Chapter 8

English Morphophonemic Spelling

Prereading Questions

Before you read, think about and discuss the following.

1. The words naked and baked look much the same but their pronunciations are very different. What can explain the difference in pronunciation?

2. Why is the word sign spelled with a g? In Appendix A, there is a reading rule that that word final gn = /ŋ/. Could there be another generalization that would make this spelling more explicable? What might that be?

Study Guide Questions

Answer these questions while and after reading the chapter.

1. Define these terms and give examples of each: morpheme, free morpheme, bound morpheme, derivational morpheme, infix, inflectional morpheme, bound root.

2. What is the morphological structure of the words Massachusetts, cannibal, congregational, carpet, disapproval, disproved, proven, Polish, liked?

3. Give an example from the chapter of pronunciation changes due to derivational morphology for a vowel, consonant, or stem change, and a stress change with vowel reduction. Then give an original example of each.

4. What does it mean to say that English writing is morphophonemic?

5. Give another example of each of the three rules for spelling morphemes consistently even though pronunciation changes due to derivational morphology: tensest vowel, stops>affricates/fricatives, most complete spelling.
6. Would you, at any point in your spelling career, have benefited from an explanation that English writing is morphophonemic? Would it help you spell better to know the principles?

7. What are the four morphological types of languages? Could a language's predominate morphology type affect the structure of the mental lexicon? How?

8. Could morphological processing in English be problematic for the ESL and EFL learner?

The bottom levels of the reading processor deal with the connection between graphemes of written language and phonemes of spoken language. But English writing has other units of organization that are important in understanding English orthography: morphemes. English orthography has been described as phonemic, but, in fact, it will be more accurately described as morphophonemic. For teachers, knowing how English morphology affects pronunciation and spelling is essential to presenting English spelling as a learnable system to students.

Readers can process morphology only if they are aware of it. Levin et al. (1999) and Bryant et al. (1999) propose that morphological awareness plays a causal role in learning some spelling patterns. That is, as children become morphologically aware, they develop more advanced knowledge of written spelling patterns. As their knowledge matures, their morphological awareness advances even further (Nunes, 1999). For example, because of allophonic variation in American English, the word dirty sounds more like dirdy, and the latter spelling is a common problem for early writers. When learners realize that dirty is related to dirt, the spelling problem resolves itself. The trigger for learning is feedback in the form of correction and instruction from teachers.

Because morphology differs from language to language, it is reasonable to think that English learners develop different strategies to process it in their L1 writing system. After an examination of English morphology, pronunciation, and spelling, this chapter looks briefly at morphology in other languages, the possibility that different languages require different morphological processing strategies, and some suggestions for ESL and EFL instruction.

Words and Morphemes: Basic Units in Language

The flow of speech can be segmented into words, but the exact meaning of word is complex. The word is in many ways the most basic unit of language, but in spite of that (or perhaps because of it) there is no adequate definition of what a word is. Part of the problem is that words are very different from language to language. Some languages have very short and simple one- or two-syllable words that mean only one concept;

some languages have words that are formed of many syllables all strung together forming a complex concept. Some languages, like English, show a variety of word structures with simple words like sun or chair and complex words like bookkeeper, antediluvian, or developing fluid.

Words

People used to think that there might be a millisecond pause between words in speech and that words could be defined that way. However, technology shows that there is no natural pause between words as people speak. The pauses in speech tend to mark off phrases or clauses, not individual words. Hulstijn (2003: 204) defines words as linguistic units that have a "special status" because they are the most accessible to people's awareness of their language. Smaller units like phonemes or larger units like phrases are less accessible. To put it in psycholinguistic terms, long-term exposure to language causes children to create memory traces for each word stored in the mental lexicon. Over time, memory traces become stable linguistic symbols that link meaning concepts and sounds; thus, words are mappings between a physical form and meanings that are stable enough to occur freely on their own but also make up phrases and sentences.

Morphemes

Because the concept of word is difficult to define, linguists talk instead about morphemes. The definition of the word morpheme has three parts. First, there must be a form, usually a sequence of sounds. Second, the form must be associated with a meaning, either a grammatical meaning or a meaning with real content. Third, the form must be minimal in that it cannot be broken down into any smaller meaningful units.

Free Morphemes. Some morphemes are free morphemes, which are words themselves. The word sun is a free morpheme. It has a form consisting of three sounds: /sʌn/. It has a meaning found in any dictionary. And finally, the form cannot be broken down into smaller meaningful units. Other free morphemes are moon, China, school, and Oklahoma. The last word may have more than one morpheme in the original Native American language it came from, but in English, it has only one morpheme.

