SHOULD READING INSTRUCTION AND REMEDIATION VARY WITH THE SEX OF THE CHILD?

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We have been asked to consider the possibility that methods of reading instruction and remediation should vary with the sex of the child. However, our research suggests that the critical problems underlying reading disability may very well be the same for both boys and girls—the problems may simply be more prevalent among boys. Therefore, we would prefer to begin a discussion of this question not by a consideration of sex differences, but rather by describing the characteristics that we have found among the reading disabled which distinguish them from children who read well. We will then present some recent evidence from our laboratory about how sex may or may not relate to some of these characteristics, and finally will offer some thoughts about instruction and remediation.

The research effort over the past several years or so by the Haskins reading research group has led us to the conviction that the difficulty of most, though perhaps not all, of the children who have problems in learning to read is basically linguistic in nature—not visual, or auditory, or motor, or whatever, but rather in the ineffective use of phonologic strategies. Thus far, we have found this linguistic deficiency of poor readers in regard to two major requirements of the reading process—lexical access and representation in short-term memory.

LINGUISTIC STRATEGIES IN READING

Linguistic Awareness and Lexical Access

First, a few words about the requirements of lexical access—that is, what the would-be reader needs if he is to get from the visual stimulus to the word it represents. Here we have considered that one critical requirement is

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a kind of linguistic awareness—the ability to stand back from one's language and analyze it into its component segments. Where the speaker-listener can usually make do with an understanding of linguistic structures that is only passive, the reader-writer is often required to deal with those structures in a more explicit way. To that extent, the would-be reader-writer must be a kind of linguist. At the very least, he must become aware of the segmental units represented by the orthography. In an alphabetic system, the basic segmental unit is, of course, the phoneme.

We have learned from speech research (Liberman, Cooper, Shankweiler, & Studdert-Kennedy, 1967) that the phoneme should be particularly difficult to abstract from the speech stream. Because of the way we articulate and co-articulate, phonemes are merged in the sound in such a way that a word like dog, for example, has three phonological segments and three orthographic segments but only one isolable segment of sound. The information for the three phonological segments is there, but so thoroughly overlapped in the sound that the phonemes cannot be made to stand alone. This characteristic of speech is no problem for the speaker-hearer because he is apparently equipped with a neurophysiology that functions automatically below the level of awareness to extract the phonological structure for him. To understand a spoken utterance, therefore, the speaker-hearer need not be explicitly aware of its phonological structure any more than he need be aware of its syntax. But that explicit awareness of phonological structure of his language is precisely what we believe to be required if the beginning reader is to take full advantage of the alphabetic system. First, he must realize that spoken words consist of a series of separate phonemes. Second, he must understand how many phonemes the words in his lexicon contain and the order in which these phonemes occur. Without this awareness, he will find it hard to see what reading is all about (Liberman, 1971, 1973).

Consider the child who sees the printed word dog for the first time. If he has never been exposed to language analysis skills, he will see the printed word only as a visual pattern of risers and descenders and squiggles of one sort or another and will be at a loss to pronounce it at all. But suppose he has been taught to identify the letters and, as they say, "sound them out." No matter how skilled he is at reading the letters and approximating their sounds, he must still match the printed word dog to the real word /dɒg/ he already has in his lexicon. To do that, however, he must understand that the word /dɒg/ that he already knows consists of these three segments. Otherwise, given the impossibility of producing the phonemic segments in isolation, the best he can do in reading the word is to produce [dɒʊɡ], a nonsense trisyllable that bears no certain relationship to the lexical item /dɒg/. Moreover, another consequence of the merging of the phonemes in the sound stream is that if he is to arrive at the correct phonological representation of the word, he had better not pronounce each letter separately. Instead, he will have to pronounce the syllable that is represented by two or three or more letters, the number varying with the nature of the word. In the case of the word /dɒg/, the number is three. We suspect that acquiring the ability to do this—that is, to know how to combine the letters of the orthography into the appropriate coding units and, moreover, to do that quickly and automatically (Laberge & Samuels, 1976)—is an aspect of reading skill that as much as any other separates the fluent reader from the beginner.
Given all these considerations, we can see why we might expect a reader to find it difficult to become aware of the phonemic segments and why this might be a problem for him as he begins to read. Let us now look very briefly at some of the evidence that the child does indeed have difficulty with phonemic analysis.

