Linnea Ehri's 1997 Presidential Address

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Introduction

This presidential address was delivered at the 1997 annual meeting of Society for the Scientific Study of Reading (SSSR) Chicago. Ehri provides a glimpse of her experiences conducting research on word reading processes in beginning readers for over 20 years. At the outset, she proposed a theory that the spellings of individual words become bonded to their pronunciations in memory, and she conducted studies to obtain evidence for this theory. This led her into various controversies with other researchers over issues such as whether phonemic awareness is a cause or consequence of learning to read, to what extent beginning readers use visual cues or alphabetic cues to read their first words. The disagreements proving most fruitful were those which spawned additional research. Disputes considered unproductive and even harmful were those involving dogmatic views not open to empirical evidence and maligning appelations intended to implant prejudice. This recounting of her career underscores the value of a systematic line of research as well as intensive discussion with other researchers.

RESEARCH ON LEARNING TO READ AND SPELL: A PERSONAL-HISTORICAL PERSPECTIVE

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I thank you for participating in our annual meeting and for being here today. I apologize for beginning on a depressing note but it can't be helped. I would like to dedicate my talk to the memory of Valerie Anderson who was here with us one year ago, despite failing health. Valerie passed away in December, 1996. When I think of the livelier moments at professional meetings over the years, very often Valerie is in the picture. She had so much enthusiasm and bubbled with ideas. I could always count on her to welcome me with her smile and her wit when I entered a social gathering knowing few other people. This year's meeting will not be quite the same for many of us. Thank you Valerie for your personal warmth and energy as well as your professional contributions to the field of literacy and education.

I am honored to stand before you and present this presidential address. In considering what I might say, I thought about the fact that this is a new organization, so I am in a position to shape tradition regarding the focus of such addresses. In another organization, I have heard presidents agonize over the preparation of their talks, because tradition dictates that you NOT talk about your research. This has always struck me as peculiar. What else would my colleagues be interested in hearing from me for 45 minutes? After querying others and puzzling over what might be suitable, I decided that it is unwise to impose ANY tradition. Presidents should feel free to say whatever they regard as important and should remain unencumbered by remarks of previous presidents.

I have been conducting research on reading acquisition for over 20 years. When I began, I never intended to stick with one topic for so long. However, each study led to more studies. In presenting my studies at meetings, I met other researchers and their work gave me more ideas. Sometimes their ideas disagreed with mine, so this led to more studies. Very soon issues in reading took over my mental life, and extrication from the topic became impossible. In my presentation today, I decided to weave a personal historical perspective into comments about my research with the hope that a behind-the-scenes look over time might have value. When one reads journal articles and book chapters, one does not really get a sense about critical events that led to the research, or about friendships among the researchers. Studies once they hit paper look so clean, uncontroversial, and devoid of feelings.

In reflecting on how I got into research on reading and spelling acquisition, I suspect that the seeds were sown early. My mother had been a kindergarten teacher before she began raising a family. In rummaging through her closet as a child, I discovered boxes of wonderful teaching materials, and she allowed me play with them. My favorite game was to round up my younger brothers and play school. I loved being the teacher. My favorite activity was to give my students spelling tests and then grade them. As you can imagine, this part of the game was not popular with my brothers, but as long as the tests were only occasional, they would comply. Perhaps my interest in literacy and in scoring and analyzing data can be traced to those early days.

I completed my graduate work at the University of California, Berkeley, under the influence of Professors William Rohwer, Robert Gagne, and Dan Slobin. This was in the late '60s when psycholinguistics was emerging as a field of study. Psychologists were intrigued with questions about how adults comprehend and produce speech, how children acquire language, and how language influences thinking. During my undergraduate days, I had worked as a research assistent for a Skinnerian psychology professor studying aggressive behavior in children. Dan Slobin converted me from a behaviorist to a psycholinguist. My dissertation involved a study of sentence processing in children. Upon graduation, I took a faculty position at the University of California, Davis.

