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Reading Education Report No. 49

THE DECODING ABILITY
OF ELEMENTARY SCHOOL STUDENTS

Dolores Durkin

University of Illinois at Urbana-Champaign

May 1984

Center for the Study of Reading

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The Decoding Ability of Elementary School Students

Detailed knowledge of the field of reading is not a prerequisite for concluding that what is popular to study and write about is often cyclical in nature. It is even more important to realize that shifts in interest rarely have anything to do with evidence that problems related to some aspect of reading have been solved, indicating it is time to move on to something else.

Exemplifying both the cycles and the fact that resolved problems do not always explain them is the current interest in comprehension compared to the scant attention being paid to phonics--a very popular topic not too long ago. Anyone who believes that evidence that children are expert decoders is the reason for the shift in interests needs only to review the research on phonics to learn that this is hardly the case.[1]

Brief Review of Phonics Research

What is both interesting and surprising about the large number of phonics studies done in past decades is that very few deal directly with decoding ability. Instead, most focus on one of two questions: (1) Does the use of whole word methodology or of phonics at the beginning lead to higher scores on reading achievement tests, and (2) Is deductive or inductive phonics instruction associated with higher scores? In practically all such studies, the assessment of reading ability occurred as early as the end of first or second grade (Chall, 1967) and revealed nothing directly or specifically about children's ability to use phonics with unknown words.

In more recent years, a few researchers have tried to learn about decoding ability (e.g., Beachowicz, Camille, McCarthy, Ogle, 1979; Calfee, Venezky, & Chapman, 1969; Johnson, 1970; Rosso & Emans, 1981; Ryder, 1982; Tovey, D. R., 1980). In all cases, however, the studies are flawed by small numbers of subjects and/or by the limited amount of phonics content tested. The frequently mentioned study by Calfee et al. (1969), for example, used a 40-item pseudo word test but the items covered only the CVe pattern, the two common sounds for c and for s, seven vowel digraphs, and three consonant digraphs.

Researchers at the Learning Research and Development Center (University of Pittsburgh) have also been reporting studies of decoding; however, decoding in this research is equated with word recognition, not with the use of letter-sound relationships to attain that end. In one study (Hogaboam & Perfetti, 1978), subjects were even told not to try to sound out words that figured in a test "since the words would disappear (from the screen) as soon as they started" (p. 719). An underlying concern of the University of Pittsburgh research lies with vocalization latency (elapsed time between presentation of a word and subject's response) and, related to that, with possible ways to help students identify words quickly. The thrust behind the

studies lies not with decoding per se--no matter how it is
defined--but with the fact that "those who score low on various
reading measures that stress comprehension are almost always slow
in accessing individual words" (Lesgold & Resnick, 1981, p. 3).
These studies, therefore, reflect the current interest in
comprehension, not a return to an interest in phonics.

The Present Study

The research to be reported here is concerned with phonics,
specifically with the ability of third-, fourth-, and sixth-grade
students to use spellings to arrive at the pronunciations of
unknown words. This focus was selected for study because even
though a sizeable amount of time in primary grade classrooms--
sometimes even in kindergartens--is spent teaching phonics, what
the instruction is accomplishing is unknown. That what is being
achieved ought to be known is bound up with the fact that
children have to be able to identify unfamiliar words if they are
to succeed in comprehending connected text. Since not all such
words appear in helpful contexts, the need to use spellings to
achieve identifications exists.

The instrument used to evaluate decoding ability will be
discussed first, after which the subjects and the schools they
attended will be described.

Assessment Instrument

Because an examination of available phonics tests by this
writer and others (e.g., Johnson, et al., 1980; Pikulski &

Shanahan, 1980) revealed serious flaws--for instance, limited
content, tasks that relate to spelling rather than to reading,
multiple-choice formats that allow for guessing--a decision was
made to construct a new test for the study. Preparations thus
required answers to the following questions:

1. Should test items be real words or pseudo words?
2. Should the assessment instrument be group-administered
   or given individually?
3. If administered to individuals, should subjects'
   responses be timed?
4. What phonics content should be used for developing test
   items?
5. From what grade levels should subjects be chosen?

Initial Decisions about the Test

The purpose of the research required that test items be
single words rather than connected text. To ensure that the
words were unfamiliar, and, second, to allow for use of the same
items with subjects at different grade levels, another decision
was to use pseudo words rather than real words even though with
the use of the former, "the examinee is deprived of the
opportunity to match the arrived at pronunciation for a test word
with a word that is a part of his or her vocabulary" (Pikulski &
Shanahan, 1980). The use of pseudo words also meant that only
"allowable sequences" of letters could be used to develop them
(Venezky, 1967). This meant that a test word might have oe in a

syllable but not ae. Or, to cite another restriction, a pseudo
word could end in ve or ue but not in v or u.

Individual vs. Group Test

    Those who have given careful attention to the most valid way
to assess decoding ability (e.g., Adams, et al., 1980; Johnson,
et al., 1980) agree that the best test consists of oral
productive tasks. As Johnson and his colleagues point out, "The
ideal phonics test would require the child to read aloud, while
the experimenter would record all pronunciation errors . . ." (p.
12). Since group-administered tests prohibit oral responses,
one further decision was to use an individually-administered
instrument. While this allows for timing subjects' responses,
that opportunity was bypassed even though studies have
demonstrated (e.g., Adams, et al., 1980; Hogaboam & Perfetti,
1978; Perfetti & Hogaboam, 1975) that skilled readers have
shorter vocalization latencies than less successful ones. The
reason for this decision had to do with the goal of the testing:
to learn about decoding ability when as much time as the reader
needs is allowed. Such a goal is different--and has different
implications for instructional programs--from one concerned with
speed.

Scope of the Test

    When improving instruction is the concern, the letter-sound
correspondences and generalizations that figure in developing
pseudo words ought to match what was taught. Adhering to that

principle was not possible, however, for two reasons. First,
classroom observations were not part of the study, which meant
that what had been taught was unknown. And, second,
commercially-prepared materials are anything but uniform in the
phonics content that they teach. To illustrate, one examination
of five widely used basal reader programs with copyright dates
ranging from 1979 to 1982 (Sorenson, undated manuscript)
disclosed that a total of 42 phonic generalizations were in all
the programs combined, yet only seven were taught in three or
more of the series. Since consensus about what ought to be
taught is not found in reading methodology textbooks either, it
was decided to use content for developing the pseudo words that
this writer considers to be both helpful and sufficient if,
first, it is viewed as providing a starting point in the decoding
process (rather than as yielding inevitably correct
pronunciations), and, second, it is taught in conjunction with
strategies for trying alternate sounds when what a generalization
suggests fails to produce a recognizable word.[2] Table 1 lists
the selected content; comments about the assumptions on which it
is based follow.

Insert Table 1 about here.

    One assumption is that phonics is meant to help with root
words. (A corollary assumption is that affixes should be taught

as meaning-bearing units with attention going both to how they are pronounced and to how they affect the meaning or grammatical function of roots.) Another assumption underlying the content listed in Table 1 is that syllables are the unit for decoding, which means that children should know how to use the information about syllabication that the spelling of an unknown root supplies.

