reading.[17]

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[16] T. Gary Waller, Think First, Read Later! Piagetian Prerequisites for Reading, (Delaware: International Reading Association, 1977), p. 10.

[17] John Downing, "Children's Concepts of Language in Learning to Read," Educational Research, 12, (1970).

To discover children's ideas about reading, Reid[18] in 1966, interviewed seven boys and five girls, five years of age, at three separate times in their first year, after two, five, and nine months of schooling. She discovered that for them reading "is a mysterious activity, to which they come with only the vaguest of expectancies."[19] She reported that these children showed a very poor understanding of such technical terms as "word", "letter", "sound", and "sentence". In loosely structured interviews, she found that children called letters "numbers" and called words "names".

The work of Downing[20,21] and Francis[22] supported and extended Reid's findings. Downing used three methods: he replicated Reid's interview method, used pictures, a book and toys as concrete stimuli, and in two experiments used a tape recording to ask the child if what he heard was "a word" or "not a word", and "a sound" or "not a sound". He concluded:

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[18] J. Reid, "Learning to Think About Reading," Educational Research, 9, (1966).

[19] Ibid., p. 62.

[20] John Downing, "Children's Concepts of Language in Learning to Read," Educational Research, 12, (1970).

[21] John Downing, "Children's Developing Concepts of Spoken and Written Language," Journal of Reading Behavior, 4, (1971-72).

[22] Hazel Francis, "Children's Experience of Reading and Notions of Units of Language," British Journal of Educational Psychology, 43, (1973).

1. Young beginners have difficulty in understanding the
   <u>purpose</u> of written language.

2. They have only a vague idea of how people read and they
   have a special difficulty in understanding <u>abstract</u>
   terms.   (23)

The results of his two experiments showed

> ... that the categories 'word' and 'sound' are
> very poorly understood by five-year-old beginners
> ... none thought of it the word as the segment
> of human speech defined by adults as 'a word'.
> Not one single child thought of 'a sound' as being
> exclusively the phoneme--as a teacher might in
> this context of the teaching of reading.   (24)

Francis interviewed fifty beginner readers four times at

six-monthly intervals. She asked them to tell her a letter, a word,

and a sentence and also asked the children to identify these. The re-

sults of the exploration of notions of letter, word and sentence con-

firmed Reid's and Downing's findings that children's concepts of letter

and word are vague and confused.[25]

As one method of assessing the problem, Evanechko, Ollila,

Downing and Braun[26] devised a "Technical Language of Literacy Test"

and administered it to 97 school beginners in five first grade classrooms;

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[23]John Downing, "Children's Concepts of Language in Learning
to Read".

[24]Ibid., p. 111.

[25]Francis, "Children's Experience of Reading and Notions of
Units of Language".

[26]Peter Evanechko, Lloyd Ollila, John Downing and Carl Braun,
"An Investigation of the Reading Readiness Domain", <u>Research in the
Teaching of English</u>, 7, (1973), p. 61-78.

the purpose was to determine the children's understanding of the terms number, letter and word. The report revealed that 15-20% of the children had difficulty with these terms.[27]

Downing and Oliver examined the conception of a 'word' over an age range of 4.5 to 8.0 with fourteen subjects. Auditory stimuli, including abstract non-verbal sounds, identifiable real-life non-verbal sounds, isolated phonemes, syllables, short words, long words, phrases and sentences were presented. All of the children, regardless of age, confused isolated phonemes and syllables with spoken words.[28]

In summary, research indicates that some beginning readers have only vague ideas of the meanings of terms commonly used by teachers during reading instruction; they are unclear as to the meanings of words such as "letter", "sound", "sentence" and "word". Beginners do not all have the same notions about these terms as the teachers who use them.

Several explanations of this confusion have been proposed. One has to do with the nature of language:

> Oral language is not divided up neatly into
> sentences, phrases or words but is a continuous
> flow. Native speakers produce this flow of
> language almost unconsciously. It is only when
> written language is introduced that there is a
> need to examine the parts of this flow, that is

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[27] Lloyd Ollila and Kerry Quorn, "The Young Child's View of Reading," _Manitoba Journal of Education_, Volume II, No. 2, (1976), p. 11-14.

[28] John Downing and Peter Oliver, "The Child's Conception of a 'Word'," _Reading Research Quarterly_, 9, (1974), p. 568-582.

> sentences, words, and sounds or letters. After
> learning to read, the sentences, words and sounds
> of letters of the language are obvious, but before
> that, they are obscure. (29)

Ollila and Quorn pointed out that it cannot be assumed that the child's

development of the language of reading is the same as that of the

teacher and that caution must be exercised in using reading-related

terms.

Another major consideration is the complexity of cognitive

development and its relationship to reading. Reid speculated that

> Part of the success seemed to depend on whether
> or not a child was able to entertain not only
> the notion of one-to-one correspondence (in this
> case between the elements of spoken and those of
> written speech) but also, side by side with that
> notion, awareness of the possibility of exceptions
> and deviations. (30)

Downing's theory considered literacy learning as a problem-solving task

rather than one of association learning.

> The task of mastering the skill of reading poses
> a very complex problem to be solved by the child.
> Thus the learning-to-read process consists of a
> series of discoveries of solutions to the sub-
> problems which constitute the total complex
> problem of finding out how to read. In other
> words, progress in literacy acquisition is made
> by a series of cognitive restructurings which
> result from the learner's probes made in the
> course of his search for solution. Sometimes the
> new cognitive structure will be a correct solution,
> but at other times it will be in error. As the
> child's attempted solution approximate more and
> more closely to the reality of each aspect of the

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[29]Lloyd Ollila and Kerry Quorn, "The Young Child's View of
Reading," Manitoba Journal of Education, Volume II, No. 2, (p. 13).

[30]J. Reid, "Learning to Think About Reading," (p. 62).

reading process, so he will achieve more and more
cognitive clarity. Therefore, the best measure
of a child's progress in solving the learning-to-
read problem should be his degree of understanding
of the nature of the task. Thus cognitive clarity
will be correlated most highly with reading success,
while failure in reading will have as its chief
symptom cognitive confusion. (31)

Francis speculated that

... perhaps the difficulty experienced by children
was not so much that the concepts word, letter,
number, name are abstract, as suggested by Downing,
but that they overlap in their application and
are somewhat ill-defined. Nevertheless, one would
not wish to quarrel with the general view, expressed
by Vygotsky, that children find the abstract nature
of written language itself something of a problem,
but this is a different matter from the question
of the nature of terminology used in teaching. (32)

In addition to the complexity of the reading task, the abstract nature

of written language and the nature of the terminology used, there is

the consideration that

... young children lack a consciously analytic
approach to speech and their notions of units
in language appear to be derived from analysis
of written forms as they learn to read.
Thus, difficulty in comprehending the
technical vocabulary of reading instruction
appears to be an integral part of the difficulty
of learning to read, rather than a separate
conceptual difficulty. (33)

Some educators have looked to Piagetian theory for insight into

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[31] John Downing, "Children's Developing Concepts of Spoken and Written Language," p. 19.

[32] H. Francis, "Children's Experience of Reading and Notion of Units of Language," p. 22.

[33] Ibid., p. 23.

cognitive factors that may account for children's success or lack of

success in beginning reading. Waller summarized the research done

to date:[34]

> Within Piaget's theory, thinking is based on a
> sufficiently large number of competencies and
> reading is certainly sufficiently complex that
> attempting to specify precisely the connection
> between the two is hazardous. It could be
> that any number of competencies or combination
> of competencies, beginning with the symbolic
> function and moving forward, form the bases for
> relationships which might be observed between
> reading and performance on Piagetian tasks.   (35)

In summary, teachers often use terms such as "sound", "letter",

"word" and "sentence" in teaching beginning readers and research re-

veals that some children do not understand this technical language.

Children's Perceptions of Words and Word Boundaries

Researchers have studied children's perceptions of words as

part of the speech or writing stream.

Reasons for this interest in children's perceptions of words

are outlined by Waller and by Kingston, Weaver, and Figa. The ability

to distinguish the signifier from that which is signified, the develop-

ment of the symbolic function, is considered crucial for reading: this

symbolic function permits the word "cat" to represent a thing which

might not be present in the immediate environment; it indicates an

awareness of the word as separate from that which it represents.[36]

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[34]1977.

[35]Waller, Think First, Read Later! Piagetian Prerequisites for
Reading, (p. 3).

[36]Ibid., p. 3.

Teachers of reading, particularly teachers of beginning reading, refer

to word recognition, word attack skills and sight vocabulary whenever

reading is discussed and tend to use the "word" as a major goal in

reading pedagogy and in judging pupil progress.[37]

Other educators go so far as to say that segmentation of words

from the speech stream is a prerequisite for learning to read.[38] It

is generally assumed that beginning readers can segment words from a

speech string, that they are aware of oral word boundaries. However,

little is known about how beginning readers learn to recognize words

or, for that matter, what a word actually is.[39] The question of word

boundaries has not received a great deal of investigation but the avail-

able empirical evidence suggests that young children are not aware of

word units in speech or writing.