It was about four years later that I shifted the focus of my research to reading acquisition. During the summer of 1974, I spent a month participating in an Institute on Reading and Child Development. The Institute was sponsored by the Society for Research in Child Development, organized by Frank Murray, and held at the University of Delaware. There were about 30 graduate students and junior scholars who participated. We all lived in a dorm on campus. Some of the participants were: Rod Barron, Roger Bruning, Joe Danks, Uta Frith, Rob Kail, George Marsh, Kathy Pezdek, Peter Reitsma, Ellen Ryan, Tim Salthouse, Sandra Smiley, Gary Waller, Richard West, and Dale Willows. During that month, we met about 30 well known researchers. Each one stayed for about two or three days to talk about their research. The presenters included: Arthur Benton, Lila Braine, Robert Calfee, John Carroll, Jeanne Chall, Carol Chomsky, David Elkind, Doris Entwisle, Lila Gleitman, Kenneth Goodman, John Guthrie, Janellen Huttenlocher, Marcel Kinsbourne, Paul Kolers, Isabelle Liberman, Jane and Norman Macworth, David McNeill, Paula Menyuk, Ernst Rothkopf, Jay Samuels, Donald Shankweiler, Robert Thorndike, Richard Venezky, and Joanna Williams.

I was particularly interested in Kenneth Goodman's work because he had proposed a psycholinguistic view of the reading process, and he had developed a scheme for analyzing the oral reading errors of beginners to study their development as readers (Goodman, 1969, 1976). During his stay at the Institute, he was very helpful and spent extra time meeting with the psycholinguists. He played audio tapes of children reading texts orally and offered to share his data on children's miscues for us to analyze.

At the end of the Institute, the students wrote a series of monographs that were published by the International Reading Association. In these papers, we focused on different reading processes and their development. My paper was included in the word recognition monograph and was entitled "Beginning reading from a psycholinguistic perspective: Amalgamation of word identities" (Ehri, 1978). This paper provided a theoretical base for much of the research I did and am still doing.

In the paper I suggested how Goodman's (1976) theory could be elaborated to explain more completely how word recognition works as readers' eyes move across a page and get meaning from print. Goodman had proposed that reading is a psycholinguistic guessing game in which readers learn to use context to predict words in a text. In my paper, I suggested that readers also build a lexicon of written words in memory. As they read the same words repeatedly, the spellings of the words become amalgamated or bonded to syntactic, semantic and phonological identities already stored in memory. When readers see words that they have learned in this way, they read them not by guessing or sounding out, but rather by accessing the amalgams in memory. Guessing or sounding out strategies are used mainly to read unfamiliar words.

When I had written this paper, I sent a copy to Goodman. He returned it with his comments in the margins. These consisted mainly of the word "No" repeated 2 or 3 times on every page, sometimes underlined. His final comment at the end consisted of a sentence declaring that reading is not a process of identifying words. I guess I should not have been surprised by his position. But I was unprepared for a reaction so closed minded and dogmatic. I considered the issue an empirical matter to be settled by research rather than by proclamation. So I treated his reply as a scientific challenge, and I set about trying to understand just how beginners learn to read words.

Interestingly, Kenneth Goodman's presentation at the Institute challenged not only me but also Richard West. I remember discussions in which Rich would stew over Goodman's (1965) claim that context was the all-important factor governing word recognition. It turned out that after the Institute, Rich went back to the University of Michigan where he was a graduate student, he recruited his good friend Keith Stanovich, also a graduate student, and for several years they conducted studies revealing that good readers do not guess words from context. Only poor readers use a guessing strategy (e.g., West & Stanovich, 1978; Stanovich, 1980). Most reading researchers know this work, but they may not realize its origin.

The reason why I was so interested in word recognition at the Delaware Institute was that I had just completed some studies of reading comprehension with children. I got the bright idea that perhaps children would be helped to comprehend what they read if the written text

included information about intonation patterns in spoken language. I reasoned that children might be dependent upon stress and pitch in processing the meaning of speech. The absence of this information in print might increase their comprehension difficulties. My solution was to build cues about intonation into the written text by varying the size of written words to reflect the amount of stress and pitch that might be assigned to words in a spoken rendering of the text. Heavily stressed words were printed in large type, moderately stressed words in medium type, and unstressed words in the smallest type. For the control conditions, I created texts in which words were printed in uniform size, or the three sizes were assigned randomly to words. I measured how quickly experimental and control groups read the texts and how well they remembered the information. Results of my first study revealed that 3rd graders read the intoned text faster than the standard text but there were no differences in comprehension (Ehri, 1974).

