The Nature, Learning, and Instruction
of General Academic Vocabulary

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Chapter 5

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Scholars have characterized school texts, especially those in content areas, as using a special register called academic language. Cummins (1979, 1984), in particular, distinguished between basic interpersonal communicative skills and cognitive academic language. For instance, the comment "Hey, that's a good point," while appropriate in a conversation between coauthors about an academic paper, would not be anticipated in a review by an editor. An editor would likely say, "The explanation in the second paragraph is noteworthy." The former illustrates the nature of language that Cummins describes as interpersonal communication, while the latter is a form of cognitive academic language.

Cognitive academic language is not simply a function of whether language is oral or written. Biber (1988) demonstrated that, even within oral language, a lecture that consists of a scientific exposition will be considerably more complex than an intimate interpersonal interaction. Typically, however, written language genres have more sophisticated vocabulary than oral language (Hayes & Ahrens, 1988). Even within the written language that appears in school texts, however, the nature of vocabulary can differ substantially across genres. The two excerpts that appear below illustrate two text types. Excerpt 1 (from a fourth-grade language arts text) falls into the category of general narrative exposition, and Excerpt 2 (from a fourth-grade social studies text from the same publisher) illustrates scientific exposition.

Excerpt 1: "Get that dog in," the pilot hollered. "I want to get out of here before the storm hits!" Akiak jumped and pulled and snapped. All she wanted was to get back on the trail. To run. To win. Then all at once, the wind gusted, the plane shifted, and Akiak twisted out of the handler's grip (Blake, 1997 in Cooper et al., 2003).

Excerpt 2: Geography is the study of the people and places of Earth. It explains the forces that shape the land. It explores how living things are

connected to the places where they live. Geography helps us understand our environment. An environment includes all the surroundings and conditions that affect living things (Viola et al., 2005).

While both texts that these excerpts represent have approximately the same percentage of rare words (around 23% for the narrative; 20% for the expository) (Hayes & Ahrens, 1988), the rare words in the two genres are different in kind. The narrative excerpt has synonyms for words that most fourth graders know (Dale & O'Rourke, 1981) such as *hollered* (yelled, shouted) and *gusted* (blew). By contrast, the synonyms for the rare words in the social studies texts are themselves likely not known by fourth graders: *affect* (have an effect on or influence) and *geography* (topography or natural features).

There is also a difference between the words *geography* and *affect* within the social studies text. Nation (1990) has distinguished between words specific to a content area (e.g., geography) and words that appear in numerous content areas (e.g., affect). This distinction, Nation has observed, is an important one to consider in the design of instruction. Words within the former group are likely to be addressed by content area specialists teaching a course or writers of textbooks and teachers' guides. Words of the second type—which Nation has called general academic words—are used to communicate the content of the topic and are not often addressed by either teachers or textbook writers of content areas.

General academic vocabulary has often been identified as an obstacle for many students, especially the students of poverty who depend on schools to become literate (Corson, 1997; Cummins, 1984). This argument has been made particularly for students who are English-language learners (ELLs) (Bailey, 2006). Reasons for this challenge may lie in the abstract content of much of this vocabulary and the shifts in meaning these words show in different conceptual contexts. Our inability to find instructional studies of general academic vocabulary suggest that this abstract and polysemous content may become an even greater challenge because these words are infrequently the focus of instruction. While the meaning of *geography* is likely to be addressed in social studies instruction, it is unlikely that instructional attention would be paid to *contain*, *certain*, and *cause*. In reading and language arts (in which most vocabulary instruction occurs), words such as *contain*, *certain*, and *cause* will be passed over to attend to unfamiliar words such as *hollered* or *gusted*.

Attention to general academic vocabulary has the potential for being a particularly productive area of instruction and learning because

many of these words belong to rich morphological families. When the word *connect* is taught, the members of its morphological family such as *connection*, *connective*, *disconnect*, *reconnect, connectible*, and *connectibility* can also be addressed. Another feature of general academic vocabulary that we report in this chapter is the presence of many words within this group that have cognates in Spanish. Since a substantial percentage of these cognates are more common in Spanish conversation than in English, attention to this group of words in instruction could build on a potential fund of knowledge held by Spanish-speaking students.

For these reasons, we have chosen to make the focus of this chapter on general academic vocabulary and not the content-specific vocabulary of content areas or the literary vocabulary of narratives. We develop four topics related to general academic language: (1) defining general academic language relative to other types of academic language, (2) describing general academic language through the lenses of two corpora, (3) reviewing available research on the learning and instruction of morphology and cognates, and (4) suggesting applications and extensions of this review on general academic vocabulary for educators and researchers.