One such study of children's discrimination of word boundaries

in written language was carried out by Meltzer and Herse to determine

whether or not thirty-nine children who had been in first grade for two

and a half months could locate the boundaries of written words in sentence

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[37]Albert J. Kingston, Wendell W. Weaver, Leslie E. Figa, "Experi-
ments in Children's Perceptions of Word and Word Boundaries," 21st Year-
book of the National Reading Conference, (Florida) 1972.

[38]George McNinch, "Auditory Perceptual Factors and Measured First-
Grade Reading Achievement," Reading Research Quarterly, VI, 4 (Summer,
1971), p. 475.

[39]Kingston, Weaver, Figa, "Experiments in Children's Perception
of Words and Word Boundaries."

form using the printer's spaces. They found that children use height of

letters, length of words and printers' spaces to identify the boundaries

of words. They found that although most children identified some bound-

aries, there were many words the children could not identify.[40]

In a study undertaken to examine first grade children's percep-

tions of written word boundaries after a year of reading instruction,

Mickish asked one hundred seventeen students to mark word boundaries in

a written sentence presented with no spaces between the words. The

sentences were played on tape while the children marked the word bound-

aries. She found that many children at the end of their first year of

reading instruction had little idea of what words are and that better

readers were better at marking word boundaries.[41]

Karpova examined the ability of three to seven year old children

to identify the number of words in a spoken sentence. She employed two

different methods: a concrete method involving the use of concrete ob-

jects as counters, and a verbal method in which children were asked to

state the number of words heard and to give the ordinal positions of the

words. Most of her subjects were able to distinguish nouns. They experienced

the most difficulty with prepositions and conjunctions. Some children could

respond correctly only when they combined a motoric and a verbal response.[42,43]

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[40]N. S. Meltzer and R. Herse, "The Boundaries of Written Words as Seen by First Grades," Journal of Reading Behavior, 1969, 1, 3-13.

[41]Virginia Mickish, "Children's Perceptions of Written Word Boundaries," Journal of Reading Behavior, 1974, VI, 1, p. 19-22.

[42]Kingston, Weaver, Figa, "Experiments in Children's Perception of Words and Word Boundaries."

[43]Margorie M. Holden and Waller H. MacGinitie, "Children's Con-ceptions of Word Boundaries in Speech and Print," Journal of Educational Psychology, V. 63, No. 6 Dec., 1972.

Evans developed an aural word identification test of ten items, dupli-
cating the structures used by Karpova. She eliminated subjects who
could not count a series of pictures or a string of two to four isolated
words. The children were dictated a sentence, asked to repeat it, and
were then asked to identify the first word and the second word. The
same task was administered in December. Her results indicated Kinder-
garten and first grade children who can identify the individual words
in a string of words are not all able to segment sentences into com-
ponent words at the beginning of the school year. In the three month
period, greater improvement in segmentation ability was shown by the
first grade subjects. Evans speculates that this difference may be
indicative of a change in the nature of the language processing
mechanisms children use: as they learn to read they begin to be able
to focus on the structure of the sentence rather than process it in
meaning units.[44]

McNinch, as part of a broader study, constructed an Aural Word
Representation Test (A.W.R.) which requires the subject to represent
each spoken word in a stimuli utterance with a single one inch foam
rubber cube. The test items range from two to six word utterances and
consist of three sample items and fifteen test items. He found a
positive correlation (.47) between the A.W.R. test given in October
and a standard end-of-year reading achievement test.[45]

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[44]Martha C. Evans, "Children's Ability to Segment Sentences into
Individual Words," 24th Yearbook of the National Reading Conference, 1975.

[45]George McNinch, "Auditory Perceptual Factors and Measured First
Grade Reading Achievement," Reading Research Quarterly, (Summer 1971), VI,
4, p. 472-492.

In a series of five experiments, Kingston, Weaver, and Figa[46]
replicated and extended the work of Downing, Meltzer and Herse, and
McNinch in that they examined first grade children's perception of
words in isolation, of word boundaries in the speech stream, and of
word boundaries in written sentences. The Meltzer and Herse study was
extended to include not only material from the subjects' basal reader
but also pseudo-words of the same length as words in the basal reader,
and sentences selected from an adult novel. They found that children
did not always use the printer's space to identify word boundaries and
that they made a significantly greater number of errors in the sentences
selected from the adult novel. They concluded that recognizing the
printer's space as a separator is secondary to perceiving that a parti-
cular linguistic unit represents a meaningful entity. In extending
the McNinch study, an aural, a visual and a taped presentation were
used: three short trial sentences and sentences or phrases of from two
to six words. Each subject was given a number of wooden cubes and in-
structed to place the number of cubes equivalent to the number of words
in the sentence before the examiner upon hearing or reading a sentence.
The highest scores were obtained in the visual presentation (Mean 12.07)
with aural (Mean 7.33) and taped (Mean 6.20) presentations producing
lower scores. They noted that in the reading aloud and in the taped
presentations, the number of words was consistently underestimated while
in the reading presentation the number of words was more often over-
estimated. In an extension of the Downing study, fifteen subjects were

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[46]Kingston, Weaver and Figa, "Experiments in Children's Percep-
tion of Words and Word Boundaries."

asked to identify sounds heard as being either a word or not a word,

fifteen subjects were asked to distinguish between 10 compound words

and 10 two-word pairs as being either one or two words, and fifteen

subjects were asked to tell how many words they heard in each of twelve

taped sentences, each sentence including both words and sounds. The

children as a group had some difficulty in recognizing the difference

between human words and non-words, and in distinguishing compound words

from word pairs, and found the last task entirely too difficult.

Figa[47] developed two twenty-sentence tests using the vocabulary

of a basal reader familiar to his eighty first grade subjects and tested

their oral and written word segmentation ability. Using an oral word

segmentation test, Figa identified forty subjects with low oral word

segmentation ability and forty subjects with high oral word segmentation

ability. They were then randomly assigned to one of four experimental

conditions of the written word segmentation test. The sentences were

spaced and punctuated, spaced and not punctuated, punctuated and not

spaced, and not punctuated and not spaced. The subjects identified

as "high" in oral word segmentation ability performed significantly

better than the subjects identified as "low" in oral segmentation

ability on the written word segmentation test. In addition, the pre-

sence or absence of the printer's space made a significant difference

but the presence or absence of punctuation did not. Figa concluded

that it is possible that just as oral language precedes written language,

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[47]Leslie Figa, Emperical Factors Involving the Perception of
Oral and Written Word Unit Segmentation (Doctoral dissertation, the
University of Georgia) Ann Arbor. University Microfilms, Order No. 72-
34, 069, 1972.

the ability to segment sentences presented orally may precede the ability to segment sentences presented graphically. However, "...the lack of consistency by each group of low and high oral word segmentation ability subjects across all conditions of the written word segmentation test leads to doubt about a direct relationship between oral and written language as measured by the tasks in this study."[48]

Holden and MacGinitie investigated children's conceptions of word boundaries in speech. In one experiment, eighty-four end-of-year Kindergarten children listened to a sentence on tape and, when they could repeat the sentence correctly, they repeated it again, tapping a poker chip for each word. In general, the greater the proportion of content words in the utterance, the greater the percentage of correct segmentations.[49]

It is evident that some beginning readers cannot segment words from the speech stream and that they are not always aware of the purpose of the printers' spaces in written language. They lack precise concepts concerning the nature of a "word". It is equally as clear that

> a first-grade teacher cannot take for
> granted that children will understand her
> when she talks about "words" and their printed
> representation. Not can she assume that the
> concepts can be quickly and easily taught, since
> printed word units do not correspond to the way
> the child thinks the utterance should be divided. (50)

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[48]Ibid., p. 46.

[49]Holden and MacGinitie, "Children's Conception of Word Boundaries in Speech and Print."

[50]Ibid., p. 556.

Various reasons for this lack of precise concepts concerning the nature of a "word" have been proposed. Although researchers have used the conventional printer's space as the standard for correct segmentation, there is no agreement among linguists as to what a "word" is. Lack of the concept does not appear to be a barrier to learning, speaking or listening but is a problem for some beginning readers:

> If there is a discrepancy between the printing
> convention of written English and preliterate
> children's intuitive identification of word
> boundaries, confusion and difficulty may aris
> for the beginning reader whose intuitive notions
> of lexical units conflict with their conventional
> representation.   (51)

It is possible that the difficulties some children have in learning to read may stem from their inability to distinguish words or perhaps they begin attending to words only after beginning instruction in reading:

> ... once children learn the conventions for
> identifying word units in reading (an ability
> which comes with the mastery of reading skills)
> it is apparently an easy transfer to break up
> the aural phonological stream into word units.
> These first graders, however, do not exhibit
> this easy transfer which is apparent in older
> children. It is possible then that this is
> because they are still erratic in their
> perception of both meaning and the function
> of the printer's space, and therefore do not
> have a firmly grounded reading perception of
> words from which to operate in the phonological
> stream.   (52)

In summary, teachers of reading use "word" as part of the language of reading instruction with the expectation that children understand it.

