

# Breaking Down Words to Build Meaning: Morphology, Vocabulary, and Reading Comprehension in the Urban Classroom

Michael J. Kieffer, Nonie K. Lesaux

When it comes to teaching vocabulary, a little knowledge (of root words, prefixes, and suffixes) goes a long way.

Ms. Jenkins (all names are pseudonyms) reads a newspaper article regarding a recent poll of public opinion about the U.S. President with her fourth-grade class. She stops to pose a question, “What does *popularity* mean?” The room is silent for a few moments as the 9- and 10-year-olds put their minds to work. Antonio, a student known more for the frequency of his answers than their accuracy, raises his hand. “It’s like something about the president.” “OK,” Ms. Jenkins notes. “Can anyone add to what Antonio said?”

Ms. Jenkins faces a sea of furrowed brows and blank stares. She glances at the clock on the wall and begins to wonder if they will make it through the text before lunch. After a long silence, Brenda responds. “It’s what the people think about the President, like how much they like him,” she suggests. “Great, Brenda. You’re right, how did you figure that out?” “Well,” Brenda pauses. “I looked at it for a while, trying to find a word inside it that I do know like you told us to do last week—and I found the word *popular*. A popular kid is, you know, a kid that people like, so I figured that *popularity* must have to do with that.” “Good work, Brenda, in attacking that word to find a part that you know. Did anyone try something different?” After a longer pause, Rafael raises his hand, “Well, I did what Brenda did. But when you say *popular* I think of Spanish, and it’s *como popular*. And when on televi-

sion they say *el Presidente es popular*, it means they like him.”

The scene above resonates with many teachers we know. As students read challenging texts, especially those in the content areas, they encounter increasingly complex words. When confronting a novel word, many students are like Antonio—they have a vague notion of what the word means, but they lack a specific understanding of it, and others may not recognize the word at all. As a result, students’ comprehension of a text may suffer. Without a firm grasp on the definition of a key word such as *popularity*, many students like Antonio are likely to miss the meaning of the passage. Even when teachers provide appropriate scaffolding with respect to decoding these words by reading them aloud, students with limited vocabularies may not be able to access the meaning of the text (Anderson & Freebody, 1981; RAND Reading Study Group, 2002).

Research evidence confirms what many teachers know—students who reach fourth grade with limited vocabularies are very likely to struggle to understand grade-level texts (e.g., Chall & Jacobs, 2003; National Institute of Child Health and Human Development, 2000; RAND Reading Study Group, 2002; Biancarosa & Snow, 2004). Unfortunately, this is often the case in urban or low-income schools in the United States. Even before they arrive at school, students in low-income neighborhoods tend to have smaller vocabularies than their counterparts in high-income schools, and this gap tends to increase with time (Hart & Risley, 1995; Molfese, Modglin, & Molfese, 2003; Organization for Economic Co-operation and Development, 2000). Along with many others, Rupley, Logan, and Nichols (1998/1999) argued that vocabulary is an essential and



school lacked much of the vocabulary to read grade-level texts. Urban students with below average vocabularies need thoughtful and strategic vocabulary instruction.

Vocabulary and reading comprehension have a reciprocal relationship—as greater vocabulary leads to greater comprehension, better comprehension also leads to learning more vocabulary words (Stanovich, 1986)—and this relationship has major implications for the teaching of reading (Rupley, Logan, & Nichols, 1998/1999). Although most research in this area has been conducted with native English speakers, current studies suggest that a similar reciprocal relationship between reading and vocabulary exists for ELLs (García, 1991; Proctor, August, Carlo, & Snow, 2005).

Researchers emphasize the importance of vocabulary yet also point out that knowing a word well involves the combination of several different types of knowledge. In his clear and concise volume on vocabulary development, Stahl (1999) suggested that knowing a word means not only knowing its literal definition but also knowing its relationship to other words, its connotations in different contexts, and its power of transformation into various other forms. Students who can master these different aspects of knowing a word have strong depth of vocabulary knowledge, and students who are familiar with many words have breadth of vocabulary knowledge. Antonio, having been previously exposed to the word *popularity*, has a vague notion of what it means, but he lacks this depth of knowledge about the word; with only a superficial understanding of this key word, his comprehension will likely suffer.

