

Why spelling?: The benefits of incorporating spelling into beginning reading instruction

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Reading and spelling are often treated as separate subjects, with reading considered to be more important than spelling at the early elementary school level. Today, in many United States first- and second-grade classrooms, reading is taught at one time of day and with one set of materials. Spelling, if formally covered at all, is taught at a different time of day and with different materials than those used for reading. Is this an optimal approach? No, say the many children for whom spelling means dreary memorization of lists of words and boring workbook exercises. No, say those advocates of skill-based approaches who propose that spelling instruction be better integrated with reading and vocabulary study (Templeton, 1991). No, say advocates of whole-language instruction, who recommend that the language arts be integrated by bringing reading and writing together and who further recommend that children not be pushed to spell correctly during the early grades (Bergeron, 1990). In this chapter, I review the research basis for these claims. I ask whether there are benefits to be gained by emphasizing writing and spelling at the early elementary school level. I also ask whether writing should be integrated with reading in instruction and, if so, how. The research to be reviewed suggests that writing has an important role to play in the early grades and that it should be coordinated with reading. However, contrary to the claims of whole-language advocates, skill in spelling does not always arise naturally and automatically as a result of reading. Spelling needs to be taught, but in a manner that is more sensitive to the natural course of spelling development than are many traditional methods.

Because the focus of this chapter is on how English-speaking children learn to spell, the chapter begins by reviewing the nature of the English writing system. I discuss how children learn about this system and the types of errors they make along the way. Next, I show that spelling skill does not always emerge as a by-product of reading. Becoming a good

speller typically requires experiences above and beyond those provided by the reading of connected text. Even though learning to read does not automatically make children good spellers, learning to spell does benefit their reading. It does so, in part, by improving children's ability to focus on the individual sounds or phonemes within spoken words. Other research suggests that young children find it easier to use an alphabetic strategy in writing than in reading. Thus, children may be able to use spelling as an entry point into the writing system. Children's spellings also provide an excellent window into their knowledge of phonology and orthography. Teachers can use children's spellings to group them for instruction, to predict future progress, and to shed light on any problems that they may be experiencing. In the last section of the chapter, I review various approaches toward spelling that have been used with children in the early elementary grades. I ask whether children should be encouraged to invent their own spellings for words with minimal guidance and correction, as proponents of the whole-language approach maintain, or whether children need some type of direct teaching to become good spellers.

### The English spelling system and the natural course of spelling development

The English spelling system is the butt of many jokes. How irregular it is, we complain, how illogical! How can children ever be expected to master such a system except through brute force memorization? In fact, the English writing system is not as irregular as often thought. Although one cannot always spell an unknown word correctly, one can usually produce a readable approximation if one knows the rules and patterns that are embodied in the writing system.

The phonemic structure of a word is the major constraint on its spelling. We know that the word seat could alternatively be spelled as sete or seet, but we know that it could not

be spelled as seab or vaim. A person who is able to segment spoken words into phonemes and who knows which graphemes (i.e., letter or letter groups) may represent each phoneme has an excellent start on spelling. Our prospective writer will do even better if he or she knows something about the contexts in which particular graphemes may occur. For example, ck may be used in the middle of a word (as in packet) or at the end of a word (as in pack) but may not occur at the beginning of a word. A speller who knows this orthographic pattern might spell soccer as socker but will not spell can as ckan. As another example, the /ɛ/ (“short e”) sound is sometimes spelled as ea when it occurs before d, as in dead and head, but is rarely spelled as ea when it occurs before p.

The morphological structure of a word (i.e., whether the word is made up of smaller meaningful parts) also influences its spelling. In many cases, a spelling that would be anticipated on the basis of phoneme-grapheme correspondences is overridden by morphological considerations. For example, one would normally expect health to be spelled as helth. The a in the conventional spelling reveals the relationship to heal. As another example, the English writing system does not represent the difference between the final /t/ sound of jumped and the final /d/ sound of hemmed. Both words are spelled with final ed to indicate that both are past tense verbs.

Even when phonological, orthographic, and morphological patterns are considered, the spellings of English words are not totally predictable. For example, sword is an irregular spelling for present-day speakers who no longer include a /w/ when pronouncing this word. The i in plaid is likewise unexpected. When multiple sources of information are taken into account, however, the English writing system is more reasonable and more logical than often believed.

Given the complexity of the English spelling system and the fact that it encodes several different types of information, one would expect mastery of the system to require a long time. Indeed it does. Learners take years to become accurate and automatic spellers and they make many mistakes along the way. Importantly, though, children's spelling errors do not typically involve the random substitution and omission of letters. Nor, for the most part, do early spelling errors arise for visual reasons, as with confusions between y and w. Rather, children's misspellings reflect their linguistic knowledge. The errors are often logical and reasonable given the knowledge that children possess.

A brief history of the acquisition of spelling is in order at this point. Preschoolers may begin to "write" by making marks with a crayon or pencil. Although these early productions may not include any conventional letters, they often reveal some understanding of the gross visual features of writing, such as its linearity. Gradually, children learn the letters of the alphabet and begin to relate letters in spellings to the sounds that they hear in words. When asked to spell, young children may represent a whole word or a whole syllable with a single letter. Children gradually represent more and more of the sounds in words, moving from spellings like B for beat to spellings like BT and BET. (Children's spellings of words will be printed in capital letters throughout this chapter.) Children's spellings reveal that their analyses of the sounds in words do not always match those embodied in conventional English. For example, first graders may represent the first sound of drum with g rather than d or the second sound of spider with b rather than p. They may spell the middle sound of city, which is called a flap, with d rather than with t. Even though these spellings are unconventional, they are reasonable from a phonetic viewpoint. Other common errors, such as SIK for sink and BED for bread, involve a failure to represent one phoneme of a consonant cluster. These

errors reveal children's difficulties in apprehending consonant clusters as sequences of individual phonemes. It tends to be the second phoneme of a two-consonant initial cluster (e.g., the /r/ of bread) and the first phoneme of a two-consonant final cluster (e.g., the /ŋ/ of sink) that is omitted. Still other errors, such as BR for bar, suggest a difficulty in analyzing certain vowel + consonant units, along with a tendency to spell these units with the letters that have the corresponding names. In the case of BR, a child spells the phoneme sequence /ar/ with r, the letter that has this name.