Bound Morphemes. Some morphemes are bound morphemes which must occur attached to another morpheme or word. The prefix un- is a bound morpheme; it has a minimal form associated with a meaning, but it cannot occur meaningfully by itself. It must be attached to another morpheme, as in the words undo or unite. Other examples of bound morphemes are decode, retake, prefix, judgment, comical, and sanity. All
of the bound morphemes exemplified in this paragraph are deriva-
tional morphemes, and they are either prefixes or suffixes in English. (Other
languages also use infixes, morphemes that are placed within the context
of a word, not before it or after it.)

Derivational Morphemes. Derivation is a common word formation
process in English in which a new word is created from a base word to
which prefixes and suffixes are added. From the noun care, the adjective
careless is formed. With the addition of the suffix, careless has a different
part of speech and a different meaning. Most would agree that careless is
a different but related word to care. New words can be formed through
derivation almost indefinitely. For instance, to careless, another suffix
can be added to form an abstract noun: carelessness. Derivational
morphemes have properties in common:

- They often (but not always) result in a change in the part of speech.
- They can be either prefixes or suffixes in English.
- They vary in productivity. In other words, some derivational
  morphemes can be added to many words, and some can be added to
  few words.
- They make a substantial and sometimes unpredictable change in the
  meaning.
- They are creative; they result in a new and different word.

Bound Roots. Another type of bound morpheme used in derivation is
called a bound root, which is a root to which a prefix or suffix must be
added in order to form a word. Many of the bound roots in English came
from words of Greek and Latin origin that were borrowed as “learned
vocabulary” or through French. Examples of bound roots are precept,
provide, supervise, and import.

Inflectional Morphemes. Inflectional morphemes add additional gram-
matical information without creating a new word. Inflectional morphemes
are the -ed past tense ending or the -s that is added to form plural nouns.
When the past tense ending -ed is added to the verb play the result is the
word played, which is merely a different form of the original base word.
When grammatical suffixes are added to bases to cause a change in gram-
matical form, the process is inflection. Inflectional morphemes have some
common properties:

- They do not usually change the part of speech.
- In English, they are always suffixes and never prefixes.
- They are very productive; they can be added to almost any word of a
certain part of speech.
- The change in meaning they cause is a predictable grammatical
detail.

- They are mechanical; they do not result in a new and different word,
  just a different form of the same word.

Inflection is an important process in many languages of the world, but in
English there are only eight inflectional morphemes:

<table>
<thead>
<tr>
<th>Nouns</th>
<th>-s (plural)</th>
<th>The students needed their books.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-s (possessive)</td>
<td>One student’s book was on the table.</td>
</tr>
<tr>
<td>Verbs</td>
<td>-s (third person singular present tense)</td>
<td>He speaks English.</td>
</tr>
<tr>
<td></td>
<td>-ed (past tense for regular verbs)</td>
<td>He wanted to learn French.</td>
</tr>
<tr>
<td></td>
<td>-ed (past participle for regular verbs)</td>
<td>He has lived in Canada for years.</td>
</tr>
<tr>
<td></td>
<td>-ing (present participle)</td>
<td>He is learning Japanese.</td>
</tr>
<tr>
<td>Adjectives</td>
<td>-er (comparative form)</td>
<td>He has bought a newer car.</td>
</tr>
<tr>
<td></td>
<td>-est (superlative form)</td>
<td>He can’t afford the newest car.</td>
</tr>
</tbody>
</table>

**Derivation, Pronunciation, and Spelling**

English words can have quite complex morphological structures made up
of many different kinds of morphemes: free, derivational, inflectional, or
bound roots. In any word, however, if there is an inflectional morpheme,
it will be the last one because it is the last part of speech that determines
the type of inflectional morpheme that can be added. Examples are:

- **progressive** = **pro** + **gress** + **ive** + **s**
- **united** = **un** + **tie** + **ed**
- **preceptors** = **pre** + **cept** + **or** + **s**

Adding derivational morphemes to bases and roots affect the derived
words in several ways. Sometimes the pronunciation of the derived word
changes when compared to the original base or root: **sane** + **ity** = **sanity**; **pro** + **gress** + **ion** = **progression**. Sometimes both the pronunciation and
the spelling changes, as in **re** + **ceive** + **tion** = **reception**. Although these
seem like random events, they can be explained by regular morphological
and phonological processes.


Pronunciation Changes

In English there are many words derived from a simple base by adding prefixes and suffixes. Prefixes don’t usually cause pronunciation changes except assimilation in place of articulation, as in imperfect versus indecisive. Assimilation refers to a phonological process where one sound becomes more similar to a sound that is adjacent to it. The final nasal phoneme of the prefix in-., presumed to be alveolar /n/, becomes bilabial /m/ when it is placed before a bilabial /p/ or /b/. This is why some people misspell input as imp. However, derivational suffixes often change the pronunciation of consonants, vowels, and stress patterns of a word.