Defining Academic Vocabulary

General academic vocabulary needs to be understood in relation to three other types of vocabulary that occur in school texts and tasks: content-specific vocabulary, school-task vocabulary, and literary vocabulary Illustrations of words in each of these groups appear in Table 5.1. The type of vocabulary most commonly associated with academic learning consists of the technical words around which content area instruction typically focuses, words such as *geography* and *democracy* in social studies and *photosynthesis* and *erosion* in science. Marzano (2004) has produced a vocabulary curriculum of content-specific words by drawing on (a) standards documents from 13 national organizations, including the major content areas (i.e., mathematics, language arts) and secondary areas (e.g., health), (b) a synthesis of more than 100 national and state documents (Kendall & Marzano, 2000), and (c) the Council for Basic Education's (1998) synthesis of 22 national and state documents. From these documents, Marzano identified 7,923 terms that can be classified into 14 subject areas and, within each subject area, at one of four grade-level spans: K–2, 3–5, 6–8, and 9–12. A sample of terms from Marzano's analysis for seven primary subject areas for grades 3–5 is included in Table 5.2.

Table 5.1. Examples of words within different vocabulary groups

Vocabulary group	Examples	Frequency	Dispersion
Content-specific (social studies)	landforms	2	.21
	geography	9	.44
	continents	20	.57
	globe	24	.63
	Meridian	3	.41
	hemispheres	2	.54
	equator	24	.51
	X	9.7	.47
School-task	preview	1	.56
	draft	11	.60
	statement	52	.63
	concluding	2	.72
	summarize	4	.74
	outline	24	.83
	opinion	52	.89
	X	20.8	.71
Literary	blizzard	4	.67
	hollered	1	.32
	burrowed	3	.43
	handler's	.02	0
	pilot	19	.72
	cautiously	6	.61
	refuge	5	.65
	X	5.4	.45
General academic	affect	63	.85
	features	48	.88
	conditions	107	.91
	created	65	.91
	reasons	91	.93
	specific	97	.93
	experienced	31	.97
	X	71.7	.91

The content-specific vocabulary in Table 5.2 for social studies, mathematics, and science illustrates the focus of instruction at the target grade level. For example, a topic such as ecosystems is evident in the term *rain*

Table 5.2. Illustrative vocabulary of seven subject areas for grades 3–5

Content area	Sample words
Civics	Abuse of power, campaign, elected representative, geographical representation, individual liberty, Labor Day, national origin, patriotism, school board, Uncle Sam, welfare
Economics	barter, division of labor, firm, household, limited budget, natural resource, rent, tax, wage
English language arts	abbreviation, capitalization, e-mail, genre, illustration, learning log, paragraph, reading strategy, table, verb
Geography	billboards, discovery, fall line, harbor, Japan, land clearing, national capital, Pacific rim, rain forest, technology, vegetation region
History	ballad, Daniel Boone, factory, Hanging Gardens of Babylon, Jackie Robinson, labor, Nathan Beman, the Pacific, race relations, tactic, vaccine, Zheng He
Mathematics	addend, capacity, equation, gram, improbability, mass, obtuse angle, quotient, sample, unit conversion
Science	bedrock, Earth's axis, gases, inherited characteristic, magnetic attraction, ocean currents, recycle, technology, water capacity

forest for geography. A unit on geometry is evident with the term *obtuse angle* among the mathematics terms. The vocabulary for English language arts in Table 5.2 is of a different type than the vocabulary for social studies, science, and mathematics. Prominent terms for English language arts are *learning log*, *reading strategy*, and *capitalization*. Unlike a concept that may underlie a selection of literature (e.g., *survival*, *bravery*), a term such as *learning logs* is used in instructional tasks including the directions in workbooks and tests. None of the words for the English language arts in Table 5.2 pertain to the content of texts that students might read—words that describe themes of literature or words that describe how characters might move or what or how they might speak or act. As is evident in Excerpt 1, children's literature has an abundance of unique vocabulary (e.g., *hollered*, *gusted*).

Within English language arts standards, the emphasis has been on instructional and reader processes, not on the content of literature (Hirsch, 2006). Hirsch's (1992) Core Knowledge program for grade-four English language arts illustrates one form that a content-specific English language arts curriculum could take. Among the topics are characters

in literature (Merlin, Lilliput, Robinson Crusoe), titles and authors/poets/playwrights (e.g., "Dreams" by Langston Hughes, *Treasure Island* by Robert Louis Stevenson), genres (e.g., myths, epic, speeches), forms of language (e.g., phrases, proverbs, idioms), and grammatical terms (e.g., prepositions, interjections, adverbs).

