

DISTINGUISHED EDUCATOR SERIES

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Explorations in developmental spelling: Foundations for learning and teaching phonics, spelling, and vocabulary

Bear and Templeton address two broad questions in this article: What is our understanding of spelling development and how does this understanding fit within a broader model of literacy development? And what are the implications of the developmental model for spelling instruction and word study?



Photo by Anita Dursteler

In *Ramona and Her Mother* (Cleary, 1979), Ramona tackles the perplexing system of English spelling. She is puzzled by a television commercial for a popular antacid remedy in which the response to the question “How do you spell *relief*?” is “*R-o-l-a-i-d-s*.” She speaks for generations of students when she goes on to lament that “Spelling was full of traps—blends and silent letters and letters that sounded one way in one word and a different way in another, and having a man stand there on television fooling children was no help” (p. 105).

One thing we’ve learned as we’ve explored and charted children’s developmental spelling knowledge is that we can help the Ramonas of the English-spelling world learn that the spelling system makes much more sense than most of us may think. The key is in knowing *where* to look, and *when* (Bear, Invernizzi, & Templeton, 1996; Templeton, 1992). So, we need to understand the kinds of information about words that the spelling system represents, and we need to understand the developmental course that children follow as they learn the spelling system.

Children’s brains are not cameras. We cannot “teach” spelling by trying to get kids to take

better pictures of words so that their mental images are clear and precise. Rather, each student's brain is an "exquisitely designed pattern detector, but it depends on adequate information to work efficiently" (Bussis, Chittenden, Amarel, & Klausner, 1985, p. 66). Where the spelling system of English is concerned, teachers can do a lot to provide this adequate information so that their students will in fact detect, learn, and apply important spelling patterns and features (Anderson, 1993; Cunningham, 1992). We feel that most students can make sense of the varied vowel patterns, the arcana of syllable structure, and those daunting Greek and Latin roots. These progressively abstract layers of information that are represented by the spelling system can be explored at appropriate times and in engaging ways. We've also come to understand and appreciate the broader role that spelling knowledge plays in the development of reading and in the growth of vocabulary. Over the last 20-odd years our explorations, together with those of others, have suggested implications for how and when we engage students in exploring phonics, spelling, and vocabulary—what we refer to, simply, as word study.

We begin by sharing why we are jointly writing this article. We had the good fortune of meeting when one of us was commencing and the other was completing graduate studies under the guidance and tutelage of Edmund Henderson in the McGuffey Reading Center at the University of Virginia. Almost 30 years ago Henderson, as well as Charles Read and Carol Chomsky, began to flesh out much of the modern study of developmental spelling (Chomsky, 1970; Henderson, 1981, 1985; Read, 1971). The glue of our friendship has been in our ties to Ed's work and his understanding of teaching and learning. We share personal and professional friendships, as well, with so many of Ed's students; more than a research community, ours has been a research family. And over the years all of us have delighted in connecting with so many others who have also been laboring in the field of word study. While the two of us are honored by the request of the editors of *The Reading Teacher* to write this article, we wish to note that it is also an honor, and a humbling experience, to attempt to represent the thrust of this larger research and teaching family.

Much of the research begun under Ed Henderson at the University of Virginia and con-

tinued over the years is now collectively referred to as the "Virginia studies" (Treiman, 1993). These studies have been published in a number of practitioner and research journals over the last 20 years, and periodic compilations of the work have included reviews of past work and new investigations (Henderson & Beers, 1980; Templeton & Bear, 1992a; two special issues of *Reading Psychology* 1989/1990 edited by Darrell Morris). Moreover, we have followed closely and learned from the insights of investigators in the field of psychology who have explored how children learn to read and spell words, as we hope they have learned from us as well. The work of Linnea Ehri, Connie Juel, Charles Read, Keith Stanovich, Rebecca Treiman, and Frank Vellutino has been especially helpful, and we have appreciated the critiques of particular aspects of the Virginia developmental theory that some of them have offered.

Through exploring the developmental course of spelling knowledge, reading, and writing, the Virginia studies have helped to reconceptualize thinking about spelling: Spelling is much more than a courtesy to one's reader; understanding how words are spelled is a means to more efficient and proficient writing and reading. To read and write words appropriately and fluently and to appreciate fully how words work in context, instruction must balance authentic reading and writing with purposeful word study.

Word study instruction integrates spelling, phonics, and vocabulary instruction (Bear et al., Henry, 1996; Moats, 1995). In word study and spelling instruction, students examine shades of sound, structure, and meaning. In word study, we do not just teach words—we teach students processes and strategies for examining and thinking about the words they read and write. This knowledge, in turn, is applied to new words students encounter in reading. Our efforts to engage students in explorations of words and their structure, therefore, have emphasized balance—pulling words from live contexts, working with them outside of those contexts, and then putting them back into those meaningful contexts. In this article, therefore, we will address two broad questions:

- What is our understanding of spelling development, and how does this understanding fit within a broader model of literacy development?

- What are the implications of the developmental model for spelling instruction and word study?

What is our understanding of spelling development, and how does this understanding fit within a broader model of literacy development?

Word study becomes useful and instructive when it is based on students' levels of development and when appropriate words and patterns are explored through interesting and engaging activities. This principle has profound implications for the spelling and word study activities that are chosen for students and for the way spelling instruction is organized. To understand spelling development means we must (a) know about the nature of the spelling system—the different layers of information the system reflects, and (b) know what students understand about these layers of information at different points along a developmental continuum.

Students' development in spelling reflects a growth in sophistication of knowledge about letters and sounds, letter patterns and syllable patterns, and how meaning is directly represented through spelling. This knowledge corresponds to the three layers of information that spelling represents—alphabetic, pattern, and meaning (Ehri, 1993; Henderson & Templeton, 1986). While these three layers oversimplify the complexity of the spelling system somewhat, they effectively capture the system's general nature. The alphabetic layer matches letters and sounds in a left-to-right fashion. For example, in the word *mat*, the letter-sound match up is obvious: *m* = /m/, *a* = /æ/, *t* = /t/.

The pattern layer provides information about a more complex grouping of letters; for example, the vowel-consonant-silent *e* pattern in words like *rake* and *time*, and vowel digraphs as in *train* in which the second, silent vowel letter signals the pronunciation of the vowel. In contrast to the alphabetic layer, the pattern layer is conceptually more advanced because learners must understand that spelling does not always work in a strictly left-to-right fashion. In order to understand how the "silent *e*" works in words such as *make*, learners must skip to the end of the word and think in a right-to-left fashion. When letter patterns within single syllables are understood, learners come to

understand syllable patterns. The two most common syllable patterns are the vowel-consonant-consonant-vowel (VCCV) pattern, as in *kitten* and *helmet*, and the vowel-consonant-vowel (VCV) pattern, as in *pilot* and *hotel*. Students come to learn that the doubling of consonants at the juncture of syllables usually depends on the preceding vowel pattern—if it's short, then double; if it's long, then don't.

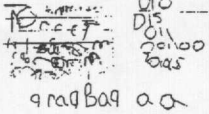
The meaning layer reflects the consistent spelling of meaning elements within words, despite sound change. For example, the spelling of the base in the following pairs of words is spelled consistently even though the sounds that the letters represent change: *define/definition*; *local/locality*; *sign/signature*.

We have worked to refine our knowledge of how learners develop knowledge about these layers of information as well as how this knowledge is related to reading and writing (Templeton & Bear, 1992b). To help understand the role of spelling knowledge as it works in synchrony with reading and writing development, we'll present an integrated developmental framework for spelling that includes milestones of reading and writing (Bear, 1991).

Developmental spelling research suggests six stages of spelling knowledge through which learners pass (see Figure 1). We'll briefly consider the characteristics of each stage and later examine how these stages determine the types of spelling features that students will systematically explore.

Prephonemic spelling. Prephonemic spelling, a characteristic of emergent literacy, covers quite a long period from the scribbling of a 16-month-old child to the kindergartner's writing of random letters. In prephonemic spelling, children explore two-dimensional space and the correspondences among what they think, say, and write. Prephonemic spelling is full of intention, but what is written is usually not linked to sound. Children may scribble while they talk, or pound dots, imitating writing styles they have seen in others. As illustrated in Figure 1, "spelling" is a blend of pictures, squiggles, and known letters. The few letters and words children learn to recognize during this stage are a bit like pictographs. Children have not connected the letters with the pronunciation of words and sounds within words. Toward the end of this stage, however, some children make links to sound by writing syllab-