The kinds of spelling errors that I have described gradually abate as children improve in their ability to segment spoken words into phonemes and as their phonemic analyses become more conventional. In addition, children gain a knowledge of the contexts in which particular spellings may occur and of the morphological underpinnings of English spelling. For example, they learn that ck may occur in the middles or at the ends of words but not at the beginnings. They learn that the past tense ending is spelled as ed, regardless of its pronunciation. In addition, children learn the conventional spellings of words whose spellings cannot be fully determined from their linguistic forms. For example, they learn about the i in plaid and the w in sword. For a more detailed discussion of children's spelling than I am able to provide here, see Adams, Treiman, and Pressley (in press), Read (1986), or Treiman (1993).

Two major theoretical approaches have been taken in explaining the course of spelling development. The first approach is that of stage theories (Ehri, 1986; Gentry, 1982; Henderson, 1985). Stage theorists propose that children pass through a series of qualitatively different stages in the course of learning to spell. During the early stages of spelling development, children draw on their knowledge of letter names and their knowledge of

phonology in order to spell words. During later stages, additional sources of information come into play, including knowledge of orthographic patterns and morphological relationships among words. These latter types of knowledge are said to be unavailable to beginning spellers. Thus, stage theorists propose that different stages in the development of spelling are marked by reliance on qualitatively different types of information.

The second theoretical approach proposes that spelling development is more continuous. Rather than using certain types of information at some points in time and other types of information at later points in time, children use a variety of strategies from the beginning. This second approach may be called the strategy approach. Support for the strategy approach comes from findings suggesting that even young children can use orthographic patterns and morphological relationships among words to aid their spelling. Thus, even first graders appear to have picked up that ck does not occur at the beginnings of English words and do not often use this orthographic pattern (Treiman, 1993). With regard to morphology, first graders begin to be able to spell the flap of dirty with t rather than d based on the relationship between dirty and dirt (Treiman, Cassar, & Zukowski, 1994). Although the ability to use orthographic and morphological information improves over time, it emerges earlier than expected under stage theories of spelling development (Cassar & Treiman, 1996). Stage theories further predict a degree of consistency among a child's spellings at a given point in time. During the so-called letter-name stage, for example, children should spell bar as BR and mess as MS, using their knowledge of letter names in both cases. Researchers who have looked for such consistency have not always found it, however (Treiman, 1994; Varnhagen, McCallum, Burstow, Pawlik, & Poon, in press).

At some level, the question of whether spelling development takes place through movement from one stage to another or through the gradual accumulation of more sophisticated strategies is not critical for the questions being addressed in this chapter. What is critical is that children make progress. How can we help children to move from primitive spellings like S or SD for sword to more sophisticated spellings like SORD and eventually to the correct SWORD? Is it enough to have children read good literature and trust that their knowledge of reading will transfer to spelling? Or is direct instruction in spelling necessary? These questions are addressed in the following sections.

Learning to spell does not come about just through reading

If learning to spell were a natural by-product of learning to read, our task would be simple. Teach children to read, let them read a lot of good literature, and they will become skilled spellers. Experience suggests that the situation is not so simple. If spelling were an automatic by-product of reading, why would this writer have to pause over the spelling of occasional when she has read the correctly spelled word thousands of times? Research findings confirm that spelling, for most people, requires something above and beyond experience with reading.

There are correlations between the ability to read and the ability to spell (see Ehri, this volume). In a study of second graders, for example, Shanahan (1984) found a correlation of .66 between performance on a spelling test and performance on a test of phonetic abilities in reading. This correlation is moderate but is far from perfect. Shanahan suggested on the basis of such results that reading and writing consist of both dependent and independent abilities and that reading instruction does not suffice to teach writing. Further support for the claim that ability to read a word does not guarantee ability to spell it comes from the fact that

some children (as well as some adults) are good readers but poor spellers (e.g., Frith, 1980; Bruck & Waters, 1990). The opposite pattern is much less common. Moreover, dyslexic individuals who as a result of intensive instruction have reached normal levels in reading often continue to be poor spellers (Boder, 1973; Critchley, 1975).

Research shows that the type of reading experience recommended by whole-language advocates -- the reading of connected, meaningful text -- is less effective than the reading of isolated words as a way to learn words' spellings. In one study, Ehri and Roberts (1979) worked with first graders who had experienced between 7 and 8 months of reading instruction. The children were taught to read 16 words such as which and witch. Half of the children studied the words in sentences and the other half of the children studied isolated printed words. Each child completed three sessions of word training during which he or she read each word a total of 16 times. Those children who studied single words showed a larger gain from pretest to posttest on a spelling recognition test than those children who studied words in context. Also, the former children got more letters correct on a spelling production test. In a follow-up study, Ehri and Wilce (1980a) compared first graders' ability to learn grammatical words such as might and enough in sentences and in lists. Again, children learned more about the words' spellings when they studied the words in non-meaningful lists than when they read them in sentences. Thus, it is experience with words taken out of context that is most helpful in learning to spell.