Scholars have labeled vocabulary such as many of the terms that are now presented within English language arts standards in Table 5.1 (e.g., *learning logs*, *reading strategy*) as the school-task vocabulary. Downing (1970) was the first to identify the many terms that teachers use as part of reading instruction or that writers of textbook programs use to describe instructional processes and tasks. Downing observed that often times teachers may be oblivious to the fact that their students do not know the terms and that some students' reading acquisition can be negatively affected as a result. Some of these terms, such as *capitalization* have to do with features of written language (e.g., *letter*, *alphabet*, *phrase*, *sentence*, *vowel*). Others have to do with reading processes such as *reread* and *summarize*. Such terms influence students' performances on comprehension questions (Cunningham & Moore, 1993) as well as on standardized tests (Butler, Stevens, & Castellon, 2006).

The vocabulary of the excerpt from children's literature illustrates a third kind of academic language—literary vocabulary. In addition to the content of literature that Hirsch (1992) identified in his Core Knowledge curriculum, literature uses particular verbs, nouns, and adjectives to describe the states of characters, their actions, and the settings in which these actions occur. Many of these words occur infrequently in conversations and in texts (e.g., *hollered*, *gusted* in Excerpt 1). While the same concept may be repeated in a poem or story, writers of literary texts will typically use synonyms or words that connote slightly different meanings for the concept. In a story on a character finding himself unprepared for the wilderness in which he is lost such as *Hatchet* (Paulson, 1987), various words will be used to describe the character's disposition—*terrified*, *frightened*, and *discouraged*. Each of these words appears only a single time in the text. While students may understand the concept *afraid*, they may not have encountered the synonyms for the concept before.

The final group of words found in school texts consists of general academic vocabulary. Similar to the literary words that characterize narrative texts, these words are not apparent in the content-specific vocabulary sampled in Table 5.2. Within Excerpt 2 from the social studies text (see page ##), such words are prominent (e.g., *contain*, *certain*, *cause*). These are words whose meanings often change in different content areas

(e.g., *form*, *process*). Further, writers of texts as well as teachers often assume that students know their meanings.

An analysis of the four groups of words in Table 5.1 illustrates the manner in which the general academic words differ from the other three groups. The frequency and the dispersion index was obtained from the *Word Frequency Book* (Zeno, Ivens, Millard, & Duvvuri, 1995) for the words illustrating each of the four groups of words. Frequency in Table 5.1 is a prediction of the number of appearances of a word per one million words of text (Zeno et al., 1995). The dispersion index reflects how widely a word is used in different subject areas (Carroll, Davies, & Richman, 1971). Words that appear in only one content area have a D value of 0; words that appear in many content areas (e.g., social sciences, science, mathematics, fine arts, literature) could have a D value as large as 1.0 (Carroll et al., 1971).

Two groups—the literary words and the content-specific words—have similar frequency (5.4 and 9.7, respectively) and dispersion indices (0.45 and 0.47, respectively). Overall, these words appear rarely in texts and do not appear in many subject areas. The school- task words have a moderate number of appearances (approximately 21 per million words of text) and the dispersion index is also moderately high (0.71), indicating that they appear across several content areas.

The general academic words have high frequency ratings and dispersion indices. On average, these words appear 71.7 times per million words of text and have an average dispersion index of 0.91, indicating that they appear across numerous subject areas. In the following section, we expand on this description by examining the words on two lists of general academic words.

Characteristics of General Academic Words

An exhaustive review of literature produced no studies of the effects of instruction of general academic vocabulary, even among scholars who have highlighted the role of these words in the success of university students who are non-native English speakers (Coxhead, 2000; Nation, 1990). As we will demonstrate with analyses of two corpora of general academic vocabulary, however, these words have certain features that have been considered in instructional interventions: morphological richness and English–Spanish cognates. While research on effects of instruction on general academic vocabulary is not yet available, studies have been conducted on these two features of vocabulary.

The first corpus consists of the Academic Word List (AWL) developed by Coxhead (2000) as part of a long-standing program of work to support English reading proficiency of university students who are non-native English speakers. Recently this list has begun to be used for middle and high school interventions as well (Snow, 2007). Recognizing that the general academic vocabulary in the elementary and middle school may differ from that found in college texts (Hyland & Tse, 2007), Hiebert (2007) developed the Core Academic Word List (CAWL). The CAWL consists of 400 morphological families in which at least one word is among the 5,586 most-frequent words in samples of written English from grades kindergarten through college (Zeno et al., 1995). Further, morphological families were selected in which at least one member had a dispersion index of 0.8 or higher. These choices were made to ensure that experiences with the 400 morphological families would extend to students' reading in the content areas during the upper grades of the elementary school and middle school.

