

Orthographic Mapping:

by Joan Sedita

Every word has three forms – its sounds (phonemes), its orthography (spelling), and its meaning. Orthographic mapping is the process that all successful readers use to become fluent readers. Through orthographic mapping, students use the oral language processing part of their brain to map (connect) the sounds of words they already know (the phonemes) to the letters in a word (the spellings). They then permanently store the connected sounds and letters of words (along with their meaning) as instantly recognizable words, described as “sight vocabulary” or “sight words”.

Sight Words

A sight word is any word that a reader instantly recognizes and identifies without conscious effort. Adult competent readers have between 30,000 and 60,000 words that have been orthographically mapped in their sight vocabulary. As soon as one of these words is seen, it is unconsciously and instantly recognizable. This is what enables us to be efficient readers, able to focus on the meaning of what we read instead of on word reading. When words are stored as sight vocabulary words in long-term memory, a reader no longer has to decode words one at a time the way beginning readers do. While some orthographic mapping can begin earlier, most children start applying this skill in second and third grade. As we continue to read into adulthood, we continue to use orthographic mapping to grow our sight word vocabularies.

Because some high-frequency words (e.g., the, and, is, was, for, are) are essential to learning how to read, teachers of kindergarten and grade 1 typically provide explicit instruction to help students automatically read some of

these words. Students are taught to read them as whole words at the same time that they are being taught how to decode most other words. However, once students are able to orthographically map, they will start to store high-frequency words as sight words on their own.

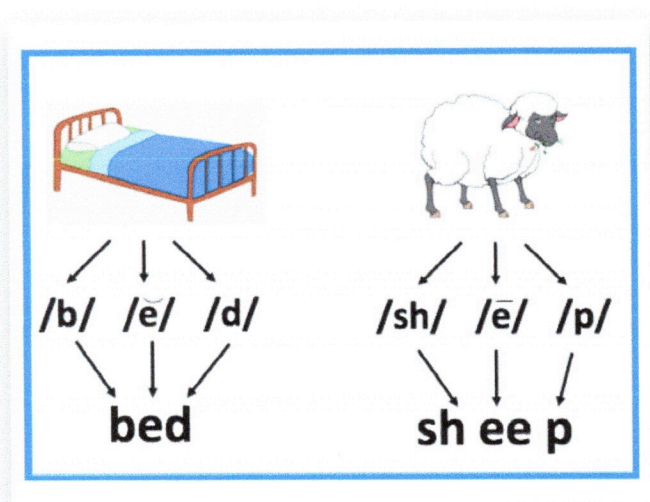
What is the mental process of orthographic mapping?

With orthographic mapping of a word, the letters we see with our eyes and the sounds we hear in that word get processed together as a sight word and are stored together in the brain. This is not the same as memorizing just the way a word looks. It is also important to remember that orthographic mapping is a mental process used to store and remember words. It is not a skill, teaching technique, or activity you can do with students (Kilpatrick, 2019). What can be taught are phonemic awareness and phonics skills which enable orthographic mapping.

With orthographic mapping, students connect something new with something they already know. Through listening and speaking, young students already know a word’s pronunciation and meaning which is stored in their long-term memory. Students turn a written word into a sight word by attaching the phonemes in the word’s pronunciation to the letter sequence of the word. The pronunciation of the word has to be broken into its phonemes, which is why having strong phonemic awareness skills is important. The word’s letter sequence can become familiar (i.e., become a sight word) because the student can attach it to the already known pronunciation.

Kilpatrick (2019) provides examples similar to the following:.

- If a student knows the spoken word /bed/, its pronunciation is stored in long-term memory – he knows what it means and what it sounds like. If he has good phonemic awareness skills, he can pull the word apart into its individual sounds (phonemes) /b/ /e/ /d/. Those sounds become the anchoring points for the word's printed sequence. The student can then attach each phoneme to its corresponding letter (spelling). The student is using the power of what he knows (the pronunciation) and attaching it like “superglue” to the printed word bed. This example has all single sound-letter correspondences.
- If a student knows the spoken word /sheep/, its pronunciation is stored in long-term memory – he knows that it means and what it sounds like. Using phonemic awareness skills, he can pull the word apart into its individual sounds /sh/ /e/ /p/. The student then attaches each phoneme to its corresponding spelling. In this example, some of the sounds are represented by more than one letter.



In typically developing readers from grade 2 on who have orthographic mapping skills, they only need to see and read printed words one to four times before they become permanently stored as sight words for future instant recall (Reitsma, 1983 as cited in Kilpatrick, 2015). When a word becomes a sight word, as soon as it is seen its sound and meaning are immediately available. Having a significant amount of stored sight words is what enables fluency – quick and accurate reading where the reader is free to focus on making meaning from text.