### **Closing the Word Gap**

Although teachers and researchers agree on the importance of academic vocabulary, less consensus exists concerning how such vocabulary can be learned. Some emphasize wide-ranging free reading as the primary vehicle through which words are learned. For example, Anderson and Nagy (1992) argued that the word-learning task is enormous—they estimated that students reading on grade level learn between 2,000

and 3,000 new words a year—and therefore concluded that most words must be learned through context. In support of this argument, researchers described the strong correlation between students' volume of reading and their vocabulary knowledge (Cunningham & Stanovich, 1991).

Other researchers insist that explicit instruction (of at least some of the low- and medium-frequency words likely to challenge students) is crucial for vocabulary learning. Beck, McKeown, and Kucan (2002) argued that the information provided by context is often too limited or misleading to be reliable in effectively supporting students' learning of new words. The National Reading Panel (National Institute of Child Health and Human Development, 2000) supported this view, finding that direct instruction of vocabulary improves comprehension. They found insufficient evidence to prove that extensive reading programs such as Silent Sustained Reading improved vocabulary, at least when implemented without complementary instructional techniques.

A balanced approach to vocabulary instruction combines explicit instruction of a limited number of well-chosen words with instruction in strategies with which students can acquire words independently (Graves, 2006; Stahl, 1999; Stahl & Nagy, 2006). Implementing such an approach ultimately requires that teachers know how to teach specific words and know which strategies are the most efficient and effective for students to use when learning words independently. Not all strategies for learning words are made equal, nor will all strategies work for all learners. To identify those word-learning strategies that will best equip students to comprehend text, researchers have investigated the strategies that successful learners use naturally.

One way to identify effective strategies is to examine students' use of various strategies and to analyze how these strategies relate to students' performance on reading comprehension assessments. Although the average vocabulary level of students in urban schools is often below the national average, great differences exist among students' individual levels, suggesting that some urban school students are more successful in learning vocabulary than others. By examining what strategies average and above average word learners use regularly, differentiating them from below average word learners, one may be able to identify the tools that could help move all students forward in

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their vocabulary and comprehension. In our own research, we found that one such tool is morphology.

## **Morphology: What Is It and Why Does It Matter for Reading?**

The word *morphology* can be broken down (morphologically) into two meaningful parts (known as *morphemes*): *morph-* meaning shape and *-ology* meaning the study of. Thus, morphology, in its most generic form, is the study of shape. In language and reading, morphology refers to the study of the structure of words, particularly the smallest units of meaning in words: morphemes. Morphemes are generally one of the two following types:

1. Bound morphemes, which are prefixes and suffixes that cannot stand alone as words, such as *geo-*, *re-*, and *-ity*
2. Unbound morphemes, which are roots within more complex words that can stand alone as words, such as *popular*

Bound morphemes that are suffixes are one of the two following types:

1. Inflection morphemes such as *-ed* and *-s* that change the tense or number of a word without changing its part of speech
2. Derivational morphemes such as *-ity* and *-tion* that change a word's part of speech

For example, adding *-ity* changes *popular* from an adjective to the noun *popularity*. When an inflectional morpheme is added, as in *walked*, we call the new word inflected whereas when a derivational morpheme is added, as in *information*, we call the new word derived.

An understanding of word structure can be a powerful tool for students faced with the daunting task of acquiring academic vocabulary. A large number of the unfamiliar words that students encounter in printed school English could be understandable if students knew the more common root word and could break the complex word down (Nagy & Anderson, 1984). Because texts contain many of these complex but decipherable words, children's abilities to attack and dissect them are essential to their understanding of these texts.

Children develop awareness of morphology throughout their childhood and into their adolescence.

Young children generally understand how inflectional morphemes (such as *-s* on plurals or *-ed* on past-tense verbs) are attached to words, whereas children in upper elementary school continue to develop understanding of how derivational morphemes connect to words (such as *-ity* on *popularity*; Tyler & Nagy, 1989). This development follows a relatively predictable sequence, although the rate at which students progress through the sequence varies considerably between children. As a result, students at a given grade level can be at very different levels in their awareness of morphology. Teachers can get some sense of where their students are on this developmental continuum by administering a developmental spelling inventory (for an example, see Bear, Invernizzi, Templeton, & Johnston, 2000).