To demonstrate the feasibility of suggesting that research on instruction of morphology and cognates can be a resource for advocating and designing instruction of general academic vocabulary, we have analyzed these two corpora for their morphological richness and the presence of cognates.

Morphological richness

Morphemes—the smallest meaning units in English—are of two types: free and bound. Examples of base morphemes are *type* and *morpheme*. In the words *types* and *morphemes*, the *-s* illustrates a bound morpheme. The addition of inflected endings (e.g., plurals [*-s*, *-es*], verb tenses [*-s*, *-ed*, *-ing*], comparatives [*-er*, *-est*]) change the meaning of a base word only slightly. Some words take derivational suffixes that change the part of speech of a word (e.g., *construct* to *constructive* to *constructively*). When a derivational prefix is added to a word, the meaning of the base word is changed (e.g., *deconstruct*, *reconstruct*). Whether a word has both inflected and derivational affixes is a function of the historical origins of a word. Unlike French/Latin words, which use derivational affixes to change the meaning of the base word, words with origins in Anglo-Saxon combine base words to form new words (i.e., compound words). An example of a compound word is *coldblooded* (*cold* akin to the German word *kalt* and *blood* to the German word *Blut*). The addition of derivational affixes (e.g., *-ion*, *non-*) is characteristic of words that came into English through French and Latin (Barber, 2000).

As texts become more complex with students' movement through school, derived words become more frequent (Nagy & Anderson, 1984; White, Power, & White, 1989). Nagy and Anderson (1984) analyzed a sampling of English vocabulary according to the criterion that, if the base or root word is known, readers have the potential to understand an unfamiliar word based on knowledge of the base or root word in the context of a text. Based on this criterion (the fourth of six categories that describe the transparency of the meaning of derived words), Nagy and Anderson predicted that 60% of the unfamiliar words students encounter in texts are derived words that students may be able to understand based on their knowledge of a member of the word's morphological family. (See Chapter 1, this volume, for more information on teaching vocabulary to young learners using word roots.)

Since morphological relationships contribute substantially to students' word learning, identifying words with rich morphological families was a key factor in the development of the CAWL (Hiebert, 2007). Hiebert used the fifth of Nagy and Anderson's (1984) categories (i.e., derived words that require an explicit extension such as *apart/apartment* and *artifice/artificial)* to establish inclusion within morphological families. Hiebert made this extension a priority because the focus of the CAWL is on instruction in morphology at the upper elementary grades. With this inclusive definition of morphological families and with the requirement that a head word represent a morphological family, it should come as no surprise that the 400 words on the CAWL represent morphological families with an average of 5.4 members.

Coxhead (2000) defined a word family according to all inflections and frequent, productive, and regular prefixes and suffixes of a base or stem word. On average, head words on the AWL represent morphological families of 5.5 words. Of the 570 words on the list, 76% had a morphological family of three or more words and 24% represented one or two words. These analyses show that, overall, a characteristic of general academic words is that they come from rich morphological families.

Cognates

The number of derivational affixes represented within the morphological families of general academic words suggests that the majority of these are French-Latin in origin (Barber, 2000). The Romance origins of general academic words are relevant for the many native-Spanish speaking students in American schools because Spanish has closer ties to French and Latin—Romance languages—than to German. French was a source for

many of the words that comprise the academic layer of English (Barber, 2000). Analyses have shown that more than one-third of the words in academic texts are Spanish-English cognates (Nash, 1997) and that knowledge of cognates mediates reading comprehension achievement (Nagy, García, Durgunoglu, & Hancin-Bhatt, 1993).

Lubliner and Hiebert (2008) developed a category scheme to analyze English-Spanish cognates based on specific spelling patterns. The scheme consists of five clusters that attend to regular orthographic shifts from English to Spanish. In the first cluster (*same*), the English and Spanish words are spelled the same in English and Spanish (e.g., *total/total*; *popular/popular*). The second, and largest, cluster *(add/change)* includes 11 cognate patterns characterized by minor spelling differences such as an additional letter(s) at the end of the Spanish word (e.g., *art/arte*, *family/familia)*. The third cluster (*verbs)* is characterized by a common base of a verb followed by inflectional endings that signify tense, number, and formality in Spanish (e.g., *accepted/aceptado*). The fourth cluster (*es)* consists of words that begin with *s* in English and change to *es* in Spanish (e.g., *student/estudiante)*. The fifth cluster (*other)* is a catchall of words that have a variety of spelling differences (e.g., *benefit/beneficio*).