One further assumption is that variability in English words insofar as stressed syllables are concerned is so great as to make it pointless to teach generalizations about stress, which accounts for their absence in Table 1. (Acceptance of this assumption means that children would be taught to stress each decoded syllable until something "clicked"--that is, until a recognizable word resulted.) The implication of the last assumption for the present study is that stressing any syllable in a polysyllabic pseudo word was acceptable. Use of the schwa sound in unstressed syllables was acceptable, too.

Another facet of decoding not directly accounted for in Table 1 is what may sometimes be required: blending sounds to produce syllables. The omission is not meant to deny that blending would figure in decoding the pseudo words. Nor does the failure of the content in Table 1 to account for substituting and adding sounds to achieve a pronunciation either minimize the value of those processes for decoding or overlook their possible use by subjects.

Test Items

Since pseudo words were to serve as test items, the spelling and pronunciation of each had to match in a way that the content summarized in Table 1 would predict. This requirement is bound up with the fact that it is not only a reader's ability to use phonics but also his or her familiarity with a word in its spoken form (plus contextual cues) that allows for decoding a real word in which a direct match between spelling and pronunciation is not found. Since the use of pseudo words automatically eliminates two of the three sources of help (oral vocabularies and contexts), they had to be regularly spelled.

Initially, 38 pseudo words were developed which exemplified the syllable and letter-sound patterns referred to in Table 1. Variations of the list of words were used on a trial basis with 32 children in grades 3-6 who had been recruited by parents, friends of parents, aunts, and neighbors. They attended a variety of schools in three cities. Since 38 test items seemed excessive for the children who did poorly, the number was eventually reduced to 29 words, which covered the same content. They are listed in Table 2 in the order in which they were shown to the subjects. (Each word was typed in lower-case letters on a 3" x 5" card.) Words that commonly caused problems in the pilot study were scattered throughout the 29 items for the purpose of minimizing discouragement and fostering persistence. Acceptable responses are shown in Table 2 in ways that should clarify what

was considered to be correct. The acceptance of certain

variations in pronunciations should be noted.

Insert Table 2 about here.

Subjects

It had been decided from the outset that subjects would be

sixth, fourth, and third graders and that they would be tested in

that order. The two decisions were related to an earlier study

of basal manuals (Durkin, 1981a) that showed generous coverage of

phonics in the primary grades but very little thereafter. This

suggested that third graders tested as close as possible to the

end of the school year could be viewed as students who had just

received the last of concentrated efforts to teach phonics,

whereas fourth graders would represent students who had had a

year to use what had been taught in the not too distant past.

Test scores of sixth graders could illustrate decoding ability at

the end of elementary school.

Originally, the testing was to be part of a school system's

large-scale effort to collect diagnostic information for

improving instructional decisions. The plan was cancelled,

however, because of unexpected budgetary problems. One

consequence was that only one class at each of the three grade

levels (amounting to 68 subjects) was allowed to participate in

the study. They attended what will be referred to as School A.

Although the use of an individually-administered instrument

placed limits on the number that could be tested, 68 subjects

from one school seemed too small to allow for conclusions worthy

of serious consideration. Consequently, permission was sought

and granted to include all the third, fourth, and sixth graders

attending an elementary school in another district. In what will

be referred to as School B, the third graders numbered 33

children; the fourth graders, 38; and the sixth graders, 45.

Altogether, then, 184 students constituted the research

population.

In order to have some estimate of the subjects' reading

ability, one other decision was to use the scores they achieved

on standardized reading tests to approximate it. The tests that

School A and School B administered during the period of time in

which the pseudo word test was being given will be described

later.

Pseudo Word Test Administration

The pseudo word testing, which began with the sixth graders

in March and ended in May with the third graders, was done by

this writer and three assistants. At the start of each test,

subjects were told of the examiner's interest in seeing whether

they could pronounce made up words by using their spellings.

(Care was taken to make sure that all understood that the words

were not real.) Yirf and morfac served as practice words to

specify the nature of the task. A tape recorder was then turned

on with the explanation that it was easier for the examiner to listen to responses than to write them. The subjects were also told that they could take as much time as they wished with each word.

As soon as possible, the examiners listened to the tapes in order to tally the number of correct responses and to record erroneous ones. Recording procedures, which had been practiced and checked in the pilot study, were similar to those used for Table 2.

Also noted for each subject were the explanations offered for how he or she pronounced three preselected words. Requests for explanations were related to the fact that the testing was done not only to see whether subjects could use spellings to achieve pronunciations but also to learn about the processes involved in attaining that end. To realize the latter goal, each of the four examiners was assigned three different words for which explanations of pronunciations were requested with the questions, "Why do you think it says that? How did you decide it says _____?" The 12 selected words were chosen on the basis of findings in the pilot study:

1. Subjects tended to respond to test items either immediately or with considerable hesitation. Quick responses were correct more often than the others.

2. When subjects were asked to explain a pronunciation, the words that caused problems yielded more detailed

(but not necessarily correct) explanations than did the words that were pronounced quickly. With the latter, explanations were often as uninformative as, "I don't know. I just think it says that."

Based on the above findings, questioning subjects about words that were apt to cause problems seemed like the most productive procedure to follow, given the interest in learning about decoding processes. On the assumption that the words that were difficult in the pilot study might continue to cause problems, the 12 words missed most often in that earlier study were those about which questions were posed. The 12 words follow:

cef	gik	naubircude	vipho
cuxot	gysan	thorge	ximdle
dilque	judkeeve	tylm	yanse

Findings: Total Group of Subjects

Scores achieved by the 184 subjects on the pseudo word test are summarized in Table 3. A one-way analysis of variance indicated that the mean scores for boys and girls were not significantly different (F = .042).

Insert Table 3 about here.

The next table, Table 4, lists the percent of correct responses to each word. As this table shows, 18 of the 29 pseudo words were mispronounced more than 50% of the time. The 18 included all of the words about which the test examiners posed questions, plus hoyk, gebthor, quawz, zalnire, thoipder, and ciftaung.

Insert Table 4 about here.

Findings: By Grade Level

Performance on the pseudo word test by grade level is summarized in Table 5. To learn whether mean scores for the three grades differed significantly, a one-way analysis of variance was done. The F-ratio was 15.287, which is significant beyond the .001 level. To compare each pair of scores, the Newman-Keuls test was used. Results showed that all possible pairs of mean scores were significantly different at the .05 level of confidence. One fact about the data in Table 5 that needs to be kept in mind is that slightly more improvement in test scores occurred between third and fourth grades than between fourth and sixth. What also needs to be remembered is that what is being reported is not a longitudinal study, which would allow for much more meaningful data about developmental trends in decoding ability.

Insert Table 5 about here.

As was done earlier for the total group of subjects, the percent of correct responses to each pseudo word was calculated for each grade. Results comprise Table 6, where the words are listed in relation to the frequency with which third graders pronounced them correctly. Words that were mispronounced at each of the three grade levels one-half the time or more and that were mispronounced equally often by the total group of 184 subjects are listed below.

cef*	gebthor	naubircude*	vipho
ciftaung	gik*	thoipder	ximdle*
cuxot*	gysan*	thorge*	
dilque*	judkeeve*	tylm*	

The eleven starred words were among the 12 about which the test examiners posed questions. (The twelfth word was yanse.)

Insert Table 6 about here.

Findings: By School

Before test data for each school are reported, the schools and the reading tests they administered will be described.