In our own research (Liberman, Shankweiler, Fischer, & Carter, 1974), we have found that in a sample of four-, five-, and six-year-olds, none of the nursery-age children could segment by phoneme, whereas half managed to do syllable segmentation. Only 17 percent of the kindergarteners could segment by phoneme, while again about half of them could segment by syllable. At six, whereas 90 percent of the children could do syllable segmentation, only 70 percent were successful with phoneme segmentation. It is certainly clear from this research and from the many other studies that followed that awareness of phoneme segments is harder to achieve than awareness of syllable segments and develops later, if at all.

Having suggested that the linguistic awareness necessary for a proper appreciation of an alphabetic orthography is, in fact, hard to achieve, we can turn again to its role in reading and summarize the empirical evidence available. To save space, we will touch only on the correlational evidence; there is considerable other corroborative evidence from the analysis of the errors of beginning readers (Shankweiler & Liberman, 1972; Fowler, Liberman, & Shankweiler, 1977; Fowler, Shankweiler, & Liberman, 1979), but we will have to omit that here.

In considering the correlational studies, we should begin by remarking on the spurt in awareness of phoneme segmentation at age six, from 17 percent correct at age five to 70 percent correct at age six. Six is, of course, the age at which the children in our schools begin to receive instruction in reading and writing. It goes without saying that age is important for both linguistic awareness and for reading, because, being cognitive achievements of sorts, both linguistic awareness and reading must require the attainment of a certain degree of intellectual maturity. But we also suspect that these two abilities are reciprocally related: While phonetic awareness may be important for the acquisition of reading, being taught to read may at the same time help to develop phonetic awareness (Liberman, Liberman, Mattingly, & Shankweiler, 1980; Alegria, Pignot, & Morais, in press; Morais, Cary, Alegria, & Bertelson, 1979).

Our own research speaks only to the first point—that linguistic awareness may be necessary for the acquisition of reading. What we have found in numerous experiments is that despite widely diverse subject populations, school systems, and measurement devices, there is a strong positive correlation between awareness of phoneme segmentation and later success in learning to read (Blachman, 1980; Helfgott, 1976; Treiman, Note 1; Zifcak, 1977).

A longitudinal study in preparation by our group (Mann, Liberman, & Shankweiler, Note 2) has just recently replicated an earlier finding of ours (Liberman & Shankweiler, 1979) that the ability to segment a word at all, even at the syllable level, is very highly correlated with reading ability. It was found that 85 percent of the good readers in the first-grade group were among the kindergarteners who had been able to segment by syllable the year before,
whereas only 24 percent of the poor readers had been able to do so. The segmenting ability of the average readers fell in between. We will return to this study later when we look at differences between the sexes.

Now as to the second point, the possibility that instruction in reading is important in the development of linguistic awareness (or the reciprocal nature of its relationship with reading), there is some work by a team of Belgian psychologists that is both relevant and interesting. One paper, from the Belgian laboratory (Alegría, Pignot, & Morais, in press), compares the syllable and phoneme segmentation performances of two groups of first graders—one which had been taught by a largely whole-word method (the global group) and the other which had been taught by a largely phonics method (the synthetic group). The synthetic group did somewhat better than the global group on a syllable analysis task (72 percent correct versus 63 percent), but spectacularly better than the global group on a phoneme analysis task (60 percent correct versus only 16 percent correct for the global group). Thus, we see that awareness of phoneme segmentation is enhanced by a method of reading instruction that directs the child's attention to the internal structure of the word. We will have more to say about this later when we talk about instructional methods.

So much for linguistic awareness and its relation to reading an alphabetic language. We do not say that linguistic awareness is the only attribute needed for lexical access, just that it may be an important one. Another that should be mentioned is ability to do rapid automatic naming (RAN) (Denckla & Rudel, 1976). A recent study (Blachman, 1980) suggests that a three-part test that taps the language analysis skills of phoneme segmentation, the word retrieval ability of RAN, and the phonetic coding of oral memory tasks may provide a remarkably efficient predictor of future reading success. That brings us to our second major linguistic requirement of the reading process, namely, the requirement for phonetic coding in short-term memory.

