Teaching and Learning Morphology: A Reflection on Generative Vocabulary Instruction

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ABSTRACT

Students’ knowledge of morphology can play a critical role in vocabulary development, and by extension, reading comprehension and student writing. This reflection describes the nature of this knowledge and how it may be developed through the examination of generative vocabulary knowledge and the role of the spelling system in developing this knowledge. In addition, it explores morphological development and the significant insights and understandings that students should attain: the basic nature of word formation processes, the spelling-meaning connection, the generativity of morphology: roots and affixes, etymology and morphology, and the role of morphological knowledge in learning other languages.

A *New Yorker* cartoon portrays three planets in a row: The one on the left is labeled “Jupit,” the one in the middle, “Jupiter,” and the one on the right, “Jupitest.” The cartoon works because of our knowledge of morphology. The vast majority of English vocabulary has, and continues to be, constructed through morphological processes. Morphology is the domain of language that addresses how meaningful word parts, morphemes, are arranged to create words. Understanding these combinatorial processes is the foundation for generative vocabulary knowledge: Generative knowledge refers to students’ ability to learn quite literally tens of thousands of words (Templeton, 2012)—words they study explicitly and words they encounter in their independent reading across all disciplines—by attending to the combinations of prefixes, suffixes, and roots. Most of these roots come from Greek and Latin.

“Morphological knowledge is a wonderful dimension of the [student’s] uncovering of ‘what’s in a word,’” Maryanne Wolf notes, “and one of the least exploited aids to fluent comprehension” (2007, p. 130). Yes, morphological knowledge has been shown to contribute to comprehension through its role in facilitating vocabulary growth and syntactic awareness (Berninger, Abbott, Nagy, & Carlisle, 2009; Bowers & Kirby, 2010), but there are a number of reasons why this knowledge is not exploited. One of the primary explanations may be the lack of deeper knowledge on the part of teachers themselves of how morphology works (Moats & Smith, 1992). The purpose of this article is to describe for educators the more significant elements in this foundation (Templeton, Bear, Invernizzi, & Johnston, 2010; Templeton & Gehmann, in press).

Linguists have, of course, been exploring morphology for a very long time (deSaussure, 1916/2011; Francis, 1958; Jacobson & Halle, 1956; Marchand, 1969), even when they have not employed the usual language of morphological inquiry (Chomsky & Halle, 1968). Among educators and researchers, there has been, over the last decade, an increased focus on morphology and on learners’ morphological development (e.g., Berninger et al., 2009; Bowers & Kirby, 2010; Carlisle, 2010; Lesaux, Kieffer, Faller, & Kelley, 2010; Nunes & Bryant, 2006; Templeton, 2012). This interest has accompanied a renewed focus on vocabulary learning and instruction (e.g., Graves, 2006; Hiebert, 2005; Stahl & Nagy, 2006), particularly as vocabulary knowledge supports comprehension during reading. With the implementation of the Common Core State Standards (CCSS) in English Language Arts (2010) and other discipline areas, the emphasis on vocabulary has, if anything, intensified, and it has explicitly been extended to how vocabulary knowledge informs and enriches students’ writing. There is specific reference to students’ awareness and application of morphology in the CCSS. This acknowledgement and emphasis in a major standards initiative is a long time coming: In a classic study, Nagy and Anderson (1984) observed that, “Knowledge of word-formation processes opens vast amounts of vocabulary to the reader” (p. 314). How vast? Across the grand corpus of English words over 60% have been formed by morphological processes; within specific disciplines, this figure climbs to over 90% (Green, 2008).

Morphology, indeed, is critical. In this article, I begin our exploration by examining briefly the nature of the spelling system of English—it powerfully reflects the morphology of the language. Next, I examine the major aspects of morphology in English. The primary focus, however, will be on the most significant understandings about morphology we wish students to develop and extend.