Research further suggests that children need to read a word many times before their ability to spell that word begins to improve. The younger the children, the more reading experience is required (see Bosman & Van Orden, in press). In one study, Dutch children with 10 months of formal literacy instruction made equal numbers of errors in spelling words

they had read six times and words they had read just twice. Only when words had been read at least nine times did the children's spelling performance began to improve through reading. The Dutch results reviewed by Bosman and Van Orden further show that tasks that require a child to focus on the exact spelling of a word -- whether copying the word, spelling it out loud, or forming the word using letter tiles -- are superior to reading as a means of learning the word's spelling. If these results generalize to English, as I suspect they would, this would support the view that reading does not always transfer to spelling.

The claim that reading knowledge does not always transfer to spelling should not be taken to imply that transfer sometimes occurs. For example, as mentioned earlier, first graders who were taught primarily by whole-language methods tended to avoid using ck at the beginnings of words. This was true even though the children were not explicitly taught that ck may not occur in this position (Treiman, 1993). The children must have picked up this orthographic pattern through reading. However, this type of learning takes time. It stands to reason that it would be more effective with patterns that are found in a large number of words than with patterns that occur in just a few words. For example, many English words have ck in the middle or at the end and none have ck at the beginning. Exposure to this entire body of words should help children learn the pattern. Sword is one of the few words that a child will see in which /s/ is spelled with sw, and so the correct spelling of this word should be learned more slowly through reading experience.

Why does the ability to read a word not always guarantee that a child will be able to spell that word? Beginners have been reported to read words logographically, by means of visual clues (Byrne; 1992; Frith, 1985; Gough, Juel, & Griffith, 1992). Ehri (this volume) has referred to this strategy as pre-alphabetic reading. Children who use this approach may

identify dog by virtue of the “tail” at the end of the word rather than by linking the letters in the printed word to the sounds in the spoken word. A child who uses a logographic strategy to recognize printed words does not focus on all of the words’ letters and so may be unable to remember and reproduce the full spelling. Even when children begin to link words’ spellings to their sounds, they do not do so completely. Instead, children may read by means of partial clues, connecting some of the letters in a word’s spelling to its pronunciation but ignoring other letters (Ehri, 1992, this volume; Perfetti, 1992). This approach will sometimes allow children to read words correctly. For example, a young child may identify bar in reading by connecting the letter b to the phoneme /b/ and the letter r to the phoneme sequence /ɑr/. Because the child has not linked the letter a to a separate phoneme in the spoken word, the child may not remember this letter when attempting to spell the word and may therefore produce the error BR.

#### Learning to spell benefits reading and phonemic awareness

The evidence just reviewed suggests that most children need to do more than read a lot in order to become good spellers. Children need experiences that encourage them to focus directly on individual words and their spellings. Exactly what these experiences might be will be discussed in more detail later in this chapter. The point that I wish to make in this section is that learning to spell, in addition to its effects on spelling, also benefits children’s reading.

The benefits of writing are both motivational and cognitive. With regard to motivation, Chomsky (1979) suggested that having young children generate their own stories and using these stories as reading material gives children a sense of ownership. Children may be more willing to try to read something they have written themselves than something that is

unfamiliar. In addition, spelling appears to have cognitive benefits. It encourages children to analyze words into smaller units of sound and to link these sounds to letters. In this way, children practice their phonemic segmentation skills. Through writing, children learn to see spellings as maps of phonemic content rather than as arbitrary sequences of letters. Practice in using the alphabetic strategy to spell helps children transfer this strategy to reading and go beyond strategies involving logographic reading or partial clues.

Support for the cognitive benefits of spelling claims comes from both correlational and experimental studies. Cataldo and Ellis (1988) used causal modeling to suggest that, early on, knowledge gained from spelling is transferred to reading more than the reverse. However, their study was an exploratory one involving a relatively small number of children. In a larger study of Dutch children, Mommers (1987) found direct effects of spelling ability on word decoding speed after children had received three to four months of first-grade instruction.

More definitive are the results of training studies. One such study, reported by Ehri and Wilce (1987), involved kindergartners. Children in the experimental group received several hours of one-on-one training over a one-month period in segmenting spoken syllables into phonemes and representing the phonemes with letter tiles. Children in the control group practiced matching letters to isolated sounds but did not learn to spell words. After the training, children were given seven trials to learn to read a list of 12 words. These words had not been taught during the training period but were composed of the taught letters. The children in the experimental group performed better on this word learning task than the children in the control group, although neither group of children mastered the full set of words. However, the spelling-trained children seemed to have a better handle on alphabetic

reading than the control children in that their errors showed a closer phonetic relationship to the presented stimuli. The spelling-trained children also outperformed the control children on a test of phonemic segmentation. Ehri and Wilce suggested that the experimental group's better performance in reading reflected their improved segmentation skills. Supporting this suggestion, research shows that training in phonemic segmentation contributes to reading acquisition, especially when phonemic awareness is taught in conjunction with alphabet letters (Ball & Blachman, 1991; Bradley & Bryant, 1985; Hatcher, Hulme, & Ellis, 1994).

Uhry and Shepherd (1993) followed up on Ehri and Wilce's (1987) study by working with first graders rather than kindergartners and by extending the length of training and the variety of posttest reading measures. In Uhry and Shepherd's study, first graders from a classroom that used primarily (but not exclusively) a whole-language approach received 40 minutes per week of supplemental small-group instruction over the course of 6 1/2 months. For the children in the experimental group, this instruction involved breaking spoken words into phonemes and representing the phonemes with letter tiles. The children practiced spelling the same lists of words that were used for regular classroom reading instruction. The children in the experimental group also played spelling games on the computer. The children in the control group practiced reading the same words used by the experimental children, reading the words out of context rather than in stories. However, the control children did not segment or spell the words. The children in the control group also played reading games on the computer. At the end of training, the children in the experimental group outperformed the controls on measures of nonsense word reading, timed word reading, and timed oral passage reading. Group differences in silent reading comprehension were not significant, although the researchers suggested that such differences may have emerged if the children had been

followed for longer. The experimental children also outscored the controls on oral segmentation and blending tests. Uhry and Shepherd's findings suggest that segmentation and spelling training that is coordinated with classroom reading instruction leads to better performance in reading than additional reading practice itself. These results suggest that it is important to include segmentation and spelling instruction in first-grade classrooms. They also suggest that spelling and reading instruction should be integrated with one another.