Figure 1
Word study focus and signs of development for each spelling stage

Stages of spelling	Ages/Range of grades	Corresponding stages of reading and writing development
Prephonemic	(Ages 1 – 7/Pre-K to middle of first grade)	Emergent
<p>Examples of invented spellings:</p> 	<p>Spelling and word study and activities:</p> <p>Talking with and reading to children reveals the sounds and rhythms of language; concept sorts with objects and pictures; rhyming sound sorts with pictures; learn the letter names of the alphabet; share alphabet books; develop individual and class alphabet books; sort letters by upper and lower case; begin to sort pictures by initial consonant sound.</p>	
Signs of development: Listen to stories, look through books, play with writing instruments, scribble and draw, mock linear writing.		
Semiphonemic/early letter name	(Ages 4 – 7/K to middle of second grade)	Early beginning
<p>Examples of invented spellings:</p> <p>B or BK for <i>book</i> T or TP for <i>top</i> J, JV, JF, JRV, JRF for <i>drive</i></p>	<p>Spelling and word study and activities:</p> <p>Compare and contrast initial and final consonants through picture and word sorts; develop word banks; hunt for words that begin or end the same; sort pictures to contrast initial consonants and consonant blends and digraphs.</p>	
Signs of development: Writing includes initial consonants and final consonants.		
Letter name	(Ages 5 – 9/ Early first to early third grade)	Middle and late beginning
<p>Examples of invented spellings:</p> <p>NAT for <i>net</i> SAD, SAN, SED for <i>send</i> SEK for <i>sick</i> BAK for <i>back</i> LOP, LUP, LOMP for <i>lump</i></p>	<p>Spelling and word study and activities:</p> <p>Compare and contrast short vowel word families through picture and word sorts; continue to develop word banks; focus on the sound and spelling of one short vowel, then compare across short vowel patterns, examine the consonant-vowel-consonant (CVC) pattern; play word study Concentration, board games, and card games such as Go Fish with short vowel word cards.</p>	
Signs of development: Use a single vowel in each major syllable, spell vowels by how they feel and sound, learn short vowel families, spell most CVC words correctly, include more blends and digraphs, spell words with preconsonantal nasals correctly (e.g., <i>lump</i>).		
Within-word pattern	(Ages 6 – 12/First to middle of fourth grade)	Transitional
<p>Examples of invented spellings:</p> <p>SEET or SETE for <i>seat</i> NALE for <i>naïl</i>, ROAP for <i>rope</i> CRIE for <i>cry</i>, FOWND for <i>found</i> BOTE for <i>bought</i> CRALL, CRAUL for <i>crawl</i> LAFE for <i>laugh</i>, TOPE for <i>troop</i> BAKE for <i>back</i></p>	<p>Spelling and word study and activities:</p> <p>Sort pictures to contrast long and short vowels; use teacher-made word sorts to examine long vowel patterns; collect words in word study notebooks; sort words by grammatic and semantic features (nouns/verbs, animal/vegetable); have word hunts for specific long and complex vowel patterns; play board games to contrast <i>r</i>-influenced vowels (<i>far, share, fear, clear</i>); play card games such as Homophone Rummy (<i>hair/hare, sell/cell, know/no, way/weigh</i>).</p>	
Signs of development: Spell long vowel patterns (CVCe, CVVC, CVV) and complex single syllable words (CVck; CVght; and diphthongs, for example, <i>noise, gown, and shout</i>).		
Syllable juncture	(Ages 8 – 18/Third through eighth grade)	Intermediate
<p>Examples of invented spellings:</p> <p>HOPING for <i>hopping</i>; ATEND for <i>attend</i> CONFUSSHUN for <i>confusion</i></p>	<p>Spelling and word study and activities:</p> <p>Study consonant doubling (<i>hopping</i> compared to <i>hoping</i>), common suffixes (<i>-ly, -ies</i>), past tense endings (<i>stopped/“t”, traded/“ed”, mailed/“d”</i>) in sorts and word hunts; examine open (VCV end in long vowels: <i>labor, reason</i>) and</p>	

(continued)

Figure 1 (continued)
Word study focus and signs of development for each spelling stage

PLEASURE for *pleasure*
CAPCHUR for *capture*
HOCKY for *hockey*
BARBAR for *barber*
DISPOSUL for *disposal*

closed syllables (VCCV end with consonant sound rabbit, racket); compare accents in words, compare words that end in the əl, er, and cher sounds, study common prefixes (*un-*, *re-*, *bi-*); interrelate spelling and meaning in word study groups; study words from readings by patterns in spelling and meaning; continue word study notebooks.

Signs of development: Spell most two- and three-syllable words correctly including words with common prefixes and suffixes (-ed; -ing), learn how syllables combine, spell lower frequency vowel patterns /oi/ *enjoy, embroider, lərl motor, dollar, quicker, teacher, sailor* correctly.

Derivational constancy

(Ages 10 and up /Fifth to 12th grade)

Advanced

Examples of invented spellings:
SOLEM for *solemn*
OPPOSITION for *opposition*
CRITASIZE for *criticize*
BENAFIT for *benefit*
AMMUSEMENT for *amusement*
APPEARANCE for *appearance*

Spelling and word study and activities:
 Make the meaning connection; study derived forms in bases and roots (*demos, ten*); word study in small groups and with partners to examine etymologies in the content areas, Greek and Latin forms and foreign borrowings; root books and dictionaries should be available.

Signs of development: Spells most words correctly, make the meaning connections among words that share bases and roots, word choice in writing is more varied, showing greater shading in meaning through vocabulary choices.

ically, where a distinct graph by its size or length is matched to a syllable. They may reread their writing differently each time.

Emergent literacy is an active period when children listen to stories and enjoy studying picture books. Children who see others reading and writing see that writing in English starts at the top left and moves from left to right. What is most important is that they learn how literacy can be a part of their lives; seeing literacy in the ones they love motivates them to possess it.

Semiphonemic or early letter name spelling. The labels *semiphonemic* and *early letter name spelling* have been used interchangeably to describe children's first excursions into sound-symbol correspondences. At first, we see the name of a letter used to represent a beginning sound and nothing else; in effect, the single letter stands for the whole word. For example, students may spell the word *when* with a Y because the name of the letter y is pronounced with a /w/ sound at the beginning.

The invented spellings characteristic of this stage provide clear evidence that children use the alphabetic principle—they can repre-

sent individual sounds with particular letters in a left-to-right match up. In Figure 1, note that children come to use the first and then the last sounds of the words in their spelling. Children in this semiphonemic stage concentrate on spelling consonants; vowels are usually omitted. Children seem to assume that the vowels are incorporated into the consonants—much like ancient writing in Hebrew, where vowels are not included. The linguist Charles Read (1971, 1975) was the first to demonstrate how children use their tacit or subconscious knowledge of how sounds are articulated in the mouth in order to spell. For example, *drive* may be spelled *JRF*. The *JR* more truly represents the beginning sounds than does *dr*; and the substitution of *F* for *v* occurs because /f/ and /v/ are articulated in similar ways, differing only in voicing. Often students are more familiar with the letter *f*, and they confuse the two letters for their common pronunciation. Both the use of articulation and letter name strategies will be further developed during the next stage of spelling, the letter name stage.

Early beginning reading is the stage of literacy that is associated with early letter name

spelling. During this period, the emergence of a concept of word in print and phonemic segmentation is a distinguishing reading development (Morris, 1981, 1992). Concept of word in print is measured by the ability of a child, after aurally memorizing a familiar text such as a poem or song, to point accurately to each printed word as she says the word. Often two-syllable words will throw the student off in his or her pointing. The writing of these early beginners is brief and often difficult to read because of the sounds that are not represented. Beginning writers make speed and accuracy trade-offs as they write. If they write too fast they miss so many letters that the text is hard to reread; if they write too slowly, sounding out each word carefully, they may lose track of what they want to say.

Letter name spelling. In the letter name stage children extend and elaborate the alphabetic principle and the use of sound and articulation to spell (Beers & Henderson, 1977). Each letter represents one sound. Their use of letter names to spell sounds begins most noticeably with the spelling of consonants but extends to vowels (Gentry & Henderson, 1981). For example, at first *bed* may be spelled *B* or *BD* and then as *BAD*. After learning about the basic short vowel families, students in this stage understand that the basic short vowel pattern is the consonant-vowel-consonant pattern (CVC).

Children's spelling of vowels offers fascinating insight into the use of the letter name strategy. Long vowels are represented with one letter whose name is the same as the vowel sound—for example, *float* may be spelled *FOT* or *rain* as *RAN*. Spelling short vowels offers an interesting problem, however, because there is no letter in the alphabet whose name is exactly the same as the short vowel sound the child wishes to spell. Remarkably, though, without instruction or much conscious thought about what they are doing, children solve this problem by choosing a letter whose name is closest in terms of articulation to the short vowel sound. For example, in spelling the vowel sound in *sit*, the child hunts for the letter name that feels most like the short *i*. It turns out that the letter name *e* (as in *feet*) is closest. The child spells *sit*, therefore, as *SET*.

Children in this stage build a sight vocabulary of known words that includes single-

syllable short vowel patterns, and they include more consonant blends and digraphs in their spelling. Where they earlier omitted the spellings of *m* and *n* before final consonants, as in *BOP* (*bump*), at the end of the letter name stage they include them. When a child has learned to spell many short vowel words, a state of disequilibrium is created that moves him/her to the next stage of spelling, where long vowels are examined. For example, after letter name spellers have spelled *beat* as *BET*, we have heard them wonder aloud: "That can't be *beat*, that's *bet*!" Letter name spelling is associated with beginning reading and writing. Letter name spellers tend to read disfluently and aloud—even when they read to themselves (Bear, 1989, 1992).