THE SPELLING SYSTEM: KEY TO MORPHOLOGICAL AWARENESS

Why begin with spelling? The answer is that spelling visually keys morphological elements within and among words. My own work in the area of spelling or orthographic knowledge and how it reflects morphology was initially sparked and influenced by the prevailing linguistic theory of the 1960s–70s: Transformational Generative Grammar (N. Chomsky, 1957, 1965a). Noam Chomsky’s work in this area was associated primarily with syntax (1957, 1965a), but it was his work on the phonological system of English (N. Chomsky, 1965b), together with Morris Halle (Chomsky & Halle, 1968), that I found most compelling. At the time, I was studying at the University of Virginia with Edmund Henderson, a
pioneer in developmental spelling research (1981, 1990; Henderson, Estes, & Stonecash, 1972; Henderson & Templeton, 1986). I was very interested in the relationship between phonology and spelling, so I found Chomsky and Halle’s remarks about the spelling system at first especially interesting, if not astonishing: the English spelling system “comes remarkably close to being an optimal orthographic system” (Chomsky & Halle, 1968, p. 49) for the language. “Optimal” in what sense? It certainly didn’t seem to do an efficient job of representing sound consistently—although we have since learned that, in fact, it does much better than is often credited (Henderson & Templeton, 1986; Templeton, 2003a, 2003b; Venezky, 1967, 1999). I probed further (Templeton, 1976, 1979); Chomsky was quite clear in stating that his theory had absolutely nothing to do with actual educational practice (1965a), but I thought that what he was saying about the spelling of English surely had some implications in that regard. I discovered that other linguists had been making a similar case about the nature of the spelling system of English (C. Chomsky, 1970; Francis, 1958; Venezky, 1967). And going back a good many years, Henry Bradley, editor of The Oxford English Dictionary (1919), made a very good case for the way the spelling system works. Using examples such as critic and criticize, Bradley pointed out that if we in fact did spell words so that they would reflect a more consistent letter-sound relationship, criticize would have to be spelled criticize. Looking further, the word competition would need to be spelled something like computishun. In gaining a more consistent letter-sound correspondence we would be losing the visual relationships among words that are related in meaning. Compare the spelling of the word pairs on the left with their spelling on the right, paying particular attention to the italicized letters:

<table>
<thead>
<tr>
<th>word</th>
<th>spelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>critic</td>
<td>compete</td>
</tr>
<tr>
<td>criticize</td>
<td>competition</td>
</tr>
<tr>
<td>criticize</td>
<td>compute</td>
</tr>
<tr>
<td>computishun</td>
<td></td>
</tr>
</tbody>
</table>

As the pairs in the left column suggest, for the vast majority of words in the English language, the spelling system tends to spell words that are similar in meaning similarly—and this often comes at the expense of more regular letter-sound relationships (Templeton, 1979, 1980). How does this relate to morphology?

David Olson once observed that writing systems help to “[bring] aspects of spoken language into consciousness . . . turning aspects of language into objects of reflection, analysis, and design” (1996, p. 258). In the case of morphology, the spelling system can help turn students’ attention to aspects of morphology—morphemes, the smallest units of meaning in the language—and how they combine to form words. Olson went on to note that, “We introspect our language in terms of the categories laid down by our script” (p. 258). A knowledgeable teacher, however, is critical in directing this attention and in helping students become aware of these categories—prefixes, suffixes, and roots. And as students reflect upon words and their spelling, they are more likely to notice the visual relationships among words that are related in meaning. Although the roots in the words compete/competition and critic/criticize are pronounced differently, they are spelled the same to preserve their relationship in meaning—the morphological relationships (Templeton & Scarborough-Franks, 1985). As Venezky concisely described it, “Visual identity of word parts takes precedence over letter-sound similarity” (1999, p. 197).

MORPHOLOGY: AN OVERVIEW

Broadly speaking, linguists have identified three components of morphology: compounding, inflectional morphology, and derivational morphology. Compounding is the familiar process of combining separate words to form a single compound word, as in: fishpond, newsworthy, rainwater. In English, inflectional morphology includes verb tense and number, as in packed/packing, ostriches; it also includes possession—girl’s, girls—and comparatives and superlatives—grander, grandest. Derivational morphology is arguably the most vibrant and productive of the three components. Hundreds of thousands of words are derived from roots through combination with prefixes, suffixes, and other roots.