Bosman and Van Orden (in press) objected that the training methods used by Ehri and Wilce (1987) and Uhry and Shepherd (1993) allowed the children time to practice reading the words. The additional reading practice, they argued, could explain the experimental group's superior performance in reading. However, the control group in the Uhry and Shepherd study had even more time for reading practice than the experimental group, yet did more poorly than the experimental group on reading posttests. Thus, Bosman and Van Orden's counter-argument does not seem to be supported.

Learning to spell not only raises children's level of phonemic awareness but also shapes their conceptions of phonemes. As discussed earlier, young children do not always analyze spoken words the same way that literate adults do and the same way the conventional English writing system does. For example, children may consider the first sound of drum to be /dʒ/ (as in the first sound of "George") rather than /d/. They may consider the second sound of spider to be /b/ rather than /p/ and the middle consonant of city to be /d/ (Treiman, 1985a, 1985b, 1993). As children learn the conventional spellings of words, their judgments about phonemes become more conventional. Support for this claim comes from a study by Ehri and Wilce (1986) which focused on flaps such as the middle sound of city. Flaps are often spelled as t in conventional English even though they sound more similar to /d/.

Teaching second graders the spellings of flaps affected the children's conceptions of the flaps' sounds, as assessed through a rhyming task. These and other results (e.g., Ehri & Wilce, 1980b) suggest that learning to spell gradually brings children's representations of sounds in line with those assumed by the conventional writing system.

The ability to spell a word may not guarantee the ability to read it. Indeed, as discussed in the next section, some young children are able to spell certain words but unable to read them. The point that I have tried to make in this section is that learning to spell words benefits children's reading down the line by giving them practice in segmenting spoken words into phonemes and in relating phonemes to graphemes.

Children may be able to use the alphabetic principle in spelling before they can do so in reading

As I have mentioned, many researchers believe that children initially approach reading as a paired-associate learning task. They read not by connecting letters in printed words to sounds in spoken words but by connecting salient visual characteristics of words to the words' pronunciations or meanings (see Ehri, this volume). Evidence for this claim comes from experimental work (e.g., Byrne, 1992) and classroom studies (Seymour & Elder, 1986). For example, children who have learned to read both fat and bat may perform at chance levels when asked whether fun says "fun" or "bun" (Byrne, 1992). Apparently, these children have not linked the f of fat to the sound /f/ and so cannot deduce that fun must correspond to "fun". Although some researchers suggest that not all English-speaking children go through a logographic stage in learning to read (e.g., Stuart & Coltheart, 1988), the proposal has enjoyed a good deal of popularity. In contrast, children are thought to use a sound-based approach in spelling from an early age. It has been suggested that spelling acts as the

pacesetter for reading early in the course of development, with children employing an alphabetic strategy in spelling before they are able to use this strategy in reading (Frith, 1985; Goswami & Bryant, 1990).

Support for the idea that children systematically relate print and sound in spelling before they do so in reading comes from several sources. Researchers such as Read (1975) and Chomsky (1979) have described preschool children who begin to spell before they are able to read. Often, these children cannot read back what they have written or are not interested in doing so. They are more concerned with the activity of spelling than with the end result. If these children do wish to check what they have written, they do not read it back as an older child or adult would do. Instead, they start again from the pronunciation and make sure that they have chosen the appropriate letters. It has been suggested that young children have a writing mode and a reading mode and that they sometimes operate in one mode only, without recourse to the other (Chomsky, 1979).

Results of a study by Burns and Richgels (1989) confirm that preschoolers who can invent plausible sound-based spellings can not always read words when presented in isolation. These researchers identified 16 gifted preschoolers who could produce phonetically reasonable spellings for one-syllable words. The inventive spellers were compared with a group of 16 non-spellers from the same program for gifted children. Seven of the 16 inventive spellers could read some isolated words. However, the other 9 inventive spellers performed poorly on the reading tasks, no better than the non-spellers. Burns and Richgels conclude that, early in literacy development, “word reading appears to be a very separate ability from word writing or spelling” (p. 13).

Other studies have examined children who learn to read and write at school rather than children who begin on their own at home. Huxford, Terrell, and Bradley (1991) studied British children in their first year at school, beginning when the children were four and five years old. The researchers compared children's ability to read and spell simple nonwords such as zep. The children spelled by using plastic letters. Testing was carried out at eight-week intervals, stopping when the children performed almost perfectly on both the reading and the spelling test (at an average age of about 5 1/2). Throughout the series of tests, the children's spelling scores were consistently higher than their reading scores. In another study, which looked at older British children aged about seven years, most children were better at reading than at spelling (Bryant & Bradley, 1980). However, there were still some items -- phonetically regular words and simple nonwords -- that children could spell but could not read (Bryant & Bradley, 1980; but see Gough et al., 1992 for some questions about these claims).

There are several reasons why children may find it easier to use an alphabetic strategy in spelling than in reading. For one thing, spelling places fewer demands on memory. Children can write down phonemes as they come to them in analyzing a word, rather than holding them in memory until the end of the word and then blending them together to form a unified pronunciation. Supporting this claim, Stahl and Murray (1994) found that digit span, a test of short-term memory, did not account for any additional variance in spelling ability above and beyond that explained by phonological awareness. In contrast, digit span made a small but significant additional contribution to word recognition.