I obtained a grant to follow up on these findings and I spent the next two years attempting to replicate my first study, but to no avail. One factor thwarting this effort was the difficulty that children had reading individual words in whatever text we chose. Beginners would skip words, or guess them, or stop and sound them out. These word reading problems occurred often and of course spoiled my efforts to measure reading speed. As the negative findings accumulated, I began to realize that if I wanted to understand how children learn to read text effectively, I should study how they learn to read words, because this was obviously the major hurdle in gaining reading skill. Realizing this, I shifted my focus.

It was on this intonation project that I hired Lee Wilce who had just completed a master's degree in Child Development. She assisted me for about 15 years. Having someone who knew how to conduct research, who could work effectively with schools and students, who was conscientious and careful in collecting and scoring data, contributed enormously to my ability to study reading and spelling acquisition.

Last year, in his SSSR annual meeting address as recipient of the Outstanding Scientific Contribution Award, George McConkie spoke about feeling grateful if he could have at least one good idea during his career (McConkie, in press). To my mind, the best idea I ever had was born in the theory of word learning that I proposed in my Institute paper. At least it has kept me busy for many years. It involved the notion that beginning readers acquire a lexicon of sight words by retaining the spellings of individual words in memory as grapho-phonemic symbols of their pronunciations. This idea led me into various controversies that propelled my research.

When I began to study word reading processes, there were two competing views of how readers read words. Proponents of the phonological recoding view argued that people read words by applying grapheme-phoneme rules to convert spellings into blends of sounds. Proponents of the direct visual access view argued that words are read by accessing a remembered association between the visual forms of words and their meanings. After substantial evidence was published showing that mature readers do not phonologically recode words to read them, researchers such as Phil Gough reluctantly admitted that the decoding view was inadequate (Gough, 1984).

But if the decoding view was wrong, was the direct visual access view necessarily right? I did not think so. I remember how Lila Gleitman illuminated the issue for me during a colloquium she gave at UC Berkeley. She expressed amazement at the feat that readers perform when they

read words, and she confessed bewilderment at how to explain this. How is it that readers can view and access in an instant any one of the thousands of words stored in their lexicons? How is it that they can so easily recognize words that they have not read frequently or recently? How is it that even beginners can learn to read unfamiliar words so quickly after very few exposures to the words? She concluded that a very powerful theory of memory is required to explain how readers read words by sight.

A possible explanation occurred to me when I thought about written word learning as a case of paired associate learning in which associations are formed between written letter sequences and specific words in lexical memory. The key involved solving the association problem, that is, explaining the nature of the connections that would allow readers to retrieve from the visual forms on the page specific words in memory while bypassing all other words, including those having almost identical visual forms. The connections had to be systematic, easily learned, quickly activated, capable of handling thousands of words, and unique for each word.

Neither of the two prevailing views of word reading met these criteria. Each procedure had a problem. Readers who applied decoding rules produced an unrecognized blend of sounds, not a specific familiar word. Readers who tried to remember associations between visual forms of words and their meanings lacked any system for forming the associations, so this placed too great a burden on memory.

My alternative solution was to propose that readers form connections between the spellings of individual words and their pronunciations. The connections are formed out of readers' knowledge of grapheme-phoneme correspondences. In recent papers (Ehri, 1992, in press), I have represented the connections as they appear in Figure 1. The spellings of words are depicted as capital letters segmented into graphemes by blank spaces; pronunciations are depicted as lower-case letters or phonetic symbols between diagonal slashes to identify phonemes; connections between graphemes and phonemes are depicted by vertical lines. The idea is that readers remember how to read a specific word by interpreting graphemes they see in its spelling as symbols for phonemes they detect in its pronunciation. Connections are formed between the two, are stored in memory, and are accessed to read the word the next time it is seen. The key point is that general grapheme-phoneme knowledge provides readers with a powerful mnemonic system that bonds the spellings of individual words to their pronunciations in memory. Once this system is known, readers can learn to read words and build a lexicon of sight words easily.