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[51] Ibid., p. 552.

[52] Kingston, Weaver and Figa, "Experiments in Children's Perception of Words and Word Boundaries," p. 98.

The research, on the other hand, indicates that beginning readers often

do not understand the term and have difficulty segmenting words in the

speech stream and in written language.

Is awareness of word boundaries a skill related to success in

reading? To answer this question, it is feasible to correlate this

skill with a skill that has already been proven to be significantly

related to reading success: letter naming.

Letter Naming as a Correlate of Reading Success

Letter naming appears to be an independent and significant

predictor for both short-term and long-term reading performance.

Muehl and DiNello list some fifteen studies related to the role

of this skill in predicting short-term reading performance and one

long-term study. They consider the research evidence to be "... im-

pressive."[53]

> Without exception naming letters proved to be the best
> single predictor, either in simple or multiple
> prediction.   (54)

To this list can be added their own study. Muehl and DiNello reported

on a seven year follow-up study which assessed the contributions of

first grade skills to subsequent reading performance. The Harrison-

Stroud Reading Readiness Profiles (HSRRP) and the WISC were administered

to subjects early in grade one to form a pool of nineteen different

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[53]Siegmar Muehl and Mario C. DiNello, "Early First-Grade Skills
Related to Subsequent Reading Performance: a Seven Year Follow-up Study,"
Journal of Reading Behavior, VIII, 1, (1976), p. 76. The studies are:
Wilson and Fleming, 1938a, Wilson and Fleming, 1940; Wilson, 1942; Gavel,
1958; Weiner and Feldman, 1963; DiNello, 1965; Barrett, 1965; Silvaroli,
1965; De Hirsch et al., 1966; Muehl and Kremenack, 1966; Bond and Dykstra,
1967; Lowell, 1971; Hick and Santman, 1971; Askov, et al., 1972; Silverberg
et al., 1972; and Bagford, 1968.

[54]Ibid., p. 76.

skill tests obtained from test instruments known from previous research
to be predictors of reading achievement. The subjects of the follow-up
study were fifty-six boys for whom reading test scores were available
from school testing for grades one through seven. In grades one
through three, Metropolitan Achievement Test, Primary I Battery, Form
A (MAT) reading scores were available from end-of-year school testing.
In grades four through seven, the Iowa Test of Basic Skills (ITBS)
reading comprehension scores were available from midyear school testing
at each grade level.

The fifty-six boys in the follow-up study ranged in age in
September of first grade from 74 to 86 months, with a mean age of 81
months. Multiple regression analysis was used to arrive at a set of
independent and significant reading predictors. The most important
conclusion for the study is that the ability to name letters is a
significant and independent predictor at every grade level. The beta
coefficients indicate the correlation of letter naming sub test with
reading independent of other predictor variables. In grades one to six
the beta coefficients of .30, .24, .28, .31, .33 and .35 are significant
at p. 05.

In their discussion, Muchl and Di Nello offer two major explana-
tions for these letter-naming findings and both suggest the operation
of a third factor: the letter naming ability reflects home background
as being the important intervening mechanism and that the letter-naming
skill reflects a maturational factor. However, since individual dif-
ferences in letter naming ability largely disappear at the end of first
grade, they ask: what is the discriminator or the psychological "residual"

that continues to interact with later reading performance?

Muehl and Di Nello direct researchers to an examination of the inter-correlations between the HSRRP   letter-naming subtest and other predictors which may help answer this question. They strongly recommend that:

> For future research in identifying skills
> related to beginning reading performance
> one fruitful approach would be to use re-
> sults from existing multiple prediction
> studies as a basis for screening promising
> variables for replication with a common set
> of Ss.   (55)

It would be valuable to follow this suggestion to see whether awareness of oral word boundaries is a skill that correlates signficiantly with letter naming.

Since research evidence shows that letter naming is a predictor of future reading success, if awareness of oral word boundaries is shown to be related to letter naming, then it could be said with some degree of confidence that awareness of oral word boundaries is a predictor of reading success. Such information might bring more understanding to the nature of the reading process and like Muehl and Di Nello's study perhaps "... provide a better rationale for useful prediction."[56]

Oral Word Boundaries Tests

A search was made of the literature to find a validated oral word boundaries test. For the purpose of this study the test is to contain such sentences as the teacher uses when instructing pupils

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[55]Ibid., p. 69.

[56]Ibid., p. 69.

to "read". These sentences, then, would be such as beginning readers would likely be exposed to and, therefore, would be found in preprimers and primers currently available for classroom use with beginning readers, and from language experience stories generated by typical beginning readers.

A search of the literature indicated the absence of an oral word boundaries test with the required characteristics. Therefore, before the correlation of letter naming and oral word boundary awareness could be studied, a word boundaries test had to be created.

Conclusions

An examination of reading manuals indicates that the language of reading that teachers use in teaching beginning readers includes the words "word", "letter", "sound" and "sentence". The research indicates that some beginning readers do not understand these terms and that they are not always aware of oral and written word boundaries. The question arises as to whether or not this awareness of oral word boundaries is an indicator of future reading success. To answer this question it would be necessary to correlate this early reading skill with another that has been a proven correlate of future reading success: letter naming.

To achieve this objective, this study undertook three tasks:

1. to develop an oral word boundaries test

2. to correlate this oral word boundaries test with a letter naming subtest. The results would reveal validation of the oral word boundaries test.

3. to see if there is a difference between boys and girls in performance on the oral word boundaries test.

Chapter 3

DESIGN AND PROCEDURES OF THE STUDY

One purpose of this study was to investigate at the Grade I

level, students' awareness of oral word boundaries as a predictor of

reading success and to investigate the relationship of this awareness

to the sex of the subjects. In order to carry out this investigation

it was necessary to develop an Oral Word Boundaries Test (OWBT) and

correlate the results of the test with letter naming abilities.

In October, the OBWT developed by the investigator and the

letter naming sub-test of the Harrison-Stroud Reading Readiness Pro-

files (HSRRP) were administered to Grade I subjects. At the end of

May of the subjects' Grade I year, the reading sub-test of the Metropolitan

Achievement Test, Primary I Battery, Form A (MAT) was administered to

these same subjects to determine reading success. Scores obtained on

the OWBT and the HSRRP were correlated, and each of these was correlated

with the MAT, for boys and girls and for the total sample.

This chapter is concerned with procedures used to gather the

necessary data. The pilot studies to develop the OWBT are first described,

followed by a description of the testing instruments. The latter part

of the chapter is devoted to describing the research study.

Development of Oral Word Boundaries Test: Description of Pilot Studies

Four pilot studies were undertaken by the investigator to develop

the Oral Word Boundaries Test (OWBT). The purpose of the pilot studies

was threefold: to develop clear instructions, to practice a standard

demonstration pattern and to select the sentences for the test. The

fourth pilot had the additional purpose of developing a standard intro-

duction to the first test session of the research study.[1]

In the first and second pilot studies, five neighbourhood

children, Grades K, I and II were the sample. In the first pilot study,

instructions were given orally and no demonstration sentences were in-

cluded. For the second pilot study, the subjects were given taped in-

structions, seven demonstration sentences and ten test sentences.

Then modifications were made in the taped instructions, the

demonstration sentences, and the test sentences for the third pilot

study, and a generally more standard format for examiner talk was

developed; the sample for this study consisted of seven Kindergarten

and fourteen Grade I children.

Twenty-two Grade I children were used as the sample in the

fourth pilot study. A standardized oral introduction to the session

was developed. The letter naming subtest of the HSRRP and the OWBT

were administered. The OWBT had been modified to include taped in-

structions, three demonstration sentences, and nineteen test sentences.

The test sentences varied in length from two to eight words since

Menyuk found that within the bound of a two- to nine-word sentence

the length of the sentence is not critical in determining the success

of repetition, even for children as young as three years.[2] The changes

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[1]See Appendix C.

[2]P. Menyuk, "A Preliminary Evaluation of Grammatical Capacity in
Children," Journal of Verbal Learning and Verbal Behavior, 2, (1963),
429-439.

introduced from one pilot study to the next reflect the investigator's attempts to ensure that subjects were given a reason for the activity, that explanations were clear and instructions standardized.

None of the children used in the pilot studies were used in the research study.