A few studies have shown that understanding of derivational morphology is related to reading comprehension (Carlisle, 2000; Freyd & Baron, 1982; Nagy, Berninger, & Abbott, 2006). Because the ability to attack and dissect words is our particular focus, we will use the terms *morphology* and *breaking down words* interchangeably in the remainder of this article. Although there are many ways in which students can understand morphology, the ability to use morphology to attack novel words is the most promising for improving reading comprehension.

## **What Did We Investigate and What Did We Find?**

Because the relationship between morphology and reading comprehension had primarily been studied among native English speakers in suburban contexts, we wondered whether this relationship also held up among Spanish-speaking English-language learners and native English speakers in an urban context. This research seems particularly important given the apparent difficulties that these populations have with acquiring vocabulary and comprehending academic text.

Our study examined how students' ability to break down words related to their vocabulary knowledge and reading comprehension in fourth and fifth grade. We also examined how this relationship changed between fourth and fifth grade. We collected data from 111 students (87 Spanish-speaking ELLs and 24 native English speakers) in a large urban district in southern California in both fourth and fifth grade. Students' understanding of morphology was assessed by asking

them to extract the root word from a complex word to complete a sentence (e.g., students were given *popularity* and asked to complete “The girl wanted to be very \_\_\_\_\_”; see Table 1 for a list of the words used on the task). Students were also given a range of standardized tests assessing reading comprehension, word reading fluency, and vocabulary. We assessed reading comprehension with the Woodcock Language Proficiency Battery—Revised, Passage Comprehension subtest, which is a cloze test in which students provide a word to complete a passage; and the Gates-MacGinitie Reading Comprehension Test (1989), which is a traditional multiple-choice test. We assessed word reading fluency with the Test of Oral Word Reading Efficiency, Sight Word Efficiency subtest (1999), which is a timed test in which students read as many words of increasing difficulty as they can in 45 seconds. Vocabulary was assessed with the Peabody Picture Vocabulary Test (3rd edition), which is a multiple-choice measure of receptive vo-

cabulary knowledge in which students hear a word and choose an appropriate picture.

Following an analysis of these relationships in the context of reading development and instruction, we have two major findings about comprehension and vocabulary to report.

### **Morphology and Comprehension**

We found that morphology was related to reading comprehension in both fourth and fifth grade, and became more important as students grew older. Students with greater understanding of morphology also have higher reading comprehension scores when holding constant their word reading fluency. Although this relationship was significant in fourth grade, it grew stronger in fifth grade, such that students’ understanding of morphology was a better predictor of reading comprehension than their vocabulary level. In addition, we found that this relationship was the same for Spanish-speaking ELLs as for native English speakers in an urban setting. That is, morphology was equally

**Table 1**  
**Items on Fourth-Grade Morphology Test in Order From Least to Most Difficult With Spanish-English Cognates in Bold and Cognate Suffixes in Italics**

Derived word	Root word	Root frequency (from www.wordcount.com)	Changes required
Runner	Run	High	Spelling
Growth	Grow	Medium	None
Dryer	Dry	High	None
Swimmer	Swim	Low	Spelling
Fourth	Four	High	None
Teacher	Teach	Medium	None
<b>Discussion</b>	<b>Discuss</b>	Medium	Sound <i>Originality</i>
<b>Originality</b>	<b>Original</b>	High	Sound
<b>Popularity</b>	<b>Popular</b>	High	Sound
Baker	Bake	Low	Spelling
Courageous	Courage	Medium	Sound
Fifth	Five	High	Sound, Spelling
<b>Possession</b>	<b>Possess</b>	Low	Sound
<b>Activity</b>	<b>Active</b>	Medium	Spelling
<b>Division</b>	<b>Divide</b>	Medium	Sound, Spelling
Width	Wide	High	Sound, Spelling
<b>Decision</b>	<b>Decide</b>	Medium	Sound, Spelling
Availability	Available	High	Sound, Spelling
<b>Glorious</b>	<b>Glory</b>	Medium	Spelling
Strength	Strong	High	Sound, Spelling
<b>Famous</b>	<b>Fame</b>	Low	Spelling
<b>Admission</b>	<b>Admit</b>	Medium	Sound, Spelling
<b>Density</b>	<b>Dense</b>	Low	Spelling
<b>Furious</b>	<b>Fury</b>	Low	Spelling

important for reading comprehension in both populations of students.