Palatalization. When a stop or fricative consonant produced elsewhere in the mouth becomes a palatal fricative or affricate, the process is referred to as palatalization. Typical examples are suppress—suppression or national—nature. In the first example, the final alveolar fricative /s/ sound of the base word suppress is pronounced like the palatal fricative /ʃ/ in the derived word suppression. In the second example, the same root word (a bound root that also occurs in the word innate) is pronounced with an (alveolar stop) /t/ in some words, but with a palatal fricative /ʃ/ in national. In the word nature, however, the t has become a palatal affricate, /tʃ/.

Velar Softening. Another type of consonant change occurs when a velar stop, either /k/ or /ɡ/, becomes “softened” to /l/ or /ɹ/, respectively. Examples are electric—electricity and analog—analogy. In the first example, the velar stop /k/ in electric is softened to /l/ in the derived word, electricity. In the second case, the final /ɡ/ of analog is pronounced as /ɹ/ in the derived word analogy.

Vowel Laxing. Some suffixes have the effect of changing the pronunciation of a vowel in the derived word. Examples are deprave—depravity, divine—divinity, and extreme—extremity. The base word deprave has the tense diphthongized vowel /eɪ/ in the second syllable, whereas the derived word depravity has the lax vowel /æ/. Similarly, the base word divine has the diphthong /ai/, while the derived word divinity has the lax vowel /i/ in the second syllable. Extreme has the tense and diphthongized vowel /ai/ in its second syllable but extremity has a lax /æ/ in that position. Because of the alternation between tense and lax vowels, vowel laxing is the name for the pronunciation change from a tense vowel or diphthong to its most similar lax vowel.

Stress Change With Vowel Reduction. Stress means a louder or more forceful pronunciation of one syllable of a word in comparison with other syllables in a word. The word confessor, for example, is stressed on the second syllable —ess—. The addition of suffixes can change the stress pattern on a word; in the base word one syllable is stressed, but in the derived word, another syllable is stressed. Change of stress is not really a problem by itself. The difficulty is that a change in stress often results in a change in the pronunciation of vowels. Vowel reduction refers the fact that when vowels have little or no stress on them, their pronunciation is reduced to /ə/. Sometimes a vowel is so reduced that it disappears from the pronunciation altogether. Thus, this is a two-step process: first, stress shifts to another syllable, and second, the newly unstressed vowel reduces to schwa.

Examples are grammar—grammatical and labor—laboratory. In the first case, the word grammar is stressed on the first syllable, so its vowel has its full value of /a/. The second syllable is unstressed, so the vowel is /ə/. However, in the word grammatical, stress has shifted from the first syllable to the second syllable. The pronunciation of the second vowel is now /ə/, and the first vowel is reduced to /ə/. (Thinking of the derived word grammatical is a good strategy to remember that the commonly misspelled word grammar is spelled with two a’s.)

The example of labor—laboratory is more complex. In American English, labor is stressed on the first syllable and the second syllable receives a secondary stress. In laboratory, primary stress remains on the first syllable although vowel laxing takes place, /eɪ/ → /æ/, but the second syllable’s stress is reduced to nothing because of the addition of —atory. In British English, the primary stress shifts to the second syllable, so it doesn’t disappear, but the vowel in the first syllable is reduced to /ə/.

Stem Change. Sometimes the pronunciation changes from a base word to a derived word, but it isn’t explained by a phonological process. Instead, some words historically have two stems: one stem for the basic word and another stem for the base for derivation. Examples are: receive—reception, permit—permissive, and divide—divisive.

To sum up, English relies heavily on derivational morphemes to create new words, and because of certain phonological processes (e.g., vowel laxing, stress change with vowel reduction, velar softening, and palatalization), the derived words aren’t pronounced like their base words. Sometimes a different stem is used to form the base of a derived word, as in describe—description. These processes involve only a segment of the English vocabulary, the Latinate vocabulary, or words and morphemes that have come from Latin and Greek origins. Native Germanic vocabulary, or words and morphemes that have come down through the history of English from its earliest days as a Germanic language, do not undergo the same word formation processes, phonological processes, and pronunciation changes. Still, Latinate vocabulary comprises roughly half of the words and morphemes used in English, so the pronunciation changes result in a mismatch with the orthography.

Morphemes and Phonemes in Writing

Phonological changes from a base word to a derived word are a problem for writing. The problem is that the orthographic system represents both
phonemes and morphemes; it is morphophonemic. In other words, English orthography is phonemic in that it represents the sounds of the language, but it is morphemic because it also attempts to represent morphemes consistently. For instance, the same free morpheme occurs in all of these: put, put, output, but there is no problem because there is no phonological change in these words.

However, this set of words: physics, physicist, physician shows evidence of velar softening and palatalization, yielding three pronunciations at the end of the base word: /kd/, /sl/, and /fi/. The question is: Is it best to change the spelling to reflect the pronunciation accurately (as in, say, fiziks, fiziszt, fizishen)? Or is it best to maintain the spelling to show clearly that the words have a morphemic relationship even though the words are not pronounced the same? In other words, which is more important for writing — the pronunciation or the morphological relationship?