School A

School A is in a city with a population of 35,000. Since
only one class at each of the three selected grade levels
participated in the research, it is pertinent to note that all
classrooms in the school are heterogenously organized and self-
contained. One sixth-grade student was omitted from the pseudo
word testing--thus from the study--because he was absent on the
three occasions when an examiner went to test him.

Teachers in School A, like all other faculty members in the
system, are permitted to use any basal series to teach reading.
They can also supplement a basal program with other materials.

The standardized achievement test administered by School A
in March of the year of the study was the CTBS Comprehensive
Tests of Basic Skills (1973). Two multiple-choice subtests
(Comprehension and Vocabulary) make up the reading section.
Level 1, Form S was used with the third graders, while Level 2,
Form S was administered to both the fourth and sixth graders.
The Vocabulary subtest at both levels is composed of 40 items.
The last item in Level 1 requires selecting from blinking,
dreaming, heavy, and sleepy the meaning of drowsy in the context
drowsy in the heat. The final item in the Vocabulary subtest at
Level 2 presents the context punctual arrival (with punctual
underscored); the task is to select a synonym for punctual from a
list made up of early, prepared, prompt, and unexpected. The
Comprehension subtest at both levels has 45 items. It is

composed of brief passages followed by questions, each of which
is followed by four possible answers.

Results of the testing for the subjects in School A are
summarized in Table 7.

Insert Table 7 about here.

School B

School B is in a city with a population of 4,500. There are
three public elementary schools. All the third, fourth, and
sixth graders in one participated in the research.

By faculty choice, the Houghton Mifflin Basal Series (Durr,
et al., 1981) has been used in School B since 1972. Like the
teachers in School A, those in School B are permitted to
supplement this basal program with other materials.

The Stanford Achievement Test (Gardner, et al., 1981) was
given in April during the year of the research. Third graders
received the Primary 3, Form E test, fourth graders took the
Intermediate 1, Form E version, while the sixth graders were
given the Intermediate 2, Form E test. Unlike the standardized
test used by School A, the reading section of the Stanford
Achievement Test is composed of Comprehension and Word Study
Skills subtests. The format of the Comprehension test is similar
to that in the CTBS test; there are 60 items, however, rather
than 45. The Word Study Skills section, also made up of 60

items, is a multiple-choice test divided equally between two

tasks. In the first, a word is divided into syllables in four

different ways; the job is to choose which division is correct.

For the second task, a word is printed (e.g., shine) and one

word is to be chosen from three (chin, motion, slice) that

includes the sound(s) recorded by the underlined letter(s) in the

target word.

The performance of subjects in School B on the reading test

is summarized in Table 8. The number of subjects in the various

groups listed in that table has been omitted for the following

reasons. Two subjects in grade 3 and two in grade 6 did not take

the achievement test. In addition, two subjects in grade 4 and

eight in grade 6 received raw scores that were sufficiently high

as not to be assigned a grade-equivalent score. Since test

results for School B did not become available until after the

school year ended, it was impossible to administer tests to the

absentees and more difficult tests to those with the highest raw

scores. That the best readers in grades 4 and 6 (insofar as

performance on the test is concerned) are not accounted for in

the data about grade-equivalent scores in Table 8 needs to be

kept in mind.

Insert Table 8 about here.

Performance on Pseudo Word Test

Results of the pseudo word test for School A and for School

B can be compared in the next table, Table 9. A one-way analysis

of variance for the data from School A indicated that differences

in mean scores at the three grade levels are not significantly

different (F-ratio = 1.544). In School B, on the other hand,

they are (F-ratio = 15.138; $p < .001$). Results of the Newman-

Keuls test indicated that all pairs of mean scores for School B

differ significantly from each other at the .05 level of

confidence.

Insert Table 9 about here.

The next table, Table 10, shows the percentage of correct

responses to each pseudo word for each school. Since all

previous ways of presenting percentages of correct responses

pointed up consistent problems with certain words, finding the

same pattern in the data for the two schools is not unexpected.

Insert Table 10 about here.

Correlation coefficients for pseudo word test scores and

standardized test raw scores for both schools turned out to be

statistically significant beyond the .01 level of confidence.

(The coefficient for School A was 0.55; for School B, it was

0.57). Because of the interest in abilities at different grade

levels, Table 11 summarizes correlation data by grade level.[3]

Why two of the three coefficients for the third graders in School

B are so markedly different from all the others has no obvious

explanation.

Insert Table 11 about here.

Discussion

Standards for evaluating in some objective way the

performance of the 184 subjects on the 29-item pseudo word test

do not exist, because of the paucity and limitations of existing

studies of decoding. Subjectively, the scores seem low whether

looked at as a whole or divided by grade level or by the schools

that the subjects attended. (Not to be forgotten is that if time

limits had been placed on responding, scores might be

considerably lower.) Reasons for a less than enthusiastic

response to the achieved scores is graphically portrayed in

Figure 1, where it can be seen that even the most successful

subgroup of subjects (sixth graders in School B) had a mean score

of only 15.4. (The standard deviation for these 45 students was

5.6; the range of scores, 6-26.)

Insert Figure 1 about here.

A number of factors could account for the low scores,

including ineffective phonics instruction. However, since

neither what was taught nor how it was taught is known, only the

assessment instrument will be considered since flaws in that (and

in instruction) are the two most logical reasons why the

subjects did not do better than they did.

Assessment Instrument

One predictable concern about the assessment instrument is

its use of pseudo words. As was explained earlier, pseudo rather

than real words were selected both to ensure that the test items

would be unknown and to allow for the use of the same words with

all subjects. To assemble a list of real words that would meet

the two criteria just mentioned (and also cover the phonics

content listed in Table 1) would require considerable testing,

thus more time than any school was likely to allow. Even if such

a list of real words could have been compiled, some probably

would be "unreal" for some subjects in the sense that they would

not be in their oral vocabulary. These students would be at a

disadvantage not shared by other subjects, given the help that

oral vocabularies provide with the decoding process.

A second predictable criticism of the assessment instrument

is that the development of test items was based on

generalizations that, in certain cases, do not have what some

would consider sufficiently high utility to serve as the basis

for a decoding test. Actually, if generalizations were

restricted to what always produces an exactly correct
pronunciation, their number would be small indeed. Since, as was
mentioned before, consensus about what is sufficiently useful to
be taught does not exist, the content used to develop the 29
pseudo words seems as defensible as any other group of
generalizations.

Because the data that have been reported indicate that
certain words consistently caused problems for a large number of
subjects, another shortcoming that might be attributed to the
test is the equal value assigned to each word in arriving at a
total score. While it is reasonable to conclude that
polysyllabic words are generally more difficult to decode than
short, monosyllabic words if only because there is more to
remember as the decoding process proceeds, it is equally true
that one and the same word may be easy for one reader and
difficult for another. Variations in what had been taught would
be one reason for the difference; but there are other reasons,
too. Take the pseudo word wobe as an illustration. One subject
may have immediately noticed its relationship to a known word
(robe), substituted /w/ for /r/, and arrived at the pronunciation
of wobe both quickly and easily. Another subject, who also knew
robe, may not have recalled it at the time wobe was shown, thus
went about decoding it letter by letter and sound by sound.
Since the test was not timed, the second child was not penalized
for making the task more difficult than it needed to be.

