

# Synthesis of Research on the Learning and Teaching of Spelling



*Words similar in meaning preserve visual relationships; although the pronunciation of the base word changes when a suffix is added, the spelling of the base word remains the same.*

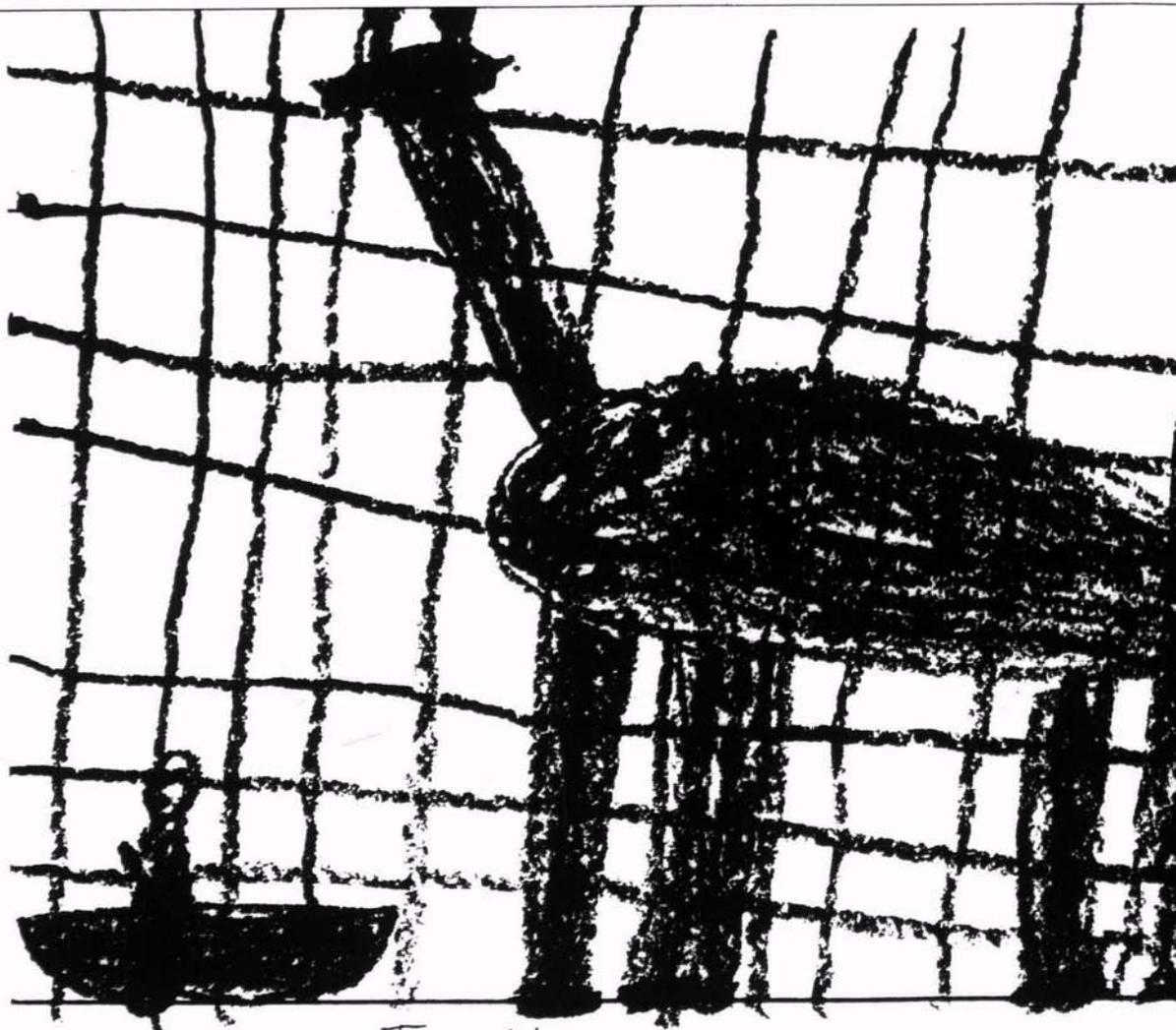
Recent advances in linguistic analysis provide a sound foundation for spelling instruction.