For the English orthography, the morphological relationship is more important. The different pronunciations are ignored in spelling; the spelling shows that the same basic morpheme is involved in this set of words. There are various pronunciations of a morpheme because of derivational changes, but the English orthographic system writes morphemes consistently. Now, there is a dilemma. In the word set under discussion, one morpheme occurs with three alternative pronunciations for the final grapheme in the base word: physics with /kd/, physicist with /sl/, or physician with /fi/. Which pronunciation should be selected for spelling the word consistently? The solution is to spell the three sounds with a c, but why? English morphophonemic writing is based on three rules of thumb that govern the morphophonemic writing system.

Stop→Fricative→Affricate. Where there are stops and fricatives, the rule is to prefer a spelling that indicates the stop pronunciation, as in physics—physicist, physician, where the c indicates the stop /kd/. Where there are stops and affricates, as in innate and nature, the stop spelling is also preferred. In press—pressure, the ss indicates the alveolar fricative /sl/ and not the palatal fricative, indicating that alveolar is written in preference to palatal even if both sounds are fricatives. The phonological processes of velar softening and palatalization are usually not shown in spelling.

Tense Vowel or Diphthong. To write a morpheme consistently in spite of variations in vowel pronunciation, the spelling that represents a tense vowel or diphthong is basic, as in produce—production or extreme—extremity. Similarly, the spelling rule is to represent the original vowel even though it may be reduced to [a] with a change of stress, as in define—definition or grammar—grammatical. The phonological processes of vowel laxing and vowel reduction are disregarded for the most part in spelling.

Most Inclusive Spelling. Finally, the spelling rule is to write graphemes even if they are pronounced in some cases and not pronounced in other cases. These spellings show the graphemes in order to keep the spelling consistent: sign—signature, bomb—bom bard, or fast—fasten.

This section has described some problems resulting from English derivational processes, namely, that the addition of suffixes (and prefixes to a lesser extent) brings about changes in the pronunciation of the base word. The English writing system, on the other hand, prefers to maintain the spelling of the original morpheme, before vowel laxing, reduction, palatalization, or velar softening occurs. This is one of the reasons for the fact that graphemes and phonemes do not correspond in a one-to-one fashion in English writing and hence, that English writing is opaque. In the charts in Chapters 5 and 6 and Appendix A, many of the apparent problems in English grapheme-to-phoneme correspondences are explained. For example, a common spelling for /fi/ is ti. This anomaly is caused by one extremely productive derivational suffix in which palatalization has occurred but the stop spelling remains: -tion.

The most efficient way for the orthographic processor to deal with this is to store the morpheme -tion as a graphemic/phonemic image or frame in the mental lexicon, which is what expert readers are likely to do. In this way, the reader can read ti as /fi/ unambiguously, easily, and effortlessly, if it occurs in the context _on. Similarly, a common spelling for /fi/ is tu, which is another example of palatalization, as in culture or picture. In addition, the specifications that gn and mb are pronounced as /n/ and /m/ are explained by the most inclusive spelling rule. Many of the tense vowel/lax vowel correspondences are also clarified.

Morphological Processing and Word Recognition

Recall that many difficulties with the English writing system are problems in writing or spelling, not in reading. The expert reader can read grammar, definite, or misspell with no difficulty. These words do not present problems for expert readers because the graphemic/phonemic image is matched in its usual way with the visual stimulus. In spelling, the graphemic/phonemic image may not be as usable or productive, except as a check after the fact. English morphophonemic spelling is especially problematic for two groups of people learning to read English: native English-speaking children and ESL/EFL students, because they must build up a vast knowledge of graphemic/phonemic images encoding, for instance, that c is usually pronounced /kd/, unless it occurs in the context i/cy or i/st, as in electricity, toxicity, or classicist. This knowledge is stored in the mental lexicon, the extensive storage of English graphemic/phonemic images, each with a number of associations to semantic memory, or the memory for word meaning.

Accessing the words and morphemes in the mental lexicon is called word recognition. Knowledge of derivational morphemes must be
contained in the mental lexicon because people can use them to make up new words if they need to. For instance, if people forget or don’t know a word, they use morphemes to make up a word: sensitiveness instead of sensitivity, and so on. However, many derived words are also included in the mental lexicon; there is some redundancy if the mental lexicon lists sane, sanity, and -ity, or progress, progression, and -ion.

The English mental lexicon is redundant in order to allow flexibility in the processing of the inconsistent derivation in English. In decision-making systems, there is a trade-off between redundancy in knowledge or information storage and efficiency in processing. Sometimes it is more efficient in processing time to store information inefficiently and redundantly, rather than storing in the most efficient way, which can increase the complexity of the processing and therefore the processing time.