Another reason that children may use a phonological approach for spelling before they do for reading is that the alternative logographic or pre-alphabetic strategy is easier to use in

reading. Children easily learn to relate the golden arches in the McDonald's logo to the word McDonald's. Having experienced some success at "reading" this and other environmental print, they may be reluctant to go beyond a logographic approach in reading. In contrast, memorizing the entire spelling of a word with no alphabetic support is so hard that children are led to look for some principled way of remembering the spelling of a word based on its sound.

Children's spellings provide an excellent window onto their knowledge of phonology and orthography

Children may begin to produce spellings like B or BT for beat before they can read very much, if at all. By carefully examining a child's spellings, one can gain insight into where the child is in the process of literacy acquisition. For example, a child who spells beat as BT is farther along than a child who spells the word with a random string of letters and numbers or a child who mixes up the letters of his or her own name.

The quality of children's invented spellings in kindergarten or at the beginning of first grade is a good predictor of later reading achievement (Mann, 1993; Mann, Tobin, & Wilson, 1987; Morris & Perney, 1984). For example, Mann (1993) gave a spelling task to groups of children at the end of kindergarten. About a year later, the children were given standardized measures of word identification and word attack skills. A measure of the phonological quality of the kindergarten spellings predicted between 37% and 47% of the variance in first-grade reading achievement. This measure was more successful than other measures of spelling that assessed children's ability to approximate the overall shape of a word or their tendency to reverse letters such as s and p. Mann's findings suggest that teachers can use a

short group-administered spelling test at the end of kindergarten to pick out children who may have problems learning to read in first grade.

In the study by Mann (1993), the invented spelling task was a better predictor of first-grade reading achievement than was a phonemic awareness task focusing on initial consonants. Other studies suggest that spelling may actually be an easier measure of phonemic awareness than many oral phonemic awareness tasks, at least for children who know the basic correspondences between phonemes and graphemes. For example, Stahl and Murray (1994) found that children who produced spellings like LESTR for lap, in which the first phoneme is correctly represented but the rest of the word is not, could often not master an oral task that involved separating onsets from rimes. That is, children seemed to show an implicit ability to divide onsets from rimes in spelling but not in oral segmentation. Duighuisen, Kerstholt, and van Bon (1990, cited in van Bon & Duighuisen, 1995), working with Dutch children who had about three months of formal reading and spelling instruction, also found that spelling is sometimes easier than oral segmentation. Van Bon and Duighuisen (1995) reported the same discrepancy among Dutch eight-year-olds who were poor spellers. Spelling tests may be more sensitive to phonological knowledge than many oral phonemic awareness tasks because spelling places less stress on short-term memory. Children can write down segments as they encounter them rather than having to hold the sound segments in memory. In addition, spellers can check and modify their responses without relying solely on phonological memory.

Spelling tasks provide a good basis for grouping children for reading instruction and word study. Bear and Barone (1989) argued that an assessment of children's spelling can provide more information than a standardized reading test. Morris and Perney (1984) drew

similar conclusions. For example, why drill a child on beginning and ending consonant sounds if the child consistently represents these sounds in spelling? Why teach the distinction between “short” and “long” vowels to a child who cannot yet spell the initial consonants of simple words?

To take advantage of the information in children’s spellings, teachers must go beyond looking at the spellings simply as correct or incorrect. They need to have an understanding of the nature of the English writing system, the sound system of the spoken language, and the normal course of spelling development. If teachers are not given the opportunity to acquire such knowledge, they may fail to appreciate why it is reasonable for a child to begin drum with a g or spider with sb. They might not understand why a child would omit the r of bread or the n of sink. Unfortunately, many teachers do not receive adequate training in phonemic awareness, linguistics, and the nature of written English (Moats, 1994). Teachers’ difficulty in thinking about the sounds of words as distinct from their spellings arises, in large part, because teachers are good readers. As discussed previously, learning to read shapes people’s conceptions of sounds, making their ideas about sounds similar to those embodied in the conventional orthography. Phonemic sensitivity may actually decline after reading has become skilled and automatic (Scarborough, 1995). The phonemic segmentation skills of literate adults can be improved through instruction. Teachers must be given the opportunity to receive such instruction so that they can interpret and respond to students’ spelling errors, pick the best examples for use in instruction, and sequence teaching in an optimal manner. Moats (1995) and Treiman (1993, Chapter 1) have outlined some information about phonology and orthography that may be useful for teachers.

As I have argued in this section, there are a number of advantages to be gained by analyzing the spelling errors that children produce and tailoring instruction accordingly. Analyses of children's reading errors can provide some of the same benefits (see Siegel, this volume). However, young children are often more willing to try writing a word than to try reading it. Even kindergartners will typically attempt to spell a word when told to spell it as it sounds and not to worry about being right or wrong. When asked to read a word, the same children may say that they cannot read or that they do not know what the word says. In addition, spellings are easier to analyze than oral reading responses because they are concrete and permanent. Teachers can collect their students' writings and analyze them later, rather than listening to children read and making quick judgments about the quality of their errors. In addition, as discussed earlier in this chapter, young children's alphabetic knowledge may reveal itself more clearly in their spelling than in their reading. For all these reasons, it is not enough to focus on reading miscues. One can get a fuller picture of children's progress and potential by also looking at their spellings.

#### How should spelling be approached at the early elementary school level?

I have reviewed a number of reasons for including spelling as one component of literacy instruction at the early elementary school level. What types of writing experiences should young children have and how should teachers deal with the misspellings that are bound to occur? In this section, I discuss a variety of approaches that have been proposed and evaluate these approaches in light of research.