Within-word pattern spelling. Children in this stage of spelling analyze the spelling of single-syllable words more abstractly. They have moved away from a strict one letter/one sound expectation and can now manipulate more complex letter patterns. Building on simple short vowel patterns, students in this stage experiment with how they can spell long vowel patterns. In Figure 1, the invented spellings of *seat*, *rope*, and *cry* reveal this explanation. Children also experiment with complex vowel digraph patterns as in *sound*, *bought*, and *crawl*, and they learn to spell most consonant blends and digraphs conventionally.

Readers and writers in the transitional stage of literacy development are just getting off the ground, and they are flying low with very modest fluency in easy chapter books. They write several paragraphs and begin writing multifaceted pieces, such as stories that are continuing adventures, plays, or informational books on one topic (Bear & Barone, 1998).

Syllable juncture spelling. The name of this stage represents the important orthographic terrain that students are now exploring: What goes on where syllables come together within polysyllabic words. The foundation for learning at this stage is laid down early on in school, usually second or third grade for most children, when they examine what happens when simple inflectional endings such as *-ed* and *-ing* are added to single-syllable words, as in *hop* + *-ing* (*hopping*) versus *hope* + *-ing* (*hoping*). When students grasp this aspect—when to double a consonant, when to drop an *e*, and when to leave matters alone—they have

the potential to apply this knowledge to a wide range of polysyllabic words (Beers & Beers, 1992). Henderson (1985) pointed this out years ago: “the core principle of syllable juncture is that of doubling consonants to mark the short English vowel” (p. 65). At the syllable juncture stage, students extend their “hopping vs. hoping” knowledge to the interior of polysyllabic words: *tummy* has two consonants in the middle because of the short vowel in the first syllable; *total* has only one consonant in the middle because of the long vowel in the first syllable. These examples illustrate the difference between closed and open syllables: When spelling a polysyllabic word, if students hear a short vowel in a syllable, that syllable will usually be “closed” by a double consonant; when they hear a long vowel, that syllable will usually remain “open,” the vowel followed by a single consonant. Also, over the course of the syllable juncture stage students become increasingly aware of the relationship between the spelling and the meaning of word elements as they explore base words and how prefixes and suffixes are attached to them (Templeton, 1992).

When students can spell a good number of single-syllable words correctly, evidencing understanding of most short and long vowel patterns, we’ll see the following patterns in their spelling of two-syllable words:

- they are not doubling when they need to (*ATEND*) or doubling when they don’t need to (*CONFUSSHUN*);
- they are spelling accented syllables according to different within-word pattern spellings (for example, *PLES* in *pleasure*; *RAID* in *parade*);
- they are misspelling the syllables that receive less accent or stress (*Y* instead of *ey* in *hockey*; *AR* instead of *er* in *barber*);
- they are spelling certain sounds at the juncture of syllables as the sounds would be spelled in single-syllable words (*CHUR* instead of *-ture* in *capture*).

When reading polysyllabic words, students at the syllable juncture stage are able to apply tacit knowledge about syllable patterns to break the words down into pronounceable chunks (Taft, 1991).

The syllable juncture stage of spelling corresponds to the intermediate stage of reading and writing. Reading and writing repertoires

build, and children learn to adjust reading strategies and writing styles according to purpose and demand. Intermediate readers enrich their speaking vocabulary from reading, and reading rates in independent and instructional level materials range from 120–250 words per minute (Bear & Barone, 1998).

Derivational constancy spelling. The term *derivational constancy* reflects the fact that words that are derived from a common base word or word root usually keep the spelling of that base or root constant (Templeton, 1979; Zutell, 1979). When students are spelling almost all of the words correctly in their spontaneous writing—a hallmark of this stage—we see occasional invented spellings such as the following:

- unaccented or “schwa” sounds are misspelled (*OPPISITION*, *BENAFIT*);
- some consonants are omitted (*SOLEM*);
- uncertainty about when to double or not (*AMMUSEMENT*);
- some suffixes are misspelled, such as the “classic” *-ence/-ance* (*APPEAR-ENCE*).

At the derivational constancy stage, students can fully appreciate how the spelling/meaning connection operates in the language (Templeton, 1983, 1992): Words that are related in meaning are often related in spelling as well, despite changes in sound. As they read widely and explore relationships among meaning families that share common bases and roots, students come to appreciate how meaning can override sound in spelling—that, in fact, they should focus on spelling *meaning* rather than spelling *sound*—and how this awareness assists not only in spelling but in expanding and elaborating their vocabularies. Importantly, teachers play a critical role in developing this awareness, because most students do not discover these features on their own (Templeton, 1992). To cite just one example: In Zilpha Snyder’s (1997) *The Egypt Game*, a work of contemporary realism appropriate for intermediate- and middle-grade students, the word *solemnity* appears on p. 148, while *solemn* appears on p. 213. By grouping together and exploring such related words in the context of a word study lesson, teachers can make explicit the spelling/meaning connection among words that are otherwise wide-

ly separated in naturally occurring text and thus probably unnoticed.

We can see, therefore, that this is the stage at which spelling and vocabulary development should be two sides of the same instructional coin. If students understand but misspell the word *solemn*, leaving off the “silent” *n*, teachers point out the related word *solemnity*, which students are not likely to know. By so doing, however, teachers accomplish two things: First, they expand the students’ vocabulary—if students know the word *solemn* they can be guided to an understanding of the related word *solemnity*. Second, teachers provide a clue to the correct spelling of the “silent” *n* in *solemn*—we hear it pronounced in the related word *solemnity*. Note how this teaching/learning strategy works with some of the other misspellings above: *oppose/opposition* and *critic/criticize*. When noting the correct spelling of *benefit*, teachers can point out words that share the *bene-* word root (meaning “good”): *benevolent*, *beneficial*, *benediction*. Again, note how this strategy accomplishes two objectives: It explains why a particular word, such as *benefit*, is spelled the way it is; it also expands students’ vocabularies. While they know what *benefit* and *beneficial* mean, they may not be so certain about *benevolent* and *benediction*—but by seeing how all of these words are related through the common word root *bene-*, they can come to learn the meanings of these “new” words as well.

Henderson (1985) wryly observed that the developmental continuum of spelling development takes us up to age 100; that is, we continue to learn about words and their spelling throughout our literate lives. At this stage of spelling, learners can explore the rich etymological strata underlying the meaning layer of spelling. It’s important to emphasize that, at this stage, the majority of the words that provide the basis for becoming aware of and understanding interrelationships between spelling and vocabulary come from print—reading—rather than from everyday oral communicative contexts. This is why it is so important to have students read widely in both narrative and expository texts, but why it is also important to point out and explore patterns and features at this level. Interestingly, so many words that students will encounter at this stage are examples of the “spelling first, sound

later” phenomenon: *spelling* will provide a more stable representation in their mental dictionaries than will *sound* (Templeton, 1979; Templeton & Scarborough-Franks, 1985).

As represented in Figure 1, Greek and Latin word roots run rife throughout the words that students will read, write, and explore at the derivational constancy stage. In a great many words, sound is not a good clue to spelling. Derivational spellers learn to find the right base word or word root that preserves meaning in spite of changes in pronunciation: for example, *crime/criminal*; *credible/credence/credit* (*-cred-* means “belief”). They also learn how to apply this information when encountering unfamiliar words in their reading. This is important, because the “context clues” we try to teach older students to use when attempting to determine the meaning of an unknown word will be of help only if students already have a strong word knowledge foundation, which includes understanding of word structure and how word elements combine (Adams, 1990; Sternberg & Powell, 1983).

Derivational constancy spellers are usually mature readers and writers who have a variety of reading and writing styles. As new interests are acquired, they become proficient in these styles. They have the potential to read and to follow more elaborate and complex text structures and to transact more critically with these texts through analyzing, synthesizing, and evaluating (Barone, 1989). They have the potential to bring this more developed critical stance to their writing endeavors as well (Templeton, 1997).

What are the implications of the developmental model for spelling instruction and word study?

Research in developmental spelling, as well as classroom experience, have yielded three important instructional practices, which we will explore next.

Students should be grouped appropriately for spelling and word study. In any class, it is unlikely that all students will be at the same point in development. This means that students need different words to study. We usually accomplish this by having three or four word study or spelling groups.

How can teachers assess their students' levels of word knowledge? In general, for each student, we examine correct and invented spellings from both informal assessment and writing. The words that students consistently spell correctly are those words that have patterns that make sense to them and that fit their current theory of how words are spelled. Invented spellings are particularly interesting because they reveal the

We continue to learn about words and their spelling throughout our literate lives.

edges of a student's learning. Early in the school year a qualitative spelling inventory may be given to learn about students' spelling and orthographic development (Bear et al., 1996; Ganske, 1994; Schlagal, 1989, 1992). These inventories are used to determine students' instructional spelling levels and reveal their developmental levels. In turn, this information guides the selection of appropriate words and patterns for students.

Determining a stage of spelling for a student is not for creating a label but serves as a starting point for planning instruction. Ongoing assessment occurs through the examination of students' writing and of their performance in word study and spelling activities. Some published spelling programs have lists arranged by grade level that may be used to determine students' instructional levels. Morris and his colleagues (Morris, Blanton, Blanton, & Perney, 1995; Morris, Nelson, & Perney, 1986) suggest that a score between 40% and 90% at a particular level defines a student's *spelling instructional level*.