However, readers differ in what they know about morphology. Knowledge of derivationally suffixed English words facilitates accurate reading in the school years and even in high school for English readers (Fowler & Liberman, 1995; Tyler & Nagy, 1990). Seeing the derivational morphemes that make up an English word is dependent what the reader knows about the language. Advanced morphological knowledge is acquired mainly through schooling (Derwing et al., 1995). The more readers know about prefixes, roots, and suffixes, the better they see structure when looking at words, and the ability to recognize morphemes may make it easier and quicker to learn new words and comprehend texts.

Recall from Chapter 5 that the Word Identification Model has two stages; the first is the familiarity check in which readers recognize a word as a known word or an unknown word, and the second is lexical access in which known words are identified and their phonology and semantic information are activated. If readers read unknown words, they won’t be recognized because there is no match stored in the mental lexicon. However, if readers pay attention to a new word, it can be added to the mental lexicon along with any meaning gleaned from the text or the dictionary. If a new word is morphologically complex, containing a prefix, a free morpheme, and a suffix, readers can use their knowledge of derivation and decision-making strategies to guess the meaning of the new word. Guessing is not easy because, in derivation, the meaning changes can be unpredictable. Still, the meanings of the derivational morphemes stored in the mental lexicon are important clues to the meaning of new words. Here are some examples.

A reader’s eyes take in the word sunny and the reader associates it with a familiar word. In the second stage, the word sunny is fully accessed, with its meaning and phonological structure activated. However, if a reader’s eyes take in the word beery, the reader must associate it with a known word beer, but it may be that the reader has never encountered the word beery before (as in The police officers thought the interior of the car smelled beery after the crash). The reader can use a number of strategies to deal with it. The reader might recognize this as a possible word in English, separate the two morphemes, access them, beer and -y, and combine to infer what the meaning of the whole word must be: like beer. Beery can also be understood using a straightforward analogical strategy to words like sunny. Word recognition depends on the stored knowledge of words and morphemes in the mental lexicon and processing strategies like matching perceived words to stored words, or detecting something that could be an English word, separating its morphemes if possible, accessing meanings for morphemes, recombining morphemes (beer + -y = like beer), and/or analogy to morphologically similar (beer + -y : sunny). Figure 8.1 shows the knowledge base and processing strategies for morphological processing and word recognition.
English Morphology and English L2 Reading

Knowledge of derivational morphemes and the phonological changes that go with them may be helpful to the English learner. Although many of the patterns are inconsistent, they are still very productive and useful as patterns. There is evidence that some ESL and EFL students do not use a phonological strategy when they come across unknown and unpronounceable words in their reading. Instead, they use a meaning-based strategy of trying to associate a visual image with some kind of meaning association. For English, a phonological strategy is more empowering. Knowing how derivation works can aid students because morphemes can be segmented and pronounced. Knowledge of the pronunciation changes that occur in derivation can result in more accurate pronunciations.

Further, derived words are not always listed in dictionaries. To look up derived words, it may be necessary to look up the root word and then apply knowledge of the prefixes and suffixes. For nonnative-speaking students whose linguistic competence develops slowly and whose reading vocabulary is often meager, direct instruction in the derivational morphemes of English may be very helpful, especially for those who wish to pursue higher education in an English-speaking environment. Do ESL and EFL readers use knowledge of English morphology and processing strategies to read unknown words? The main strategies that ESL/EFL learners use in word recognition are cognate recognition (Carroll, 1992), context (Bensussan & Laufer, 1984), graphemic similarity (Walker, 1983), and morphological analysis.

Cognate recognition is available to ESL and EFL readers of languages that are Germanic or Latin-derived. The use of context is available if there is sufficient surrounding information in the sentence or paragraph, and it can be grasped by the reader. Graphemic similarity (similarity in the appearance of a word in L2 to L1) is of limited use. However, Osborne and Mulling (1998), in their survey of this literature, find that students prefer these strategies and rarely use morphological analysis (i.e. segmentation of morphemes to access meaning) to help them identify unknown words. In another study, Osborne and Mulling (2001) found that many Spanish-speaking ESL students could use morphological analysis if necessary, but they preferred not to, presumably because of the cognitive load that morphological processing entails. Cognitive load refers to the amount of mental work involved in a task – the more work, the more reluctant the reader is to do it.

The cognitive load involved in processing English morphology can be great. First, processing derivational morphology involves disassembling the word into component morphemes (which could be ambiguous), matching them with sound representations (which are opaque), accessing them in the mental lexicon and semantic memory (where they might not occur), and reassembling the pieces into the whole word. ESL/EFL students may not have the knowledge base or processing strategies for such morphological processing, or their processing strategies might not work with automaticity. Nevertheless, morphological knowledge is linked to vocabulary acquisition. In a study of Japanese-speaking English learners, Zhang and Koda (2012: 1211) found that “learners who possessed better morphological awareness tended to learn words better, and in turn, held a larger vocabulary.”