Using this category scheme, Lubliner and Hiebert (2008) established that nearly 70% of the 570 head words on the AWL were morphologically transparent English-Spanish cognates. Hiebert (2007) used the same category scheme to identify head words on the CAWL that had morphologically transparent English-Spanish cognates. Of the 400 words on the CAWL, 61% of the English words were of this type.

An additional analysis was conducted to determine how many of the cognates on the AWL had higher frequencies in Spanish than in English. Lubliner and Hiebert (2008) conducted this analysis because of the distinction of Bravo, Hiebert, and Pearson (2007) between high-frequency and low-frequency cognates. An illustration of a high-frequency Spanish-English cognate is *facil*, which is the common word in Spanish for the English word *easy*. *Facilitation* (a word on the AWL) and members of its morphological family—*facilitator*, *facilitate*—are used in academic texts and speeches but not common speech in English. Of the 268 AWL cognate pairs for which frequency rankings in both Spanish and English could be obtained, 85% were more frequent in Spanish than English. Provided that Spanish-speaking students can recognize an English word in a text as a word in their spoken language, the higher frequency of Spanish words that correspond to English academic vocabulary words could provide them with a linguistic advantage.

The analyses of these two lists of general academic words indicate that many are French-Latin in origin. This origin means that these words typically represent rich morphological families and have cognates to Spanish words.

Learning and Instruction of General Academic Vocabulary

We could not find any studies on how well students perform with general academic vocabulary nor could we find any studies of interventions on general academic vocabulary. There are studies, however, of learning and instruction of words based on both morphology and cognates. Because descriptive analyses have shown that many general academic words have rich morphological families and cognates, we consider the literature on these two topics.

Learning and Instruction: Morphology

As the analyses of the general academic vocabulary corpora showed, derivational affixes (prefixes and suffixes) are more important to academic vocabulary than inflected suffixes. Native English speaking children have generally acquired most inflected forms in their oral language (both receptive and productive) before they start school (Anglin, 1993; Carlisle & Fleming, 2003; Tyler & Nagy, 1989). Typically, children who are beginning school also know some derivational suffixes, such as *-er* (e.g., *runner*, *teacher*) and the -y adjective (e.g., *smelly*) (Berko, 1958). However, most derivational suffixes are acquired between first and fifth grades. Based on a extensive study of derivational knowledge, Anglin (1993) reported that students learned about 4,000 base words and about 14,000 derived words during the period from grades one through five. Explicit knowledge of the morphemic structure of words (also described as morphological awareness) continues to develop through the high school years (Anglin, 1993; Carlisle, 2000; Mahony, 1994; Tyler & Nagy, 1989; Wysocki & Jenkins, 1987). Even with orthographic and phonological abilities accounted for, morphological awareness and vocabulary knowledge correlate highly. Nagy, Berninger, Abbott, Vaughnn, and Vermeulen (2003) reported that this correlation was highest at grades 4 and 5 ($r = 0.83$). Beyond this level into high school, the correlation decreased slightly (Nagy, Berninger, & Abbott, 2006). Morphological awareness also contributes to reading comprehension, independent of its relation to vocabulary (Katz, 2004; Nagy et al., 2006).

Findings of a recent study suggest that instruction that fosters morphological awareness may be appropriate for many students, not simply learning disabled students. Nagy et al. (2006) reported a substantial amount of variation among students in the speed with which students decoded morphologically related words even within a sample where 98% of the students were of European-American descent and only 8 qualified for free or reduced lunch. Morphological awareness proved to be a powerful predictor of reading comprehension, reading vocabulary, and spelling through the last grade that they tested (grade 9). Nagy et al. speculated that higher levels of morphological awareness are associated with greater accuracy and fluency in decoding morphologically complex words, which in turn contribute to greater comprehension.

The research team that produced these descriptions of students' morphological knowledge has studied an intervention to support the development of morphological awareness in learning-disabled students. Berninger et al. (2003) contrasted a morphological condition with a phonological one. The activities of the morphological condition were designed to build sensitivity to morphological composition of words, such as word building (producing written words by combining base words and affixes) and unit finding (identifying base words and affixes in written words). Students also received instruction in the meaning of prefixes and suffixes, had opportunities to highlight and discuss unfamiliar words, and practiced oral reading fluency and text comprehension. The program in phonological knowledge had the same goals but activities focused at level of phonemes and graphemes rather than morphemes. Berninger et al. reported that, while both the phonological and morphological interventions produced an increase in accuracy of phonological decoding for students with reading disabilities, those in the morphological intervention had higher performances on nonsense word reading. Effects on vocabulary and comprehension measures were unclear since these measures were not administered.