**Phonetic Coding in Short-Term Memory**

It is obviously a characteristic of all language comprehension that the component words of a phrase or sentence must be held temporarily in memory so that the meaning of the whole phrase or sentence can be extracted. It is, of course, possible that in reading, some nonlinguistic representation—visual or semantic, perhaps—might be invoked (Kleiman, 1975). Such a strategy does appear to be used by the congenitally deaf (Locke, 1978), but they are notoriously poor readers.

At all events, we have assumed that in normal language processing, the use of phonetic structures is a particularly efficient way to meet the short-term memory requirements that all language comprehension imposes (Liberman, Mattingly, & Turvey, 1972). And that assumption was certainly reinforced in our minds by the abundant evidence in the psychological literature that when short-term memory is stressed, normal adults do rely on phonetic codes.

In view of these considerations, we were interested to learn whether beginning good and poor readers could be further distinguished by the degree to which they rely on a phonetic representation when short-term memory is
stressed. We assumed that good beginning readers of an alphabetic orthography would have the phonetic structure already available for use in short-term memory. As for the poor readers, we know that many have difficulty in going the analytic, phonetic route and might tend, therefore, to rely more heavily, perhaps, on representations of a visual or semantic sort.

To test that assumption, we carried out several experiments with children in the second year of elementary school. In these experiments, we used a procedure in which the subject's performance is compared on recall of phonetically confusable (rhyming) and nonconfusable (nonrhyming) material. Our expectation was that the rhyming items would generate confusions and thus penalize recall in subjects who use a phonetic representation in short-term memory.

The results showed that though the superior readers were better at recall of the confusable items, their advantage was virtually eliminated when the items were phonetically confusable. Phonetic similarity always penalized the good readers more than the poor ones. As can be seen in Figures 1, 2, and 3, these findings held true for recall of letters (Shankweiler, Liberman, Mark, Fowler, & Fischer, 1979), words and sentences (Mann, Liberman, & Shankweiler, 1980) and obtained, moreover, whether the items to be recalled were presented to the eye or to the ear.

The longitudinal study mentioned before (Mann et al., Note 2) provides compelling evidence of the importance in beginning reading not only of linguistic awareness, as we reported above, but also of phonetic coding in short-term memory as well. In this study, kindergarteners were given the Corsi test of memory for the position of randomly scattered blocks (Corsi, 1972) and also tests for the memory of orally presented rhyming and nonrhyming sequences of words. The following year, as first graders, these same children were retested on those tasks, and in addition, were given a reading test by means of which they were grouped as good, average, or poor readers.

The findings are displayed in Table 1. As can be seen there, the performances of the three reader groups were quite undifferentiated on the Corsi memory test, which is nonverbal in nature. In contrast, the performances of the three groups on verbal memory tasks were strikingly and significantly differentiated. The difference related to how they were affected by rhyme: The good readers were strongly affected by it; the average readers less so; and the poor readers hardly at all. Thus once again, phonetic similarity penalized the better readers more than it did the poorer ones.

Recent studies by Byrne and Shea (1979) strongly support the finding that good readers tend to use phonetic representations in remembering linguistic materials. In addition, these studies provide compelling evidence that the poor readers, in contrast, may prefer a semantic strategy instead. Using a memory for repeated items design, these investigators first presented the subjects with foils that were either semantically or phonetically confusable with words on the antecedent list. They found that the poor reader in processing oral language favors a semantic coding strategy over the phonetic when the two are in competition, while the good reader does the opposite. In their second experiment, nonsense words were used and the foils were now
Figure 1. Mean errors of superior and poor readers on recall of letter strings, summed over serial positions. (Means from delay and nondelay conditions are averaged. Maximum = 40.)
Figure 2. Mean error scores of good and poor readers on recall of word strings, in nonrhyming and rhyming conditions. (Maximum = 5.)
Figure 3. Mean error scores of good and poor readers on recall of meaningful and meaningless sentences in nonrhyming and rhyming conditions. (Maximum = 13.)
<table>
<thead>
<tr>
<th>READING ABILITY</th>
<th>VERBAL MEMORY</th>
<th>NONVERBAL MEMORY</th>
<th>SYLLABLE SEGMENTATION</th>
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<tbody>
<tr>
<td></td>
<td>Max = 32</td>
<td>Max = 32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nonrhyming</td>
<td>Rhyming</td>
<td>Corsi Blocks</td>
</tr>
<tr>
<td></td>
<td>Word Strings</td>
<td>Word Strings</td>
<td></td>
</tr>
<tr>
<td>GOOD READERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 26 KDGN</td>
<td>8.1</td>
<td>13.4</td>
<td>8.4</td>
</tr>
<tr>
<td>IQ 114.7 1st GRADE</td>
<td>5.5</td>
<td>12.1</td>
<td>8.7</td>
</tr>
<tr>
<td></td>
<td>85%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AVERAGE READERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 19 KDGN</td>
<td>12.8</td>
<td>15.4</td>
<td>9.0</td>
</tr>
<tr>
<td>IQ 114.7 1st GRADE</td>
<td>9.2</td>
<td>11.3</td>
<td>8.1</td>
</tr>
<tr>
<td></td>
<td>56%</td>
<td></td>
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<tr>
<td>POOR READERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 17 KDGN</td>
<td>13.2</td>
<td>15.0</td>
<td>10.1</td>
</tr>
<tr>
<td>IQ 115.5 1st GRADE</td>
<td>13.7</td>
<td>12.7</td>
<td>10.1</td>
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<td></td>
<td>24%</td>
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</tbody>
</table>