TEST INSTRUMENTS

Oral Word Boundaries Test (OWBT)

The OWBT, developed by the investigator in four pilot studies, consists of three demonstration sentences and 19 test sentences having a total of one hundred test words, twenty-seven of these polysyllabic. The test contains one two-word sentence, two three-word, three four-word, five five-word, three six-word, three seven-word and two eight-word sentences. These sentences were chosen from primers and pre-primers currently used in Grade I classrooms, with three sentences taken from language experience stories developed with a Grade I class.[3] For purposes of assuring controlled testing conditions, instructions for the demonstration sentences and the test sentences were taped.[4] The subject was expected to say the test sentence while indicating a bead to represent each word. The score obtained is referred to as the initial response. The subject was then expected to say the test sentence a second time while indicating the bead which corresponded to the spoken word. The score obtained is referred to as the repeat response. Thus

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[3] See Appendix A for list of readers.

[4] See Appendix B for Instructions for Administering.

two scores were obtained for each subject: initial response and repeat response.

A subject's response was recorded by underlining that part of a sentence that the subject orally indicated was represented by each bead. The test score was obtained by counting the total number of individual words that the subject indicated as represented by a bead.

Harrison-Stroud Reading Readiness Profiles (HSRRP)

The Letter Naming sub-test (LN) of the HSRRP consists of forty-two upper and lower case letters. These are presented visually by the examiner, one row at a time, while covering the row above and the row below. The examiner points to the first letter and asks the subject the name of the letter. The number of letters correctly named is the subject's score for the test.

The HSRRP was revised for publication in 1956. Though the test appears to have content validity, the test authors present no evidence regarding subtest validity or predictive validity and the manual contains no data on reliability.[5]

The HSRRP was chosen for this study following the recommendation made by Muehl and Di Nello:

> For future research in identifying skills
> related to beginning reading performance one
> fruitful approach would be to use results from
> existing multiple prediction studies as a basis
> for screening promising variables for replication
> with a common set of Ss.... Such research is
> likely to reduce the appearance of diversity
> among predictors. It could also provide a basis

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[5]Oscar K. Buros, ed. The Fifth Mental Measurements Yearbook, Highland Park, New Jersey: Gryphon Press, 1959.

> for looking beneath the statistical relationships
> among the variables to discover common psychological
> processes....   (6)

The HSRRP was used by Muehl and Di Nello in their study of letter

naming ability as a long-term predictor of reading success.

Metropolitan Achievement Test, Primary I Battery, Form A (MAT)

The Reading subtest of the MAT consists of two sections. The

first is a thirteen-item section in which the subject chooses, from

among three sentences, the sentence that correctly describes an adja-

cent picture. The second is a thirty-three item section in which the

subject is required to read a paragraph and then choose the correct

one of three possible answers to the comprehension questions that

follow each paragraph. This is a 35 minute timed test. The reliability

of the test, .92, is considered high.[7]

The MAT was chosen because it was used in the Muehl and Di Nello

study to determine end of first grade reading success.[8]

RESEARCH STUDY

Sample

The sample consisted of fifty-one grade one children, twenty-eight

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[6]Muehl and Di Nello, "Early First-Grade Skills Related to Sub-
sequent Reading Performance: A Seven Year Follow up Study," p. 69.

[7]Roger Farr and Nicholas Anaslasiow, Tests of Reading Readiness
and Achievement, (Newark, Delaware: International Reading Association,
1969), p. 42.

[8]Muehl and Di Nello, "Early First-Grade Skills Related to Sub-
sequent Reading Performance: A Seven Year Follow up Study.".

boys and twenty-three girls. Their ages at the beginning of grade one ranged from 69 months to 82 months, with a mean age of total sample of 75 months; mean age of girls was 74 months and mean age of boys was 75 months. All of the children had one year of Kindergarten experience, with the exception of one boy, age 82 months, who had two years of Kindergarten experience. The sample was the entire Grade I population of an elementary school in a suburb of Winnipeg that may be representative of a middle-class socioeconomic area.

Testing Procedures

The LN subtest of the HSRRP and the OWBT were administered to each subject individually by the researcher, in a small private room. This testing was done during the second half of October, with both tests administered at the same sitting. Standardized procedures were followed in introducing the testing session and in administering the tests.[9]

Both tests were scored and checked by the examiner. In addition, the OWBT was analyzed for types of error.

The MAT was administered by the classroom teacher during the last week of May, following the procedures outlined in the test manual. The tests were scored by the classroom teacher and checked by the investigator.

Statistical Analysis

There were several statistical techniques applied to the data. Pearson Product Moment correlations were used to determine the relationship between the LN subtest of the HSRRP, the OWBT and the MAT.

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[9]See Appendix C for Introduction to First Testing Session.

A regression analysis was used to determine whether the OWBT adds significantly to the LN subtest in predicting reading success.

A T-test was used to determine whether or not there was a significant difference between the scores of boys and the scores of girls in each test.

The analysis of the segmentation pattern of the OWBT is descriptive.

Chapter 4

ANALYSES OF THE DATA

The main aim of this study was to obtain empirical data to
investigate, at the Grade I level, the relationship between awareness
of oral word boundaries and future reading success and to investigate
the relationship of this awareness to the sex of the subjects. To
achieve this purpose, scores obtained on the OWBT and the HSRRP were
correlated, and each of these was correlated with the MAT, for boys
and girls and for the total sample.

Data obtained in this investigation was processed through the
University of Manitoba Computer Centre.

The initial phase involved a descriptive analysis of the data,
including the arrangement of scores into frequency distributions, the
means and medians of each test, and a survey of the dispersion of
scores within each test with examination of the range, standard devia-
tion and measures of variance.

In the second phase of the analysis, the raw scores on the
tests were correlated in order to discover the relationships between:
1) Letter Naming abilities and scores obtained on the Metropolitan
Achievement Test; 2) scores on the Oral Word Boundaries Test and the
scores for the Metropolitan Achievement Test; 3) Letter Naming abilities
and scores obtained on the Oral Word Boundaries Test. For each of the
above, correlations were found for scores obtained by boys, by girls
and by both groups combined. The .05 level of significance was used.

The next phase of the analysis was concerned with determining

whether or not the Oral Word Boundaries Test added significantly to
Letter Naming in predicting reading success. A regression analysis
was used, with scores on the Oral Word Boundaries Test and the Letter
Naming Test used as the independent variable, and scores obtained on
the Metropolitan Achievement Test as the dependent variable. Analysis
was done on scores obtained by boys, by girls, and by both groups
combined.

The fourth phase of the analysis was concerned with com-
paring scores for boys and scores for girls, using a T-test to deter-
mine significant differences.

The final phase of the analysis is a descriptive analysis of
the segmentation patterns for the Oral Word Boundaries Test.

DESCRIPTIVE ANALYSIS OF THE DATA

Subjects

The fifty-one subjects, 28 boys and 23 girls, ranged in age
in September of first grade from 68 months to 82 months. The range
for boys was from 68 months to 82 months and the range for girls was
from 68 months to 80 months. All subjects were in their first year
of grade one. One subject, age 82 months, had two years of Kinder-
garten. The median age for the boys was 75 months, the median age
for the girls was 74 months and the median age for the total group was
74 months.

TABLE 4.1

FREQUENCY DISTRIBUTION OF SUBJECT AGE RANGE IN MONTHS

Age in Months	Boys	Girls	Total Sample
68	1	0	1
69	2	2	4
70	0	2	2
71	1	0	1
72	2	2	4
73	3	3	6
74	4	4	8
75	2	1	3
76	1	0	1
77	3	0	3
78	5	3	8
79	2	4	6
80	1	2	3
81	0	0	0
82	1	0	1
	N=28	N=23	N=51
	Median=75	Median=74	Median=74
	Mean=75	Mean=74	Mean=75
	(S.D.=3.52)	(S.D.=3.67)	(S.D.=3.56)

Descriptive Analyses of Response to Letter Naming Test

The range of scores in the Letter Naming Test for boys is from 13 to 42, with a mean of 35.42. The range of scores for girls is from 22 to 41 with a mean of 37.21. For the total group, the range is from 13 to 42 and the mean is 36.23. The highest possible score is 42.

TABLE 4.2

LETTER NAMING TEST SCORE RANGE, MEANS AND S.D.
FOR BOYS, GIRLS AND TOTAL SAMPLE

	Boys	Girls	Total Sample
Range	13-42	22-41	13-42
Mean	35.42	37.21	36.23
S.D.	7.44	4.02	6.46
	N=28	N=23	N=51

Descriptive Analyses of Responses to Metropolitan Achievement Test

The MAT range of scores for boys is from 1.3 to 3.7, with a mean of 2.21 and a S.D. of .61. The range of scores for girls is from 1.5 to 3.9, with a mean of 2.35 and a S.D. of .73. The range of scores for the total group is 1.3 to 3.9, with a mean of 2.27 and a S.D. of .66. The highest possible score for the test is 3.9.