Baumann et al. (2002) implemented a project to establish which aspects of morphological training produce the greatest benefits. The National Reading Panel (NICHD, 2000) had identified a shortcoming of much vocabulary research to be the confounding of numerous instructional components, making it uncertain as to which components produce the greatest effects. To isolate variables, Baumann et al. compared fifth graders' performances as a function of morphological instruction of prefixes, instruction in contextual clues, a combined treatment of morphological and contextual knowledge, or an instructed control group.

The morphology instruction focused on eight sets of prefixes, clustered according to similar meaning such as the not family (*dis*, *un*, *in*, *im*) and the number family (*mono*, *bi*, *semi*). The context group was taught eight ways of using context such as appositives or synonyms. Following 12 fifty-minute lessons, students were tested on their ability to recall the meanings of words used in the instructional lessons (lesson words) and their ability to correctly identify the meaning of either uninstructed words using taught morphological elements or words in texts using taught context clues (transfer words). Both immediate and delayed effects of morphological and contextual analysis instruction were found for lesson words and an immediate effect for both treatments for transfer words. However, instruction in morphological or contextual analysis, whether in isolation or combination, did not significantly affect text comprehension. Further, the morphological and contextual instruction in combination was as effective as either form of instruction conducted separately.

Henry's (1989) structural-historical approach took another direction in research on morphological training. Because letter-sound correspondences and syllabic and morphemic patterns differ according to word origin (Anglo-Saxon, French/Latin, and Greek), students in Henry's study were taught to distinguish between letter-sound correspondences and morpheme patterns on the basis of words' origins. In Henry's study, upper elementary grade students who received decoding instruction made significant gains in word structure knowledge and in decoding and spelling achievement. Those students receiving decoding instruction based on word structure and word origin learned more about the structure of English orthography and also made similar gains in reading and spelling performance. In that the instruction provides information at both the phoneme and morpheme levels, it is difficult to determine the degree to which morphological instruction is useful.

A final example of directions of research on morphology is that of Nunes and Bryant (2006). While Nunes and Bryant have only recently begun to include measures of vocabulary with those of spelling that have been their primary interest, the underlying stance of the project is that morphology, like phonology, needs to be taught explicitly if many students are to develop appropriate knowledge and strategies. Further, the systematic progression of the project from laboratory to large-scale implementation provides a model for research on morphology instruction. Nunes and Bryant began with quasi-experimental studies in a laboratory setting (instructor student ratio of 1:2) and in classroom settings taught by members of the research team. These studies were of limited duration

and addressed limited content (i.e., two suffixes). Based on positive effects on spelling in this initial phase (with a significant, although weaker, effect in the classroom), a second phase was initiated in which classroom teachers conducted the instruction on a wider range of affixes and spellings with members of the research team at hand (Nunes, Bryant, & Olsson, 2003). A significant positive effect of this instruction on students' spelling led to a larger classroom intervention where teachers received a CD-ROM that contained tasks or games and a small amount of professional development. This larger classroom intervention also produced strong effects on students' spelling (Nunes & Bryant, 2006).

Finally, the research program attended to the effects of teachers' participation in a course about morphemes and spelling. The course did increase teachers' awareness of morphology and its links with spelling. Further, students' spelling improved when teachers used at least some of the project tasks. More recently, intervention tasks were presented in a training program designed to improve students' vocabulary. The program, administered with minimal constraints, improved students' knowledge and understanding of polymorphemic words.

While the review of the National Reading Panel (NICHD, 2000) indicated that evidence for large-scale efforts of vocabulary instruction were limited, an increasing number of projects are showing that instruction morphology can have a positive effect on students' learning of vocabulary and spelling. Further, these studies provide models for instructional content, strategies, and tasks. In that rich morphological families characterize general academic vocabulary, these studies demonstrate the benefits and also the means that can be used to facilitate general academic vocabulary.

Learning and Instruction: Cognates

Students who are ELLs face particular challenges learning English vocabulary. The historical antecedents of academic vocabulary, however, may mean that native Spanish speakers have resources to draw upon that are not as readily available as speakers of other native languages, including English. Many native Spanish speakers learning to read in English, however, need to be made aware of these connections through instruction. Nagy et al. (1993) found that the relationship between first-language vocabulary and second-language comprehension of texts containing cognates was positive for those students who recognized the most cognate relationships and negative for those who recognized the fewest cognate relationships

Factors such as ability, biliteracy, and age appear to affect bilingual students' ability to recognize and use cognates. Successful Spanish-speaking bilingual students make effective use of cognates while less proficient students do not know how to apply their knowledge of Spanish to reading tasks in English (Jiménez, García, & Pearson 1996). Biliteracy confers an advantage to students in terms of their ability to transfer strategies across languages, including enhanced ability to use cognates (Proctor, August, Carlo, & Snow, 2006). Student age also appears to influence the successful use of cognates. Middle school grade students are more successful in cognate recognition tasks than elementary students, suggesting that cognate awareness increases with age and cognitive maturity (Hancin-Bhatt & Nagy, 1994).