L1/L2 Transfer Problems in Morphology

L1 morphology may interfere with word recognition in L2. Linguists generally describe word formation in other languages with four terms: isolating, fusional, polysynthetic, and agglutinating. In isolating languages, normally, each word is made up of one morpheme (e.g. Vietnamese, Chinese). In fusional languages, words will often have more than one morpheme per word and the morphemes cannot be easily broken down into components (e.g. Spanish, Italian). Polysynthetic languages have words that are made up of many morphemes, but the individual morphemes may be hard to separate out (e.g. many Native American languages). Agglutinating languages have words with many morphemes that are easy to segment into separable morphemes within a word (e.g. Turkish). However, languages often have different types of words so it is not always easy to categorize a language.

English has words of all of these types. Isolating words (words made up of one free morpheme) are sun, moon, carpet. Fusional words, where the morphemes are fused together and inseparable are words like were (be + past tense + plural) or people (human + plural). Examples of agglutinating words are compounds like bookkeepers, where each morpheme is easily separated and the meaning of the whole is made from adding each part together. Polysynthetic words, made up of many inseparable morphemes, might be long derived words with Latin roots, like antediluvian and antebellum. This variety in word types in English might cause increased cognitive load for ESL/EFL students whose languages contain predominately one type of word and who therefore might be unused to the other types.

Possible problems for the ESL/EFL reader in processing morphology may stem from interference; they may have a different organization in the mental lexicon and/or different processing strategies. (At present, it seems that L1 and L2 are stored separately but with interconnections at the level of words. See discussions in Altarriba and Isurin, 2013.)
Mental Lexicon

Schreuder and Baayen (1995: 132) propose that different language-specific characteristics of morphology may affect the way that the mental lexicon is organized. Evidence from Caramazza et al. (1988) and Jarvela et al. (1987), which was reported in Schreuder et al. (1990), indicated that differences in the reading processes for Italians reading Italian (verbs with fusional endings) and Dutch can be attributed to the fact that Italian has a more complex verb system than Dutch does and therefore knowledge of the verbs and verbal endings is stored in memory in different ways that are efficient for each language.

Serbian has an extensive fusional case marking system for noun phrases. There is a base noun form that adds inflections based on how the noun is used in the sentence: subject, direct object and so on. Lukatela et al. (1980) propose an organization of the mental lexicon in which the nominative case (for subjects) is the central one; the others “revolve” around it as satellites. This rather ornate organization for nouns is unnecessary for English, because nouns do not change their form according to their use except as singular or plural. Bentin and Frost (1995: 272–273) suggest that

The lexical presentation and parsing of morphologically complex words which are possible in language with an agglutinative word structure such as Turkish must be different than those in a language with a non-concatenative morphology such as Hebrew, in which different inflections and derivatives are formed by infixing word-patterns within the consonantal string that forms the root morpheme.

Reading Strategies

Schreuder and Baayen (1995: 132), who proposed that different language-specific characteristics of morphology may affect the way that the mental lexicon develops, also assume different “language-specific models of morphological processing.” It is possible that languages that have words of predominately one type of morphological pattern might encourage readers to develop one strategy to use uniformly. For example, a matching strategy that connects the word with the meaning is useful for isolating languages. Matching one-to-one may be less useful for fusional or agglutinating languages, and readers might develop other morphological strategies in order to process words in reading.

Chinese writing doesn’t contain information about morphology because it is an isolating language not given to morphologically complex words, although compound words are common. In addition, sinograms do not easily indicate changes in the words that they encode, because they are printed “as is.” This is unlike alphabetic writing, which can print the words in present tense or past tense, singular or plural, through changes in spelling. Taft and Zhu (1995) discuss a number of questions concerning morphological processing in Chinese writing; they make some suggestions for morphological processing that are quite different from any proposed for English. It is quite possible that Chinese learners of English reading do not process the grammatical information from derivational and inflectional morphemes in English, or that they do not process it efficiently and automatically.

Garnham et al. (1995) showed that gender marking in fusional languages like French and Spanish is used to determine reference between a pronoun and a noun phrase. In French and Spanish, nouns are either “masculine” or “feminine,” and adjectives, determiners, and pronouns must match them. Readers of Spanish and French have developed a strategy to process gender marking of nouns, but English does not have the same type of gender markings. In English, most nouns are neutral with respect to gender and are referred to with “it” unless there is some reason to assign them a gender (as in referring to boats as she). French and Spanish speakers will not be able to rely on their L1 strategy to process nouns and they may lack the strategies that English speakers develop.