## Vocabulary and Morphology

Students with larger vocabularies tended to have greater understanding of morphology. As with the relationship between reading and vocabulary development, the relationship between vocabulary and morphology appears to be reciprocal. Understanding morphology may help students broaden their vocabularies, and vocabulary growth may improve students' understanding of morphology. This suggests that teaching morphology may work well with other types of context-rich and thoughtful vocabulary instruction to improve students' reading and language outcomes.

As shown in Table 1, some of the items on the morphology task were more difficult for students than other items. The following three factors influenced the difficulty of the items:

1. Whether they required a change in sound to go from the derived word to the root (e.g., *popularity* to *popular*)
2. Whether the word required a change in spelling (e.g., from *swimmer* to *swim*)
3. The frequency of the root word

As shown in Table 1, items that required both spelling and sound changes (e.g., *strength* to *strong*) were among the most difficult. Items that also included less frequent root words (e.g., from *furios* to *fury*) tended to also be difficult for students. The easiest items had common root words and did not require changes in spelling (e.g., *dryer* to *dry*, *growth* to *grow*). This finding suggests that teachers may need to point out to students how some derived words relate to their roots. Although students may automatically see the connection between *dry* and *dryer*, they may need to be taught to recognize that *strength* and *strong* are related. The findings also suggest that for some words, students need to be taught the meaning of the root even before they learn about its relationship with the derived word. Teaching students to recognize *fury* within *furios* can only be helpful if they first learn the meaning of *fury*.

The conclusion that students with greater understanding of morphology are more successful at learning academic vocabulary and comprehending text is a strong argument for including morphology instruc-

tion in language and literacy programs, especially in urban settings. This conclusion also raises important instructional questions regarding how teachers ought to go about teaching morphology in the context of general vocabulary instruction.

## So, What Does Good Morphology Teaching Look Like?

We recommend four principles for teaching morphology to improve students' vocabulary and reading comprehension. These recommendations are based on the research findings described above, the frameworks and programs put forth by vocabulary experts in the field, and our own experiences working in urban schools.

### Principle 1: Teach Morphology in the Context of Rich, Explicit Vocabulary Instruction

Our findings suggest that understanding morphology is related to, but also distinct from, overall vocabulary. Therefore, it makes sense that morphology strategies should be taught within the context of a comprehensive program of vocabulary improvement, but as a *distinct* component of that program. Although a complete discussion of effective vocabulary instruction is not possible here, it is worth summarizing some of the key elements that make up rich, explicit vocabulary instruction, with an emphasis on how morphology may fit into such a program.

Vocabulary instruction has been conceptualized in several different ways. In their classic meta-analysis on vocabulary instruction, Stahl and Fairbanks (1986) found that the most effective approaches provided multiple exposures to words, introduced the words in meaningful contexts, and involved students in deep processing of the words' meanings. By synthesizing results from 52 studies on the topic, they found that these methods had substantial effects not only on vocabulary knowledge, but also on students' reading comprehension.

Similarly, Beck, McKeown, and Kucan (2002) defined what they call "robust vocabulary instruction" as vigorous, strong, and powerful instruction that "involves directly explaining the meanings of words along with thought-provoking, playful, and interactive follow-up" (p. 2). They suggested that teachers

choose useful, academic words that appear in a wide variety of texts, provide student-friendly explanations for them, create instructional contexts that supply useful information about new words, and engage students in actively dealing with word meanings. Although they did not address morphology in particular, they highlighted the importance of teaching relationships among words. Teachers should emphasize the relationships among words based on their shared roots, prefixes, or suffixes.

In his recent book, Graves (2006) suggested that a comprehensive vocabulary program would include activities that serve the following four functions:

1. To provide students with “rich and varied language experiences” (p. 38)
2. To teach a relatively small number of well-selected individual words directly
3. To teach word learning strategies, including morphology, dictionary skills, and the use of context clues
4. To foster “word consciousness,” that is, students’ “awareness of and interest in words and their meanings” (p. 119)

In this framework, understanding of morphology is firmly contextualized alongside other strategies for word learning.

Addressing the specific needs of ELLs, Carlo et al. (2004) suggested four principles that underlie an effective vocabulary program for these learners.

1. New words should be taught in meaningful contexts.
2. Words should be encountered in a variety of contexts.
3. Word knowledge involves depth of meaning as well as spelling, pronunciation, morphology, and syntax.
4. Native Spanish speakers should have access to the text’s meaning in Spanish.