Students should examine known words. This applies primarily to students who are in the semiphonemic, letter name, and within-word pattern stages of spelling development. As with any type of conceptual learning, analysis is very difficult and counterproductive if students don't first know what they're looking at. In the intermediate grades, when students are in the syllable juncture and derivational

constancy stages, new words are included as they are related in spelling and meaning to known words.

Which words should in fact be selected? Once we determine the developmental/instructional level, then words that represent developmentally appropriate patterns can be collected and examined. Some teachers pull the words from students' reading, although this does require a lot of work. Most teachers, however, prefer to turn to some type of resource that has already selected words and arranged them so that they reflect a developmental sequence. In addition to resources developed for teachers (e.g., Bear et al., 1996; Cunningham, 1995; Gentry & Gillet, 1992), some published spelling programs increasingly reflect a developmentally appropriate organization (Templeton, 1991; Zutell, 1994).

In well-intentioned attempts to focus on meaningful word study, some teachers have used only content-related words for spelling study without consideration of developmental appropriateness. For example, while many first graders can learn to read words such as *ocean* and *plankton* as part of a thematic unit focusing on oceans, their ability to remember the spelling of these words is very limited. If theme is the sole criterion for selecting words, however, then students are reduced to learning how to spell one word at a time, with no opportunity to discover and explore the spelling patterns that apply to many words.

Word study at the syllable juncture and derivational constancy stages focuses extensively on meaning, and exploration of spelling/meaning relationships often should include new words that are, as often as possible, derived from known words. Indeed, at these levels it is crucial to make the link between the spelling of a word, its meaning in text, and its structural relationship to other words.

Students should be guided toward discovering patterns and generalizations among the words they examine. Traditionally we've talked about "rules," but this term can connote a lack of flexibility. With most students the time to discuss spelling rules is after they know what we're talking about and after they have made the generalizations for themselves. Although some students may benefit from being given a list of spelling rules, for most this often closes off an attitude of inquiry that leads to more ef-

fective word study and long-term motivation and interest. There are a number of key instructional formats that work very well in helping students discover and examine patterns and generalizations (Bear et al., 1996).

- *Word sorts* are a particularly powerful means of exploring words. In word sorts, students compare and contrast words, thinking explicitly about how they are alike or different. Encouraging this type of thinking also allows students to show one another what patterns they see among the words they are studying—as in all learning, there is a social component to learning about spelling. Through this type of active work with words, students make generalizations about words and related patterns that can then be applied to the reading and spelling of unknown words in actual reading and writing tasks (Barnes, 1989).

Word sorts may be conducted in *closed* or *open* formats. In closed sorts, teachers define the categories into which students will sort the words. In open sorts, students examine the words and determine their own categories into which the words may be sorted. Importantly, when students are sorting in groups or individually, teachers have the opportunity to see what they know about spelling patterns and assess the accuracy of their sorting. For example, assume that a student has accurately sorted words into two categories—those that begin with single consonants (*can, cop, cap*) and those that begin with consonant digraphs (*chop, chat, chin*). We can then infer that the student understands the visual and auditory differences that distinguish these two types of word beginnings, though we should check by asking *why* the words were sorted in that manner.

As we watch students sort, we also look at the fluency of their sorting. How rapidly do they examine each word, compare it to the key words that represent each category, and place it in the correct column? When we begin sorting and examining spelling lists with students, we start out with easy categories. And when we start a new type of sort at students' instructional levels, we expect slow sorting and some hesitancy. But as students practice sorting these and related words or pictures, sorting becomes easier and more fluent. When fluency in sorting and in spelling is observed, it is a sign that these types of word patterns will begin to be spelled correctly in writing. This is also a

sign to start planning the next feature and comparisons to introduce to students.

- Students often do a *writing sort* after they've completed a closed sort. Categories are set up, and as words are called out, students listen and decide in which category each word belongs. They then write the word under that category label.

- *Word hunts*. After studying a pattern, students return to texts they are reading to find words that go with a specific pattern; for example, students may be asked to hunt for words that sound like *beat* (long *e*) in the middle. The words they find can be recorded in word study notebooks.

- *Word study notebooks* are notebooks, or a section of a larger notebook, in which students collect words and occasionally record word sorts that they've completed.

- *Word games*. Almost any card game or board game can be adapted for word study. Path games are particularly successful, as are word study versions of Go Fish, Bingo, and Black Out. At the upper levels, student- and teacher-made versions of Rummy, Uno®, and Jeopardy® are popular.

Spelling and word study at each developmental stage

In choosing word study and spelling activities, we start with activities that are easy so that students can first concentrate on learning how to do the activity. This may mean that we dip back into activities from the previous stage for these easy activities.

Prephonemic spelling and word study. Students use pictures and objects for sorting and categorizing (Gillet & Kita, 1978). They sort buttons into different shapes and colors and pictures into categories of what fits and what doesn't. For example, children enjoy sorting objects that are found indoors and objects found outdoors, and they like to sort blocks, buttons, and coats. Sorting pictures and objects develops a critical eye that gets students used to categorizing and explaining their categories.

Semiphonemic and early letter name spelling and word study. Semiphonemic spellers learn about beginning consonants and consonant blends and digraphs. At first, they engage in picture sorts beginning with simple contrasts between pictures of items whose

names begin with one of two consonant sounds. For example, they may sort pictures of words whose beginnings sound like the beginning of *top* in one pile and pictures that sound like *goat* at the beginning into the other. They also work to strengthen their knowledge of the letter names of the alphabet; less frequent initial consonants are learned by the end of this stage. Games like Go Fish, actual fishing in a pretend pond for pictures that sound alike, and initial consonant Bingo are useful and entertaining activities.

Collecting sight words for their word banks is another important activity for early letter name spellers. These words come from familiar texts such as pattern books, familiar rhymes, group experience charts, and individual dictations (Henderson, 1981; Stauffer, 1980). For easy reference, copies of these familiar texts are collected in students' personal readers (Bear et al., 1996). Students' known words are written on small 1" × 2" cards and stored in plastic bags attached to the personal readers. At first, children collect only one or two words from a familiar text for their word banks, but toward the end of this stage they are collecting four or five words.

Consonant blends and digraphs are introduced as students learn initial consonants. In picture sorts that focus on auditory discrimination, for example, children sort pictures that begin with a single initial consonant (*bed*) and contrast these words that begin with initial blends (*blanket*) or digraphs (*thumb*).

Letter name spelling and word study. Students in this stage explore the common short vowel patterns. Letter name spellers begin their word study with short vowel word families like *rat*, *sat*, and *bat*. In closed picture sorts, the teacher establishes the short vowel families to sort by introducing key pictures, for example, a picture of a cat for *-at* and a bed for *-ed*, and students take packs of picture cards and sort them accordingly. Following such a picture sort, students look through their word banks for words that follow similar sound and spelling patterns.

After a thorough exploration of word families, students study short vowels in more depth. Word families for different short vowels are combined so that students can make generalizations about the short vowel sounds and the CVC patterns. Students look across short

vowels to see that this CVC pattern applies to all short vowels. Figure 2 illustrates a word sort contrasting three short vowels.

Students in the letter name stage continue to gather words for their word banks by finding known words in familiar reading materials; many of these familiar selections are collected in their personal readers. Toward the end of this stage, students' word banks hold between 150 and 250 known words.

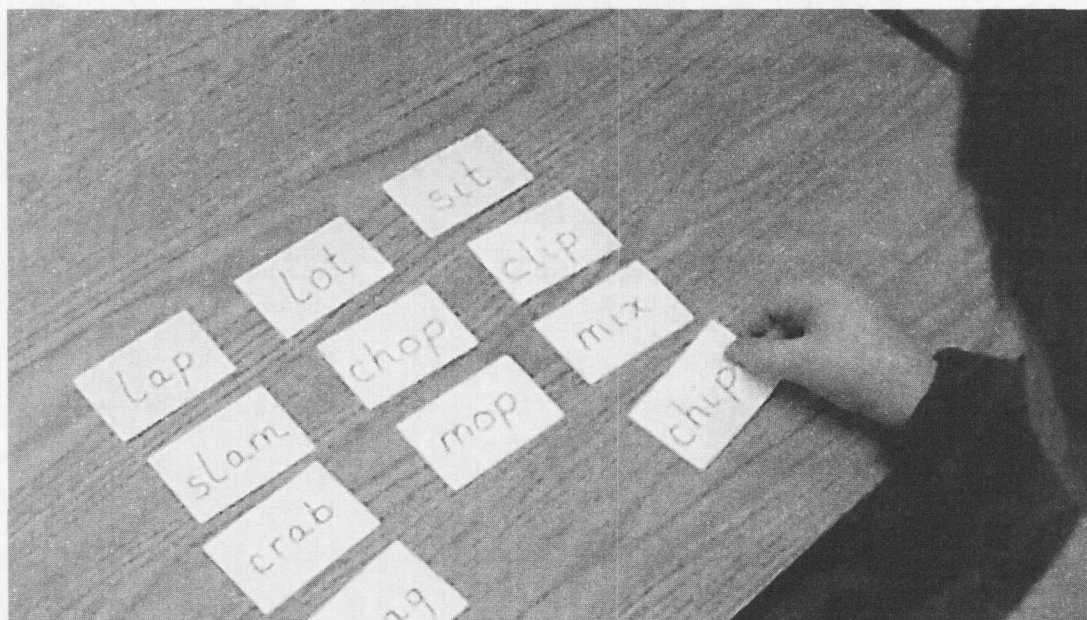
Board games are very popular during this stage, especially those with a racetrack format (Morris, 1982). And most board and card games can be adapted for word study, such as Short Vowel Bingo and Concentration.