Mean error scores of good, average and poor readers on memory tasks: A longitudinal study (IQ determined in kindergarten, reading achievement in first grade).
either related or unrelated phonetically. Here they found that when the
semantic mode was not available, the poor reader will use phonetic coding, but
less well than the good reader.

It appears from all these findings that the difference between good and
poor readers in recall of linguistic material will turn on their ability to
use a phonetic representation, whether derived from print or speech. We see
that, especially in the beginner, failure to establish a phonetic representa­
tion properly may be a cause as well as a correlate of poor reading.
Moreover, the evidence thus far from the studies of phonetic coding in short­
term memory certainly suggests that we may be dealing with a very general
strategy used by the child in handling language, whatever its source.

To summarize our view, both linguistic awareness and phonetic coding in
short-term memory are requirements for skilled reading, both appear to be
deficient in the retarded reader, and both share the common trait that they
require linguistic strategies for success.

SEX DIFFERENCES AND LINGUISTIC STRATEGIES

Given that good readers tend to use a linguistic strategy in both reading
and listening whereas poor readers tend not to do so, the question we can now
ask is whether girls and boys can be distinguished in this regard. We have
not carried out any research ourselves to address this question directly, but
for the purposes of this conference we recomputed by sex some of our
longitudinal data on the linguistic performances of kindergarteners and first
graders (Mann et al., Note 2). As expected, the nonverbal Corsi block test
did not differentiate between good and poor readers. It also did not
differentiate between boys and girls. Thus both samples were relatively well-
matched in respect to general nonlinguistic memory. What we did find,
however, was the usual strong interaction between reading ability and our
linguistic measures, but no interaction between sex and the linguistic
measures. As can be seen in Table 2, children who were good readers at the
end of the first grade, whether boys or girls, tended to be strongly affected
by rhyme in their memory performance. Thus, good readers, whether they were
boys or girls, were apparently using phonetic strategies.

What about the poor readers? It is apparent from Table 2 that the
children who were the poor readers at the end of first grade also performed
similarly; whether they were boys or girls again made no difference. However,
the performance of the poor readers was sharply different from that of the
good readers: the poor readers, as usual, were hardly affected by rhyme at
all.

Moreover, one sees from Table 3 that the same pattern of performance had
obtained when all these children were kindergarteners. The future good
readers, whether boys or girls, were affected by rhyme. They also could
segment syllabically. In contrast, the future poor readers, whether boys or
girls, were not affected by rhyme and could not segment syllabically. But
none of the groups were differentiated in nonlinguistic memory.
TABLE 2
Mean error scores of first-grade good and poor readers separated according to sex.

<table>
<thead>
<tr>
<th>READING ABILITY</th>
<th>SEX</th>
<th>VERBAL MEMORY</th>
<th></th>
<th>NONVERBAL MEMORY</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Max = 32</td>
<td>Nonrhyming</td>
<td>Max = 32</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Word Strings</td>
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<td></td>
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<td></td>
<td>Rhyming Word Strings</td>
<td>Corsi Blocks</td>
</tr>
<tr>
<td>GOOD READERS</td>
<td>GIRLS</td>
<td>6.13</td>
<td>12.19</td>
<td>8.44</td>
</tr>
<tr>
<td></td>
<td>N = 16</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>BOYS</td>
<td>4.36</td>
<td>12.00</td>
<td>8.50</td>
</tr>
<tr>
<td></td>
<td>N = 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POOR READERS</td>
<td>GIRLS</td>
<td>15.33</td>
<td>14.50</td>
<td>10.67</td>
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<tr>
<td></td>
<td>N = 6</td>
<td></td>
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<tr>
<td></td>
<td>BOYS</td>
<td>12.82</td>
<td>12.55</td>
<td>8.82</td>
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<td></td>
<td>N = 11</td>
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</tbody>
</table>
**TABLE 3**

Mean error scores of kindergarteners, separated according to sex and reading ability as first-graders (IQ determined in kindergarten).