From this perspective, morphology is considered both a component of knowing a word well and a strategy for learning new words.

### **Principle 2: Teach Students to Use Morphology as a Cognitive Strategy With Explicit Steps**

Our findings, along with those of other researchers, suggest that using morphology to manipulate words

is best understood as a cognitive strategy to be learned, not simply a set of rules to be memorized. Like other strategies related to reading comprehension, this is a strategy that is best taught with the cognitive steps of the task in mind. To break a word down into morphemes, a student must complete the following four steps:

1. Recognize that he or she doesn’t know the word or doesn’t have a deep understanding of the meaning of the word.
2. Analyze the word for morphemes she or he recognizes (both roots and suffixes). As our findings indicate, this process may be more difficult if the word is not transparent, particularly if it requires a change in both sound and spelling.
3. Hypothesize a meaning for the word based on the word parts.
4. Check the hypothesis against the context.

Teachers should teach these four steps explicitly, model them several times with various words, and provide students with time to practice them. In so doing, teachers can scaffold this process, gradually releasing the responsibility to the students (see Clark & Graves, 2005, for a thoughtful discussion of scaffolding in comprehension instruction).

### **Principle 3: Teach the Underlying Morphological Knowledge Needed in Two Ways—Both Explicitly and in Context**

Although the ability to break words down into morphemes is best taught as a cognitive strategy, it also requires a certain amount of knowledge about language. Along with the four steps described above, this knowledge needs to be taught explicitly. There are three types of knowledge of language that students need to know to use morphology effectively:

**Knowledge of Prefixes and Suffixes.** Teachers can teach prefixes and suffixes in a variety of ways. Teachers should engage students in grouping words by prefix or suffix. They can then discuss what these words share in meaning or part of speech. In this way, students can articulate their own meanings of prefixes and suffixes. Providing a cumulative word wall with these prefixes and suffixes grouped by meaning will reinforce these lessons. Teachers can also develop students’ word con-

consciousness by encouraging them to seek out and analyze new examples of word parts to add to the wall. Like other vocabulary items, learning prefixes and suffixes will require practice and reinforcement. Table 2 displays the 20 most common prefixes and suffixes, adapted from Blevins (2001). Students may know many of the high-frequency affixes but need to learn the low- and medium-frequency affixes.

### Knowledge of How Words Get Transformed.

Students should be taught the changes in sound and spelling that are often required to extract roots from derived words. To do so, teachers can group words by root to show how a single word can take many forms. This can expand students' written vocabulary by providing them with several forms for a known word. For instance, Kinsella (2002) and others have advised teachers to create a word chart that displays these various forms of key words selected from a text that students are reading. Table 3 displays an example of such a word chart, with words drawn by us from a newspaper article about current events. As with the word wall grouped by prefixes and suffixes, students

can be engaged in finding and adding forms of these words themselves.

**Knowledge of Roots.** Students' abilities to extract roots from derived words can be a powerful strategy for acquiring new vocabulary, but only if students know the meanings of the roots. Although some roots are known to upper elementary students, it appears that others (such as *dense* and *fury*) may not be. Thus teachers need to teach a selected number of these roots as well. Clearly, this is a big task, given the huge number of roots that exist. As a starting point, teachers can teach some of the most common Latin and Greek roots (see Table 4). However, like other vocabulary words, these roots should not be presented as a list to be memorized, but rather they should be taught in meaningful contexts when they are most useful for students to comprehend particular texts. For instance, many of these roots such as *therm* and *hydro* may be best suited to science lessons built around expository text. For other resources on teaching morphological knowledge, see Bear et al. (2000).

**Table 2**  
**Most Common Prefixes and Suffixes in Order of Frequency**

Prefixes		
Highest frequency	High frequency	Medium frequency
un- (not, opposite of)	over- (too much)	trans- (across)
re- (again)	mis- (wrongly)	super- (above)
in-, im-, ir-, il- (not)	sub- (under)	semi- (half)
dis- (not, opposite of)	pre- (before)	anti- (against)
en-, em- (cause to)	inter- (between, among)	mid- (middle)
non- (not)		
under- (too little)		
in-, im- (in or into)		
Suffixes		
-s (plurals)	-ly (characteristic of)	-al, -ial (having characteristics of)
-ed (past tense)	-er, -or (person)	-y (characterized by)
-ing (present tense)	-ion, -tion (act, process)	-ness (state of, condition of)
	-ible, -able (can be done)	-ity, -ty (state of)
		-ment (action or process)
		-ic (having characteristics of)
		-ous, -eous, ious (possessing the qualities of)
		-en (made of)
		-ive, -ative, itive (adjective form of a noun)
		-ful (full of)
		-less (without)

Note. Adapted from Blevins (2001).