This was my resolution of the controversy about reading words. I sought evidence for this theory of sight word learning in various ways. My first study is especially memorable because I ended up having to do multiple experiments to convince editors of its validity. The purpose of the study was to show that spellings have mnemonic power, that they help readers remember the phonological forms of nonsense words when they symbolize the words phonemically. No doubt you have had the experience of being introduced to someone with an unfamiliar name and asking the person how it is spelled to enhance your memory for the name

. In my study (Ehri & Wilce, 1979), first and second graders were given several paired associate learning tasks. The stimuli prompting responses were single letters. The responses to be

associated with the stimuli were spoken pseudowords. Students were given several practice trials to learn the associations. Let me run you through the basic task. First there was a study trial.

FIGURE 1 Connections formed between graphemes in words to bond spelling to their pronunciations in memory. Capital letters separated by blank spaces designate graphemes; lowercase letters or phonetic symbols between diagnonal slashes designate phonemes; vertical lines between graphemes and phonemes designate connections.

Learners were shown each of 4 visual letter prompts: M, R, K, G. They heard and repeated a pseudoword upon seeing each letter. For example:

The letter M stands for "mav."
The letter R stands for "rel."
The letter K stands for "kip."
The letter G stands for "guz."

They were told to remember them so that later when they were shown the letter, they could recall its pseudoword. The test trial followed. Each letter prompt was shown, students tried to recall the pseudoword, and they were corrected if wrong. Students completed several test trials to learn the pseudowords. This was the basic task serving as a control condition.

In the experimental condition, the study trial was modified slightly. Each letter prompt was shown, the pseudoword was pronounced, but students also saw a spelling of the word.

The letter P stands for "pab" (PAB shown.)
The letter D stands for "des" (DES shown.)
The letter N stands for "nif" (NIF shown.)
The letter F stands for "fug" (FUG shown.)

The test trial followed. Single letter prompts were presented but without any spellings shown or mentioned, and students tried to recall the pseudowords. If wrong, they were corrected and shown the spelling of the pseudoword. They completed several trials to learn the pseudowords.

In a third condition, we showed students misspellings of the words during the study trial. For example, rather than showing PAB, DES, NIF, AND FUG when the pseudowords listed above were spoken, we showed students PES, DIF, NUG, FAB. The same procedures were followed.

All of the tasks were given to each student, with different letters and pseudowords used in each condition. We found that when students were shown correct spellings, they remembered the pseudowords better than when they were shown no spellings or misspellings. We interpreted findings to indicate that orthography has mnemonic value: seeing spellings produces a bonding between spellings and pronunciations in memory, and this enhances recall of the pseudowords.

In the same study, we found very high correlations between students' ability to recall pseudowords whose spellings had been seen and students' ability to read high frequency words ($r = .75$), higher than correlations in the other conditions involving no spellings ($r = .56$) or misspellings ($r = .41$). This suggested to us that such a mnemonic system might very well explain beginners' ability to remember how to read words by sight.

I was elated when I analyzed the results of this experiment. However, the feeling turned to misery when I realized that I had not counterbalanced the order of my conditions completely across subjects. I remember the day this realization struck. A niece had traveled from Seattle to visit my family. Later my husband revealed that she had inquired whether I was ill.

Very soon I remedied the problem by completing a second experiment. Results were the same, so I wrote up the two studies and sent the manuscript off to a journal editor. The reactions I got back were not what I expected. Rather than offering praise for a brilliant experiment, the reviewers were quite skeptical. One pointed out that when students were shown correct spellings,

they may have rehearsed the pseudowords an extra time, so surely this explained their superior recall. Reluctantly, I had to admit that this was a possibility.

To rule out this alternative explantion, I performed a third experiment that included a control condition in which students rehearsed the pseudowords orally an extra time. Results still favored the group that saw correct spellings of the pseudowords. To clinch the case, I added a fourth experiment. Experimental subjects were told to imagine spellings of the words while controls rehearsed the words orally. Results still favored the spelling condition. I sent the manuscript back to the editor who accepted my revision, and the article appeared in the Journal of Educational Psychology in 1979. This was the first of several attempts to show that sight word learning is at root an alphabetic process in which spellings of specific words are secured to their pronunciations in memory.