TABLE 4.3

METROPOLITAN ACHIEVEMENT TEST SCORE RANGE, MEANS, AND S.D.
FOR BOYS, GIRLS AND TOTAL SAMPLE

	Boys	Girls	Total Sample
Range	1.3-3.7	1.5-3.9	1.3-3.9
Mean	2.21	2.36	2.28
S.D.	.61	.73	.66
	N=28	N=23	N=51

Descriptive Analyses of Responses to Oral Word Boundaries Test

The range of scores at the initial presentation for boys was
from 30 to 96. The range for the repetition is from 31 to 96. Four
subject, numbers 6, 8, 42 and 49 asked to have instructions repeated.
Six subjects had higher scores in their repetition attempt, with a
mean difference of +2.67 between the first and second attempt. Fourteen
subjects had lower scores in their repetition attempt, with a mean dif-
ference of -3.64 between the first and second attempt. The mean dif-
ference for the twenty subjects was 3.35. For eight subjects, the
scores remained the same. The mean difference for the total of 28
subjects was 2.36. The mean for their initial presentation was 71.04
with a S.D. of 20.41 and for the repetition was 70.00 with a S.D. of
20.40.

The range of scores at the initial presentation for girls was
from 0 to 91. The range for the repetition is from 12 to 92. Five
subjects, numbers 1, 2, 17, 33 and 34 asked to have instructions re-
peated. Nine subjects had higher scores in their repetition attempt,
with a mean difference of +3.78 between the first and second attempt.
Ten subjects had lower scores in their repetition attempt, with a mean
difference of -1.90 between the first and second attempt. Mean dif-
ference for the nineteen subjects was 2.79. For four subjects the
scores remained the same. For the 23 subjects, the mean difference
was 2.30. The mean for the initial presentation for the girls was
58.65 with a S.D. of 23.41 and for the repetition was 58.96 with a
S.D. of 22.16.

For the total group, the scores in the initial presentation

ranged from 0 to 96, and the range for the repetition was 12 to 96.

Nine of the 53 subjects asked to have their initial instructions re-

peated. Fifteen subjects had higher scores in their repetition attempt

and 24 subjects had a lower score in their repetition attempt. The

mean difference between first and second scores for the fifty-three

subjects is 2.26. The mean is 65.45 with a S.D. of 22.47 and the mean

for the repetition is 65.02 with a S.D. of 21.71.

Summary of Descriptive Analyses

Based on the observations made through the descriptive analyses

of the data the following conclusions were drawn:

1. The mean age of the boys exceeded the mean age of the girls by one

    month.

2. The mean letter naming test score was higher for girls than for

    boys by 1.79.

3. The mean Metropolitan Reading Achievement test score was higher for

    girls than for boys by 0.15.

4. The mean of the Oral Word Boundaries Test was higher for boys

    than for girls in both initial and repeat response, by 12.39 and

    11.04 respectively. The lowest raw score for boys was 30 of a

    possible 100. The lowest raw score for girls was 0 of a possible

    100.

CORRELATION OF RAW SCORES

Testing of the Hypotheses

Six hypotheses were formulated for testing in this phase of

the analyses for the purpose of revealing the relationships between

the raw scores of the tests and the sex of the subjects.

TABLE 4.4

ORAL WORD BOUNDARIES TEST SCORES BY SUBJECT SEPARATELY FOR BOYS AND GIRLS

	BOYS			GIRLS	
Subject	Score initial presentation	Score for repetition	Subject	Score initial presentation	Score for repetition
3	93	93	1	67	68
5	92	92	2	86	86
6	65	66	4	91	92
8	50	38	7	68	72
10	88	85	9	46	45
11	53	52	16	77	77
12	85	87	17	30	32
13	74	72	19	51	48
14	77	75	23	47	49
15	86	79	25	45	44
18	96	96	27	76	73
20	58	62	28	63	61
21	72	72	30	18	17
22	90	83			
24	72	69	31	86	85
26	88	87	33	0	12
29	57	57	34	56	56
32	74	74	35	58	57
37	58	58	36	61	57

(Continued)

TABLE 4.4 (continued)

	BOYS			GIRLS	
Subject	Score initial presentation	Score for repetition	Subject	Score initial presentation	Score for repetition
38	35	37	39	55	61
41	30	31	40	47	45
42	34	34	46	90	92
43	73	79	47	88	84
44	35	31	50	43	43
45	87	85			
48	83	80			
49	86	85			
51	95	90			

N=28 Mean: 71.04 Mean: 70.00
      S.D.: 20.41 S.D.: 20.40

N=23 Mean: 58.65 Mean: 58.96
      S.D.: 23.41 S.D.: 22.16

Total Group: N=51

Initial Presentation   Score for Repetition
Mean: 65.45   Mean: 65.02
S.D.: 22.47   S.D.: 21.71

Hypothesis 1. There is a significant correlation between beginning Grade I letter naming abilities and end of Grade I scores on the Reading subtest of the Metropolitan Achievement Test for:

    a. boys

    b. girls

    c. total sample

Table 4.5 represents the Pearson product-moment correlations between Letter Naming score and MAT scores.

TABLE 4.5

CORRELATIONS BETWEEN LETTER NAMING SCORES AND METROPOLITAN
ACHIEVEMENT TEST SCORES FOR BOYS, FOR GIRLS
AND FOR TOTAL SAMPLE

Sample	Degrees of Freedom (n-1)	r	Significance
Boys	27	.51	S (.01^2.471)
Girls	22	.48	S (.05^2.404)
Total Sample	50	.49	S (.01^2.354)

There is a significant correlation between letter naming scores and Metropolitan Achievement Test scores for boys. This correlation was significant at the .01 level and hypothesis 1 a is thus accepted.

Similarly there is a significant correlation between letter naming scores and MAT scores for girls, at the .05 level. Hypothesis 1 b is thus confirmed.

Again, there is a significant correlation between letter naming scores and MAT scores for the total sample. This correlation is

significant at the .01 level and hypothesis 1 c is also accepted.

Hypothesis 2. There is a significant correlation between
beginning Grade I scores on the Oral Word Boundaries Test and end
of Grade I scores on the Reading subtest of the Metropolitan Achieve-
ment Test for:

    a. boys

    b. girls

    c. total sample

Table 4.6 gives the Pearson product-moment correlations between
Oral Word Boundary Test scores (initial response) and MAT scores.

Table 4.7 gives the Pearson product-moment correlations between
Oral Word Boundary Test scores (repeat response) and MAT scores.

TABLE 4.6

CORRELATIONS BETWEEN ORAL WORD BOUNDARY SCORES (INITIAL RESPONSE)
AND METROPOLITAN ACHIEVEMENT TEST SCORES FOR
BOYS, FOR GIRLS AND FOR TOTAL SAMPLE

Sample	Degrees of Freedom (n-1)	r	Significance
Boys	27	.58	S (.01 $\geq$ .471)
Girls	22	.44	S (.05 $\geq$ .404)
Total Sample	50	.45	S (.01 $\geq$ .354)

TABLE 4.7

CORRELATIONS BETWEEN ORAL WORD BOUNDARY SCORES (REPEAT RESPONSE)
AND METROPOLITAN ACHIEVEMENT TEST SCORES FOR BOYS,
FOR GIRLS AND FOR TOTAL SAMPLE

Sample	Degrees of Freedom (n-1)	r	Significance
Boys	27	.56	S $(.01 \geq .471)$
Girls	22	.45	S $(.05 \geq .404)$
Total Sample	50	.45	S $(.01 \geq .354)$

There is a significant correlation between the Oral Word Bound-
ary Scores (initial and repeat responses) and the Metropolitan Achieve-
ment Test Scores for boys, for girls and for the total sample. This
correlation in both cases is significant at the .01 level for boys
and for the total sample and at the .05 level for girls. Hypotheses
1a, 1b and 1c are thus accepted.

Hypothesis 3. There is a significant correlation between be-
ginning Grade I letter naming ability and scores on an Oral Word Bound-
aries test for:

a. boys

b. girls

c. total sample, in the initial and the repeat resonses

Table 4.8 gives the Pearson product-moment correlations between
the Letter Naming scores and the scores on the Oral Word Boundaries
Test, initial response.

TABLE 4.8

CORRELATIONS BETWEEN LETTER NAMING SCORES AND ORAL WORD BOUNDARY
REST SCORES (INITIAL RESPONSE) FOR BOYS,
FOR GIRLS AND FOR TOTAL SAMPLE

Sample	Degrees of Freedom (n-1)	r	Significance
Boys	27	0.58	S $(.01 \geq .471)$
Girls	22	0.31	N.S.
Total Sample	50	0.40	S $(.01 \geq .354)$

Table 4.9 represents the Pearson product-moment correlations
between the Letter Naming scores and the scores on the Oral Word Bound-
aries Test, repeat response.