This is also a time when teachers can use short, simple word lists in spelling. At first, lists focus on word families as can be seen in this partial list: *cat, bat, mat, pat, rat/ bed, red, fed, Ted, led*. As students progress through this letter name stage, spelling lists include more difficult short vowel patterns: *back, rack, spend, rent, shed*. Students help to create lists in word hunts where they search through familiar materials and their word banks for words that follow the patterns.

Within-word pattern spelling and word study. Word study for students in the within-word pattern stage focuses on the common long vowel patterns and *r-* and *l-*influenced patterns. Students begin by contrasting the sound and spelling patterns of the long and short vowel patterns for one vowel. Quite a bit of time may be spent on the first long vowel, with progressively less time on the other long vowels as students' knowledge grows. By the middle of this stage, students compare patterns across vowels; for example, the CVCe pattern in *name, time, and hope*; the CVVC pattern in *nail, feel, and coat*; and the CVV pattern in *bay, tie, and toe*.

Word bank cards were used during the letter name stage to be sure that students were sorting words they could read easily. In the within-word pattern stage, word banks are unnecessary because teachers can accurately predict what words students can read with ease, so they can choose from a set of teacher-made sorts for students. Making entries in a word study notebook is an important activity begun during this stage. Students keep track of their sorts in these notebooks by writing down some of the sorts they perform and by periodically

Figure 2
A sort for students in the letter name stage contrasting short a, o, and i.



From Caserta-Henry, Bear, & Del Porto, 1996. Reprinted by permission of the University of Nevada, Reno. Photo by Anita Dursteler

adding words to these lists. These word study notebooks chronicle students' activities, and students may use their notebooks during small-group instruction as a source of words, patterns, and sorting activities.

There are some basic rudiments for sorting during the within-word pattern stage. Figure 3 shows that students start with a word study sheet, which they cut into separate cards and then sort according to the guide words in bold. Next they examine the differences between long and short vowels. They already know about the CVC patterns and now look at the common long vowel patterns like the CVVC, CVCe, and CVC patterns. At the end of the sort, students record what they learned in their word study notebooks, as illustrated in Figure 3. Numerous supporting activities are assigned throughout the week, including path and board games, small-group lessons using the sorts, and pre- and postassessments, if desired.

Letter Cubes is a popular game during this stage. It is played with letter cubes like those from Boggle®. Playing in pairs, one player makes words out of the letters he or she has

thrown while the other player keeps time and records the sort into a column based on how many letters are in the word. Players realize that the longer the words they make, the more points they earn. An important aspect of this game is its flexibility: Students can add and subtract letters to make words, so that a student in this stage may make a series of words from interchanging consonants: for example, *dime, time, lime*; and *line, dine, pine, fine*.

Students' spelling lists during this stage are longer and focus on one or more common patterns. These words are integrated into students' entries in their word study notebooks. For example, students may add the spelling words to the appropriate columns in their word study notebooks, and later in the week they may work with a partner to add several more words that follow the same patterns. In the middle of this stage, *r-* and *l-*influenced vowels are studied at length, starting with simpler patterns, as in *farm, short, and fall*, and progressing to more complex, as in *near, chair, and crawl*.

Figure 3
Three steps in a teacher-made word sort in the within-word pattern stage

walk	cave	nail	say
may	land	tall	lane
gain	tray	hail	faint
rain	sail	paid	made
paste	flat	chase	chain
range	lace	flame	can

(a) Teacher prepares word study sheet of long \bar{a} vowel patterns.

walk	cave	nail	say
land	paste	gain	may
tall	range	rain	tray
tall	lace	sail	
can	chase	hail	
	lane	paid	
	flame	faint	
	made	chain	

(b) Student sorts words underneath the key words printed in bold.

CVC	CVCE	CWC	CVV
walk	cave	nail	may
land	paste	gain	tray
flat	range	rain	
tall	lace	sail	
can	chase	hail	
	lane	paid	
	flame	faint	
	made	chain	
		chase	

(c) Student records sort into the word study notebook.

Toward the end of this stage, students examine more complex vowel patterns as in *caught* as well as homophones such as *plain* and *plane*. Exploring homophones helps students understand that the spelling of a word can represent its meaning as well as its sound: Words such as *sail* and *sale* are spelled differently because they mean different things. Homophone Rummy is a popular game for students who are making the meaning contrasts among familiar homophones. The exploration of homophones is a perfect transition to the next stage of spelling development, where vocabulary development and meaning patterns increasingly become major aspects of word study instruction.

Syllable juncture spelling and word study. While they are learning about the spelling of syllable patterns, students begin the more systematic examination of structural elements in words—bases, prefixes, and suffixes—and how the spelling of these elements depends upon an understanding of their meaning. We point out the spelling/meaning connection to them, though the more full-fledged exploration of this connection will not get underway until the next stage. We encourage students to be curious about new words they encounter in their reading, recording these in their word study notebooks and discussing the more interesting words with us. Importantly, spelling and vocabulary instruction come closer together during the syllable juncture spelling stage, and we can also combine grammar studies with word study at this level: For example, through sorting base words and suffixes, students examine how the suffix *-ment* affects the meaning and the part of speech in word changes from verbs to nouns: *agree, govern, develop, move*.

At the syllable juncture stage, students examine a range of orthographic features that are determined by syllable structure and juncture. Henderson (1985) pointed out that “One remembers only those things one has attended to.... Syllable-sorting tasks develop the habit of looking where it counts” (p. 150). In these word sorts and in other meaningful instructional contexts, therefore, we show students what they already know about the spelling of a word and then guide them to the realization that they should attend to what they don’t know.

Early in this stage students explore a range of simple suffixes: Through comparing and contrasting base words with their inflected forms, students learn about the simple plural endings *-s* and *-es* and simple inflectional endings *-ed* and *-ing*.

bunch + s versus tack + s
watch + s versus mit + s
 and
swim + ing versus slide + ing versus float + ing
bump + ed versus trade + ed

Later, the principle of open and closed syllables first learned with simple bases and inflectional endings is applied to noninflected, polysyllabic words:

(Open syllables)	(Closed syllables)
<i>bacon</i>	<i>happy</i>
<i>diner</i>	<i>bottom</i>
<i>nature</i>	<i>number</i>
<i>begin</i>	<i>suppose</i>
<i>pilot</i>	<i>barber</i>

Students next extend their understanding of particular spelling changes that must be made when certain suffixes are added to words: The classic “changing *y* to *i*” phenomenon, for example, is explored through comparison and contrast: *bunny/bunnies, hurry/hurried* versus *turkey/turkeys, chimney/chimneys*.

Certain vowel patterns will continue to be explored at this stage, usually in the context of polysyllabic words and homophones. For example, the */oy/* sound in *avoid* and *employ* is spelled *oi* when it occurs in the middle of a syllable and *oy* when it occurs at the end; the */o/* sound in *doe* is spelled differently in *dough* (these different spellings reflect the fact that these words mean different things). Quite a wide range of homophones is explored at this stage, underscoring the principle of “different spelling, different meaning”: For example, *night/knight; course/coarse; sore/soar; pour/pore*. By tying the spelling of a sound or sounds to their *position* within a word as well as to *meaning*, students have a much stronger conceptual handle for remembering the conventional spelling of these words and the sounds within them. This is far more efficient and effective than simply telling students that */oy/* may be spelled either *oi* or *oy* (so they’ll just have to remember it as best they can) or that */or/* may be spelled *-oar, -or, -ore, -or, -our*.

The role of accent in spelling is examined at this stage for two reasons: Students will learn that many of their spelling errors occur in what turn out to be *unaccented syllables* (BAR-BAR, PACKIT), so sound is not a clue to spelling, and they will need to attend to these parts of words. Second, students learn how accent distinguishes certain *homographs*, words that are spelled the same but pronounced differently, such as proDUCE/PROduce; REcOrd/reCORD. Yes, homographs go against the

Rote memorization is an inefficient means of learning content-related vocabulary terms.

principle that says words should be spelled differently if they mean different things. However, it's important to point out that the different pronunciation of homographs provides a clue that they mean different things; moreover, we point out to students that, interestingly, there aren't nearly as many homographs in the language as there are homophones.

Derivational constancy spelling and word study. Spelling/meaning relationships are explored extensively at this level. We begin with related word families in which vowel and consonant sounds change while the spelling of the base or root changes little or not at all: for example *sign/signal, please/pleasant, competel/competition, legal/legality, connect/connection, magic/magician, condemn/condemnation*. Most students do not realize these relationships on their own, so it's critical for teachers to point them out and launch students' explorations.