Derivational suffixes are the “workhorses” of morphology (Templeton et al., 2010). While relatively few in number (for example -ful, -ous, -ity), they allow us to derive additional words from a single root—nation + -al, -ity, -ism, -ist, -istic (Stauffer, 1942; White, Power, & White, 1989). Students grow in their understanding of English morphology by examining how these suffixes extend the core meaning of the roots to which they are attached, as well as the different parts of speech that often result. In the process, students develop and extend foundational knowledge of the Greek and Latin component of English, expanding their vocabulary and word consciousness (Lubliner & Scott, 2008; Scott, Skobel, & Wells, 2008). When we remove all the prefixes and suffixes in a word, what remains is the root. The root may be a word—as, for example, when un- and -ful are removed from the word unhopeful, and hope remains—or, the result may be a word that cannot stand alone. In this case we usually have revealed a Greek or Latin root, as for example when pre- and -ion are removed from the word prediction, and dict remains. Dict is a Latin root meaning “to say”—prediction literally means “the act of saying before.”

Students and Morphological Development: Significant Insights and Understandings

Over the last several years a number of educators have provided resources to support teachers in facilitating their students’ morphological development (e.g., Bear, Invernizzi, Templeton, & Johnston, 2012; Rasinski, Padak, Newton, & Newton, 2008; Templeton et al., 2010). This section presents the key understandings of morphology that support the generative approach to vocabulary learning and instruction. We begin in the primary grades, demonstrating for children how simple word parts combine (Gehsmann & Templeton, 2011/2012, 2012), and even mentioning from time to time Greek and Latin roots (see, for example, Mountain, 2005). We most powerfully grow these understandings, however, at the intermediate grade levels and beyond. These are the levels at which students encounter most of the vocabulary occurring in
texts of greater complexity (Fisher, Frey, & Lapp, 2012) that reflects more complex morphological aspects.

**The Basic Nature of Word Formation Processes**

For primary grade learners, as well as many older English learners, the process begins simply, with walk-throughs of “Take-Apart” and “Build-A-Word” strategies:

**Take-Apart**
- Display the word: *unbreakable*
- Remove the prefix: *breakable*
- Remove the suffix: *break*

**Build-A-Word**
- Display the word: *reach*
- Next, add a suffix: *reachable*
- Finish by adding a prefix: *unreachable*

We make sure that the root word is aligned vertically in each presentation so that what occurs at each step is obvious to students. And, at each step, we discuss with students how the meaning of the root is affected when an affix is removed or added. We are quite explicit here because we are teaching a way of looking at and thinking about words and their relationships.

**The Spelling-Meaning Connection**

We lay the groundwork in the elementary years for students to become aware of and apply understanding of the spelling-meaning connection: Words that are related in meaning are often related in spelling as well, despite changes in sound (Templeton, 1983). We begin with words the students can read and understand, but which they usually do not realize are related: *sign/signature, bomb/bombard, crime/criminal*. Over the grades, this attention to the relationship between the spelling of related words and their meaning will grow. In fact, it often impresses students when we show them what might happen if we did try to spell words the way they sound, and compare them with morphologically-based spellings. We present morphologically related words, but spelled phonetically:

- *anælæge*
- *anælæjkæl*
- *ænælæg*

We then present the conventional spelling for these words:

- *analogy*
- *analogical*
- *analogue*

Such examples help to make the point quite compellingly: Words that are semantically related look similar. Being sensitive to the spelling-meaning connection will not only help students in their learning of spelling, it will help them expand their vocabulary as well. While beginning with concrete, straightforward examples such as *muscle/muscular*, as students encounter a broader range of vocabulary we should continue to engage them in observing and thinking about the spelling-meaning—morphological—relationships in more abstract words:

- *onerous* / *confuse* / *innocent*
- *exonerate* / *obfuscate* / *innocuous*

In such words, the spelling-meaning connection still holds: Words that are related in meaning are often related in spelling as well, despite changes in sound (Templeton, 1983). There is a reciprocal, back-and-forth relationship between noting these spelling-meaning connections and students’ learning about Greek and Latin roots and affixes.

**The Generativity of Morphology: Roots and Affixes**

Tamara Baren, a master teacher with whom we have worked for years, tells her students that, “You learn one word, you learn ten!” In a unit exploring the theme of “Courage,” for example, she begins by writing *courage* and then just starts adding affixes—prefixes and suffixes:

- *courage* 
- *courageous* 
- *courageously* 
- *encourage* 
- *discourage* 
- *discouragingly* 
- *encourageable* 
- *encouragement* 
- *encouragingly*

So often, there are many more than ten words that could be derived from a root word, but “learn one word, learn ten” is an impressive memory tag, and emphasizes the generative aspect of morphology. Tamara then discusses several of the words with the students, talking about how the meaning of the affixes, together with the root, contributes to the meaning of each word.

