

Word Recognition." *Journal of Memory and Language*, v.51 (2004).

Van Heugten, M. and E. K. Johnson. "Infants Exposed to Fluent Natural Speech Succeed at Cross-Gender Word Recognition." *Journal of Speech, Language, and Hearing Research*, v.55 (2012).

White, K. S. and R. N. Aslin. "Adaptation to Novel Accents by Toddlers." *Developmental Science*, v.14 (2011).

## Spelling

To participate fully in a modern society, children must learn to use written as well as spoken language. Spelling is one of the many skills that contribute to being an effective writer. Although formal literacy instruction starts around the age of 6 in many societies, children begin to learn about some of the basic characteristics of written words well before this. At a young age, therefore, children may produce spellings that look somewhat like the words of their language but that do not use letters to represent sounds in a systematic way. As children learn that written symbols stand for units of language, they make predictable spelling mistakes. In languages with complex writing systems, becoming a good speller is a long process. Learning to spell benefits reading as well as writing and deepens children's knowledge about their language.

Spoken language is an important method of communication, but it fades quickly. People have developed various ways of making language last by putting it into a visual form. This entry concentrates on alphabetic writing, which maps onto spoken language at the level of individual sounds or phonemes. In some alphabetic writing systems, including those of Spanish and Finnish, a particular phoneme is almost always spelled in the same way across the words in which it occurs. In other systems, such as those of English and French, several alternative spellings are often available for the same sound. The choice among the alternatives may be influenced by the position of the sound in the word or syllable, the morphological structure of the word (whether it is one unit of meaning, such as *tax*, or more than one, such as *tacks*), and other factors.

Children in modern, literate societies see many examples of written language inside and outside the home, and parents may point it out to them or talk with them about the letters that it contains.

Correspondingly, these children begin learning about some of the characteristics of writing from an early age. Children as young as 2 or 3 years of age produce subtly different productions when asked to write their name, for example, and when asked to draw a self-portrait. The word may be smaller than the picture, and children may use a black implement to produce the word and a colored one for the picture. During the course of the preschool years, children learn that written words are composed of letters. They begin to produce forms that look somewhat like the letters of their script when asked to write and, later, letters that are recognizable. According to Emilia Ferreiro and Ana Teberosky's work with learners of Spanish, young children also learn that the same letter is not generally repeated multiple times within a word. Children's written productions reflect this knowledge, even before the children use letters in a systematic way to represent sounds.

The first word that a child can spell is often the child's own name. A preschooler who can write his or her name, however, may not know how the letters in the written name map onto the sounds in the spoken name. Given children's familiarity with the letters in their own name, they may use these letters frequently, and often inappropriately, when attempting to write other words.

Before formal literacy instruction begins, some children begin to invent spellings that reflect the sounds in the corresponding spoken words. Charles Read's study of U.S. children's invented spellings showed that children's conceptions of the sounds in words do not always agree with those of adults. For example, children may consider the nasal segment of a word like *jump* to be closely allied with the vowel and may therefore not use a separate letter to represent it. Rebecca Treiman and other researchers have found spellings such as *jup* for *jump* among young schoolchildren as well as among precocious spellers. Children also sometimes fail to spell the interior consonants of initial consonant clusters, as in *sak* for *snack*. Linnea Ehri has called spellings that represent some of the sounds in words but not others partial alphabetic spellings. The errors follow patterns; they are not random.

Children's early spellings reflect not only their conceptions of phonemes, or phonological awareness, but also their knowledge of letter names. For example, children who are familiar with the name of the letter *o* may write *bone* as *bon*. The letter *o* seems to them sufficient to represent the /o/ sound, and it takes some time for the children to learn that a final *e* is required.

As another example, children who are familiar with the name of the letter *l* may write *tell* as *tl*. Using the letter to represent both of the phonemes in its name allows children to circumvent the problem of analyzing the /*el*/ sequence into individual phonemes and representing each phoneme with a separate letter.

Even young spellers show some knowledge about the positions in which particular letters and groups of letters may occur in the words of their language. In a study by Rebecca Treiman, for example, U.S. first-graders (about 6 years old) were more likely to use *ck* in the middle or at the end of a word, positions in which it may occur in English, than at the beginning of a word. Findings of this sort indicate that early spelling is not purely phonological in nature.

Children gradually learn how their writing system classifies sounds, such as the nasal segment of a word like *jump*. They learn that consonant clusters at the beginnings of words must be separated for spelling purposes. Their spellings become more conventional, and they become able to represent all of the sounds in spoken words or to produce fully alphabetic spellings. In turn, learning the conventional spellings of words affects children's conceptions of spoken language.

It takes more time to become a good speller of a language such as English, where many phonemes have more than one possible spelling, than a language such as Spanish, where this is not the case. Learners of English may produce errors in which they substitute one spelling of a sound for another, as in *buk* for *book* (*u* is used to spell this same vowel in words like *put*). Fortunately for children, even complex writing systems have patterns that can be used to help to choose among alternative spellings. In English, for example, the *ee* spelling of /*i*/ is relatively common before *d* and *p*, as in *deed* and *deep*. The *ea* spelling of this sound is more common before several other consonants, such as the *m* of *steam*. According to work reviewed by Brett Kessler, children begin to learn about such conditional or context-dependent patterns during the course of primary school. They do this even when the patterns are not explicitly taught to them. These findings show that children use their statistical learning skills in learning about spelling, as in learning about spoken language. Learning to spell is not purely a process of rote visual memorization.