Koda (1993) studied second-language learners of Japanese (21 Americans, 12 Chinese, and 13 Koreans). A sentence completion task measured knowledge of case-marking particles. The data confirm that sentence comprehension differs among second-language readers of Japanese with varying L1 backgrounds and suggest that reading skills transferred from native language interact with L2 linguistic features in shaping processing strategies. Besides the potential difference in reading strategies, English learners are affected by lack of knowledge of English inflectional and derivational morphology. The Japanese learners of English studied in Schmitt and Meara (1997: 26) show “a rather weak awareness of derivative suffixes and their use [and they] lack convincing mastery of even inflectional suffixes.”

Implications for ESL Reading Instruction

As ESL and EFL students are learning words in English, it is to be hoped that they are building up a storage of morphemes, rimes, and syllables through direct instruction and through extensive reading practice. Students like Ho whose first languages are isolating may have difficulty with the complex morphological structure of some English words. Their mental lexicons may need restructuring to include knowledge of derivational morphemes and they must learn the inflectional morphemes of English. If the L1 writing system doesn’t encode morphological changes
in words, readers may not have efficient processing strategies for inflections like tense, possessive, or plural.

Students who speak Hebrew or Arabic, like Mohammed, may have L1 processing strategies that focus more on infixed morphological changes rather than on the prefixed and suffixed morphology of English. Students like Mohammed may, like Ho, benefit from direct instruction in reading derivationally complex words and inflectional endings so that their lexical processor works optimally.

Students like MariCarmen and Despina come from languages that are largely fusional with complex verbal systems of many inflectional endings and complex noun/adjective/pronoun agreement systems that use gender and case markings to show relationships and reference. This rich and informative inflectional morphology is probably processed with more attention than the meager inflectional morphology of English, which provides few cues to verb tense and noun agreement and relies more on word order in the sentence to encode meaning relationships. Students from Latin or Greek-based languages have the benefit of shared derivational morphology with English (pre-, post-, -ment, -tion, etc.); they may focus more exclusively on Germanic morphology (-ness, -dom, -ly).

In addition, for some advanced English L2 readers, teachers should comment on the phonological rules of English that affect the pronunciation of derived words and therefore complicate the spelling rules of English. This may enable students to sound out words more effectively to determine whether they know the word by sound and to discard a meaning-based reading strategy for words that are hard to pronounce. Teachers should tell students that English writing is not just phonemic but also morphemic in that the accurate representation of sound is sacrificed to maintain the semantic connection between words that can be perceived if the root morphemes are spelled consistently. The English system tries to strike a balance between representing phonemes and morphemes, and sometimes the need to represent morphemes overrides the need to represent sound accurately. This may help students see meaning relationships among words because the point of morphological instruction and practice is to reduce the cognitive load associated with the task.

**SPOTLIGHT ON TEACHING**

The following inductive sequence can be used for teaching prefixes and suffixes.

**Step 1.** Teachers show examples like happy and unhappy. Discuss the difference in meaning between the two words. Elicit other words that students know: kind/unkind, important/unimportant.

**Step 2.** They have students articulate what un- adds to the meaning of the base word or articulate it for them. Have them write it down in a vocabulary notebook.

**Step 3.** If teachers are introducing a suffix, they discuss how it changes the part of speech of the original word: care/careful, help/helpful, use/useful. Example words are shown in different grammatical contexts:

I care for my pets. I am careful to give them water.

Teachers ask students to articulate the difference if they can.

**Step 4.** Teachers provide controlled practice with typical activities on a group or individual worksheet:

a. Rewrite “He was not happy. He was unhappy.”

b. Complete the sentence with the correct word or fill in the blank.

c. Match the correct word with its definition.

d. Provide the morpheme and a list of words it can be added to. Have students make up words, define them, and write sentences with them.

e. Contrast the morpheme with others that are like it, if any: -less/-ful, pre-/post-.

**Step 5.** Teachers give opportunities for guided practice:

a. Write a class essay using words with the morpheme.

b. Provide vocabulary lists with words that have the morpheme to practice with.

c. Ask students to identify the morpheme in their class readings when they see it.

**Discussion Questions**

1. Review the meanings of these terms from the chapter: word, morpheme, free morpheme, bound morpheme, derivational morpheme, inflectional morpheme, bound root, prefix, suffix, inflex, morphophonemic writing, derivation, pronunciation changes (palatalization, velar softening, vowel laxing, stress change with vowel reduction), stem change, spelling rules (Stop>>Fricative>>Affricate, tense vowel or diphthong, most inclusive spelling), semantic memory, word recognition, word recognition strategies (cognate recognition, context strategy, graphemic similarity, morphological processing), cognitive load, language types (isolating, fusional, polysynthetic, agglutinating), case marking.

2. Have you figured out the naked and baked example from the
beginning of the chapter? If not, look them up in the dictionary and try a little morphological analysis.