<table>
<thead>
<tr>
<th>READING ABILITY</th>
<th>SEX</th>
<th>VERBAL MEMORY</th>
<th>NONVERBAL MEMORY</th>
<th>SYLLABLE SEGMENTATION</th>
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<td></td>
<td></td>
<td>Max = 32</td>
<td>Max = 32</td>
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<tr>
<td></td>
<td></td>
<td>Nonrhyming Word Strings</td>
<td>Rhyming Word Strings</td>
<td>Corsi Blocks</td>
</tr>
<tr>
<td>GOOD READERS</td>
<td>GIRLS</td>
<td>9.44</td>
<td>13.81</td>
<td>8.13</td>
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<tr>
<td></td>
<td>N = 16</td>
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<tr>
<td></td>
<td>BOYS</td>
<td>8.00</td>
<td>12.80</td>
<td>8.8</td>
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<tr>
<td></td>
<td>N = 10</td>
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<tr>
<td>POOR READERS</td>
<td>GIRLS</td>
<td>15.0</td>
<td>15.67</td>
<td>11.5</td>
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<tr>
<td></td>
<td>N = 6</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>BOYS</td>
<td>12.18</td>
<td>15.55</td>
<td>9.27</td>
</tr>
<tr>
<td></td>
<td>N = 11</td>
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</table>
These findings will need to be replicated, of course, with experiments specifically addressed to this question of sex differences in reading, but these data certainly would make it seem as if differences in linguistic strategies, and not sex as such, will determine which children will have problems in reading.

It should be remarked at this point that a sex difference did appear in these data. That is, the poor readers in our sample tended more often to be boys, as is usually the case in clinic and school populations, while the good readers more often tended to be girls. We would interpret this to mean that at ages five and six, which is when the testing was done, more girls than boys have developed these basic abilities needed for reading. If the claim is that girls tend to mature earlier than boys, then it may be that girls develop more sophisticated linguistic strategies earlier than boys (Waber, 1977).

At all events, it is apparent that we need more information about the developmental progression of the various strategies available for dealing with language. We saw earlier that poor readers leap toward a semantic strategy in dealing with language when that option is available to them and turn to linguistic strategies only when other options are limited and, even then, do so reluctantly and inefficiently (Byrne & Shea, 1979). The semantic strategy in dealing with language is also typical of some kinds of aphasia, according to the interesting work of investigators at the Boston VA Hospital. Broca's aphasics apparently rely heavily on the content words for apprehending the meaning of sentences rather than dealing with the internal structure of the language, whether phonologic or syntactic (Caramazza & Zurif, 1976).

Nonlinguistic strategies appear also to be typical of younger children. Conrad (1972) found that in tasks stressing the short-term memory, younger children--those under six--appeared to be using nonphonetic strategies to hold information in memory. In contrast, children over six increasingly relied on a phonetic strategy. In fact, the older children preferred the phonetic strategy, just as adults do, even when it had a penalizing effect on their performance, as when they had to remember items that were phonetically confusing.

Thus we may say that the linguistic strategy as used by the good readers is a more mature strategy, akin to that used by normal adults, whereas the semantic strategy resorted to by poor readers is regressive, or at least less mature, and may be more akin to aphasic performance.

One may ask then whether the poor readers, regardless of sex, are constitutionally deficient in the abilities needed to grasp the formal or structural aspects of language, much as some aphasics are, or whether they are simply more immature and slower in developing these abilities. And in either case we may ask whether instruction will make a difference. And what kind of instruction would be most efficacious.