Spelling is enjoying a renaissance. In recent years, every major educational publisher has brought forth a spelling series. Considerable insights have been gained into the ways in which students master spelling (Henderson and Beers 1980, Read and Hodges 1982). These insights, when combined with research on the *nature* of the spelling system of English, provide the foundation for an informed program of formal spelling instruction. Whether developed by a knowledgeable teacher (DiStefano and Haggerty 1985) or presented in a well-constructed basal spelling series, such programs can provide the critical

knowledge base for growth in spelling: a systematic, sequenced presentation and study of the major spelling patterns in the English language. Some students acquire knowledge of these patterns without formal study, but most do not. This article examines significant research in spelling and suggests how an awareness of this research can provide the foundation for effective spelling instruction.

## **The Memory/Kinesthetic Approach**

Although some of the most engaging insights into how students learn to spell have come fairly recently, tradi-



*The invented spellings of kindergarten student Nathan Padgett illustrate his developing knowledge of the way letters represent certain sounds. Here's the translation: "I went to the jungle, I went to the zoo, I had nothing to do, but sit in a canoe."*

I Y W N N T O D W G O N L  
 I Y W N T O D W Z O O  
 I H D N E N T O D O  
 B T S T N A K N O

tional spelling research also has implications for spelling instruction (Horn 1969, Hillerich 1981). This line of research examined the spelling system from the perspective of what linguists term a "surface" or alphabetic analysis. That is, it was noted how sounds correspond to letters in a sequential, left-to-right manner. This type of analysis suggested that English spelling is quite irregular; therefore, its mastery re-

quired basic memorization. Some rules could be helpful, but because of the letter/sound variability, the value of teaching a large number of rules—and their inevitable exceptions—required the primary thrust of spelling instruction to be placed on memorization. A significant study by Hanna and others (1966) revealed that there was more regularity to English spelling if the unit of analysis was not the single

letter or sound but rather the *syllable*. This study was still, however, a "surface" analysis and did not significantly affect the prevailing attitude toward English spelling or the ways in which spelling was formally taught.

Nevertheless, this line of research yielded some important insights, which dealt primarily with methods for ensuring the more efficient memorization of spelling words. Facilitative



Drawing courtesy of Marianna Carina,  
teacher at Hopkins Elementary School,  
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practices included the "test-study-test" procedure (Horn 1969); applying spelling skills in writing (Fitzsimmons and Loomer 1978, Hillerich 1981); spending but a few minutes a day on spelling instruction (Horn 1969); and avoiding the practices of students simply writing the words to be learned a certain number of times and copying their definitions from the dictionary (Hillerich 1981). Hillerich (1982) sug-

gested that strategies should ensure that words "be studied through a visual memory, kinesthetic approach to memorization."

A different line of research has focused primarily on (1) linguistic analyses of the spelling system of English, and (2) how children learn to spell. This research has advanced understanding of the content and strategies of spelling instruction and has offered instructional strategies that significantly supplement or replace the memory/kinesthetic approach.

### Linguistic Analyses

Linguistic analyses of the spelling system of English have demonstrated that there are other levels of information represented in spelling besides letter/sound correspondence (Chomsky and Halle 1968, Venezky 1970). The basic point of linguistic analyses is that there are three principles according to which English is spelled: *alphabetic*, *within-word pattern*, and *meaning* (Henderson and Templeton in press).

English spelling is *alphabetic* in that letters correspond to sounds in a more or less left-to-right sequence. There is not a consistent one-letter/one-sound correspondence, however, because of historical influences, usually positive, that have affected the spelling system. These influences have accounted for the other two principles of English spelling, *within-word pattern* and *meaning*.

The *within-word pattern* principle demonstrates that the sounds that particular letters or groups of letters represent depend on their *position* within words. For example, consider the ways in which the consonant digraph *gh* can represent different sounds in such words as *laugh*, *through*, and *ghost*. The sound the *gh* digraph represents, in other words, depends on its *position* within the word, or the *pattern* of the letters making up the word. Similarly, *ey* represents a long "a" sound at the end of a word but rarely in the middle; other letters will represent that sound in the middle of a word. The ways in which letters correspond to sounds, therefore, depend very much on the *pattern* within the particular word.