Because spelling in years past was narrowly conceived, the words that composed programs of spelling instruction were selected on the basis of their frequency in printed material at students' particular grade levels. *Solemn* and *solemnity* would definitely not be presented together. And more recently, an irony of our emphasis on engaging students extensively in real literature has been our failure to grasp the full potential for word study that this immersion affords. In contrast to years past, students are

now much more likely in their reading to encounter examples of words and word forms that illustrate spelling/meaning patterns—words like *solemn* and *solemnity*—but they must have the word knowledge to understand these patterns and accommodate them in their “mental dictionaries.” Many years ago, Edgar Dale, a preeminent wordsmith and educator, observed that “In general, students are not making associations between such words as *reduce* and *reduction*... 74 percent of fourth-graders know *pretend*, but *pretense*, the noun form of *pretend*, is not commonly known until the twelfth grade” (Dale, O'Rourke, & Bamman, 1971, p. 172). Many years later, the situation is much the same (Templeton, 1992). But this is a situation that teachers can change.

When students develop a fuller understanding of and appreciation for the spelling/meaning connection among familiar words such as *wise/wisdom* and *sign/signal* and extend these understandings to new words such as *solemn* (known) and *solemnity* (unknown), they are then primed to explore in depth the role that Greek and Latin word elements play in the spelling and meaning of words. We begin with frequently occurring Greek and Latin elements whose meaning and spelling are consistent; for example, the Greek elements *tele-* (far, distant), *-therm-* (heat), and *-photo-* (light); the Latin elements *-tract-* (drag, pull), *-spect-* (look), *-port-* (carry), *-dict-* (to say), *-rupt-* (to break), and *-scrib-* (to write). We explore additional Latin and Greek prefixes such as *inter-* (between), *post-* (after), *pro-* (in front of, forward), and *co-/com-* (together). We explore common Greek suffixes that students frequently encounter, such as *-crat/-cracy* (“rule” as in “democracy”—rule by the *demos*, “people”), and *-ician* (“specialist in” as in *dietician*).

Finally, the pervasive but little-understood phenomenon of *absorbed* or *assimilated* prefixes is explored at this stage. These are prefixes whose spelling and sound have been “absorbed” into the spelling and sound of the base word or word root to which they are attached: For example, *in-* (“not”) + *mobile* = *immobile*; *ad-* (“to or toward”) + *tract* (“to draw or pull”) = *attract*. Although the spelling of the prefix *ad-* has been absorbed in the following words, it still holds onto its meaning: *aggressive*: *ad-* + *gress* (“to move”) = “to move toward”; *affirm*: *ad-* + *firm* (“make

firm”) = “to make firm”; *appalled*: *ad-* + *pall* (“make pale”) = “to make pale.” Students (and their teachers) can appreciate how an awareness of this phenomenon leads to better spelling (when do I double and when don’t I?) and to a broader vocabulary and a deeper understanding of specific words.

For students at this stage, instructional activities continue to involve word sorts and word study games, as well as engaging students in word hunts for words that share particular roots, prefixes, or suffixes. Throughout their word study, students collect and group words that share meaning as well as spelling relationships in their word study notebooks. With the exception of slang, reading will be the primary source for new vocabulary. In small-group discussions, teachers may share their own interests in word histories, or etymology, in the different content areas.

We’ve noted that rote memorization is an inefficient means of learning important content-related vocabulary terms. On a frequent basis, we should group vocabulary items together and talk about them, noting common structural/spelling features. For example, the second author once worked with a student teacher who was teaching *Animal Farm* to a class of 10th graders. She had selected 12 new vocabulary words from one of the chapters to be read. The suggestion was made that (a) she could trim her list, as not all of the words she selected represented major ideas/concepts; and (b) for each important term that remained, she could develop a deeper understanding through webbing or listing related words, relating the new words to words the students already knew, pointing out relationships, and facilitating connections among these words. All the while, she would be reinforcing the spelling of each word as well. She then selected *apathy*, *literate*, *tractable*, *posthumously*, and shared some related terms like *sympathy*, *literacy*, *attract*, and *human*.

We can also point out cognates from other languages: One fifth-grade boy, for example, whose native language was Spanish, commented that the letters *f-i-n* in the words *finish* and *final* also spell the Spanish word *fin*, which means “end” (Sabey, 1997). In French, *dormir* means “sleep”; the same root occurs in *dormant* and *dormitory*.

Where do we go from here? Studying word study and spelling instruction

We’d like to place our work within the broader context of research exploring what and how individuals learn about printed words. Those of us engaged in developmental spelling research have noted how research in cognitive psychology, developmental psychology, and cognitive science suggests that learners construct knowledge about words specifically and about spelling patterns more generally. Our research and study support the view that learners draw upon this core knowledge in both writing and reading. Knowing that this common core exists, we can more confidently and appropriately guide learners toward applying their word knowledge effectively. Based on their theories of how printed words work, over a period of years learners develop orthographic representations for words in their mental dictionaries. As we have seen, these orthographic representations change from alphabetic, to patterns of letters, to syllable patterns, to meaning elements.

Student-generated word sorts and reflections. Although the patterns that we study change with students’ development, the ways in which we teach students to study words do not change very much as long as the activities are engaging and useful. After they have been engaged in word study activities for several months, we often ask students to discuss their favorite games to see if they can then adapt them for word study. Recently Charles, a student who was in the within-word pattern stage of spelling and in third grade, developed a game called “Race to the Princess,” in which toy soldiers climb a ticky-tack notch in a rope to capture the castle. As students play a word card game, each player turns up a word card from the main deck. When a player makes a match with a card in his or her hand—for example, matching a long vowel pattern—the player earns a chance to spin the spinner and move a certain number of notches on the rope.

Children who are experienced word sorters can be effective word study guides and instructors. They know how to sort, and they know the sequence of activities and several games. In the same way that students learn to lead discussions in reading groups (Bear & Invernizzi, 1984), they can learn how to guide

word study sessions. For example, in one fourth-grade class two students shared a chart of 100 vocabulary words they found related to the study of spiders. In small groups, they shared with classmates how they organized the words and what some of the words meant. Students in the upper levels can lead discussions in which they share word studies of interesting words and their histories (Templeton, 1997). For example, in a study on the word *nautilus* as part of an ocean life unit, a group of students learned that *nauseous*, *nautical*, and *navy* are words that share a common origin. Growing out of this type of exploration, we are investigating how teachers can engage students, particularly upper level students, in "think-alouds" during word sorts (Fresch & Wheaton, 1995; Sabey, 1997).

Orthographic development and word study in other languages. There have been several studies of developmental spelling in other languages including Spanish (Cuetos, 1993; Ferroli & Krajenta, 1990; Temple, 1978; Valle-Arroyo, 1990), Chinese (Shen, 1996), French (Gill, 1980), Greek (Porpodas, 1989), and Portuguese (Pinheiro, 1995). Studying other languages more carefully is important in order to understand comparisons and contrasts that second-language learners make when they spell in English (Fashola, Drum, Mayer, & Kang, 1996; Zutell & Allen, 1988). This is particularly true for students in the letter name and within-word pattern stages.

The study of spelling in other languages leads to word studies that enrich students' vocabulary and engenders curiosity about other languages. Students see borrowings in spelling that they had not known (*banquet*, *dinette*) and relations among language families. Students who speak more than one language enjoy comparing what they know about the orthographies with their classmates. Children who speak English and Spanish compare and contrast consonants in the two orthographies and then compare English long vowels to the much more phonetically regular spelling patterns in Spanish.

Students' vocabularies and conceptual development expand as they compare synonyms across languages. To compare English and Spanish vocabulary, for example, students might start with an English word, find the word in a Spanish dictionary, and then go back

to related words in English: *boast/presume/presume*; *comprehensive/extenso/extensive*; *nightly/noturno/nocturnal*; and *powder/polvo/pulverize*.

The study of spelling development in these other languages shows us common strategies students use to read and spell. Even in a character-based writing system such as Chinese, children in Grades 1 through 6 follow a developmental sequence similar to the model of orthographic development outlined here for English (Shen, 1996). In examining 7,000 spelling errors from the writing of children in the People's Republic of China, Shen found that children in the early grades analyze the sound layer of the orthography, then as they develop as readers and writers, they turn their attention to the pattern layer; with continued growth, they give greater attention to the meaning layer of the orthography.

Teaching students with difficulties. Interestingly, there are very few invented spellings that cannot be understood given the developmental model first sketched out by Henderson and subsequently developed and elaborated by his students (Henderson, 1985; Templeton & Bear, 1992a). Studying invented spelling among learning disabled students supports the idea that most learners with difficulties are delayed and that their spelling develops in the same order with the same types of inventions as other learners (Abouzeid, 1992; Bear & Cheney, 1990; Gerber, 1986; Gerber & Hall, 1989; Worthy & Invernizzi, 1990).