**Table 3**  
**Sample Completed Word Form Chart With Words Drawn From a Newspaper Article**

Noun	Adjective	Verb	Adverb
politics, politician	political		politically
strategy	strategic	strategize	strategically
provision	provisional	provide	provisionally
representation	representative	represent	
finance	financial	finance	financially
acceptance	(un)acceptable	accept	(un)acceptably

### **Principle 4: For Students With Developed Knowledge of Spanish, Teach Morphology in Relation to Cognate Instruction**

Teaching Spanish-speaking students to recognize and use cognates (words with similar spelling and meaning in two languages, such as *information* and *información*) has the potential to be a very powerful way for students to use their first language as an asset to improve their English reading comprehension. This strategy is particularly promising because many academic English words are similar in form and meaning to everyday Spanish words (e.g., *tranquil* is a rare, low-frequency English word while *tranquilo* is a common, frequently used Spanish word). But as with any technique or instructional strategy of promise, there are also pitfalls. Research suggests that this strategy may not work automatically for all students because students may lack proficiency in Spanish or may not have enough literacy in Spanish to recognize similarities in spelling (Nagy, García, Durgunoglu, & Hancin-Bhatt, 1993; Nagy & García, 1993). Even students with well-developed Spanish skills will need targeted instruction to learn how to recognize cognate relationships and use them to build reading comprehension in English.

One step to making cognate instruction effective is to teach the understanding of morphology in relation to teaching cognates. This is not difficult to do, given the prevalence of cognates among derived words (See the bold items in Table 1 for examples) and among Latin and Greek roots (virtually all of the roots

in Table 4 have some cognate relationship with Spanish words). Teachers can further subdivide their word wall to have a section for cognates and encourage students to find them. Students can also be taught to use common suffixes that are themselves cognates (See italicized suffixes in Table 1 for examples). They can be taught to recognize the regular relationships between English and Spanish suffixes (*-idad* in Spanish almost always translates to *-ity* in English, as in *originalidad* and *originality*).

### **Putting It All Together to Build Meaning**

As we have suggested, morphology is just one part of a comprehensive vocabulary and reading comprehension program for upper elementary students. However, it is important that we do not ignore such a potentially powerful tool to add to students' toolkits for extracting and constructing meaning from texts. As the insights of Brenda and Rafael reveal, this tool can be essential in our students' path toward becoming successful readers and writers.

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**Table 4**  
Common Latin and Greek Roots

Common Latin roots		
Root	Definition	Examples
Audi	Hear	Audience, auditorium, audible, audition
Dict	Speak	Dictate, predict, contradict, verdict, diction
Port	Carry	Import, export, portable, porter, transport
Rupt	Break	Abrupt, bankrupt, erupt, interrupt, rupture
Scrib/script	Write	Describe, inscribe, prescribe, scribe
Spect	See	Inspect, respect, spectacles, spectator
Struct	Build	Construct, destruct
Tract	Pull, drag	Attract, detract, contract, subtract
Vis	See	Visible, supervise, vision, visionary
Common Greek roots		
Auto	Self	Automobile, automatic, autograph, autobiography
Bio	Life	Biography, biology, biodegradable, biome
Graph	Written or drawn	Graphic, telegraph, seismograph
Hydro	Water	Dehydrate, hydrant, hydrodynamic
Meter	Measure	Barometer, centimeter, diameter, thermometer
Ology	Study of	Geology, biology, archeology
Photo	Light	Photograph, photocopy, photosynthesis, photoelectric
Scope	See	Microscope, periscope, stethoscope, telescope
Tele	Distant	Telephone, telescope, telecast, telegram

Note. Adapted from Blevins (2001).

*Kieffer is a graduate student at Harvard University, Cambridge, USA. E-mail michael\_kieffer@gse.harvard.edu. Lesaux teaches at Harvard University.*

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