*Meaning* functions significantly in spelling. For example, *homophones* are words that sound alike but have different meanings and spellings. They are often cited as examples of how

irrational English spelling can be. Viewed from this perspective, however, they illustrate how spelling distinguishes between words that mean different things. The different spellings of the homophones *whole/bole*, *sale/sail*, *meat/meet/mete*, *rain/rein/reign*, avoid confusion in writing and in reading. If all homophones were spelled alike, the reader would have to sort out the differences in meaning, making reading a slower and less efficient process.

The *meaning* principle in spelling functions in another significant way. It preserves *visual* relationships among words that are similar in meaning. For example, the italicized segments in each of the following word pairs remain spelled the same despite differences in their pronunciations: *bomb-bombard*, *sign-signal*, *music-musician*, *extreme-extremity*, *revise-revision*, *compose-composition*, *compete-competition*, *image-imagine*, *fatal-fatality*. In each word pair, the pronunciation of the base word changes when a suffix is added, but the spelling remains the same. This phenomenon also is apparent in the so-called "hidden" roots of Latin or Greek origin in the following words: *dictionary-indictment*, *judgment-adjudicate*, *mnemonic-amnesia-amnesty*. If every one of these words were spelled on a one-letter/one-sound basis, they would look quite different, and the *visual* similarity indicating these words are related in meaning would be lost.

### Developmental Research into How Children Learn to Spell

The investigation of the development of word and spelling knowledge has shown that knowledge of the ways in which words are composed of letters needs to be *constructed* over time. Research conducted during the past 15 years strongly supports this fact and has helped researchers and educators better understand how this process of construction develops.

Students' understanding of the structure of words appears to follow a developmental sequence of four stages (Henderson and Templeton in press).

*Stage 1. Concept of Word*—marks the point at which pupils have a basic concept of what a "word" is. Studies by Read (1971, 1975), Beers and Henderson (1977), Chomsky (1971), and others have helped to explain the "invented spellings" of young children.

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These spellings show how children are able to apply their developing knowledge about print and the sounds that letters represent in an attempt to express what they want to say. At first, these “spellings” are strung together without the spaces one would expect to find in printed English. Gradually, however, spaces appear, and the writing becomes more “decodable.” Consider the following invented spellings of a kindergarten child.

● *I wot sm cdgches* (“I want some cottage cheese”).

● *I brok mi bik* (“I broke my bike”). Children are capable of inventing such spellings when they have a simple concept of what a “word” is (Morris 1983). When children understand that a word is a group of letters with a space on both ends, they are capable of more rapidly acquiring a sight word vocabulary.

**Stage II. Letters and Sounds**—involves an understanding of the patterns to which letters and sounds correspond within single-syllable words. Sight words provide the foundation for children’s first careful examination of the actual way in which words are spelled in English (Henderson 1985). Students should have a formal spelling program in the 1st grade if they are acquiring a good sight vocabulary and are proceeding well in reading. The words children study should be high-frequency words they can read automatically and that follow basic common single-syllable patterns such as,

for example, consonant-vowel-consonant (cat), consonant-vowel (go), and consonant-vowel-consonant-final e (make).

**Stage III. Syllables and Affixes**—involves an understanding of the conventions that govern the joining of syllables, prefixes, and suffixes in polysyllabic words. After examining consistent patterns within single-syllable words, pupils are developmentally ready to study polysyllabic words. Instruction here focuses on the conventions that determine spelling at the point where syllables join together, including the addition of prefixes and suffixes to base words. Schlagal (1982) reported that a considerable number of spelling errors made by students in the upper elementary grades occur in these categories. A second type of frequent error in the spellings of young adolescents is the spelling of the “schwa” (ə)—the vowel sound (“uh”) that usually occurs in the least-stressed syllable of a polysyllabic word (Schlagal 1982, Templeton 1979, Zutell 1979). In many cases, such as “defend,” this spelling must simply be remembered. Learning is facilitated by examining words that follow similar syllable patterns in which the schwa is spelled the same way. In many other words, however, the spelling of the schwa is explained by examining words related in spelling and meaning. This becomes possible when students learn in-depth how the *meaning* principle functions in spelling.