Several studies have identified factors such as orthographic and phonological overlap and word frequency in Spanish and English that may be salient in students' ability to recognize and use cognate information. According to Bowers, Mimouni, and Arguin (2000), cognate relatedness is based on the overlap of orthographic features. Findings reported by Nagy et al. (1993) confirm this argument in that students were more successful in identifying cognates with clear orthographic overlap; even small spelling differences reduced students' ability to recognize English-Spanish cognate pairs.

For native Spanish speakers who are being taught to read in English and not in Spanish, however, the degree of phonological transparency between cognates may be particularly critical. For example, when confronted with the word *possible* [**pos**-uh-buhl] in a text, students may not recognize that the word is the same as the word *possible* [po-**see**-blay] due to differences in pronunciation and accent. This prediction is confirmed by findings from a study by Carlo, August, and Snow (2005) who reported that fourth graders' ability to correctly identify low-frequency English words that are cognates to Spanish was predicted by performances on measures of Spanish reading. Students who were not fluent readers in Spanish were not able to recognize cognates in English text to the same degree as fluent Spanish readers, regardless of the language of instruction.

Research on the amount of instruction required to bring native Spanish speaking students to relatively high levels of cognate recognition in reading English is based primarily on information from research on the Vocabulary Improvement Project (VIP) first reported on by McLaughlin, August, and Snow (2000) and subsequently by Carlo et al. (2004) and Carlo et al. (2005). Because this research program includes

an array of vocabulary strategies, the specific effects of cognate instruction in the development of morphological awareness and proficiency with academic vocabulary is not clear. However, results of the project are indicative of the kinds of instruction that can support the learning of academic vocabulary.

In its initial implementation (Carlo et al., 2005; Lively, August, Carlo, & Snow, 2003), VIP was conducted with a set of fables (Lobel, 1980). A group of 10–12 target words from a different fable provided the focus of each of the eight lessons. After 10 weeks of instruction, large differences were found on all measures for language status (ELLs versus English-only students) and geographic site. Impact of the intervention was found only for the mastery test that measured whether students had retained the vocabulary words taught in the curriculum.

Carlo et al. (2004) tested VIP next with fifth graders, making the instruction more rigorous by extending the length of the intervention to 15 weeks and by using social studies content (immigration). This more rigorous version of the intervention produced significantly higher performances than comparison students on generalization measures of word association, polysemy, and cloze as well as on the mastery test of taught vocabulary.

The topic of immigration and the use of informational text also meant that the vocabulary was challenging. Unlike the fourth-grade intervention with narrative text where approximately 20% of the target words had clear Spanish cognates, approximately two-thirds of the words in the fifth-grade social studies instruction were cognates. We conducted an analysis of the number of general academic words in the Carlo et al. (2004) study. A substantial number of the words were content-specific words (e.g., *transcontinental*, *treaty*, *tenement)*. Since some of the texts that Carlo and colleagues used were trade books, literary words were also prominent among the vocabulary (e.g., *fledging*, *straddle*, *ominous*, *scorn*). However, general academic words were also present. Of the 169 words that Carlo and colleagues taught as part of the immigration unit, 23% were on the AWL and 16% on the CAWL.

Studies of the ability of native Spanish-speaking students to use their knowledge of Spanish cognates in reading English indicate that many do not make these connections without at least a modicum of explicit instruction. When they are guided in using this knowledge as part of instruction, however, their knowledge of English vocabulary expands. While research to date has not attended to the learning of general academic vocabulary as part of interventions, efforts such as the VIP

illustrate ways in which native Spanish-speaking students can be taught to use their knowledge of cognates in understanding academic words in English.

Implications and Extensions

While specialists who instruct university students who are non-native English speakers have emphasized the importance of general academic vocabulary, a similar emphasis has not been apparent in curricula for students learning to read in their first language or of students learning to read in English. Many educators with a specialty in reading may never have received or taught a lesson in general academic vocabulary. This lack of attention to general academic vocabulary is indicative of the atheoretical nature of the vocabulary curriculum that Pearson, Hiebert, and Kamil (2007) have described. However, analyses such as those of Hiebert (2007) indicate that general academic vocabulary consumes a sufficiently critical portion of content area texts, even in the upper elementary grades, to make it a factor in proficient reading.