More research is needed in all these areas of concern before definitive answers can be given. We simply do not know whether the differences we find reflect a constitutional deficiency or a developmental lag or varying degrees of either or both. Until definitive answers are available, however, we must do the best we can.
Before presenting our suggestions for reading instruction and remediation, we should like to describe briefly three procedures in widespread use that appear to us to be misguided, and some of our reasons for believing them to be misguided. The first is a remedial procedure that makes the unfounded assumption that the difficulties of poor readers can typically be traced to deficits that are visual or motor in nature, presumably because the printed word is visually apprehended (Kephart, 1971; Lerner, 1971). This procedure ignores the fact that what the alphabetic writing system transcribes are the phonological segments of the spoken language and that what the child has to master are strategies for recovering the linguistic structure of the word from its encipherment in print. Moreover, there is abundant evidence that the problem of most poor readers is not in visual discrimination, visual sequencing, or visual-motor coordination but in the cognitive-linguistic sphere. So, remediation that concentrates on such tasks as visual matching of geometric figures, copying of beadstring patterns, visual-tracking and pursuit movements, and balance-beam walking is at best a waste of time if the goal is the improvement of reading skill. Such procedures may improve the child's ability to identify enemy aircraft, to follow the flight pattern of birds, or to ride a bicycle, but they will not improve his reading. One can point out, for instance, that even if the child's problem in reading really had to do with his eye movements, the visual treatment involving visual tracking and visual pursuit exercises could not help him. The eye movements in reading are well-known to be not tracking or pursuit movements at all, but rather saccadic movements or rapid jumps from fixation to fixation. The reading is done during the fixation, not during the saccadic jump. What is processed during the fixation and where the eye moves next is largely governed by cognitive and linguistic considerations (Rayner & McConkie, 1976), not optical considerations.

So much for the first misguided procedure. The second misguided procedure is of more recent vintage and was originally designed for developmental reading instruction, but has lately been recommended for remedial reading as well. Its originators call it the psycholinguistic guessing game (Goodman, 1969). In our view, this is an egregious misnomer because, far from encouraging the reader to use a linguistic approach, it encourages the child to try to bypass the linguistic structure of the word, and to go from the print directly to meaning. That is, the child is encouraged to rely heavily on guessing from the shape and context in lieu of using decoding skills. This procedure simply reinforces the same inefficient strategies that the poor reader already uses much to his disadvantage. We know from the extensive research of Perfetti and his associates (Perfetti, Goldman, & Hogaboam, 1979; Perfetti & Roth, in press) that it is the poor reader who relies most on context, not the skilled reader. Moreover, the poor reader uses context much less efficiently. We ourselves have shown (Shankweiler & Liberman, 1972) that a child's ability to read connected discourse is highly correlated not with guessing but with his ability to read individual words. In short, the skilled reader can read the individual words and uses guessing from context only when he must. Thus guessing can be useful on occasion when a word is difficult to decipher, but should not be the cornerstone of reading instruction and certainly not in the early stages of reading instruction or in the remediation of most reading disorders. So much for the so-called psycholinguistic guessing game approach.
The third procedure we consider to be misguided combines some aspects of the other two. That is, it treats the written word if it were a logogram, and encourages the child to rely on paired associate memory to relate the printed word with a particular spoken word and without regard to its internal segmental structure. This is the whole-word or look-say method. A corollary procedure draws the child's attention to the visual configuration of the word in terms of ascenders and descenders, or in relation to other special visual features ("remember this shape, it has a tail") and its associated meaning ("the one with the tail means monkey").

Having very briefly described what should not be done, we must now outline our own approach.

READING INSTRUCTION AND REMEDIATION

First, we should emphasize that our concern is with children who find it difficult to learn to read in an alphabetic writing system. We know that other orthographies are much easier for anyone to acquire at the outset. Take logographies, for example, the writing systems in which each character represents a word, instead of a letter as ours does. A recent study at the University of Connecticut (House, Hanley, & Magid, 1980) has shown that it is possible to teach retardates with a mental age of five or even less, who had never learned to read, to identify 200 or more pseudologograms and then to read off strings of the logograms correctly. They simply teach the retardates to pair a character with a word and to memorize the association between the two.

Very simple, very easy. In such an instructional procedure, a semantic strategy is all that is required for lexical access and no analysis below the level of the word is required.