My theory drew me into another controversy, that involving the causal nature of the relationship between phonemic awareness and learning to read and spell. Isabelle Liberman and Donald Shankweiler were among the first to publish studies showing that young children have difficulty analyzing speech into phonemes, and that phonemic awareness is strongly correlated with beginning reading ability. They argued that print is parasitic on speech and that sound segmentation skill is needed to learn to read (Liberman, Shankweiler, Fischer & Carter, 1974).

However, our research led us to a different conclusion: children's knowledge of the spellings of words influences their sound segmentation ability (Ehri, 1979, 1984; Ehri & Wilce, 1980-b, 1986). Our view of sight word learning suggested this. If children form grapho-phonemic connections between the spellings of words and their pronunciations when they learn to read and spell those words, then the spellings of words should influence what sounds they think are in the words. In one study, we showed that 4th graders segmented words to take account of letters as well as sounds (Ehri & Wilce, 1980-b). Children segmented words such as "pitch" into four sounds (/p/-/I/-/t/-/c/) whereas they segmented words such as "rich" into only three sounds (/r/-/I/-/c/). We argued that the spelling of "pitch" but not "rich" directs readers' attention to an extra /t/ sound that can be found in articulating the word. Also we observed an effect of spellings on syllable counting. Subjects who knew how to spell a word such as "interesting" divided it into 4 syllables (in-ter-es-ting) whereas subjects who did not know the spelling tended to find 3 syllables (in-tres-ting). We concluded from our research that the bulk of phonemic awareness is acquired when children learn how the alphabetic system works to represent speech phonemically.

Advocating this view put us in disagreement with linguists who regard the sound structure of words as primary and independent of their spellings. One experience underscored the resistance of linguists to our view. Several years ago I wrote a review paper detailing results of many studies indicating that spellings influence speech in a number of ways (Ehri, 1984). Spellings are consulted spontaneously even by beginners when they are asked to manipulate sounds in words in phonemic awareness tasks. This is made apparent in their analysis of words having misleading spellings, for example, the word MIX. If asked to count its sounds, most readers find three sounds corresponding to each letter, whereas phonemically there are four sounds, /m/, /I/, /k/, /s/. In contrast, people who lack knowledge of alphabetic spellings, such as non-literate adults or readers of non-alphabetic orthographies, have little awareness of or ability

to manipulate phonemes in words (Bertelson, 1986). Spellings of words are activated and influence performance in word judgment tasks where the words are only spoken, not written. For example, Seidenberg and Tanenhaus (1979) found that rhyming words were recognized faster when their spellings were consistent (e.g., blue - true) than when they were inconsistent (blue - shoe). According to Bright (1960), an anthropologist, whether or not speech in a community of speakers exhibits phonetic drift over time is influenced by the presence of a writing system that represents speech phonemically. Speech is much less apt to change over time in communities having a written alphabet than in communities lacking a writing system. In the paper, my interpretation for the lack of phonetic drift was that spellings serve to freeze the pronunciations of words because spellings sit in memory as symbols for the pronunciations.

I sent this paper (Ehri, 1984) with a note to Victoria Fromkin, author of a widely used introductory linguistics text (Fromkin & Rodman, 1983). In her book, she had asserted wrongly that "Every human speaker, without special training, can segment a speech signal; when we learn the language we learn to segment an utterance into its basic discrete elements of sound." (p. 36) I suggested that she correct her statement to indicate that sound segmentation develops only in speakers who have learned to read an alphabetic orthography. She replied that she would consider my paper when she revised her book. However, in the next edition, there was no change. In fact, she asserted that spellings exert no influence on speech.

One would think that linguists, at least those who teach introductory phonetics courses, would be keenly aware of the impact of spellings on speech, given that they struggle to rid students of spelling-based misconceptions when they teach them how to transcribe sounds in speech using the International Phonetic Alphabet. I have discussed this with Robert Scholes, Bruce Derwing, and Becky Treiman who have published similar evidence and have encountered the same frustrating resistance from linguists.