TABLE 4.9

CORRELATIONS BETWEEN LETTER NAMING SCORES AND ORAL WORD
BOUNDARIES TEST SCORES (REPEAT RESPONSE) FOR BOYS,
FOR GIRLS, AND FOR TOTAL SAMPLE

Sample	Degrees of Freedom (n-1)	r	Significance
Boys	27	0.62	S $(.01 \geq .471)$
Girls	22	0.34	N.S.
Total Sample	50	0.44	S $(.01 \geq .354)$

There is a significant correlation between the scores on the
Oral Word Boundaries Test (initial and repeat response) and the Letter
Naming Scores for boys and for the total sample at the .01 level. The

correlation between the scores is not significant for the girls. Hypothesis 3a is thus accepted. Hypothesis 3b is not accepted. Hypothesis 3c is accepted.

Hypothesis 4. An Oral Word Boundaries Test adds significantly to letter naming scores in predicting reading success for:

a. boys

b. girls

c. total sample

Tables 4:10:a, 4:10:c, and 4:10:d, give the results of the regression analysis which was used to determine whether the Oral Word Boundaries Test (initial response) adds significantly to the Letter Naming Test in predicting reading success for boys.

TABLE 4:10:a

MEANS AND STANDARD DEVIATIONS MULTIPLE REGRESSION BOYS

Variable	Mean	Standard Deviation
1. LN	35.43	7.44
2. OWBT (initial)	71.04	20.41
3. MAT	2.21	0.61

TABLE 4:10:b

SIMPLE CORRELATION COEFFICIENTS MULTIPLE REGRESSION BOYS

Variable	1. LN	2. OWBT(i)	3. MAT
1. LN	1.00		
2. OWBT(i)	0.58	1.00	
3. MAT	0.51	0.58	1.00

TABLE 4:10:c

VARIABLE 3(MAT) ON THE TWO VARIABLES 1(LN) AND 2(OWBT)i
MULTIPLE REGRESSION BOYS

Variable	Mean	S.D.	B	S.B.	T	Standardized B
1	35.43	7.44	0.02	0.02	1.40	0.27
2	71.04	20.41	0.01	0.01	2.22	0.43

Y Intercept = 0.54

Multiple Corr. Coeff. = 0.62

Standard Error of Estimate = 0.49

TABLE 4:10:d

ANALYSIS OF VARIANCE BOYS

Source	SS	DF	MS	F
Regression	3.83	2.	1.91	7.842
Deviation	6.10	25.	0.24	
Total	9.93	27.	0.37	

.05≥3.38

(.26864 (LN) + .42575 (OWBT) + .53662 = MAT)

The OWBT (initial) adds significantly to the LN in predicting reading success for boys at the .05 level. Hypothesis 4 a is thus accepted.

Tables 4:11:a, 4:11:b, 4:11:c, and 4:11:d give the results of the regression analysis which was used to determine whether the Oral Word Boundaries Test (initial response) adds significantly to the Letter Naming Test in predicting reading success for girls.

TABLE 4:11:a

MEANS AND STANDARD DEVIATIONS MULTIPLE REGRESSION GIRLS

Variable	Mean	Standard Deviation
1. LN	37.22	5.02
2. OWBT(i)	58.65	23.41
3. MAT	2.36	0.73

TABLE 4:11:b

SIMPLE CORRELATION COEFFICIENTS MULTIPLE REGRESSION GIRLS

Variable	1. LN	2. OWBT(i)	3. MAT
1. LN	1.00		
2. OWBT(i)	0.31	1.00	
3. MAT	0.48	0.44	1.00

TABLE 4:11:c

VARIABLE 3 (MAT) ON THE TWO VARIABLES 1 (LN) AND
2 (OWBT): MULTIPLE REGRESSION GIRLS

Variable	Mean	S.D.	B.	S.B.	T.	Standardized B
1	37.22	5.02	0.56	0.03	1.97	0.38
2	58.65	23.41	0.01	0.01	1.67	0.32

Y Intercept = −0.29

Multiple Corr. Coeff. = 0.57

Standard Error of Estimate = 0.63

TABLE 4:11:d

ANALYSIS OF VARIANCE GIRLS

Source	S.S.	D.F.	M.S.	F
Regression	3.80	2.	1.90	4.862
Deviation	7.82	20.	0.39	
Total	11.62	22.	0.53	

$.05 \geq 3.49$

Tables 4:11:a, 4:11:b, 4:11:c, and 4:11:d indicate that the OWBT (initial response) adds significantly to the LN in predicting reading success for girls at the .05 level. Hypothesis 4 b is thus accepted.

Tables 4:12:a, 4:12:b, 4:12:c, and 4:12:d give the results of the regression analysis which was used to determine whether the Oral Word Boundaries Test (initial response) adds significantly to the Letter Naming Test in predicting reading success for the total sample.

TABLE 4:12:a

MEANS AND STANDARD DEVIATIONS MULTIPLE REGRESSION TOTAL GROUP

Variable	Mean	Standard Deviation
1. LN	36.24	6.46
2. OWBT(i)	65.45	22.47
3. MAT	2.28	0.66

TABLE 4:12:b

SIMPLE CORRELATION COEFFICIENTS MULTIPLE REGRESSION TOTAL GROUP

Variable	1. LN	2. OWBT(i)	3. MAT
1. LN	1.00		
2. OWBT(i)	0.40	1.00	
3. MAT	0.49	0.45	1.00

TABLE 4:12:c

VARIABLE 3 (MAT) ON THE TWO VARIABLES 1 (LN) AND 2 (OWBT):
MULTIPLE REGRESSION TOTAL SAMPLE

Variable	Mean	S.D.	B.	S.B.	T.	Standardized B
1	36.24	6.46	0.04	0.01	2.83	0.37
2	65.45	22.47	0.01	0.003	2.37	0.31

Y Intercept = 0.32

Multiple Corr. Coeff. = 0.57

Standard Error of Estimate = 0.56

TABLE 4:12:d

ANALYSIS OF VARIANCE TOTAL GROUP

Source	S.S.	D.F.	M.S.	F.
Regression	6.98	2.	3.49	11.292
Deviation	14.83	48.	0.31	
Total	21.81	50.	0.44	

$.001 \geq 8.25$

(.37 LN + .31 OWBT + .33 = MAT)

Tables 4:12:a, 4:12:b, 4:12:c, and 4:12:d indicate that the OWBT (initial response) adds significantly to the LN in predicting reading success for the total sample at the .001 level. Hypothesis 4 c is thus accepted.

Hypothesis 5. There is no significant difference between scores of boys and scores of girls on the:

a. MAT

b. LN

c. OWBT(i)

Table 4:13 gives the results of the T-test which was used to determine whether there was a significant difference between the MAT scores for boys and the MAT scores for girls.

TABLE 4:13

T-TEST COMPARING BOYS AND GIRLS MAT MEANS

	Mean	S.D.	S.E.	T-Ratio
Boys	2.21	0.61	0.11	
Girls	2.36	0.73	0.15	0.781 (N.S.)

D.F. 49

Null hypothesis 5 a is not rejected since the T-ratio is not significant.

Table 4:14 gives the results of the T-test which was used to determine whether there was a significant difference between the Letter Naming scores for boys and the Letter Naming scores for girls.

TABLE 4:14

T-TEST COMPARING BOYS AND GIRLS LN MEANS

	Mean	S.D.	S.E.	T-Ratio
Boys	35.43	7.44	1.41	
Girls	37.22	5.02	1.05	0.983 (N.S.)

D.F. 49

Null hypothesis 5 b is not rejected since the T-ratio is not significant.

Table 4:15 gives the results of the T-test which was used to determine whether there was a significant difference between the OWBT

(initial response) score for boys and the OWBT (initial response) score for girls.

TABLE 4:15

T-TEST COMPARING BOYS AND GIRLS OWBT(i) MEANS

	Mean	S.D.	S.E.	T-Ratio
Boys	71.04	20.41	3.86	
Girls	58.65	23.41	4.88	2.018(S.)

D.F. 49 $.05 \geq 2.009$

Null hypothesis 5 c is rejected since the T-ratio is significant at the .05 level.

Hypothesis 6. There is a segmentation pattern in the subjects' responses to the Oral Word Boundaries Test.

The final phase of the analysis of the data is concerned with the question: Is there a segmentation pattern to the subjects' responses to the OWBT?

It should be noted at the outset that no subject received a perfect score. The remainder of this discussion will be devoted to the types of errors made.

The errors were classified into five main categories: lumping, splitting, forming contractions, additions and omissions.

In "lumping", subjects indicated that more than one word was represented by one bead. For example, the subjects lumped

two words, as in I made it (2 beads)

three words, as in Come out and play ball (3 beads)

four words (and two) as in <u>Now</u> <u>the cat</u> <u>is in the house</u> (3)

a word and a word part as in <u>Baby</u> <u>robins</u> <u>get</u> <u>hung/ry</u> (4)

In "splitting", subjects indicated that a word part was represented by one bead. For example,

<u>What</u> <u>a</u> <u>good</u> <u>sur/prise</u>! (five beads)

<u>Some/one</u> <u>can</u> <u>make</u> <u>pre/tty</u> <u>shoes</u> (7 beads)

In "forming contractions" subjects changed

See what he will get

to <u>See</u> <u>what</u> <u>he'll</u> <u>get</u> (4 beads)

        and

Now the cat is in the house

to <u>Now</u> <u>the</u> <u>cat's</u> <u>in</u> <u>the</u> <u>house</u> (6 beads)

In "additions", subjects added a word to the test sentence, or added a bead for which they did not say a word.