One approach is to begin literacy instruction with writing rather than with reading (Chomsky, 1979; Montessori, 1964). This approach is motivated by some of the findings discussed earlier in this chapter. As I discussed, some children start to write at an early age

even before they begin to read. Those children who do not begin to write on their own before they go to school may use the alphabetic principle earlier in spelling than in reading. The idea of approaching reading through invented spelling fits with the view that children learn best if they construct a system on their own rather than having it handed to them by an adult (e.g., Piaget, 1972). Chomsky described a first-grade classroom in which children begin by writing, using invented spelling, and later use the books they have written, recopied in standard spelling, as reading material.

One problem with the “write first, read later” approach lies in what to do about children who cannot write words or who produce spellings that have no relationship to the intended word. Should we wait until these children begin to spell on their own, letting them draw pictures or engage in other activities while their classmates write stories? Alternatively, should we provide these children with experiences that will help them to spell on their own? As I discuss later in this section, instruction in phonemic awareness and in how phonemes relate to letters can be very helpful for such children.

A related approach toward writing and spelling is advocated by proponents of the whole-language approach to literacy instruction. Although these individuals do not necessarily believe that children should begin to write before they read, they recommend that writing be an integral part of early literacy instruction. Children are encouraged to write from an early age and there is little stress on the correctness of their spellings. In some classrooms, like the one studied by Treiman (1993), children are not told the standard spellings of words even if they ask. The idea is that learning to spell is a developmental process and that children will move toward conventional spelling on their own with little or no direct teaching. The main type of input that is required for learning to spell, in the whole-language view, is

experience with print. Children will get this experience through their reading and so spelling need not be directly taught.

Some of the research reviewed earlier in this chapter casts doubt on aspects of the whole-language approach. As I discussed, children do not always become good spellers by doing a lot of reading. Moreover, children learn to spell better if they study words in isolation than if they read them in context. The whole-language approach, by eschewing presentation of isolated words and isolated sounds, may not give children the kinds of experiences that they need in order to become good spellers. A similar problem applies to the “write first, read later” approach, if it is assumed that children will learn to spell as a result of reading their own stories in conventional print.

Castle, Riach, and Nicholson (1994) reported an empirical evaluation of the whole-language approach as applied to spelling. In New Zealand, where they conducted the study, literacy instruction begins at the age of five and follows a whole-language approach. As one feature of this approach, children are encouraged to write stories and invent their own spellings. Castle and her colleagues identified 30 school beginners who started out low in phonemic awareness. Half of these children were assigned to the experimental group. These children worked with an experimenter twice weekly for twenty minutes each session over a 10-week period. The children engaged in a variety of activities that were designed to foster phonemic awareness and knowledge of sound-letter associations. The other half of the children were assigned to the control group. These children spent the same amount of time writing stories and inventing spellings. The children in the experimental group showed more improvement in phonemic awareness from pretest to posttest than the children in the control group. In addition, the experimental group made larger gains on a standardized real word

spelling test and an experimental spelling test. The experimental group was particularly good at spelling pseudowords, suggesting that the training they received improved their ability to segment novel words into phonemes and represent these phonemes with letters. The superiority of the experimental group is especially noteworthy given that the control group actually engaged in more story writing and inventive spelling than the experimental group.

The results of Castle et al. (1994) suggest that, for children who enter school with poor phonological awareness, grasping the alphabetic principle requires more than writing using invented spelling. Such writing should be supplemented with phonemic awareness training and training in sound-letter associations. These findings concur with other findings showing that, for children who are initially low in phonemic awareness, instruction that is directed toward improving these skills improves later spelling (Bradley & Bryant, 1985; Lie, 1991; Lundberg, Frost, & Petersen, 1988; Tornéus, 1984). The gains appear to be most pronounced when the phonemic awareness instruction is integrated with instruction about the relationships between phonemes and letters, as in the study by Castle and colleagues (Ball & Blachman, 1991; Bradley & Bryant, 1985; Hatcher et al., 1994). That is, children should be taught not only how to analyze spoken words into phonemes but also how to represent the phonemes with letters.

If phonemic awareness instruction and instruction in letter-sound correspondences are provided, then encouraging children to invent their own spellings during free writing assignments may be helpful. Evidence for this claim comes from a study by Clarke (1988). Clarke studied four first-grade classrooms, two in which children were expected to invent spellings for unknown words during their creative writing periods and two in which children were expected to use traditional spellings. The children in both the invented spelling

classrooms and the traditional spelling classrooms also learned letter sounds, generally in isolation, and followed a basal reading program. All of the children were taught phonics as a part of their language arts instruction using a variety of oral drills and worksheets. Clarke (1988) found that children whose teachers encouraged invented spelling wrote longer stories containing a greater variety of words than children whose teachers expected correct spelling. Clarke also reported that the inventive spellers spent more time during a writing session actually engaged in writing or in reading what they had written. The traditional spellers spent more time asking or telling classmates how to spell words or copying spellings from dictionaries or wall charts. When these children asked the teacher for help, they spent time in unproductive waiting if the teacher was busy with another child.

A possible drawback of invented spelling that is suggested by the results of Clarke's (1988) study is that the first graders who were encouraged to invent spellings did not improve in usage of correct spellings over the course of the study. The percentage of correct spellings for this group increased from 70% in November to 73% in December but decreased over the next three months to 60% in March. In contrast, the children using traditional spelling were over 90% correct throughout the course of the study. However, another study of first graders who followed a similar approach as the children in the invented spelling classrooms studied by Clarke found that children's spellings did become more correct over the course of the school year (Treiman, 1993). Perhaps Clarke would have found improvement had she followed the children for longer.

The most important result of Clarke's (1988) study is that the invented spelling group performed significantly better than the traditional spelling group on a standardized spelling test and a spelling test involving low-frequency regularly spelled words. The inventive

spellers also outperformed the traditional spellers on single-word reading tests, although not on passage comprehension. Importantly, the benefits of invented spelling were only significant for the children who had lower levels of alphabet knowledge, spelling skill, and reading skill at the beginning of first grade. For children who performed well on these measures at the start of first grade, there were no reliable differences in outcome between the invented spelling group and the traditional spelling group. Thus, Clarke's results suggest that encouraging children to invent spellings while they are engaged in creative writing helps them to appreciate the alphabetic principle. Once children have grasped this principle, inventive spelling is no longer superior to traditional spelling.