Among reading researchers, however, the controversy over the causal relationship between phonemic awareness and literacy acquisition has proved remarkably fruitful. Many have joined the fray over the years and have contributed scores of studies exploring this relationship. Findings of these studies have caused most researchers to consider the issue settled at this point. The relationship is thought to be reciprocal with cause running in both directions: phonemic awareness is a cause as well as a consequence of literacy acquisition, with each influencing the other as children learn to read and spell. I have asserted this conclusion as well. However, in truth I am not so sure that a complete resolution has been achieved, particulary when it comes to practical questions such as how to teach phonemic awareness and when and how to introduce letters.

If you examine what phonemic awareness entails in English, you quickly realize that phonemes do not map directly onto single letters in very many words. The major problem facing beginning readers is not phonemic awareness but grapho-phonemic awareness, that is, how to match up graphemes in the spellings of words to phonemes in their pronunciations. Very often, the learner must recognize that two letters match up to one phoneme in words, as evidenced by the connections depicted in Figure 1.

The first words that children learn to read are preprimer level words. Harris and Jacobson (1972) list 58 preprimer words that I have sorted into two categories in Table 1. On the left are words that exhibit one-to-one grapheme-phoneme correspondences. On the right are words that contain multiple letters corresponding to single phonemes or that exhibit other grapho-phonemic complexities. There are as many complex words as there are simple words. Thus, right off the bat, beginners need to figure out how to apply their phonemic awareness to letters on the page. The solution is not transparent, and teaching them phonemic awareness solves only part of the problem.

TABLE 1
Preprimer-Level Words Sorted Into Those Exhibitng Simple Grapheme-Phoneme Correspondences and Those Exhibiting Complex Correspondences

Simple	Complex
a	are
and	ball
at	blue
big	call
can	come
did	daddy
do	down
dog	funny
for	green
fun	have
get	here
go	little
he	look
help	make
I	mother
in	play
is	ride
it	said
me	see
my	something
no	that
not	the

ran	this
red	what
stop	who
to	will
up	with
want	work
we	you

Note: Words from Harris and Jacobson (1972).

Let us consider some examples. Words on the right in Table 1 contain various types of multiple letters that correspond to one phoneme: doubled consonants, doubled vowels, consonant digraphs such as TH, vowel digraphs such as AI. There are silent letters such as final E that corresponds to no phoneme. There are sounds that are ambiguous phonemically: is the "ow" in "down" one or two phonemes? is the "er" in "work" and "mother" one or two phonemes? how do you teach children to split this sound? is the final syllable in "little" just one phoneme /l/ or two phonemes? how do children reconcile this with the spelling LE? is E a silent letter or does the spelling -LE reverse the order of the phonemes / / followed by /l/? These examples raise doubt about the value of phonemic awareness training conducted without consideration for the graphemic side of the picture.

According to our theory of sight word learning, grapho-phonemic analysis is central for retaining sight words in memory. This suggests that we need to teach children grapho-phonemic awareness, rather than phonemic awareness. This is the real problem that learners face once they move beyond an initial recognition that words have constituent sounds. The big chore is grappling with the correct spellings of individual words and figuring out how the graphemes and the phonemes come together in a systematic way.

From my story, you can see that the phonemic awareness controversy has been an important force propelling my research as well as that of other researchers. Another productive controversy erupted with Philip Gough and Connie Juel over the processes used by beginners to read words. They claimed that when children begin learning to read words, they select a salient visual cue to remember how to read their first 40 or so words, for example, the tall posts in yellow or the humps in the middle of camel. However, this system eventually breaks down when readers run out of distinctive visual cues. At this point, they shift to cipher reading which involves using grapheme-phoneme correspondences to read words (Gough, Juel & Roper/Schneider, 1983).

I disagreed with their portrayal of the word reading processes used by beginners before the shift to cipher reading. This disagreement unfolded during conversations at various professional meetings where I tried to persuade Connie and Phil that they were wrong. The most memorable exchange occurred during David Pearson's birthday party at an IRA meeting in New Orleans. Realizing that I was getting nowhere, I resorted to some experiments (Ehri & Wilce,

1985, 1987a, 1987b). My findings revealed an intermediate phase between visual cue reading and cipher reading. I called this phonetic cue reading to capture the fact that novice beginners use partial letter-sound cues to remember how to read words, for example, reading SPOON by remembering connections between the initial and final letters and their sounds in the word. My findings indicated that phonetic cue reading replaces visual cue reading at a very early point in acquisition, long before beginners have learned to read 40 words.