Nonetheless, the hypothetical procedures that the two subjects
used do show that difficulty is not as objective as it may at
first appear to be. All this is to say that it would be
impossible to arrive at a hierarchy of difficulty for the 29
pseudo words and then assign points accordingly.

The hypothetical description of how two subjects went about
decoding wobe may have raised still another question about the
test, namely, that it did not necessarily assess the subjects'
ability to use the selected generalizations—assuming that they
knew them, which, based on the data collected, is not likely to
be the case for some. As was acknowledged early in the report,
it was never thought that only the generalizations would figure
in the decoding processes used by the subjects. Actually, what
any decoder uses—whether with real or pseudo words—will vary
from word to word depending on what words are in the decoder's
reading vocabulary, on what can be recalled about what is known
that will be helpful, and—in the case of real words—on the
availability of contextual help. It was to try to find out what
the subjects did do and use with the pseudo words that examiners
asked questions about 12 preselected words. What the questions
revealed will be reported later.

Now let me consider two further questions that might be
raised about the assessment instrument. One is that it did not
provide enough opportunities to apply a generalization, thus
making it impossible to arrive at reliable conclusions about the

subjects' ability to use it. To be more specific, the
generalization that c followed by e, i, or y suggests the soft
sound for c applied to just three test words: rincy, cef, and
ciftaung. While insufficient chances to use the content of
selected generalizations is a valid criticism, anyone interested
in assessing decoding ability must choose one of two
possibilities, particularly when the assessment instrument is
used with individuals: (1) Test a small amount of content with a
sizeable number of words, or (2) test more content but with fewer
words for each part. Given the underlying purpose of the
research, it was decided from the outset to choose the second
alternative.

Because the interest was in collecting data on students'
decoding ability when they are allowed as much time as they need,
time restrictions for responding were not used during the
testing, which some may think is another flaw for two reasons.
First, it does not allow for making distinctions between decoding
procedures like those described earlier for wobe; and, second, it
fails to recognize that what contributes to comprehension is
decoding that is accurate and fast. However, since children can
hardly use quickly what they do not know, an attempt to find out
what is known seems basically important, especially because of
the few studies of decoding ability that have been reported.

Having dealt with questions likely to be raised about the
assessment instrument, let me continue the discussion of the data
reported earlier.

Frequently Missed Words

As was reported, one reason why achieved scores on the
decoding test were no higher than they were lies in the fact that
14 words were mispronounced half the time or more no matter how
the scores were organized or divided. The 14 are shown below.

cef	gebthor	naubircude	vipho
ciftaung	gik	thoipder	ximdle
cuxot	gysan	thorge	
dilque	judkeeve	tylm	

Why did these 14 words cause problems? One reason is that
both c and g were commonly assigned their "hard" sounds,
regardless of the graphemic environment in which they occurred.
In the Calfee, Venezky, and Chapman study (1969), similar
findings for c were found--g was not tested in the brief amount
of content assessed. These researchers attribute their subjects'
common errors with c to a "response bias" for /k/ because of the
frequency with which c pronounced /k/ appears in English words.[4]

English words did not appear to have much influence on what
subjects in the present study did with dilque because in all the
mispronunciations, que (pronounced "ku") was the second syllable
in what is a monosyllabic word. While real words ending with que
are hardly common, they do appear in materials that children see

in and out of school—for instance, <u>antique</u>, <u>unique</u>, <u>technique</u>, <u>clique</u>, and <u>plaque</u>, the latter being a word that now receives attention in health and science textbooks whenever tooth decay is discussed.

Knowing that /v/ in final position is always recorded by <u>ve</u> should have helped the subjects know that <u>judkeeve</u> is not a three-syllable word; yet "jŭd-kē-vē" was the typical, incorrect pronunciation.

Reasons why the other words in the group of 14 were mispronounced so often can be explained briefly because of shared problems. Many subjects (1) did not seem to know what to do with <u>y</u> except when it occurred at the beginning of a word or at the end of a multisyllabic word; (2) failed to deal with digraphs as units; (3) had trouble with <u>r</u>-controlled vowel sounds; and (4) did not know what to do with <u>x</u> when it appeared in initial position. Relatively few problems occurred when <u>x</u> was obviously in final position, as it is in <u>dowx</u>. Although it also is in final position in <u>cuxot</u> (<u>cux ot</u>), knowing that requires the ability to divide <u>cuxot</u> into syllables. The sample mispronunciations for <u>cuxot</u> shown below indicate problems with syllabication, thus with <u>x</u>.

coō ŏxt   cŭ zŏt   coō tŏx   cŏxt   cŭ ŏx   cŭ shŏt   cŭ ŏxt

The other common problem that is suggested in transcriptions of the most frequently mispronounced words was the inability to

blend sounds correctly. Evidence of this shortcoming, and of previously mentioned problems with syllabication, digraphs, and <u>r</u>-controlled vowel sounds, can be seen in a few sample errors:

<u>Pseudo</u> <u>Word</u>	<u>Mispronunciations</u>				
thorge	thrō orj	thrō jē	thwarj	thrawg	thor idge
naubircude	nā ū bē ir kūd		now bū ir cŭd		
	nā brī cŭd	nā bī er cūd	nau brī kūd		
thoipder	thō pī der	thō perd	thor per	thŏp der	
ciftaung	kĭf tong	clĭf tang	sĭf thang		

Subjects' Explanations for Pronunciations

As was mentioned, subjects were questioned about why they pronounced preselected words as they did. In each case they were asked, "Why do you think it says that? How did you decide it says _____?" The content and number of subsequent questions depended on the response to the first two and on the nature of the word being discussed. Of special interest was why the subjects divided a word into syllables in the way that was suggested in their pronunciation, and why they assigned the sounds they did to vowel letters and to consonants that have variant sounds. These aspects of their decoding efforts were of interest because it is believed that an effective instructional program for phonics enables students to cope with them successfully. Because of space limitations, the guideline used

to select explanations that would be quoted in this report was to

focus on the words that, up until now, have received less

explicit attention than others in the group of 12 words about

which the subjects were queried. Those words are gysan, tylm,

vipho, ximdle, and yanse.

Before reporting some of the explanations, two points need

to be made. The first is the recognition that even the most

successful decoders may not be able to verbalize what they know

and can do. It is even possible that the successful ones are

least able to explain what they do because it is done

automatically, or at least with relatively few conscious

decisions. It was hoped, nonetheless, that questions about

pronunciations might elicit information that would be relevant

for improving phonics instruction.

The second point is that at least some of the explanations

offered by subjects may have been after-the-fact attempts to

justify a pronunciation rather than a description of what they

thought about and decided as they attempted to decode a word.

This possibility means that what are called explanations may at

times be something else.

Gysan. Two of the common decoding problems discussed

earlier apply to gysan, which helps explain why 88% of the total

group of subjects mispronounced it. One problem was the

persistent tendency to associate g only with /k/, even though g

followed by y consistently stands for /j/. The second problem

was uncertainty about what to do with y whenever it occurred

anyplace except at the beginning of a word (yanse) or at the end

of a multisyllabic word (rincy).

Interestingly, explanations given by the relatively few

subjects who pronounced gysan correctly did not always fit the

pronunciation. To illustrate:

Grade	Explanation[5]
3	The y in it makes it sound like "jī." Y has the sound "yuh."
4	Gy is like the start of gypsy. San is like sun. The a is sort of short, sort of long, sort of like half a sound."[6]

Some mispronunciations of gysan and the explanations offered

for them follow. Examples begin with mispronunciations in which

the correct sound was assigned to g since that was uncommon.