It is important to keep in mind that the inventive spellers in Clarke's study did not follow a strict whole-language approach to reading and writing. These children were learning about phonics and letter-sound associations as well as doing creative writing. It is not clear whether a superiority for inventive spelling over traditional spelling would have been found among children who did not receive any phonics instruction.

Clarke's (1988) results help to alleviate a fear that is commonly voiced by opponents of invented spelling -- that young children who are encouraged to invent their own spellings will come to believe that these spellings are correct and will get "stuck" producing incorrect spellings. If this were so, then the children in Clarke's invented spelling classrooms should have performed worse on the spelling posttests than the children in the traditional spelling classrooms. As discussed earlier, young children do not always read back what they have written. Even when they do, children must read a word many times in order to learn its spelling. Because the children in the invented spelling classrooms spelled a large variety of words, they probably did not produce any single error often enough to encode the error as

correct. Supporting this line of reasoning, Ehri, Gibbs, and Underwood (1988) found that second and third graders who invented spellings for novel words did no worse when later learning the words' correct spellings than children who did not invent spellings. Also, Bradley and King (1992) found that exposure to misspellings did not hurt the spelling accuracy of most fifth graders. Although production of or exposure to misspellings seems to have negative effects on some fifth graders (Bradley & King, 1992) and adults (Brown, 1988; Jacoby & Hollingshead, 1990), it does not appear to hurt early elementary school children.

The results reviewed so far suggest that first graders can and should write at some time during the school day. During this creative writing period, it is probably a good idea to encourage children to invent spellings for unknown words if they cannot readily recall or locate the correct spelling. This policy will mean that children spend more time writing and less time waiting for a teacher's help. It will allow children to write more interesting and engaging stories than if they were limited to a small set of known words. By inventing spellings, children will gain practice breaking words into phonemes and representing these phonemes with letters. However, creative writing using invented spelling should not be the only type of writing experience that children receive. To make most progress in learning to spell, children need instruction in phonemic awareness if they are initially lacking in these skills. They also need some type of direct instruction in spelling. Clarke's (1988) findings suggest that, as children become better spellers, there are fewer benefits to be gained from inventive spelling. As time goes on, children should be encouraged to spell words correctly, for example by looking for words in a dictionary or a personal word bank, rather than inventing their own spellings.

If children need some type of direct instruction in spelling above and beyond experience with writing and inventive spelling, what kind of instruction is most useful? One possibility is to embed spelling instruction into each child's independent writing experiences. Using this approach, the teacher selects certain invented spellings for consideration and helps the child to understand how the spellings can be improved. This approach may be called guided invented spelling. Because it is integrated into the context of writing, it is an example of what Morrow and Tracey (this volume) call authentic instruction.

Currently, many teachers who encourage invented spelling do not offer children much guidance on how to improve their spellings. For example, the teachers in the invented spelling classrooms studied by Clarke (1988) seem not to have commented on the correctness of the children's spellings or helped children to improve their spellings. The children usually read their stories to the class, the teachers commented on the content of the stories, and this marked the end of the writing process. In the classroom studied by Treiman (1993), the teacher wrote the conventional spellings of the words on the child's paper but did not discuss how the child's spellings differed from the conventional ones and did not help the child to improve his or her spellings.

Guided invented spelling would seem to be very helpful if well and sensitively done. This is because the instruction is tailored to individual children, giving them feedback on the errors they have just made and teaching them what they need to know at that particular time. However, there is as yet no body of research systematically addressing the effectiveness of guided invented spelling.

The research does suggest a number of techniques by which guided invented spelling could be carried out. For certain types of errors, it may be helpful to focus on phonemic

awareness, helping children to divide problematic parts of spoken words into phonemes. For example, a child who spells bread as BED can be helped to analyze the /br/ cluster into /b/ followed by /r/. The child can be shown that each part of the cluster can be represented with a separate letter, yielding br. If the child then spells the word as BRED, the teacher might say that this is an excellent attempt, not mentioning at this time that the word actually contains an a. Another way to guide invented spelling is to focus on reading. For instance, a teacher may have the child read BED and help the child to realize that this printed word corresponds to bed, not bread. Confronted with the fact that they have spelled two different-sounding words alike, children sometimes change their spellings. Indeed, this happened about 40% of the time among the first graders studied by Treiman (1991). This rate may be increased by teaching children how to use reading to check their spelling. Such an approach should help children learn to integrate reading and spelling, which, as I have discussed, are not always well connected in young children.

Teachers can offer guidance, as well, on the use of orthographic and morphological spelling strategies. For example, a child who spells can as CKAN can be shown known words that end with ck and words that have ck in the middle and can be led to the generalization that ck appears in these positions of words but not at the beginnings. Teachers can also help children use morphologically related words to guide their spelling. For example, a child who represents the flap sound of dirty with d rather than with the conventional t can be helped to think of dirt and use it as a guide. As another example, the child who omits the /n/ of rained can be taught to think of the stem rain. Children can learn to use not only morpheme units but other subword units in spelling. For example, a child who

has spelled tight as TITE but who is familiar with the -ight pattern in might and light could be taught that /ait/ is often spelled as ight (see Goswami, this volume).