Another dispute that I regard as productive arose between me and Usha Goswami. She had published studies showing that beginners can read new words by analogy to words they have already learned to read, for example, reading PEAK or BEAN by analogy to BEAK (Goswami, 1986). She claimed that this was a very early strategy used by beginners. However, I was not so sure. My theory about word reading led me to think that novice beginners would use phonetic cue reading and would read known words by processing only some letter-sound cues in words. This should cause them to mistake new words for known words when the words contain the same remembered cues, for example, misreading BEAN (new word) as BEAK (known word). Our differing views were clarified when Usha and I shared a hotel room at the 1988 annual meeting of the American Educational Research Association in New Orleans and chatted late into the night. Both of us returned home to design studies that tested our ideas (Ehri & Robbins, 1992; Goswami & Mead, 1992).

The outcomes of controversies such as these show that science works in our field. Recently Rich West expressed to me his belief that we have been part of a real success story in terms of the contribution that scientific research has made to our understanding of reading processes. I attribute much of this progress to the presence of controversies that researchers have tackled empirically. In fact, I urge you all to suppress your tendencies to be nice and agreeable and to work harder at generating and resolving fruitful disputes with colleagues.

However, it turns out that not all types of disputes have been productive. We are in the midst of a very serious, emotionally charged reading war that is probably worse than all previous reading wars. One reason why it has erupted, I believe, is because there are individuals whose ideas have not survived the scrutiny of science yet who have been unwilling to give up those ideas and have resorted to means other than science to make their ideas prevail and to beat down scientific findings. To show how this process has worked, I would like to cite some personal examples.

Dogmatic opposition to my research on word reading surfaced when I wrote my early theoretical paper, as I told you. I encountered it again from two anonymous reviewers reacting to a manuscript I had submitted to a journal. The year was 1978. This was a study comparing what beginners learn about words when they practice reading them in two different ways. In one condition, first graders practiced reading a set of words in meaningful sentence contexts. In the other condition, students practiced reading the same words in isolation on a list, and then listened to the sentences. The words taught were 8 pairs of homophones:

which/witch, whacks/wax, buries/berries, choose/chews
wring/ring, rows/rose, bald/bawled, hall/haul

Examples of sentence contexts were:

"The swimmer wrings out water from the wet towel."
"The teacher rings the bell when it is lunch time."

Pictures accompanied the sentences to make them more meaningful. Students practiced reading the words and then were given posttests to assess what they had learned about the words, including information about meanings and spellings.

We found that students who practiced reading the words in sentences recognized the correct meanings of the two different spellings better, whereas students who read the words in isolation were able to read the words aloud more quickly and to spell them more accurately. I interpreted these findings to indicate that there are multiple identities of words to be amalgamated in memory by beginning readers, and that their experiences reading words influence what is learned.

The editors rejected the manuscript and returned it with comments from the reviewers. One of the reviewers' reactions is reproduced in Figure 2. The second reviewer also objected to the focus on words and asserted, "A very slight study. Not a very interesting topic. Full of sentences which need to be rewritten to give them some sparkle. Not at all important. Surely we can spend our time looking at more significant issues."

READING RESEARCH QUARTERLY, Manuscript No. 537, Reviewer No. 1

Manuscript Title: "Do beginners learn printed words better in context or in isolation?"

REVIEWER'S REACTION:

I. Should the manuscript be published in a future issue of the *Reading Research Quarterly*? No.

II. General Comments: A worthless study which adds to the abundant confusion about "learning words" -- 16, count 'em--and "reading." What 6 year old could remember (or needs to) which/witch is which? Forty wax to the author! This study is the buries. How did they chews to hall these words out and ring sound out of them?

III. Importance of the Study: None --or rather negative. The study signifies nothing, but adds sheer weight to the unwarranted focus on words.