Grade	Mispronunciation	Explanation
3	jĭ săn	Gy is like gypsy. San sounds like "san." It would be "sand" with a d. I divided between y and s because I can just tell where to divide.
3	jĭp sē ŭn	Gy is like gypsy, so I just guessed. The end is just "san." I divided between y and s because it looked like two separate words.
4	jĭ sŭn	I got part of it from gypsy, and then "san." Gypsy is one of our spelling words this week.
4	jĭn săn	Y has the "yuh" sound. It's a consonant. That's why I divided between the y and s.

3	gāz	G and y have a sound like "gā." It's a one syllable word.
4	gĭ săn	The y sounds like a long i because of the a. It has two syllables split into "gī" and "săn."
6	gĭ săn	I know that the sound of gy is "gī." I divided it between the y and s, but I don't know why.
6	ĭ săn	I know that y has the i sound. I don't know if it's long or short.

As can be seen in the explanations listed above, recollections of gypsy to help with gysan were common and suggest the subjects' failure to consider syllabication first. Had the spelling of gysan been used to sort out its syllables (gy san), it would have been seen that the initial syllables in gypsy and gysan represent different spelling patterns, thus different sounds for y.

Tylm. While knowing gypsy should have helped with tylm, it was never mentioned, probably because the subjects attended more to individual letters than to patterns of letters. Other words that might have been known and that would have helped with tylm (e.g., gym, myth, hymn) were not referred to either.

Explanations for correct pronunciations of tylm were not always as good as the pronunciations. For example:

Grade	Explanation
3	The y has the sound of short i. It's one syllable because it has only four letters.
4	I really just guessed. Y is short.
4	Y is short i but I don't know why.
6	Y has the sound of short i because of the t.

Almost without exception, the incorrect pronunciation for tylm was "tī lĕm." Two explanations at each grade level for this mispronunciation follow:

Grade	Explanation
3	It has a long y.
3	It has two syllables, split between the y and l. If you divided after the first letter, it wouldn't make sense. Y sounds like "wuh."
4	Ty is like toy if you take out the o and put the t and y together. Lm is like limb. It sort of sounds like that. It's a two syllable word.
4	Y has the long sound. This is[7] a two syllable word, divided between y and l.
6	You divide between y and l. I know that y should have the i sound because it's between two consonants.
6	The y sounds like an i, the long i because it sounds better.

More unique responses to tylm include the following:

Grade	Mispronunciation	Explanation
3	trā lē ŭm	It just looks like it. It has two syllables, divided between l and m.

| 4 | twī lĕm | It's a one syllable word. |
| 6 | tīmȩ/ | L can be silent in some words, and I think it would be in this word. The sound of y is long i. |

Vipho. Another word for which explanations for pronunciations were requested was vipho, which was pronounced correctly by 30.4% of the third graders, 31.3% of the fourth graders, and 42.4% of the sixth graders.

Explanations for a correct response ("vī phō" or "vī phō") were unusually brief, thus incomplete, and sometimes incorrect. For example:

Grade	Explanation
4	Vi is "vī" because it has an o at the end, and ph is an f.
4	Ph has the f sound.
6	I couldn't decide whether it was "vĭp hō" or "vī phō." The ph sounds like f.

Some erroneous responses and the explanations for them follow:

Grade	Mispronunciation	Explanation
3	vĭp hō	That's a short i because of the o, so that's "vĭp," and then the ph sounds kind of like an f, so it says vĭp hō.
4	vĭp hō	The v, i, p says "vĭp," and the h, o say "hō."
4	vĭp pō	v, i, p says "vĭp" and p, o says "pō"
4	yĭ phō	You split it between the p and the h. V, i, p spells "yĭp" and h, o spells hō.
6	vō	The o is long, and the ph is silent.

Responses to vipho, like many of the responses to tylm, provide further evidence for the contention that subjects often failed to scan the whole of a word, sort out syllables with the help of letters and their sequence, and then consider letter-sound correspondences syllable by syllable. The most common mispronunciation for vipho (vĭp hō) also suggested what erroneous responses to other test items often pointed to: the practice of looking for pronouncible parts in a word even though not all of what was pronounced was in the same syllable. This is like the questionable practice--sometimes encouraged by teachers--of looking randomly for little words in big words in order to get the latter identified.

Yanse. That pronouncible parts in yanse may have been sought by some subjects is suggested by the fact that the total group of subjects either pronounced it correctly (56%) or responded to this monosyllabic word with "yăn sē." It would be interesting to know if the subjects who said "yăn sē" could identify real words having the same spelling pattern--words like sense, judge, prince, and solve. If they could, it suggests the need to make patterns explicit for students, since it cannot be assumed that knowing words like sense and judge automatically results in an understanding of the implications of the VCCe pattern for pronunciations.

Some of the explanations for correct responses to yanse include the following, all offered by sixth graders. Third and fourth graders who

responded correctly either said nothing when asked why they thought it was pronounced the way they had suggested, or stated, "I don't know."

Explanations for Correct Pronunciations

Yan has the short sound and the e is silent.

Yan makes a short sound.

Se is like dance, so it's "yăns."

It reminded me of dance. It just looks like it would be pronounced that way.

The two consonants before the e make the a short.

One explanation at each grade level for the incorrect response "yăn sē" follow:

Grade	Explanations
3	It has two syllables, but I don't know why.
4	If it was spelled y,a,n,c,e it would be "yăns." With s, it's "yăn sē."
6	The yan is kind of like candy, so you just put y in front of it.

Highest Achievers on Pseudo Word Test

Since the words about which examiners asked questions turned out to be the most troublesome, the foregoing discussion of responses and reasons cited for them painted a negative picture. With the hope of painting if not a positive picture then at least a balanced one, Table 12 was prepared to provide test data for the 25 subjects who achieved a score of 20 or higher—20 was chosen arbitrarily—on the 29-item test. This group is composed

of four third graders (7% of all the third graders), seven fourth graders (11% of all the fourth graders), and 14 sixth graders (22% of all the sixth graders).

Insert Table 12 about here.

As Table 12 indicates, the most successful subjects were noticeably different from the others in their ability to decode judkeeve correctly. The specific difference was a two- rather than a three-syllable pronunciation. Based on explanations for the pronunciations of 12 words—including judkeeve—this more successful group knew more about syllabicating unknown words than did the others.

Another obvious difference was the success of the better decoders with cef. Repeatedly, they explained the correct assignment of /s/ to c with a reference to the occurrence of this sound when c is followed by e. Once again, this exemplifies a trait of the better decoders: they were more proficient than the others in verbalizing relevant generalizations when asked to explain a pronunciation. This had not been anticipated because of the assumption that the best of decoders achieve pronunciations so quickly that it might be difficult to put into words what was thought about and done. It is possible, of course, that a different pattern would have been found had the test been timed.

The success of the best decoders with cef is likely to raise
a question about what is also shown in Table 12:   problems with
ciftaung and cuxot. With ciftaung, 4 of the 9 errors were
mispronunciations not of c but of the digraph au. With cuxot,
the consistent source of difficulty was x.