How does orthographic mapping develop?

Three intersecting skills must be in place to enable orthographic mapping (Ehri, 2014; Kilpatrick, 2015):.

- Highly proficient phonological and phonemic awareness.
- Automatic letter-sound correspondence knowledge
- The ability to accurately and quickly decode a word by identifying its sounds letter by letter, and blending those sounds to read the word

Kilpatrick (2015) describes three phases of word-reading development for children in the primary grades that are aligned with corresponding phonological skill development.

Beginning readers in kindergarten and grade 1 are developing their knowledge of letter-sound correspondences and basic phonemic awareness skills, and are beginning to learn phonic decoding. Before a student can orthographically map a word, the word first has to be identified. Young students identify the pronunciation of a word by using

their letter-sound knowledge to determine each sound in the word, and then using their phonemic blending skills to blend those sounds to decode (sound out) the word.

Once these skills are proficient, typically by grade 3, orthographic mapping usually develops for the majority of students simply by interacting with letters and words. However, many students with word-reading difficulties do not develop orthographic mapping. They therefore have greater difficulty developing the sight word vocabulary needed for fluent reading and will likely stay disfluent and hesitant readers unless they receive intervention that builds proficiency in phonemic awareness and phonics skills (Kilpatrick, 2015; Parker, 2019). It is difficult for them to get beyond having to decode most words when they read.

Orthographic mapping doesn't work well for students who struggle with letter sound knowledge or who do not have proficient phonemic awareness skills. Here's how Ehri (2014) explains the skills that need to be in place before orthographic mapping can take place: "To form connections and retain words in memory, readers need some requisite abilities. They must possess phonemic awareness, particularly segmentation and blending. They must know the major grapheme-phoneme correspondences (letter-sound knowledge) of the writing system. Then they need to be able to read unfamiliar words on their own by applying a decoding strategy." Doing so "activates orthographic mapping to retain the words' spellings, pronunciations, and meanings in memory." (p. 7)

Implications for Teaching: Explicit Phonemic Awareness and Phonics Instruction Leads to Orthographic Mapping

Phonemic awareness and phonics instruction help students use the alphabetic principle to learn relationships between the letters of written language and the sounds of spoken language. As noted in the word-reading development chart above, developing early phonological awareness, including phonemic awareness of initial sounds, should be a focus of PreK and kindergarten instruction to develop basic letter-sound correspondence knowledge. As students move through kindergarten and grade one, a focus on blending and segmenting of phonemes in

written words develops phonic decoding skills which must be in place for orthographic mapping. Some kindergarten and grade 1 students may be able to start completing

Word-Reading Development		
Grade	Phonological Skill	Word-Reading
PreK-K	Early phonological awareness: rhyming, alliteration, first sounds	Letters & Sounds: requires simple phonology to learn sounds that correspond to letters
K-1	Basic phonemic awareness: blending, segmenting	Phonic Decoding: requires letter sound knowledge and blending; a gateway to orthographic mapping
2-3+	Advanced phonemic awareness: phonemic proficiency including phoneme manipulation	Orthographic Mapping: requires letter-sound skills and advanced phonemic awareness

simple phoneme manipulation tasks, such as deleting or substituting initial sounds in words.

Kilpatrick (2015, 2019) suggests that as students move into grades two and three, they need to become proficient in more advanced phonemic awareness skills to apply the orthographic mapping process. If a student can do a phoneme manipulation task with ease (i.e., deleting, substituting, reversing phonemes), it indicates a higher level of proficiency with phonemes which is correlated with word reading more than blending and segmenting.

For struggling readers in grades two and three who do not naturally develop advanced phonemic awareness skills through exposure

to classroom literacy activities, orthographic mapping is difficult. Research suggests that advanced phonemic awareness skills and phonics should be directly taught for these students to become proficient readers.

Kilpatrick (2015) notes:

"Intervention studies that allow students to complete their phonological awareness development (along with teaching and reinforcing phonics skills and phonic decoding, and providing opportunities for reading connected text) produce very large gains in word-level reading skills. Studies that do not address phonemic awareness skills beyond the basic level (blending and segmenting), however, yield more limited results because their students have only partially completed their phonological awareness development." (p. 312)

References

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For further information about comprehension instruction, the author can be contacted through the Keys to Literacy website: www.keystoliteracy.com

A free, archived webinar "The Role of Orthographic Mapping in Learning to Read" presented by Joan is available for viewing at <https://vimeo.com/642494306>

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