Should we therefore use this as a model for instruction and remediation? Many educators today would say so. They would recommend that we forget about language analysis and encourage our children to treat alphabetically written words as if they were logograms. That is, they would, as we have said, teach the children to identify whole words by means of their shapes and other visual characteristics without regard to their linguistic components. The children would thus acquire a collection of word identifications by means of paired-association memory. Then, in reading connected text, the children would identify, as best they can, the words they have memorized, filling in the rest by guessing from context, again as best they can.

This kind of approach has been suggested as being especially appropriate for reading-disabled boys whose problem is said to be related to their particular cognitive style. Their cognitive style is said to be characterized by a tendency to apprehend stimuli as wholes, using a so-called right-hemisphere strategy, while girls are said to be more analytic in their cognitive style, using instead a left-hemisphere strategy. For this reason, the suggestion has been made that it might be desirable to teach boys by the whole-word method and girls by a more analytic method.
We need hardly point out two possible problems with this line of thinking. The first is that the boys' deficiency in analysis seems to be confined to linguistic matters and does not appear in the nonlinguistic tasks in which they apparently actually excel (see, for example, Symmes & Rapoport, 1972 on the dyslexic boys' excellence in block design). Thus the source of the boys' difficulties is not analysis as such, but rather linguistic analysis. And the second problem is that it is precisely the whole-word, linguistic-analysis-be-damned approach that has been in widespread use in beginning reading programs over these many decades during which we have been amassing the frightening legions of reading-disabled boys in our schools. It certainly did not help them then and will not, in our opinion, help them now.

We would thus strongly disagree with the educators who in increasing numbers are suggesting that we ignore the alphabetic principle in teaching our children to read and that we concentrate instead on "reading for meaning," as they put it. It is true that some children, whether boys or girls, will learn to read even though the teaching method used initially by-passes the phonological structure of the word. The children achieve success in spite of the efforts of the reading establishment to keep the alphabetic principle a mystery to them, because the children themselves notice the relationships between how the words are written and how they are pronounced. The children themselves, in effect, discover and use the alphabetic principle on their own. We see this as testimony to the excellent native linguistic ability of those children, not to the method of instruction. There are, of course, wide individual differences in this trait as in any other.

We do not concede that because some children can pick up the principles of the orthography on their own, reading instruction should ignore this incredibly versatile and efficient symbol system. There will be too many children who will not make the discovery leap on their own, whether because of constitutional deficiency or maturational lag in linguistic abilities or whatever. Whether boys or girls, their strategies will be inefficient and hopeless. "That's one of the words with a tail, isn't it? Is it baby? Funny was another one of those words with a tail, but that wouldn't make any sense. Oh, there's a dollar sign further down on the page. Maybe the word is money." The nonlinguistic whole-word method will provide would-be readers only with an ever-fading collection of words they recognize dimly, if at all, while they resort to incredibly inefficient visual or semantic strategies that prevent them from unlocking the alphabetic cipher and really learning to read.

If understanding of the phonological structure is desirable, as we believe, then the next question is whether it can indeed be taught to children who, for whatever reason, have not yet developed the knack. The Belgian research that we reported on above certainly suggests that reading instruction itself can be effective in the development of language analysis skills, at least at the first grade level. You will recall that their first graders who had been taught to read by a method emphasizing language analysis were strikingly better at phoneme segmentation tasks than children taught to read by the whole-word method. We can also report that teachers with whom we have worked over the years have all found that for most reading disabled children, prior training in the development of language analysis skills before formal reading instruction began was not only possible, but also extremely helpful in bringing about more successful reading in children previously resistant to
reading instruction. The Wallachs' study of inner city poor readers (Wallach & Wallach, 1980) and Isabel Beck's work with elementary school children (Beck & Mitroff, 1972) are two investigations that come to mind as providing more direct evidence of this in carefully devised research. Like them, we would attempt to meet the challenge of the alphabetic system by means of direct instruction and not leave it to chance discovery by the child.

The direct instruction of which we speak need not, as we implied earlier, be the letter-by-letter [dɑ-ɔ-gə] "blend it, say it faster" procedure that has given phonics instruction such a bad name, though that might be better than no phonics instruction at all. There are many alternative ways of teaching children about the internal phonological structure of the word and how it relates to the orthography. These are limited only by the ingenuity and understanding of the teacher.

REFERENCE NOTES

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FOOTNOTES

1In a recent paper, we have set forth in greater detail some general guidelines for reading instruction and remediation (Liberman, Shankweiler, Blachman, Camp, & Werfelman, 1980).