All the other words that were missed fairly frequently by
the most successful decoders caused problems for reasons that
pertain to all the subjects, thus have already been identified:

Regardless of what letter followed g in a syllable, it was
pronounced /g/.

Confusion existed about what to do with y when it did not
occur at the beginning or end of a word, and with x when it
occurred anywhere except at the end of a word.

Some Conclusions

Drawing defensible conclusions from the study is impeded not
so much by what was done as by what was not done. The major
omission, of course, is classroom observations since they would
allow for factual information about the content and the
methodology of the phonics instruction received by the 184
subjects. The fact that problems with certain letters and letter
combinations occurred repeatedly at the three grade levels
studied does tempt one to conclude that more phonics should
have been taught; however, visits to classrooms in connection
with other research (Durkin, 1974-75, 1978-79, 1983b) have shown
repeatedly that much time is already being spent on phonics,
sometimes as early as kindergarten. That being the case, it is
likely that better phonics instruction is called for, not more.

Although not everyone is likely to agree, it is the opinion
of this writer that better phonics instruction would ensure that
three deficiencies identified in the present study would be
replaced by something better. The first deficiency has to do
with what seemed like a disorganized, hit or miss approach taken
by many of the subjects as they attempted to work out
pronunciations. Evidence that they had been taught to scan the
whole of a word before considering its parts was slim. Often
missing, then, was a strategy for achieving pronunciations that
was both systematic and correct.

Related to the absence of such a strategy was what seemed
like a disregard for, or a lack of understanding of, the
significance of syllabication for decoding. As the earlier
description of subjects' pronunciations and explanations make
clear, problems with pronunciations often stemmed from problems
with syllabication, especially when attempts were made to use
recognizable parts of words even when they were in different
syllables.

The same pronunciations and explanations also suggest
problems with blending sounds to produce syllables or words. In
some instances, these problems were so great that subjects'
efforts to synthesize sounds resulted in such unusual
pronunciations that it was almost impossible to record them.

Together, both the specific problems with certain letters
and the more general ones with syllabication and blending should

at least suggest—especially if similar deficiencies characterize

the decoding behavior of other elementary school students—that

the large amounts of time now being spent on phonics need to be

made more productive. The same data also support a point that

was made at the start of this report, namely, that the very

apparent switch in research interests from phonics to

comprehension was not prompted by evidence that decoding ability

among elementary school students is an accomplished fact. What

might be more productive is balance in interests—something that

the profession seems rarely able to achieve.

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Footnotes

[1]In this paper, decoding refers to the use of spellings to arrive at the pronunciations of unknown words.

[2]Decoding strategies for dealing with irregularly spelled words are described in two citations in references at the end of this report (Durkin, 1983a, 1981b).

[3]To be kept in mind is the ceiling effect on correlation coefficients of the high raw scores achieved by two fourth graders and six sixth graders in School B.

[4]What the researchers should also have pointed out is the reliability (or utility) of the generalization about the times when c will record /k/ and when it will stand for /s/. The consistency for c (but not for g) makes it reasonable to expect fewer errors than were found in that study and in the present one.

[5]What is cited throughout this section as an explanation includes in every case all the information that was elicited with various numbers of questions.

[6]Asked if he was referring to the schwa sound, the subject looked puzzled and said nothing.

[7]This explanation was given repeatedly at all grade levels for the pronunciation "ti lem." Why lm was pronounced "lem" could not be, or at least was not explained by any subject who said "ti lem."

Table 1

Content Used to Develop Pseudo Words

SYLLABICATION	Examples	
When a consonant is preceded and followed by vowels, a syllable division often occurs between the first vowel and the consonant.	<u>ro</u>bot	<u>ro</u> <u>bot</u>
When two successive consonants that are not special digraphs are preceded and followed by vowels, a syllabic division generally occurs between them.	<u>win</u>dow	<u>win</u> <u>dow</u>
When a word ends with a consonant followed by le, the three letters form a syllable whose vowel sound is the schwa sound.	<u>gam</u>ble	<u>gam</u> <u>ble</u>
When x is preceded and followed by vowels, the preceding vowel and x are in one syllable and the vowel that follows it is in another.	<u>exit</u>	<u>ex</u> <u>it</u>

VOWEL SOUNDS

When only one vowel letter is in a syllable and is in final position, it generally stands for its long sound.	<u>me</u>	<u>silo</u>
When one vowel letter is in a syllable and is not in final position, it usually stands for its short sound.	<u>met</u>	<u>campus</u>
When two vowels that are not special digraphs appear in succession in a syllable, the long sound of the first is common.	<u>eel</u> <u>meat</u>	<u>say</u> <u>maintain</u>
When two vowel letters are in a syllable, one of which is final e, and the two are separated by one consonant, the long sound of the first is common.	<u>mete</u>	<u>vacate</u>
When two vowels are in a syllable, one of which is final e, and the two are separated by two consonants, the short sound of the first vowel is common.	<u>pledge</u>	<u>evolve</u>
Vowel sounds in unstressed syllables are commonly reduced to the schwa sound.	<u>sýmbol</u>	<u>aróma</u> <u>condóne</u>

Table 1 (Cont.)

Digraphs	Examples

Certain pairs of vowels, referred to as "special digraphs," are to be considered one letter recording one sound.

au	aw	pause paw
oo		cool or cook
ou		out
ow		owl or own
oi	oy	oil boy

With these digraphs, y and w function as vowels.

Y Functioning as a Vowel

When y is the only vowel in a syllable and does not record the final sound, it stands for /ĭ/.

gym   syntax

When y occurs in final position in a polysyllabic word and is preceded by a consonant, it usually stands for /ē/.

hurry   plenty

Otherwise, when y is functioning as a vowel, it stands for /ī/. (Y functions as a vowel except when it occurs in initial position, as in yes and beyond.)

rhyme   dynamo   asylum

R-Controlled Vowel Sounds

When a vowel is followed in a syllable by r, the vowel plus r stand for various blends. The most common one is in final position in her.

dollar   her   dirt   word   hurt

The pair ar may record two other blends.

car   war

The blend in final position in war is usually represented by or.

for

When a vowel is followed in a syllable by re, other blends are common.

dare   here   fire   more   cure

Table 1 (Cont.)

CONSONANT SOUNDS	Examples		
When c or g are followed by e, i, or y, they often record their soft sounds.	cent gem	cite gin	cynic gym
Otherwise, c and g commonly stand for their hard sounds.	can gum	scar glad	sac wig
The letter s stands for both /s/ and /z/. In initial position, the sound is /s/.	son	bus	has

Digraphs

Certain pairs of consonants, referred to as "special digraphs," are to be considered one letter recording one sound.

th	the		thin
sh		shop	
ch	chop	chef	chord
ph		phone	
ng		length	

Q plus u should be viewed as one consonant letter that stands for /kw/ or /k/. The blend /kw/ occurs most often in initial position, whereas /k/ occurs most often in final position.	queen	clique
The letter x stands for /z/ in initial position. Otherwise it stands for the blends /gz/ or /ks/.	xylem exile sox	
The remaining consonant letters (b,d,f,h, j,k,l,m,n,p,r,v,w,y,z) are fairly consistent in the sounds they record.	boy, day, fall, him, job, kite, long, me, no, put, run, van, we, yes, zoo	