**Stage IV. Derivational Patterns**—involves an in-depth exploration and understanding of the *derivational* relationships among words in English—the spelling/sound patterns that apply to words that are related in spelling and meaning. As pupils’ vocabularies expand during the upper elementary years, they come to include words that, although more abstract in terms of meaning, exhibit a high degree of regularity when examined from the perspective of the *meaning* principle in English spelling (Templeton 1979, Zutell 1979). By 5th and 6th grade, most students are ready to formally examine the meaning principle as it applies to this growing vocabulary. In the 7th and 8th grades, students are ready for an immersion in this type of study. Students should examine related words such as *compete-competition, fatal-fatality, clinic-clinician, and judi-*

*cial-adjudicate* in order to acquire the following fundamental understanding: words that are related in meaning are often related in spelling despite changes in pronunciation (Templeton 1983). Most of the schwa spellings, as noted, are easily explained when this principle is understood. For example, if the spelling of the schwa sound in competition is not known by students (common misspellings are *compation, computation, and compitition*), the teacher may point out the related word or base word *compete*, in which the vowel sound is clearly heard and the spelling obvious.

Spelling knowledge can begin to interact more powerfully with vocabulary development at the upper elementary and middle grade levels (Juola et al. 1978, Mangieri and Baldwin 1979, Marsh et al. 1980). In order to explain to students why the *n* is silent in *condemn*, for example, a teacher should point out the related word *condemnation*, in which the *n* is pronounced. If students know the meaning of the word *condemn*, the meaning of *condemnation* should be easy to grasp. When one member of a “meaning family” is known and the other members are unfamiliar, the words usually share enough of a core meaning that the unfamiliar words may be presented and understood. In this analogical fashion, spelling functions to expand and elaborate students’ vocabulary while the vocabulary explains and reinforces the spelling—the relationship between spelling and vocabulary at Stage IV is reciprocal.

A few studies have followed students over time and examined the differentiated effects of formal or systematic spelling/word analysis instruction. Coupled with the developmental studies, these investigations support the role of “meaningfulness” and “patterns” or analogic reasoning with respect to words (Beers et al. 1977, Invernizzi 1984, Juola et al. 1978, Mangieri and Baldwin 1979, Marsh et al. 1980, Schlagal 1982, Wolff et al. 1985). After reviewing the related research in spelling methodologies, Read and Hodges (1982) concluded: “these findings suggest that it is more productive over the long term to help students *develop strategies for looking for orthographic patterns* [emphasis added] among words than to memorize isolated words” (p. 17).

### Highlights of Research on the Learning and Teaching of Spelling

- Learning how to spell follows a developmental progression.
  - Learning how to spell is primarily a *conceptual process* rather than a rote memorization process.
  - Words selected for study should reflect students' level of conceptual understanding of words as well as the frequency of the words and word patterns.
  - Learning how to spell depends on interaction with the other language arts of reading, writing, and vocabulary development.
- As for the spelling system of English, linguists have pointed out that it makes a great deal of sense when viewed from the perspective of how well it represents *meaning* rather than simply how well it represents *sound*.

### Which Words Should Be Taught?

Educators agree that a solid program of formal spelling instruction should teach those words most likely to be used by students in their writing. These words, of course, should also be words that the students know how to read. Over the years researchers have attempted to tabulate those words most frequently occurring in students' reading and writing vocabularies. The most notable of these studies were conducted by Gates (1937), Horn (1926), Rinsland (1945), Green (1954), and Harris and Jacobson (1972). Recently, Jacobson (1985) analyzed the written compositions of 22,650 students in grades 2 through 12 to determine the types and frequency of words that students use spontaneously. The results of this extensive analysis showed that students still use the basic core of high-frequency words used over the years. In addition, the students' spelling errors corresponded to errors made by students in earlier research (Gates 1937, Spache 1941). Such information, when combined with the earlier studies, enables us to select the appropriate words for inclusion in a formal spelling program and to present these words for study at developmentally appropriate levels.