3. Gunning (1988) has this list of prefixes, suffixes, and Greek and Latin bound roots with their level of difficulty for English speakers. Do you agree with this order of difficulty for the nonnative speaker of English? Is this order of difficulty related to the productivity of the morpheme? Which morphemes cause phonological changes in the base words to which they are attached? Do you know a word with each prefix or suffix?

<table>
<thead>
<tr>
<th>Prefixes</th>
<th>Suffixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary: dis-, pre-, re-, un-</td>
<td>-able, -er, -ible, -ful, -less, -ness, -y</td>
</tr>
<tr>
<td>Intermediate: anti-, co-, de-, en-, fore-, il-, im-, in-, ir-, inter-, non-, over-, post-, semi-, sub-, super-</td>
<td>-age, -al, -an-, -ant, -ent, -ese, -est, ic, -ive, -like, -ment, -or, -some, -th, -ward</td>
</tr>
<tr>
<td>Advanced: ad-, circum-, contra-, counter-, ex-</td>
<td>-ance, -hood, -ism, -ity, -ize, -osis, -ship</td>
</tr>
</tbody>
</table>

Write a lesson plan for one of the prefixes or suffixes.

4. Review Phonological Processes. One very common phonological process is called assimilation. Assimilation takes place when two sounds that are near each other become more similar to each other in voicing, place, or manner of articulation.

A. Here are some examples of assimilation. Identify if they seem to be assimilating in voicing, place, or manner of articulation.
   a. input [input]
   b. income [inkam]
   c. escape [eskempt]
   d. Chomsky [champsky]

B. A special type of assimilation is called palatalization, in which a stop or fricative becomes palatalized, (e.g. [ʃ ʃ j ʃ]) in some environments. Say each word in each set and listen carefully for the palatalization. Underline where you hear palatalization in each word set. Do you see some generalizations in this process?
   a. innate native nature
   b. press depression depressive
   c. definition define definite
   d. cult culture cultural
   e. permit permissive permission

f. rate ratio ration

5. Review Morphophonological processes and spelling patterns. If English writing were truly alphabetic, the changes that occur in the pronunciation of word derived by adding suffixes, as shown in the last exercise, would mean that words like native, nation, and national would not look the same. English writing has another principle that governs these cases: the morphemic principle. This principle states that morphemes will maintain their visual appearance no matter how their pronunciations change because of phonological processes like assimilation, palatalization, vowel reduction, and so on. Although this principle doesn’t always hold, it has a strong consistency. The morphemic principle has three parts: tensest vowel or diphthong, stop>fricative=affricate, or most complete spelling.

A. Match the justification with the example. Some words may require more than one justification.
   a. domestic—domesticity
   b. phlegm—phlegmatic
   c. severe—severity

C. Another phonological process is called velar softening, in which /k/ and /g/ become “softened” to /s/ or /ʃ/. Pick out where the velar softening has occurred in these word sets. (Careful! There are also some examples of palatalization.) Then make any generalizations you can about the process.
   a. analog analogy
   b. electric electrician electricity
   c. colleague collegial college
   d. mag- (bound root) magic
   e. log- (bound root) logic (socio)logy
   f. automatic automation automaticity

D. Vowel reduction occurs when vowels are so lacking in stress that they are pronounced as a schwa [ə]. Say each of these words. Where has vowel reduction occurred? There may be some variation in the answers.
   a. parade
   b. laboratory
   c. telegraph
   d. telegraphy
   e. police
d. define—definite
e. electric—electricity
f. confess—confession
g. bomb—bombard
h. signature—sign

B. These are counterexamples to the morphemic principle. Explain why they are exceptions.

a. goose—gosling
b. maintain—maintenance
c. pronounce—pronunciation

Chapter 9

Spelling Development

Prereading Questions
Before you read, think about and discuss the following.

1. Do you remember any spelling lessons from school? What were they like?
2. What words are difficult for you to spell?
3. What strategies do you use to remember the spelling of a word?
4. Do you know the difference between these homophones: there, their, they’re; its, it’s; your, you’re; too, to, two? How do you decide which one to write?

Study Guide Questions
Answer these questions while or after reading the chapter.

1. What are the two important variables that influence pedagogical effectiveness and student interest in spelling and other instruction for language issues?
2. How are reading and spelling connected?
3. What is the Lexical Quality Hypothesis?
4. What kind of linguistic knowledge do good spellers have?
5. What are the unconscious spelling strategies? What are some conscious strategies?
6. Go over Figure 9.1 and articulate what each section means.
7. What are the stages or phases of dominance in spelling development? What is overgeneralization?
8. What is the balanced approach to spelling instruction?
9. What is the most effective method of spelling practice in the classroom according to Bosman and Van Orden (1997)? What are some ways teachers can work on spelling in the classroom or that people can use to improve their spelling on their own?