Teachers using guided invented spelling must sometimes admit to children that certain letters in the conventional spelling of a word do not make good sense on the basis of sound. For example, there is no separate /i/ (“short i”) sound in girl. The word instead contains a syllabic /r/ that takes the place of a vowel. If a child spells girl as GRL, as many first graders do (Treiman, Berch, Tincoff, & Weatherston, 1993; Treiman, 1993), a teacher may say that this is a good attempt to capture the word’s sound but that the word happens to contain an i before the r. The teacher may use this opportunity to point out the orthographic generalization that all written syllables contain a vowel letter.

Although guided invented spelling would appear to offer many benefits, there are some potential problems with this approach. Teachers need time to interact with individual students based on the errors that each student has made in his or her writing. With many students, there may be little time for this type of individual teaching. In addition, guided invented spelling requires a large degree of skill on the part of teachers. They must be aware of the reasons behind children’s errors and of what children are ready to learn next. Unfortunately, as discussed earlier, many teachers do not have the opportunity to acquire the linguistic knowledge that they need in order to guide children’s spelling in the most effective manner. For instance, it would be counterproductive to tell a child that he or she should be able to hear an /i/ sound in the spoken word girl. Telling a child that there is such a sound when there in fact is not could cause the child to doubt his or her ability to analyze words phonemically. Finally, because guided invented spelling takes place spontaneously, in

response to a particular need, it may not be systematic enough to teach children what they need to know.

Given the limitations of guided invented spelling, this approach needs to be supplemented with group instruction. As discussed earlier (Bear & Barone, 1989; Morris & Perney, 1984), children can be placed in groups on the basis of their spelling and reading skills and spelling instruction can take place in these settings. Useful suggestions for such instruction may be found in the chapters in this volume by Goswami, Calfee, and Gaskins, as well as in Templeton (1992) and Brown, Sinatra, and Wagstaff (in press). For example, children can play games that involve analyzing spoken words into phonemes. They can sort printed words into categories, for example words beginning with single consonants versus those beginning with consonant clusters. They can learn to form new words by substituting one letter for another, forming cat and mat from rat. They can learn strategies for spelling new words based on familiar words and word parts, using dirt to spell dirty and -ight to spell tight and sight. Instruction should be grounded on knowledge of spelling development and of the errors that children typically make. For example, given many first graders' difficulties in spelling consonant clusters, it would be useful to teach this skill directly. One cannot assume that a child who can use b at the beginning of bed and r at the beginning of red will necessarily be able to use br at the beginning of bread (Treiman, 1991). Some programs assume that children will be able to do this and so do not offer explicit teaching about the spelling of consonant clusters (Cronnell & Humes, 1980).

Memorization of spelling words and weekly spelling tests can be one component of spelling instruction. This type of activity is particularly useful for common but difficult to spell words such as said and would. However, children need to understand that the spellings

of many words make sense on the basis of linguistic principles and that patterns like the ai of said are a special case. By placing too much stress on the rote memorization of unusual words, particularly during the early stages, teachers may give children the idea that the English spelling system is irregular and illogical. Thus, such study should not begin until children have grasped the alphabetic basis of the English writing system and have begun to read comfortably. Templeton (1991) suggests that the second half of first grade is a good time to begin the systematic study of word lists. The lists should be short, about five or six words, and should be made up of words that children already know how to read. Through spelling study, children critically examine the words and learn the details of their spellings. Several authors (Cunningham & Stanovich, 1990; Woloshyn & Pressley, 1995) have offered useful suggestions for strategies that children may be taught to use in memorizing words.

How should spelling instruction be integrated with reading? One way is to focus on the same or similar words in reading and in spelling. The results of Mason, McDaniel, and Callaway (1974) suggest that children who are taught to spell words from their reading program, whether through direct instruction or as they use the words in composition, progress more rapidly than children who are taught to spell words that are not in their readers. Another way of integrating spelling and reading is to teach children to use reading to check their spelling. Although this strategy seems obvious to adults, young children do not always read back what they have written. Activities involving spelling and word study can form a common core that links the domains of reading and writing (Templeton, 1991). Through such activities, children are led to examine and analyze the words that they know how to read. They learn to use the knowledge extracted from these analyses as a foundation for reading and spelling new words.

## Conclusions

Advocates of phonics-based instruction and advocates of whole-language instruction, although they disagree on many things, agree on at least one point. Specifically, both think that writing is important. Both are interested in children's early invented spellings, if for somewhat different reasons. Advocates of direct instruction in phonics believe that spelling helps strengthen children's phonics skills by practicing segmenting spoken words into phonemes and relating phonemes and graphemes. These individuals are impressed by the knowledge of phonology and language structure that children bring with them to the spelling task and by the role that spelling can play in furthering this knowledge. Whole-language advocates, although they place primary stress on higher-level writing skills, are struck by the fact that some children who have received no formal reading or spelling instruction can make up their own spellings for words. They encourage all children to invent spellings for words when writing and they believe that children will move toward correct spelling on their own as they learn to read. Whole-language advocates further stress the importance of integrating writing and reading and the need to make both activities interesting and motivating for children.

Both of the positions outlined above have some merit. The research reviewed in this chapter shows that spelling helps children master the alphabetic principle and also has a positive impact on reading. Proponents of the whole-language approach are thus correct in suggesting that writing not be put off until the middle or late elementary grades but should begin much earlier. However, contrary to the belief of whole-language advocates, the research shows that children will not automatically become good spellers as a result of reading a lot. One cannot count on transfer from reading to teach spelling. Children should

certainly read good literature, but they should also spend time focusing on individual words. These experiences can be provided through individual instruction -- what I have called guided invented spelling -- through group activities, or, ideally, through both. Although children need to spend some time studying isolated words and sounds, this study should not be meaningless or boring. Fortunately, there are a number of interesting and motivating activities through which children can learn about words and their spellings. Memorization of word lists may be one part of such instruction, but it should by no means be the only part. Indeed, the systematic study of words --- their spellings, meanings, and derivations -- provides an important foundation for all of reading and writing.

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