Some letters of some words in complex writing systems, such as the *ie* of *friend*, fail to follow any patterns

that go beyond that specific word. These present trouble spots for spelling. Most letters of most words follow patterns, however. Researchers sometimes divide words into exceptional and regular categories, but the division is not clear-cut. Many of the letters in so-called exception words such as *friend* are phonologically well motivated.

In some languages, the spellings of words reflect not just their phonological structure but also their morphology and their etymology. For example, the English past-tense morpheme is spelled as *ed* whether it is pronounced as /*t*/, /*d*/, or /*əd*/. As another example, the spelling of the root word *magic* is retained in *magician*, even though the pronunciation changes. For such languages, learning to spell draws on knowledge about morphology. Learning to spell educates children about their language, for example, alerting them to relationships among words that they might not otherwise have noticed.

A tension in education involves the degree to which children's invented spellings should be accepted, or even celebrated, versus the extent to which conventional spelling should be stressed. Educators who adopt a whole-language approach see invented spelling as a sign of children's linguistic creativity and believe that premature stress on the production of conventional spellings is not appropriate. They argue that, given the existence of spell-checkers, conventional spelling is no longer as important as it once was. Those who take the opposite position maintain that correct spelling is not just a meaningless convention. Having a single agreed-upon spelling for each word facilitates communication. Moreover, children must have a certain amount of spelling knowledge in order to produce a spelling that is recognizable to a spell-checker and in order to choose among the alternatives that it suggests. Once spelling and handwriting have become automatic, it is argued, mental resources are freed for other aspects of writing, such as planning and sentence formulation.

Another controversial issue is whether children should be explicitly taught about spelling or whether they pick it up implicitly, through exposure to words while reading. Research shows that children learn some things about spelling through reading but that explicit instruction speeds the process. Moreover, learning to spell words helps children to read them. Given this, it has been argued that spelling should receive more emphasis in classrooms than it currently does in many schools.

One method of explicit teaching about spelling is phonics, which focuses on rules that link sounds and letters. Research shows that literacy instruction that includes phonics leads to better results in spelling and reading than instruction that does not. Phonics instruction generally focuses on links from spellings to sounds, assuming that children will transfer what they know about the reading (spelling-to-sound) direction to the spelling (sound-to-spelling) direction. However, this is not always the case. A further limitation of phonics instruction is that it does not cover many of the context-dependent patterns of complex writing systems.

Another method of teaching spelling centers on the rote memorization of words' spellings. Even though research shows that learning to spell involves much more than rote memorization, the idea of spelling as memorization continues to influence spelling instruction. For example, U. S. primary school students may receive a list of words on Monday and may be directed to memorize these words for a Friday test. The words may not share spelling patterns or sound patterns. Even if they do, the patterns may not be pointed out to the students.

Within a classroom, some children are better spellers than others. Difficulties with spelling have been linked to poor instruction and to difficulties with phonological and morphological awareness. Children with developmental dyslexia usually have extremely poor spelling skills. The mistakes that they make, however, are quite similar to those of typically developing younger children. The spelling errors of dyslexic children reveal difficulties with the same linguistic structures that are problematic for typical beginning spellers, such as consonant clusters.

A child who is learning to spell in a second language may make errors that reflect the rules and patterns of the spelling system of the first language. Other spelling errors may reflect a lack of mastery of the phonology of the second language. Thus, the spelling of children who are learning a language as a second language may differ, in some respects, from the spelling of children who are learning the language as their first language.

Rebecca Treiman  
Washington University

**See Also:** Cross-Linguistic Research on Literacy Development; Developmental Dyslexia; Home Environment (Effects on Language and Literacy

Development); Literacy Instruction Methods; Phonological Awareness; Reading, Development of; Written Discourse.

### Further Readings

- Ehri, Linnea C. "The Development of Spelling Knowledge and Its Role in Reading Acquisition and Reading Disability." *Journal of Learning Disabilities*, v.22/6 (1989).
- Ferreiro, Emilia and Ana Teberosky. *Literacy Before Schooling*. New York: Heinemann, 1982.
- Kessler, Brett. "Statistical Learning of Conditional Orthographic Correspondences." *Writing Systems Research*, v. 1/1 (2009).
- Nunes, Terezinha and Peter Bryant. *Improving Literacy by Teaching Morphemes*. London: Taylor and Francis, 2006.
- Nunes, Terezinha, Peter Bryant, and Miriam Bindman. "Morphological Spelling Strategies: Developmental Stages and Processes." *Developmental Psychology*, v.33 (1997).
- Read, Charles. *Children's Categorization of Speech Sounds in English*. Urbana, IL: National Council of Teachers of English, 1975.
- Treiman, Rebecca. *Beginning to Spell: A Study of First-Grade Children*. New York: Oxford University Press, 1993.

---

## Spoken Word Recognition

*Spoken word recognition* refers to the ability to recognize an acoustic form that constitutes a word, whether in isolation or in continuous speech. In more mature language processing, this includes accessing semantic information about the word. In initial language learning, however, this ability is generally thought to be based on the familiar auditory form alone, not its attendant meaning. To learn a language, an infant has to learn the individual words that constitute that language. In other words, an infant has to learn which sound patterns go with which meanings. The first step in this process is learning which auditory objects are words.

An infant's prior experience with spoken words is what establishes the familiarity of an auditory object (or word familiarity). This familiarity is what the infant brings to the perceptual process. The emergence of a mental lexicon influences how acoustic stimuli are processed (e.g., as words with meaning). However, preverbal infants—who do not yet have a mental lexicon—must initially recognize words based