This same “generativity” works for Greek and Latin roots (Flanagan, Templeton, & Hayes, 2012). From the Latin root *rupt*, meaning “break,” for example, we can generate *disrupt/disruption, erupt/eruption, abrupt/abruptly, corrupt/corruptible/incorruptible, interrupt/interruption/uninterruptedly*—and a good many more.

In general, our exploration of roots and how they work—usually the domain of the English/Language Arts teacher—may follow a transparent-to-more-opaque progression. For example, *predict/dictate/diction* are explored early on, while words derived from the Latin root *fid*—(meaning “trust”)—would be considered later—*confide/fidelity/infidelity/fiduciary* (see Templeton et al., 2010, for a comprehensive yet flexible scope and sequence of roots and affixes across the grades). And there are quite frequently those serendipitous instructional opportunities when teachers may point out certain roots in a word to anchor more compellingly, the meaning of the word: For example, in science, the word for a species of mite, *dermatophagoides*, contains the Greek roots *derma* (skin) and *phag* (eat). So, literally, the name of this mite means, “eating skin” (Templeton et al., 2010)—an insight guaranteed to grab students’ attention!

Word sort or word categorization activities are particularly effective in supporting students’ learning of both the meaning of particular roots, as well as the ways in which they function in words to contribute to the meanings. The sort presented below explores the prefix, *mal* (“bad”; it also often functions as a root),...
and the root bene ("good, well") (Templeton, Johnston, Bear, & Invernizzi, 2009). The students first sort the words according to whether they contain -bene- or -mal-. We then discuss with them which words they think they know, making sure that they understand that benefit has to do with "good." Words about which they are uncertain may be checked in the dictionary (much easier to do in our digital age). They will find, for example, that in a word like dismal, which at first glance might mean "not bad," what appears to be a prefix (dis) is actually another root, meaning "day." In discussing benefactor, we may ask them if they recognize another root recently explored (-fac-, "to make"). A benefactor "makes good," and may be beneficial and benevolent ("good will" -vol is a Latin root meaning "will"). How are benefactor and malefactor alike? How are they different?

- bene-  
  benefactor  
  beneficial  
  benevolent  

- mal-  
  malefactor  
  malcontent  
  malfunction  
  malevolent  
  malevolent  
  malice  
  malediction

Etymology

C. S. Lewis (1990) described how words have a "semantic biography." Developing over time, understanding these biographies—histories—allows students to construct deeper, more nuanced meanings as they read and write. The Common Core State Standards explicitly address the role of etymology in vocabulary acquisition in grades 9–12, but in much of the curriculum being developed in response to the CCSS, word histories are explicitly addressed beginning in the intermediate grades (for example, Common Core Curriculum Maps, 2012). As we guide students in their etymological explorations, we help them understand the role of metaphor as one of the prime forces at work in growing the literal and connotative meanings of words. One of the meanings of meta- is "beyond, transcending." When we share with students the ways in which words have grown beyond their original meanings, and developed their legacies, we are helping to give students a sense of control and power as they employ these words in different genres and in the service of different purposes.

The birth of so many words was accomplished through morphological processes—circumpect, for example, once had a much more literal meaning having to do with looking around. A middle-school English teacher took advantage of her students’ reading of Suzanne Collins’s The Hunger Games (2008) to explore the etymology of the word circumpect. She began by asking them "How would you describe Katniss’s behavior at the end of the book when she is crowned by President Snow?" "How would you describe her behavior during the interview she and Peeta have with Caesar?" The students observed that Katniss was very careful, worrying about saying the wrong thing . . . she was concerned about behaving in a way that might lead to her death. The teacher then said, "You’ve just described the meaning of this word" as she wrote the word circumspect. "Actually, circumspect comes from two Latin roots—circuit and spect." She asked the students to tell what circuit means ("around") and then she told them what spect means ("look"). She then observed, "So, circumpect literally means 'to look around.' What does that have to do with how Katniss behaved?" Initially, students will often not volunteer much in response, so teachers model how we might think about the meaning of a word developing from the concrete to the more abstract; over time, students will understand this metaphorical process. So, the teacher continued: "Well, when Katniss first arrived and saw Peeta—after being separated from him for so long—she ‘looked around’ to see who else was there and what was going on—she didn’t want to do something that would lead to her imprisonment or, worse, death! So, the literal meaning of circumpect is 'look around,' but that meaning has grown over many years to include not only looking around but thinking about what might happen if you’re not careful."