For example,

for Red looks pretty

the subject said <u>The</u> <u>red</u> <u>looks</u> <u>pretty</u> (4 beads)

for After Christmas we opened presents

the subject said <u>After</u> <u>Christmas</u> <u>we</u> <u>opened</u> <u>up</u> <u>presents</u> (6 beads)

and for Thanks Cathy

the subject inserted a bead <u>Thanks</u> <u>   </u> <u>Cathy</u> (3 beads)

and for See what he will get

the subject inserted a bead <u>   </u> <u>See</u> <u>what</u> <u>he</u> <u>will</u> <u>get</u> (6 beads)

In "omissions", subjects omitted a word or part of a word.
For example,

for The leaves on the trees are changing colours

subject said <u>The leaves</u> <u>on the trees</u> <u>changing</u> <u>colours</u> (4 beads)

    for Father and John go fishing

subject said <u>Father</u> <u>and John</u> <u>go</u> <u>fish</u> (4 beads)

    Some observations can be made about the frequency of the various error types. Table 4:16 indicates that the most frequent error made was lumping two words together, and that lumping errors were more frequent than splitting errors.

TABLE 4:16

OWBT ERROR TYPE AND FREQUENCY FOR BOYS, GIRLS AND TOTAL SAMPLE

Error Type	Error Frequency		
	for Boys	for Girls	for Total Sample
Lumping			
two words	204	270	474
three words	45	47	92
four words	2	4	6
five words	0	1	1
entire sentence	0	19	19
word plus part	4	7	11
Splitting			
polysyllabic word	235	114	349
one syllable word	6	1	7
Forming contraction	2	4	6
Addition of			
word	9	4	13
bead	14	7	21
Omission of			
word	14	12	26
word part	3	1	4
Total	538	491	1029

Table 4:17 indicates some difference between the error frequency for boys and for girls. Boys made an almost equal number of lumping and splitting errors, 47% and 45%, while girls made more lumping than splitting errors, 71% and 23%.

TABLE 4:17

FREQUENCY OF ERROR TYPE FOR BOYS, GIRLS AND TOTAL GROUP

Error Type	Boys		Girls		Total Sample	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Lumping	255	47	348	71	603	59
Splitting	241	45	115	23	356	35
Forming Contractions	2	.3	4	.1	6	.1
Additions	23	4	11	2	34	3
Omissions	17	3	13	3	30	3
Total	538	99.3	491	99.1	1029	100.1

Not all subjects made each type of error. Table 4:18 shows the number and percentage of the total sample which made each type of error. The greatest number of subjects, made splitting errors (49); fewest subjects made errors of contractions, (6). No subject had all correct.

TABLE 4:18

RANGE OF ERROR TYPE: NUMBER AND PERCENTAGE OF BOYS AND GIRLS
MAKING EACH TYPE OF ERROR

	Girls	Boys	% of Total Group[*]
Lumping	22	24	90
Splitting	21	27	94
Forming			
Contractions	4	2	12
Additions	6	7	25
Omissions	3	4	14
	N=23	N=28	[*]N=51

In trying to determine whether or not a segmentation pattern
exists, an analysis of error type was made for the seventeen subjects
(one third of total sample), receiving the highest raw scores and the
seventeen subjects (one third of total sample) receiving the lowest
raw scores on OWBT.   Then a comparison was done of error types made
by each group.   The seventeen subjects who made fewest errors had an
error range of from two errors to fourteen errors and included 11 boys
(39% of boys) and 6 girls (26% of girls).   Table 4:19:1 shows the
frequency and percentage of each error type for the top group.   This
top group made 159 errors, 15.6% of the errors made by the total group.
They made more splitting errors than any other type.

TABLE 4:19:1

TOP THIRD OF SCORES, ERROR DISTRIBUTION AND PERCENTAGE OF TOTALS
FOR TOP THIRD, FOR ERROR TYPE AND FOR TOTAL GROUP

	Frequency	% of total for third	% of total for error type	% of total for N=51
Lumping	44	28 (of 159)	7 (of 603)	4 (of 1029)
Splitting	109	69 "	31 (of 356)	11 "
Contractions	1	.6 "	17 (of 6)	.1 "
Additions	4	3 "	12 (of 34)	.4 "
Omissions	1	.6 "	3 (of 30)	.1 "
Total	159	101.2 (of 159)		15.6 (of 1029)

The seventeen subjects who made the largest number of errors had
an error range of from twenty-seven to forty-three, and included 9 boys
(32% of the boys) and 8 girls (35% of the girls). Table 4:19:2 shows
the frequency and percentage of each error type for this group. This
group made 484 errors, 47.1% of errors made by the total group. They
made more lumping errors than any other type.

TABLE 4:19:2

BOTTOM THIRD OF SCORES, ERROR DISTRIBUTION AND PERCENTAGE OF
TOTALS FOR BOTTOM THIRD, FOR ERROR TYPE AND FOR TOTAL GROUP

	Frequency	% of total for third	% of total for error type	% of total for N=51
Lumping	316	65 (of 484)	52 (of 603)	31 (of 1029)
Splitting	129	27 "	36 (of 356)	13 "
Contractions	1	.2 "	17 (of 6)	.1 "
Additions	25	5 "	74 (of 34)	2 "
Omissions	13	3 "	43 (of 30)	1 "
Total	484	100.2 (of 484)		47.1 (of 1029)

In comparing the top and bottom groups (Table 4:19:1 and Table 4:19:2), the top group made 15.6% of the total errors, and the bottom third of the subjects made 47.1% of the total errors. The top third made 7% of the lumping errors and the bottom third made 52% of them. The top group made 31% of the splitting errors and the bottom group made 36% of them. Comparing the within-group errors, the top group made fewer lumping errors than splitting errors (28% and 60%) while the bottom group made more lumping errors than splitting errors (65% and 27%).

It would appear that there is a segmentation pattern in the subjects responses to the OWBT.

Chapter 5

SUMMARY, CONCLUSIONS AND IMPLICATIONS

The main purpose of this study was to obtain empirical data
to determine, at the Grade I level, the relationship between awareness
of oral word boundaries and future reading success and to investigate
the relationship of this awareness to the sex of the subjects. To
achieve this main purpose the oral word boundaries awareness and
letter naming ability of pupils was tested at the beginning of grade
one and reading ability was tested at the end of the grade one year.
Scores obtained on the OWBT and the HSPRP were correlated and each
of these was correlated with the MAT, for boys, for girls and for
the total sample.

The two main questions for study were:

1. At the beginning Grade I level, what relationship exists
between the letter naming abilities and the awareness of
oral word boundaries?

2. Does awareness of oral word boundaries add significantly
to letter naming as a predictor of reading success?

The six hypotheses, which focused on these two main areas of
investigation, are summarized in two sections from which certain con-
clusions and implications will follow:

The first area of investigation involved the relationship be-
tween beginning Grade I letter naming scores and end of Grade I reading
scores, beginning Grade I awareness of oral word boundaries scores and
end-of-Grade I reading scores. These were examined under hypotheses
one and two. The relationship between awareness of oral word boundaries

scores and letter naming scores was examined under hypothesis three. Each of the above relationships was examined for boys, for girls and for total sample. The significance of the differences of the scores for boys and the scores for girls for each test was examined under hypothesis five.

The other two hypotheses focused on the second main question for study: investigation of a possible predictive element, based on whether or not awareness or oral word boundaries scores add significantly to letter naming scores in predicting future reading success. This relationship was examined in hypothesis four, for boys, for girls and for the total sample.

In order to bring additional information to the possible predictive element in awareness of oral word boundaries, the individual test items of the OWBT were examined for possible developmental sequence and a comparison was made between the types of errors made by the subjects with scores in the top third of the total sample and the type of errors made by the subjects with scores in the bottom third of the total sample. The segmentation pattern of the individual responses was examined under hypothesis six.

This chapter summarizes the findings related to the hypotheses, followed by conclusions and then by implications for classroom practice and further research.

SUMMARY

The ability of naming letters and indicating awareness of oral word boundaries was determined with fifty-one subjects, the entire Grade I population of one suburban school. This was ascertained during

the last half of October. To obtain this information the letter naming

subtest of the Harrison-Stroud Reading Readiness Profiles and the Oral

Word Boundaries Test developed by the investigator were administered

individually. The reading ability of these subjects was determined

by classroom teacher administration of the reading subtest of the

Metropolitan Achievement Test, Primary I Battery, Form A in May, at

the end of the subjects' Grade I year. The significance of the re-

lationship between each pair of tests was examined, for boys, for girls

and for total group, in addition to the significance of the differences

between scores for boys and scores for girls. Finally, the OWBT was

examined, to determine whether it adds significantly to letter

naming in predicting future reading success; the OWBT responses were

analyzed for error type to determine whether there is a developmental

segmentation pattern to the responses.