IV. Procedures and Data Analysis: Poor. The first sentence is an unbased assumption and the rest is down hill from there. All could read. All learned all words. All learned to do better things they were taught to do better. Even statistically insignficant "findings are massaged beyond all justification. Sources are misquoted to make the focus on teaching words as units seem to be valid.

V. <u>Writing Style and Organization</u>:

VI. <u>Rewrite Suggestions</u>: Really! When will we get to real issues? When will we try to look at real kids reading real language? And when will we lift our eyes from the <u>word</u> to <u>meaning</u>?

FIGURE 2 Copy of the original review of a paper I submitted for publication. **Normally my reaction to negative reviews is**, first, to let the anger subside, and then to consider the criticisms and try to devise ways to address them, either with logic or additional data. However, in this case, there was nothing to address. The entire study had been rejected as insignificant. So we sent the paper to Child Development, a highly respected journal, where it was published (Ehri & Roberts, 1979). A year later, we conducted another similar study with findings supporting the first study (Ehri & Wilce, 1980). We submitted this study to the same reading journal, now with new editors. This time it was accepted for publication and in fact received an award from IRA, indicating that this research did have value.

However, the resistance to reading research that focused on words, phonemes, and letters only grew stronger in subsequent years, as more data appeared supporting its importance for learning to read. What kind of resistance was this? Unfortunately, it was not scientifically conducted studies. Quite the contrary. Science was denounced as a means of providing answers to questions. Name calling tactics were employed. For example, I recall attending a symposium, entitled "Researching Whole Language" at the 1989 AERA meeting. Rich West, Keith Stanovich and I stood at the back of a very crowded room. We found ourselves the target of criticism as one speaker contrasted whole language research to traditional research. He criticized traditional researchers for going into schools and conducting studies that have not been designed through collaboration with the teachers and do not address needs that teachers feel are most important. He branded these researchers "academic rapists." This was clearly an attitude shaping tactic intended to turn educators against an approach to research that had produced evidence challenging whole language beliefs.

Another example of the use of maligning language to prejudice educators occurred during a conference that was organized by IRA and the Center for the Study of Reading for the purpose of presenting the latest research to publishers of reading programs. Marilyn Adams was on the program talking about the book she had just written, Beginning to Read: Thinking and Learning about Print (Adams, 1990) which reviewed much of the research on beginning reading processes that I and others had published. Joanna Williams and I were discussants for Marilyn's presentation. Later in the day, another discussant who was a whole language advocate expressed disagreement with Adams and branded all of us "phonicators." Since then Marilyn has been the target of many such attacks. Her book has been referred to as the work of the devil. At an IRA meeting, many people heard a whole language leader assert publicly that Marilyn should be "shot with a silver bullet," implying that she was a vampire.

Unfortunately these tactics have been effective. Many teachers and educators have adopted the dogma and anti-phonics sentiments of the whole language movement without requiring evidence

or exercising critical inquiry. This situation is not only anti-scientific but also anti-intellectual and hence unhealthy for teachers, students, and our society. Fortunately, the tide seems to be turning, although I worry whether the political battles that are currently raging in California and Texas as well as other states over beginning reading instruction leave any room for a middle ground where reasoned solutions are possible. But that is a subject for another day.

To conclude, I have given you a glimpse of my struggles over the years to understand how children learn to read words. Luckily there have been many others who have struggled with me. I am proud that our combined efforts have advanced our understanding, but I am disheartened that our work has not made schools more effective places for teaching students to read. However, there is reason for hope. We have some great minds at work on this problem. A report is being prepared by a distinguished panel of literacy researchers, many of whom are SSSR members. Sponsored by the National Academy of Sciences, the report will review research and make recommendations on the prevention of reading difficulties in young children. The Office of Education will soon hold a competition to fund a research center focused on beginning reading instruction. Most importantly, we have an organization up and running that brings together researchers to present data, talk about these issues, and consider various courses of action. So I am optimistic. Let us pursue our research. Let us educate the public about effective reading instruction as well as the nature and value of scientific evidence. Let us work at building SSSR into something that makes a difference. Thank you for your attention and thank you for your support during my time as president.

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Riggs Editor's Note: We have taken some editing license in adding "bold" beginnings to paragraphs; the article is long, somewhat complicated, and we felt this would break up the text for easier reading.

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