Generalizing Morphology to the Learning of Other Languages

A productive strategy for learning vocabulary across languages is to look for words that look alike—they often share the same or similar meanings. When they do, we refer to them as cognates. Over the last several years, educational publishers have included Spanish cognates in both English Language Arts and subject matter materials. Cognates vary in their similarity, and our instruction begins with those that are most similar—this is the spelling-meaning connection across languages: for example, we compare the English/Spanish polygon/polygono, important/importante, and initial/inal. Then, we move into cognates that have less-obvious visual overlap: state/estado, study/estudiar. We are learning much about the selection, sequencing, and teaching of cognates (Lubliner & Hiebert, 2011; Templeton, 2010), and are beginning to explore their generative potential for learning vocabulary in new languages. This is where morphology comes most fully into play; we would have students examine, for example, the following cognate pairs:

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td>abreviación</td>
<td>abbreviation</td>
</tr>
<tr>
<td>anticipación</td>
<td>anticipation</td>
</tr>
<tr>
<td>declaración</td>
<td>declaration</td>
</tr>
<tr>
<td>creación</td>
<td>creation</td>
</tr>
<tr>
<td>imitación</td>
<td>imitation</td>
</tr>
<tr>
<td>vegetación</td>
<td>vegetation</td>
</tr>
</tbody>
</table>

The only place in which the Spanish/English cognates differ is where the suffix joins the root, and because these suffixes vary in terms of only one letter, might their visual similarity be a key to their meanings? If we know how -ion works in English and what it means, might this be a clue to figuring out the meaning of ión in Spanish? Morphological knowledge in one language, in other
words, will support learning the vocabulary in many other languages—not just those learning English as a new language, but native English-speaking students learning other languages.

For English learners who are at the Intermediate and Advanced levels of English proficiency, we may encourage them to read longer words for meaning rather than attempting to sound them out. This is because, as we have seen, the spelling system is morphological, representing meaning directly. Longer and more morphologically complex words occur in texts with far greater frequency than they do in oral language—so we are much more likely to be familiar with their visual/meaning features than we are with their sound features. In this sense, the same strategy for native speakers applies for ELLs. Decode the meaning—students are much more likely to be able to do this if the teacher has taught them to focus on meaningful elements, roots and affixes, in the exploration of words.

CONCLUSION

As I hope this brief overview has suggested, the exploration of morphology constitutes a critical foundation for students’ vocabulary growth, and by extension, their comprehension in reading and their effectiveness as writers. In emphasizing the importance of morphological, generative knowledge, I suggest an analogy between understanding morphological structure and understanding narrative structure (Templeton, 2012)—the latter of which underlies our organization and explanation of our worlds. In guiding students’ explorations of narratives, we help them realize how stories are much more than the sum of their parts—“their beginnings, episodic structure, and resolutions are means to deeper insights and understandings” (Templeton, 2012, p. 133). In such fashion, we also guide students’ investigations of words and their morphological structure, which may lead to insights that reveal words to be more than the sum of their morphological parts: The ways in which roots and affixes join and function in sentences and texts support an ever-expanding network of interconnected concepts and their connotations. As classroom teachers explore the elements of morphology—often, in the beginning, along with their students—and become more confident in guiding students’ continuing explorations, we may hope that more students will develop the curiosity about words that will motivate them towards further exploration.

Selected Resources

In our teacher-preparation coursework, very few of us—including English teachers—had a course that explored words in the ways we have discussed here, much less how to use this knowledge to support students’ learning. Fortunately, a number of resources are available. The list offered here is by no means exhaustive, but is representative of some of the most informative resources we have used, often with our students as well.


References


**Literature Cited**


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