Occasionally, a student's incomprehensible spelling is a result of a frustration with spelling that leads the student to throw letters at the page. For example, Susan, a fourth grader who is a beginning reader, spelled *bump* as *BEL* and *hid* as *TIO*. While the *b* makes sense, the rest of her spellings are hard to explain. Quite simply, Susan had abandoned the alphabetic principle. She was plugging in letters to fill the space. To help her to find the letters to match the sounds she was trying to spell, word study and spelling instruction focused on finding appropriate instructional-level activities that began with initial consonants and moved on to brief guided spelling lessons. Together with plenty of encouragement from her tutor, Susan began to write more sensibly and was personally rewarded by being able to reread what she had written. After a few months of instruction, it

was clear that she was making some progress in ways that we would expect of a beginning reader.

From time to time, we can see hearing and speech difficulties evidenced in children's invented spellings. The invented spellings of children with severe and profound hearing losses are perhaps the most unusual ones we see. Without clear information about articulation and sound, children with severe and profound hearing losses may not follow a typical developmental progression in their spelling development. Their invented spellings are often unique; for example, *SHAE* for *short* or *AIJONIER* for *ashamed* are largely unexplainable.

The spelling development of children with severe and profound hearing losses who use Cued Speech has been encouraging. Cued Speech is a sign system that supports oral communication by clarifying speech reading ambiguities with hand movements and hand configurations (Cornett & Daisey, 1992). The invented spellings of beginning readers who use Cued Speech seem to be based on articulation (Bear, 1995). Similar articulation errors among children using Cued Speech have been observed in cueing errors (Alegria, Lechat, & Leybaert, 1988; Alegria, Leybaert, Charlier, & Hage, 1992). From a sign system like Cued Speech, children may obtain supplementary information about articulation of the spoken language. This information may enable them to follow a developmental progression that leads to developing strong readers and writers (Caldwell, 1994).

The effect of "deep" word knowledge on reading and writing. If students have been meaningfully engaged in purposeful and motivating word study throughout the elementary years, they are well primed for continuing such exploration at the upper levels. What are the effects for these students of knowing explicitly about the many layers of meaning and the history that are represented by the spelling of a word? It is, of course, clearly apparent that many students, and their teachers, learn to read and write to high levels of competence and self-actualization without extensive knowledge of the aspects of the "meaning" layer of spelling, including the influence of Greek and Latin. There may be an additional value, however, of knowing something about the etymological substrata of words and the elements of

which they are composed—roots, prefixes, suffixes (Skinner, 1989). We are fond of paraphrasing C.S. Lewis, author of the Narnia chronicles and a preeminent wordsmith, and his notion of the *semantic biography* of a word (Templeton, 1995). This is a sense or feeling that a word has an intriguing story behind it that reveals why the word has come to mean

We can see hearing and speech difficulties evidenced in children's invented spellings.

what it does. Cumulatively, this sense for the semantic biographies of words may enrich students' engagements with narratives, tapping ever deeper cognitive and affective roots. We trust that, when taken with the other insights afforded by deep reading, such knowledge and the engagements it affords will lead to lifelong commitments to the power of text in their lives.

Conclusion

Ramona saw spelling as being full of traps. We wonder what she might have thought had she seen spelling as a place for exploration. Her frustration, shared by so many real-world students, underscores the importance of reconceptualizing spelling as more than simply learning the correct sequence of letters in a word. When spelling is more narrowly defined—as a "skill" for writing—then learners are not allowed opportunities for exploring and learning patterns that apply to more than the individual words that are causing difficulty.

We know that students can have a natural curiosity about words, and with developmentally focused, engaging word study instruction we are certain Ramona would have become interested in words and how they are spelled. Two stories we heard recently tell us a little about how students come to think about meaningful word study. Tamara Baren, the teacher in a multiage Grade 4-5-6 classroom, asked her students at the end of the year what *one thing* helped them to improve as readers. They said it was the word study they had done throughout the year. At her retirement party,

principal Sharon Cathey told about a medical student she had taught many years before in first grade, who returned to share his experiences in word study. He told her, "I'm *still* sorting words," and explained how he puts the key vocabulary terms on cards and sorts them into categories.

How much word study should teachers involve their students in? Several years ago, in reflecting on what Ed Henderson thought the answer should be, we observed that:

His pedagogical call is certainly not a new one: Balance study of the "basics"—in this case, words—with meaningful reading, writing, and discussion about what is read and written. The consequences of ably answering that call, however, are indeed revolutionary, because elementary education has never before achieved this balance on a large scale. (Templeton & Bear, 1992b, p. 346)

Until recently, emphasizing word study outside of online reading and writing appeared to be more reactionary than revolutionary. For most students, however, exclusive reliance on these incidental encounters with spelling features may not ensure the breadth of exposure and depth of processing required for their brains to "detect the patterns."

We return, then, to where we began in this article: It is essential that instruction balance authentic reading and writing with purposeful word study. We achieve this balance when students explore words *their way*—in word study that is developmentally appropriate and embedded within the overarching contexts of deeply satisfying engagements with reading and writing.

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References

- Abouzeid, M.P. (1992). Stages of word knowledge in reading disabled children. In S. Templeton & D.R. Bear (Eds.), *Development of orthographic knowledge and the foundations of literacy: A memorial Festschrift for*

Edmund H. Henderson (pp. 279 – 306). Hillsdale, NJ: Erlbaum.

Adams, M.J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.

Alegria, J., Lechat, J., & Leybaert, J. (1988). Role of Cued Speech in the identification of words by the deaf child: Theory and preliminary data. *Glossa*, 9, 36 – 44.

Alegria, J., Leybaert, J., Charlier, B., & Hage, C. (1992). On the origin of phonological representation in the deaf: Hearing lips and hands. In J. Alegria, D. Holender, J. Morais, & M. Radeau (Eds.), *Analytic approaches to human cognition* (pp. 107 – 132). Amsterdam: Elsevier Science.

Anderson, R. (1993). The future of reading research. In A.P. Sweet & J.I. Anderson (Eds.), *Reading research in the year 2000* (pp. 17 – 36). Hillsdale, NJ: Erlbaum.

Barnes, G.W. (1989). Word sorting: The cultivation of rules for spelling in English. *Reading Psychology*, 10, 293 – 307.

Barone, D. (1989). Young children's written responses to literature: The relationship between written response and orthographic knowledge. In S. McCormick & J. Zutell (Eds.), *Cognitive and social perspectives for literacy research and instruction* (pp. 371 – 380). Chicago: National Reading Conference.

Bear, D.R. (1989). Why beginning reading must be word-by-word. *Visible Language*, 23, 353 – 367.

Bear, D.R. (1991). "Learning to fasten the seat of my union suit without looking around": The synchrony of literacy development. *Theory Into Practice*, 30, 149 – 157.

Bear, D. (1992). The prosody of oral reading and stage of word knowledge. In S. Templeton & D.R. Bear (Eds.), *Development of orthographic knowledge and the foundations of literacy: A memorial Festschrift for Edmund H. Henderson* (pp. 137 – 189). Hillsdale, NJ: Erlbaum.

Bear, D.R. (1995, December). *The study of Cued Speech and orthographic knowledge: Implications for the understanding of articulation in orthographic knowledge*. Presented at the annual meeting of the National Reading Conference, New Orleans, LA.

Bear, D.R., & Barone, D. (1998). *Developing literacy: An integrated approach to assessment and instruction*. Boston: Houghton Mifflin.

Bear, D.R., & Cheney, C. (1990). An integrated approach to literacy education for handicapped students: Diagnostic teaching techniques. *Intervention*, 26, 221 – 226.

Bear, D.R., & Invernizzi, M. (1984). Student directed reading groups. *Journal of Reading*, 28, 248 – 252.

Bear, D.R., Invernizzi, M., & Templeton, S. (1996). *Words their way: Word study for phonics, vocabulary, and spelling instruction*. Englewood Cliffs, NJ: Prentice Hall.

Beers, C.S., & Beers, J.W. (1992). Children's spelling of English inflectional morphology. In S. Templeton & D.R. Bear (Eds.), *Development of orthographic knowledge and the foundations of literacy: A memorial Festschrift for Edmund H. Henderson* (pp. 231 – 252). Hillsdale, NJ: Erlbaum.

Beers, J.W., & Henderson, E. (1977). A study of orthographic concepts among first graders. *Research in the Teaching of English*, 11, 133 – 148.

Bussis, A., Chittenden, E., Amarel, M., & Klausner, E. (1985). *Inquiry into meaning: An investigation of learning to read*. Hillsdale, NJ: Erlbaum.

Caldwell, B. (1994). Why Johnny can read. *Cued Speech Journal*, 5, 55 – 64.

Caserta-Henry, C., Bear, D.R., & Del Porto, C. (1996). *The reading buddies manual*. Reno, NV: Center for Learning and Literacy, University of Nevada, Reno.

Chomsky, C. (1970). Reading, writing, and phonology. *Harvard Educational Review*, 40, 287 – 309.