### Implications of Research for Formal Spelling Programs

A synthesis of the results of the most significant research into spelling supports some fairly sound conclusions. For example, learning to spell involves an interaction with reading, with writing, and with vocabulary development. Learning to spell means coming to understand the structure of words at progressively more abstract levels.

The data that relate spelling knowledge to developmental level, to reading, and to writing are compelling enough to support the conclusion that a formal spelling program that relies primarily on the memorization of lists of words will not teach spelling adequately. Formal spelling programs should address the following four general criteria.

1. *Connections must be made between spelling and reading, writing, and vocabulary development.* The principles that are examined in any list of words must be understood and applied. Knowledge of words experienced in reading must be exercised in purposeful, meaningful writing. Spelling series should be examined to determine if they provide for these connections through activities in pupil texts and additional suggestions in teacher editions.

2. *Students must learn how to examine words.* As they gain competence in

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reading, students pay less attention to individual words. Unless they are taught how to “walk through” words, noting the types of information that are expressed in the spelling, their development in spelling and in vocabulary may be curtailed. Evaluators should examine pupil texts to determine whether the explanatory portions of each lesson are sufficiently explicit and straightforward in pointing out the pattern to be studied—and the teacher edition should support this explanation. First, does the teacher edition include sufficient background information about the pattern or principle to be studied? Background information is critical, particularly in the case of “meaning-based” patterns about which teachers may not be familiar. Second, if teacher “scripts” are included for each lesson, they should be examined to determine whether they simply parrot the presentation in the pupil text or flesh out the principle by relating it to previous knowledge and previously learned words.

3. *List words should be selected so that they correlate with students' level of word knowledge.* Formal spelling programs must have a solid research foundation according to which the appropriateness of the words they present is determined. Research has shown, for example, that the word *able* would not be a good word to use in a 2nd grade speller for teaching how the long “a” is sometimes spelled. Students may not have yet encountered the word in their reading, and, moreover, the spelling problem they might have with *able* will not reflect the long “a” spelling but rather the *le* ending. Therefore, 3rd grade would be a more appropriate level at which to present *able* and other two-syllable words that end in—*le*. For students in the upper elementary and middle grades, words related in meaning and in spelling should be grouped *together* in lessons. Words that students may not know but which are related to the list words may be introduced in an activity in the unit—this is an essential means by which vocabulary is expanded as well.

4. *Spelling makes sense.* This simple statement in effect synthesizes and extends the three foregoing criteria. Formal spelling programs should reflect the three principles that linguists have

noted govern the system of English spelling: alphabetic, within-word pattern, and meaning. Spelling programs should focus on the *logic* of spelling rather than presenting in format and in tone the attitude that most of English spelling is illogical and has to be memorized. Almost as unfortunate, some series convey the attitude that if students simply learn a large number of rules or conditions—usually all at the “alphabetic” level—then they will be good spellers. Students having difficulty with spelling know intuitively that this is not the case. Students who are good spellers simply ignore it. On the other hand, if a positive attitude is presented—based, as is now known, on some powerful, logical relationships in the spelling system—then both teachers and students may experience a significant, fundamental change in attitude. Instead of being thought of as irrational and arbitrary, spelling may be appreciated for the types of information it reflects and for the purposes it may serve.

In their review of recent spelling research in the *Encyclopedia of Educational Research*, Read and Hodges (1982) described the implications of this research for formal spelling programs:

The unfolding understanding that learning to spell is not simply a matter of memorizing words but in large measure a consequence of developing cognitive strategies for dealing with English orthography [spelling] poses one of the most significant challenges for curriculum developers in the long heritage of this school subject.

Read and Hodges state further that the challenge for formal spelling programs is to develop a scope and sequence for spelling that reflects the recent awareness of the nature of the spelling system and the recent understanding of students' developing word knowledge. □

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