Table 2

Acceptable Responses to the Twenty-Nine Pseudo Words

	Word	Acceptable Response(s)		Word	Acceptable Response(s)
1.	rincy	rĭn sē	16.	cef	sĕf
2.	flure	rhymes with <u>lure</u>	17.	dilque	dĭlk
3.	ximdle	zĭm dəl	18.	thorge	thorj or thirj
4.	zalnire	zăl niré	19.	gavvore	găv vōr (or ōr)
5.	dowx	douks or dōks	20.	quawz	kwawz
6.	naubircude	nau bĭr kūdé (or kōōd)	21.	plere	rhymes with <u>here</u>
7.	gysan	jī săn (or zăn)	22.	vipho	vī (or vĭ) fō*
8.	yanse	rhymes with <u>dance</u>	23.	wobe	rhymes with <u>robe</u>
9.	shigur	shī (or shĭ) gur*	24.	chaylar	chā lar (or ler)
10.	cuxot	kŭks (or kŭgz) ŏt	25.	jownare	jou (or jō) nare (rhymes with <u>pare</u>)
11.	tylm	rhymes with <u>film</u>	26.	gebthor	jĕb thor (or ther)
12.	judkeeve	jŭd kēv	27.	hoyk	hoik
13.	gik	jĭk	28.	ciftaung	sĭf tong (rhymes with <u>song</u>)
14.	arfeaple	ar fē pəl	29.	thoipder	thoip der
15.	voog	vōōg or vŏŏg			

*Some instructional materials teach that in words with the VCV pattern, the vowel preceding the consonant may stand for its short sound (<u>lemon</u>) even though it is a single vowel in a syllable (<u>le</u>) and is in final position. This writer's recommendation to teachers is to instruct children to try the long sound first (<u>spider</u>, <u>cupid</u>, <u>baby</u>) but that if it fails to suggest a recognizable word, they should next try the short sound (<u>lizard</u>, <u>melon</u>, <u>acid</u>). For the research, "shi-gur" and "vi-fo" were accepted as correct responses to <u>shigur</u> and <u>vipho</u> respectively. If subjects said "shi-gur" or "vi-fo," they were asked, "Might there be another way to say that word?" If they then offered "shi-gur" or "vi-pho"--and this occurred frequently--their response was considered to be correct. If they did not offer the second pronunciation for the initial syllable, the response was marked incorrect.

Table 3

Scores on 29-Item Pseudo Word Test

Subjects	Mean Score	Standard Deviation	Range of Scores
Total Group (N = 184)	12.2	6.0	0-26
Girls (N = 89)	12.1	5.8	1-26
Boys (N = 95)	12.3	6.1	0-25

Table 4

Percent of Correct Responses to Each Pseudo Word

Total Group of Subjects (N = 184)

	Word	Percent of Correct Responses		Word	Percent of Correct Responses
1.	wobe	82.1	16.	zalnire	43.5
2.	rincy	75.5	17.	vipho	34.8
3.	voog	74.5	18.	cef	34.2
4.	shigur	64.1	19.	thorge	31.0
5.	chaylar	62.0	20.	naubircude	30.4
6.	dowx	60.9	21.	thoipder	27.7
7.	gavvore	·57.6	22.	ciftaung	25.5
8.	flure	56.0	23.	cuxot	25.5
9.	arfeaple	54.3	24.	tylm	23.4
10.	plere	52.7	25.	gebthor	22.3
11.	jownare	51.1	26.	ximdle	15.8
12.	hoyk	47.3	27.	dilque	12.5
13.	judkeeve	47.3	28.	gik	12.5
14.	yanse	44.0	29.	gysan	12.0
15.	quawz	43.5			

Table 5

Scores on 29-Item Pseudo Word Test

by Grade Level

Subjects	Mean Score	Standard Deviation	Range of Scores
Third Graders (N = 56)	9.3	5.6	0-21
Fourth Graders (N = 64)	12.2	5.5	3-25
Sixth Graders (N = 64)	14.9	5.5	5-26

Table 6

Percent of Correct Responses to Each Pseudo Word

by Grade Level

Word	Grade 3 (N = 56)	Grade 4 (N = 64)	Grade 6 (N = 64)
wobe	76.8	79.7	89.1
rincy	58.9	79.7	85.9
voog	58.9	79.7	82.8
flure	57.1	50.0	60.9
shigur	55.4	60.9	75.0
chaylar	51.8	70.3	62.5
gavvore	50.0	46.9	75.0
judkeeve	48.2	43.8	50.0
plere	44.6	45.3	67.2
dowx	42.9	62.5	75.0
jownare	37.5	59.4	54.7
hoyk	35.7	43.8	60.9
arfeaple	32.1	64.1	64.1
thorge	30.4	28.1	34.4
vipho	30.4	31.3	42.2
quawz	28.6	42.2	57.8
yanse	28.6	48.4	53.1
zalnire	26.8	45.3	56.3
cuxot	21.4	21.9	32.8
naubircude	19.6	26.6	43.8
cef	16.1	34.4	50.0
ciftaung	12.5	25.0	37.5
thoipder	10.7	28.1	42.2
tylm	10.7	23.4	34.4
ximdle	10.7	12.5	23.4
gebthor	8.9	23.4	32.8
gik	8.9	20.3	7.8
dilque	5.4	14.1	17.2
gysan	5.4	9.4	20.3

Table 7

Scores in March on Standardized Achievement Test: Reading Section

School A

Subjects	Raw Scores			Grade-Equivalent Scores		
	Mean	Stand. Dev.	Range	Mean	Stand. Dev.	Range
Total Group (N = 68)	57.7	17.2	20-84	6.1	2.4	1.9-11.9
Third Graders (N = 23)	56.4	17.7	20-78	4.5	1.4	1.9-7.4
Fourth Graders (N = 26)	54.4	16.0	26-83	6.3	2.1	3.2-11.9
Sixth Graders (N = 19)	63.7	17.6	23-84	7.9	2.6	2.8-11.9

Table 8

Scores in April on Standardized Achievement Test: Reading Section

School B

Subjects	Raw Scores			Grade-Equivalent Scores		
	Mean	Stand. Dev.	Range	Mean	Stand. Dev.	Range
Total Group	94.4	15.1	38-117	7.4	2.8	2.7-12.9
Third Graders	93.2	11.3	59-109	5.9	2.2	2.7-11.2
Fourth Graders	90.0	20.0	38-117	6.8	2.5	2.7-11.8
Sixth Graders	99.1	10.6	74-113	9.4	2.3	5.5-12.9

Table 9

Performance on Twenty-Nine Item Pseudo Word Test

Test Data	School A				School B			
	Third Graders (N=23)	Fourth Graders (N=26)	Sixth Graders (N=19)	Total Group (N=68)	Third Graders (N=33)	Fourth Graders (N=38)	Sixth Graders (N=45)	Total Group (N=116)
Mean Score	10.7	11.9	13.5	11.9	8.3	12.4	15.4	12.4
Standard Deviation	5.9	4.7	5.2	5.3	5.3	6.1	5.6	6.4
Range of Scores	0-21	4-22	5-23	0-23	1-21	3-25	6-26	1-26