- Cleary, B. (1979) *Ramona and her mother*. New York: Morrow.
- Cornett, R.O., & Daisey, M.E. (1992). *Cued Speech resource book for parents of deaf children*. Raleigh, NC: National Cued Speech Association.
- Cuetos, F. (1993). Writing processes in a shallow orthography. *Reading and Writing Quarterly: An Interdisciplinary Journal*, 5, 17 – 28.
- Cunningham, P. (1992). What kind of phonics instruction will we have? In C.K. Kinzer & D.J. Leu (Eds.), *Literacy research, theory, and practice: Views from many perspectives* (pp. 17 – 32). Chicago: National Reading Conference.
- Cunningham, P. (1995). *Phonics they use: Words for reading and writing* (2nd ed.). New York: HarperCollins.
- Dale, E., O'Rourke, J., & Bamman, H. (1971). *Techniques of teaching vocabulary*. Palo Alto, CA: Field.
- Ehri, L.C. (1993). How English orthography influences phonological knowledge as children learn to read and spell. In R.J. Scholes (Ed.), *Literacy and language analysis* (pp. 21 – 43). Hillsdale, NJ: Erlbaum.
- Fashola, O.S., Drum, P.A., Mayer, R.E., & Kang, S. (1996). A cognitive theory of orthographic transition: Predictable errors in how Spanish-speaking children spell English words. *American Educational Research Journal*, 33, 825 – 843.
- Ferrollo, L., & Krajenta, M. (1990). Validating a Spanish developmental spelling test. *The Journal of the National Association for Bilingual Education*, 14, 41 – 61.
- Fresch, M.J., & Wheaton, A. (1995, December). *Using think alouds in the classroom: Issues for research and practice*. Paper presented at the meeting of the National Reading Conference, New Orleans, LA.
- Ganske, K. (1994). *Developmental spelling analysis: A diagnostic measure for instruction and research*. Unpublished doctoral dissertation, University of Virginia, *Dissertation Abstracts International*, 55-05A, 1230.
- Gentry, J.R., & Gillet, J.W. (1992). *Teaching kids to spell*. Portsmouth, NH: Heinemann.
- Gentry, J.R., & Henderson, E.H. (1981). Three steps to teaching beginning readers to spell. In E. Henderson & J. Beers (Eds.), *Developmental and cognitive aspects of learning to spell* (pp. 112 – 119). Newark, DE: International Reading Association.
- Gerber, M.M. (1986). Generalization of spelling strategies by LD students as a result of contingent imitation/modeling and mastery criteria. *Journal of Learning Disabilities*, 19, 530 – 537.
- Gerber, M.M., & Hall, R.J. (1989). Cognitive-behavioral training in spelling for learning handicapped students. *Learning Disability Quarterly*, 12, 159 – 171.
- Gill, C.E. (1980). *An analysis of spelling errors in French*. Unpublished doctoral dissertation, University of Virginia, *Dissertation Abstracts International*, 41-09A, 3924.
- Gillet, J., & Kita, M.J. (1978). Words, kids, and categories. *The Reading Teacher*, 32, 538 – 542.
- Henderson E.H. (1981). *Learning to read and spell: The child's knowledge of words*. DeKalb, IL: Northern Illinois University Press.
- Henderson, E.H. (1985). *Teaching spelling*. Boston: Houghton Mifflin.
- Henderson, E., & Beers, J. (Eds.). (1980). *Developmental and cognitive aspects of learning to spell: A reflection of word knowledge*. Newark, DE: International Reading Association.
- Henderson, E.H., & Templeton, S. (1986). A developmental perspective of formal spelling instruction through alphabet, pattern, and meaning. *The Elementary School Journal*, 86, 305 – 316.
- Henry, M. (1996). *Words*. Austin, TX: PRO-ED.
- Moats, L.C. (1995). *Spelling: Development, disabilities, and instruction*. Baltimore, MD: York.
- Morris, D. (1981). Concept of word: A developmental phenomenon in the beginning reading and writing process. *Language Arts*, 58, 659 – 668.
- Morris, D. (1982). "Word sort": A categorization strategy for improving word recognition ability. *Reading Psychology*, 3, 247 – 259.
- Morris, D. (1992). Concept of word: A pivotal understanding in the learning to read process. In S. Templeton & D.R. Bear (Eds.), *Development of orthographic knowledge and the foundations of literacy: A memorial Festschrift for Edmund H. Henderson* (pp. 53 – 77). Hillsdale, NJ: Erlbaum.
- Morris, D., Blanton, L., Blanton, W., & Perney, J. (1995). Spelling instruction and achievement in six elementary classrooms. *Elementary School Journal*, 96, 145 – 162.
- Morris, D., Nelson, L., & Perney, J. (1986). Exploring the concept of "spelling instructional level" through the analysis of error-types. *Elementary School Journal*, 87, 181 – 200.
- Pinheiro, A.M.V. (1995). Reading and spelling development in Brazilian Portuguese. *Reading and Writing Quarterly: An Interdisciplinary Journal*, 7, 111 – 138.
- Porpodas, C.D. (1989). The phonological factor in reading and spelling of Greek. In P.G. Aaron & R.M. Joshi (Eds.), *Reading and writing disorders in different orthographic systems*. (pp. 117 – 190). Norwell, MA: Kluwer.
- Read, C. (1971). Preschool children's knowledge of English phonology. *Harvard Educational Review*, 41, 1 – 34.
- Read, C. (1975). *Children's categorization of speech sounds in English*. Urbana, IL: National Council of Teachers of English.
- Sabey, B.L. (1997). *Metacognitive responses of syllable juncture spellers while performing three literacy tasks*. Unpublished doctoral dissertation, University of Nevada, Reno.
- Schlagal, R. (1989). Constancy and change in spelling development. *Reading Psychology*, 10, 207 – 232.
- Schlagal, R. (1992). Patterns of orthographic development into the intermediate grades. In S. Templeton & D.R. Bear (Eds.), *Development of orthographic knowledge and the foundations of literacy: A memorial Festschrift for Edmund H. Henderson* (pp. 31 – 52). Hillsdale, NJ: Erlbaum.
- Shen, H.H. (1996). *Spelling errors and the development of orthographic knowledge among Chinese-speaking elementary students*. Unpublished doctoral dissertation, University of Nevada, Reno, *Dissertation Abstracts International*, 57-12A, 5101.
- Skinner, B.F. (1989). The origins of cognitive thought. *American Psychologist*, 44, 13 – 18.
- Snyder, Z.K. (1997). *The Egypt game*. New York: Dell.
- Stauffer, R.G. (1980). *The language-experience approach to the teaching of reading* (2nd ed.). New York: Harper & Row.
- Sternberg, R.J., & Powell, J.S. (1983). Comprehending verbal comprehension. *American Psychologist*, 38, 878 – 893.
- Taft, M. (1991). *Reading and the mental lexicon*. Hove, UK: Erlbaum.
- Temple, C.A. (1978). An analysis of spelling errors in Spanish. Unpublished doctoral dissertation, University of Virginia, *Dissertation Abstracts International*, 40-02A, 0721.
- Templeton, S. (1979). Spelling first, sound later: The relationship between orthography and higher order phonological knowledge in older students. *Research in the Teaching of English*, 13, 255 – 264.

- Templeton, S. (1983). Using the spelling/meaning connection to develop word knowledge in older students. *Journal of Reading*, 27, 8 - 14.
- Templeton, S. (1991). Teaching and learning the English spelling system: Reconceptualizing method and purpose. *Elementary School Journal*, 92, 183 - 199.
- Templeton, S. (1992). New trends in an historical perspective: Old story, new resolution—sound and meaning in spelling. *Language Arts*, 69, 454 - 463.
- Templeton, S. (1995). *Children's literacy: Contexts for meaningful learning*. Boston: Houghton Mifflin.
- Templeton, S. (1997). *Teaching the integrated language arts* (2nd ed.). Boston: Houghton Mifflin.
- Templeton, S., & Bear, D.R. (Eds.). (1992a). *Development of orthographic knowledge and the foundations of literacy: A memorial Festschrift for Edmund H. Henderson*. Hillsdale, NJ: Erlbaum.
- Templeton, S., & Bear, D. (1992b). Summary and synthesis: Teaching the lexicon to read and spell. In S. Templeton & D.R. Bear (Eds.), *Development of orthographic knowledge and the foundations of literacy: A memorial Festschrift for Edmund H. Henderson* (pp. 333 - 352). Hillsdale, NJ: Erlbaum.
- Templeton, S., & Scarborough-Franks, L. (1985). The spelling's the thing: Older students' knowledge of derivational morphology in phonology and orthography. *Applied Psycholinguistics*, 6, 171 - 189.
- Treiman, R. (1993). *Beginning to spell*. New York: Oxford University Press.
- Valle-Arroyo, F. (1990). Spelling errors in Spanish. *Reading and Writing Quarterly: An Interdisciplinary Journal*, 2, 83 - 98.
- Worthy, M.J., & Invernizzi, M. (1990). Spelling errors of normal and disabled students on achievement levels one through four: Instructional implications. *Annals of Dyslexia*, 40, 138 - 151.
- Zutell, J. (1979). Spelling strategies of primary school children and their relationship to Piaget's concept of decentration. *Research in the Teaching of English*, 13, 69 - 80.
- Zutell, J. (1994). Spelling instruction. In A. Purves, L. Papa, & S. Jordan (Eds.), *Encyclopedia of English studies and language arts* (Vol. 2, pp. 1098 - 1100). New York: Scholastic.
- Zutell, J., & Allen, J. (1988). The English spelling strategies of Spanish-speaking bilingual children. *TESOL Quarterly*, 22, 333 - 340.



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