Summary of Findings

    1. There was a significant relationship between LN scores and

scores on MAT, for boys, for girls and for the total group. These

correlations were significant at the .01 level for each of the three

groups.

    2. There was a significant relationship between OWBT scores

and scores on MAT, for boys, for girls, and for the total group. Cor-

relations for boys and for the total group were significant at the .01

level, and significant for girls at the .05 level.

    3. There was a significant relationship between LN scores and

scores on OWBT for boys and for the total sample. This correlation

was significant at the .01 level. For girls, correlation was not

significant.

4. The OWBT added significantly to LN in predicting future reading success for boys, for girls and for the total sample. This relationship was significant at the .05 level for boys and for girls, and was significant at the .001 level for the total group.

5. There was no significant difference between scores of boys and scores of girls for LN and for the MAT. However, this difference in scores was significant at the .05 level for the OWBT.

6. There was a segmentation pattern in the subjects' responses to the OWBT. Those subjects who scored in the top third generated 159 errors, 69% of these being splitting errors and 28% of these being lumping errors. Those subjects who scored in the bottom third generated 484 errors, 27% of these being splitting errors and 65% of these being lumping errors. Those subjects who scored in the top third generated 7% of the total lumping errors, which was 4% of all errors made by the entire sample. Those subjects who scored in the bottom third generated 52% of the total lumping errors, which was 31% of all errors made by the entire sample.

7. There is no difference between OWBT (initial response) and OWBT (repeat response) in significance of the relationship of OWBT to LN and MAT.

Descriptive Analyses

1. Median age for boys was 75 months, median age for girls and for total sample was 74 months.

2. In the LN test, mean score for boys was 35.42, mean score for girls was 37.21 and mean score for the total sample was 36.23.

3. In the MAT, mean score for boys was 2.21, for girls was 2.35, and for the total sample was 2.27.

4. In the OWBT, mean score for boys was 71.03, for girls was 58.65 and for the total sample was 65.45.

CONCLUSIONS

Bearing in mind the danger of generalizing findings on the basis of a single study, the following conclusions are offered tentatively for consideration.

1. Beginning readers are not always aware of oral word boundaries, yet, awareness of oral word boundaries appears to be important to future reading success.

2. The Oral Word Boundaries Test appears to have the potential of being a valid test of awareness of oral word boundaries, since it identifies those beginning readers who may shortly encounter reading difficulties, however, to ensure validity, further refinement is needed.

IMPLICATIONS FOR THE CLASSROOM

The following implications appear warranted on the basis of the present investigation:

Classroom teachers may administer the Oral Word Boundaries test to beginning first graders as a useful predictor of future reading success. The test results would have implications for direct classroom instruction and may be helpful in prevention of future reading difficulties. Since this research confirms studies which indicate that the letter naming skill is a useful predictor of future reading success,

teachers may find it useful to test for both the letter naming abilities

and oral word boundaries awareness before making decisions about readiness

for reading and before grouping for instruction.

It would seem advisable that, through in-services, teachers

should be made aware that certain terms used in reading instruction

are not well understood by beginning first grade children, and that the

teacher's manuals in common use make unrealistic assumptions about the

degree of this awareness.

Publishers of reading texts and the accompanying teacher's manu-

als need to be made aware of concerns about pupil awareness of reading

related terminology and should produce materials accordingly.

IMPLICATIONS FOR FURTHER RESEARCH

The following suggestions for further research are offered

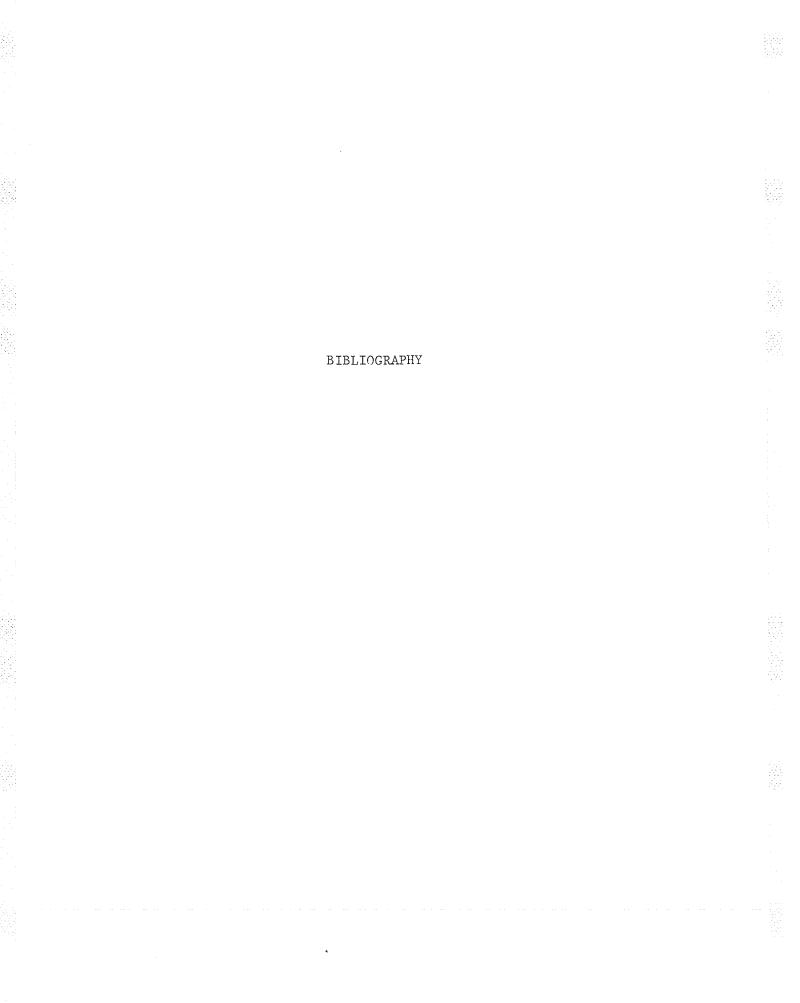based upon the results of this study:

It would appear that the second response to the Oral Word

Boundaries Test compared with the first response produce responses

that are not significantly different. Since the second response

seems redundant, it should be deleted to shorten the OWBT testing time.

The sequence of sentences needs further refining. It was

noted during administration that the use of the pronoun "I" in the

instructions and immediately again in the demonstration sentence may

have been confusing to the subject. Demonstration sentences without

the word "I" need to be chosen, and test sentences containing the

pronoun should be placed among the last half of the test sentences,

again to avoid confusing the subject.

This study must be replicated on other populations for validation of the OWBT.

Investigations into the developmental pattern in beginning readers' awareness of oral word boundaries and the possible utility of this pattern to classroom reading instruction would be a most fruitful undertaking.

Another area of research is to examine the OWBT which was developed using sentences from reading materials currently in use in schools and other oral word boundaries tests constructed from other sources in order to determine which type might be most useful in predicting future reading success.

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APPENDICES

APPENDIX A

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APPENDIX B

Oral Word Boundaries Test

Instruction for Administration

The Oral Word Boundaries Test is introduced on tape using the

voice of the examiner:

> "I am doing this because I want to learn more about words.
> We're goint to play a game. In this game, we listen for
> words. I have here some beads that I'm going to use as I
> talk."

Examiner places beads on table. The tape continues:

> "Listen to what I say and watch what I do. Listen and watch."

There is a pause in the tape and then the first demonstration

sentence is heard.

> "I can play ball."

Examiner repeats sentence. Then while drawing one bead for each
word spoken, examiner repeats sentence a second time, placing beads
in line in front of self. Examiner then repeats sentence a third time
while pointing in a left-to-right progression to the bead that re-
presents each word. Two more demonstration sentences are heard. The
tape voice then asks:

> "Do you see how the game does?"

If the subject responds with a "yes", the examiner says "Here
are the beads. The next words are for you. Use the beads the same
way I did. Listen."

If the subject responds with a "No", the demonstration is
repeated.

APPENDIX C

Introduction to First Testing Session (HSRRP and OWBT)

The purpose of this introduction is to develop rapport with

the subject and give information about the purpose of the testing.

The following is said by the examiner:

"The Grade I children are helping me learn more about letters
and words. They are helping me with letters by doing something that
is like a test. They are helping me with words by doing something
that is like a game. This is the part that is like a test".

The examiner administers the letter naming subtest of the HSRRP

outlined.

"This is the part that is like a game. I will turn on this
tape recorder. The voice that you hear is mine. Let's listen".

The examiner turns on the tape recorder and both listen to the

introduction and the demonstration sentences. Following the third

demonstration sentence, the examiner says:

"Here are the beads. The next words are for you. Use the beads

the same way I did. Listen."