Table 10

Subjects' Responses to Pseudo Word Test

School A (Subjects = 68)				School B (Subjects = 116)		
Percent Correct	Rank	Word		Percent Correct	Rank	Word
82.4	1.0	wobe		81.9	1.0	wobe
80.9	2.0	rincy		73.3	2.0	voog
76.5	3.0	voog		72.4	3.0	rincy
63.2	4.5	chaylar		70.7	4.0	shigur
63.2	4.5	dowx		62.1	5.0	gavvore
60.3	6.0	flure		61.2	6.0	chaylar
57.4	7.5	arfeaple		59.5	7.0	dowx
57.4	7.5	jownare		55.2	8.0	plere
52.9	9.5	shigur		53.4	9.0	flure
52.9	9.5	yanse		52.6	10.0	arfeaple
50.0	11.0	gavvore		50.9	11.0	hoyk
48.5	12.0	plere		49.1	12.5	judkeeve
44.1	13.0	judkeeve		49.1	12.5	quawz
41.2	14.5	hoyk		47.4	14.0	jownare
41.2	14.5	zalnire		44.8	15.0	zalnire
33.8	16.0	quawz		38.8	16.0	yanse
32.4	17.0	thorge		37.1	17.0	vipho
30.9	19.0	cef		36.2	18.0	cef
30.9	19.0	cuxot		31.9	19.5	naubircude
30.9	19.0	vipho		31.9	19.5	thoipder
27.9	21.0	naubircude		30.2	21.0	thorge
22.1	22.5	ciftaung		27.6	22.0	ciftaung
22.1	22.5	gebthor		26.7	23.0	tylm
20.6	24.0	thoipder		22.4	24.5	cuxot
19.1	25.0	gik		22.4	24.5	gebthor
17.6	26.0	tylm		16.4	26.0	ximdle
14.7	27.0	ximdle		14.7	27.0	gysan
11.8	28.0	dilque		12.9	28.0	dilque
7.4	29.0	gysan		8.6	29.0	gik

Table 11

Correlation Coefficients for Pseudo Word

Test Scores and Raw Scores from Standardized Reading Tests

	Pseudo Word Test and Reading Test	Pseudo Word Test and Comprehension Subtest	Pseudo Word Test and Vocabulary Subtest	Pseudo Word Test and Word Study Subtest
SCHOOL A				
Grade 3	.45*	.43*	.45*	
Grade 4	.63***	.53**	.69***	
Grade 6	.62**	.67***	.51*	
SCHOOL B				
Grade 3	.31*	.09		.46**
Grade 4	.60***	.53***		.57***
Grade 6	.58***	.46***		.55***

*p < .05, one-tailed test

**p < .01, one-tailed test

***p < .001, one-tailed test

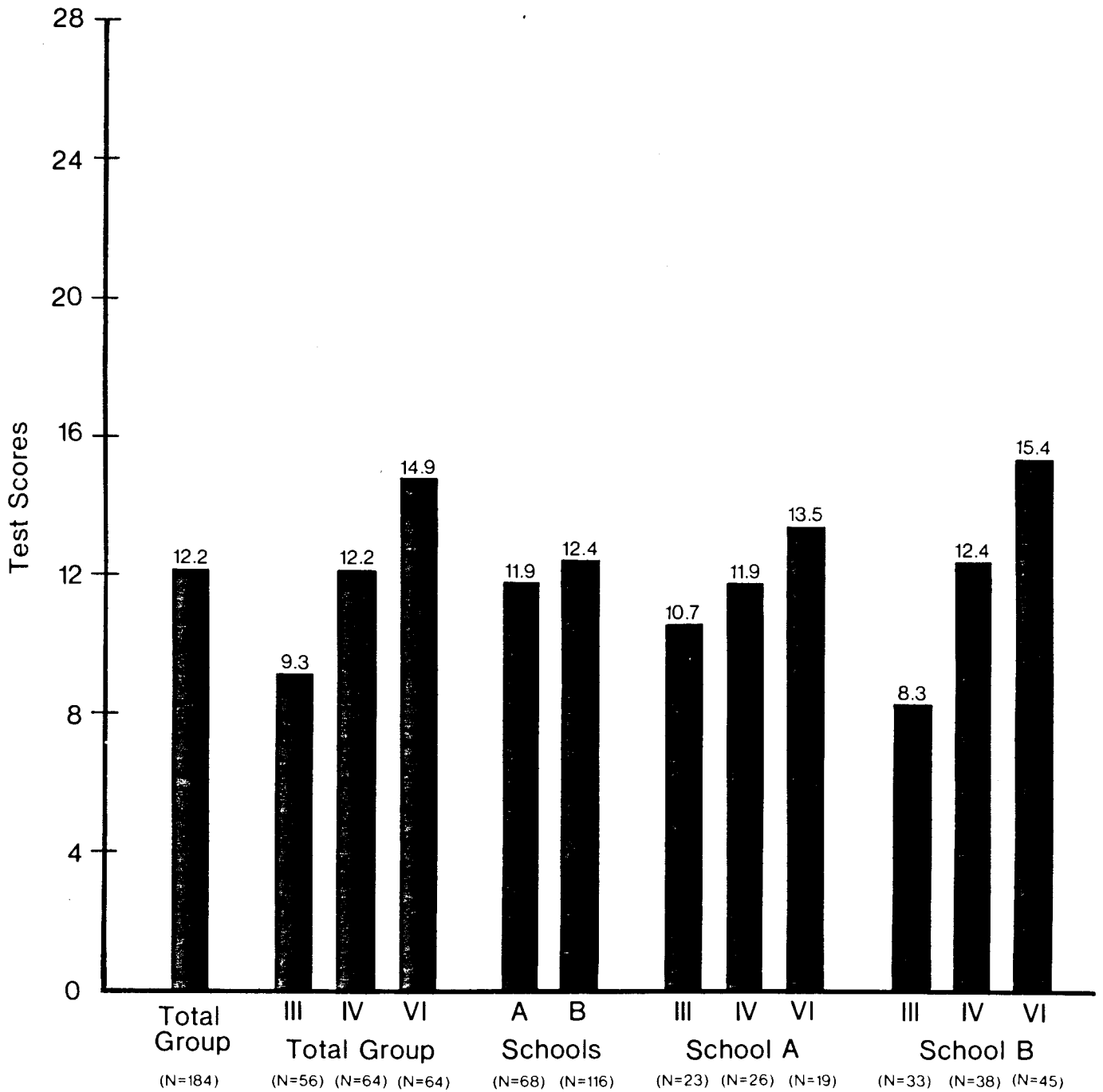# Mean Scores on Twenty-Nine Item Pseudo Word Test

Table 12

Number of Correct Responses by Subjects (N = 25)

Achieving Pseudo Word Test Score of Twenty or Higher

Word	No. of Correct Responses	Word	No. of Correct Responses
rincy	25	jownare	20
voog	24	flure	20
judkeeve*	24	yanse*	17
dowx	24	vipho*	17
zalnire	23	thorge*	17
wobe	23	tylm*	16
shigur	23	cuxot*	16
gavvore	23	naubircude*	16
chaylar	23	ciftaung	16
cef*	23	ximdle*	14
arfeaple	23	gebthor	12
thoipder	22	dilque*	10
quawz	22	gysan*	9
hoyk	22	gik*	2
plere	20		

*Words with asterisks are the 12 about which questions were asked.

**Underlined words are those that were mispronounced 50 percent of the time or more by the total group of subjects (N = 184) and at each of the three grade levels.