An unanswered question is whether general academic words, with their often variable meanings in different content areas and contexts, can be taught effectively and efficiently. Even among those who have emphasized the need to attend to general academic vocabulary with university students who are non-native English speakers, the nature and effects of instructional programs that focus on general academic vocabulary have not been documented. A research project that focuses specifically on general academic vocabulary in middle schools is currently underway (Snow, 2007), components of which will be described subsequently to illustrate the form that instruction of general academic vocabulary can take. However, effects of this project have not been reported to date. What we know at present about the learning of general academic vocabulary is based on studies of morphology and cognates. While the findings are not specific to general academic vocabulary, these studies have shown that students' knowledge of words in reading and spelling can be improved by instruction that focuses on morphology, including cognates. This instruction makes a difference to general groups of students, in addition to those who typically have lower levels of morphological awareness such as learning-disabled students. When instruction has emphasized cognates with native Spanish-speaking students, the learning of non-native English speakers who often have lower vocabulary performances is also enhanced.

We anticipate that instruction of general academic vocabulary will increase morphological awareness as well as facility with general academic vocabulary. Carlisle (2006) and Nunes and Bryant (2006) have raised the need for increased attention to morphological knowledge within the school curriculum, especially in the middle grades and beyond. As Carlisle (2006) stated

> Leaving morphological analysis to be discovered by students on their own means that those who are in some way challenged by language learning are likely to be left behind by their peers in the development of vocabulary, word reading, and reading comprehension. (p. 90)

The presence of the cognates among general academic vocabulary also means that these words are a potentially rich fund of knowledge for Spanish-speaking students. The finding that 70% of the head words on the AWL are transparent cognates and 50% of these words are either highly or moderately frequent in Spanish means that these words are used commonly in oral Spanish discourse. However, it is unlikely that Spanish-speaking students will automatically make the connections between languages if they are learning to read in English (and not in Spanish first). Although orthographic similarities may appear obvious, the differences in phonological representation need to be considered. That is, students may not recognize that a Spanish word that they use commonly in conversations is very similar to an English word in their texts. Spanish-speaking students likely require explicit cognate instruction if they are to realize the potential value of their linguistic fund of knowledge.

What form might instruction of general academic vocabulary take? The first response to this question is the form that such instruction should *not* take. Instruction should not take the form of distributing word lists that teachers are asked to systematically instruct from top to bottom— and that students are asked to learn or memorize. There is no evidence that such learning or instructional experiences will develop the facility with this vocabulary that is necessary for success in the content areas. Further, there is no evidence of which words among the general academic vocabulary require support and in what content areas. At present, the data on which words are within students' vocabularies are from an outdated and methodologically flawed source (Dale & O'Rourke, 1981). Studies that establish levels of students' knowledge of general academic words in particular content areas are needed. Studies of the extent to

which students can generalize their knowledge of base words and derivational affixes within morphological families are also needed. In all likelihood, however, there are substantial numbers of general academic words that would benefit from instructional attention. The review of studies of morphological awareness and of cognates indicate that explicit instruction is needed for students to develop their capacity to expand their vocabularies on the basis of morphological characteristics.

In addition to the previously reviewed studies where morphological knowledge andcognates were the focus, there is a project that is currently examining effects of instruction of specific words on the AWL (Coxhead, 2000) to middle school students (Snow, 2007). In this project titled Word Generation, a group of five words from the AWL is the focus for a week. These words appear in a text that students read (or that is read to students) on Mondays as part of their homeroom period. The texts pertain to topics such as cloning or drug testing in the workplace that are viewed as interesting and controversial to adolescents and young adults. During the homeroom periods of a week (every day or 4 days a week), students are involved in an experience with the texts, content, and words. The science, social studies, and mathematics teachers as well as the English language arts teachers are given information on how the words apply to their content. Students end the week by writing their response or opinions about the topic.

Middle schools have homeroom periods in which instruction such as Word Generation (Snow, 2007) can occur. But where should instruction of general academic vocabulary occur in the upper grades of the elementary school? We suggest that, starting in grades 3 or 4,, this instruction should occur in the reading or language arts period. The reading and language arts are consuming more and more of the school day in elementary schools. Regardless of claims, narrative text continues to consume the curriculum (Walsh, 2003). As the examples in Table 5.1 (see page ##) illustrate, there are critical differences in the vocabularies of narrative and informational texts. One of these differences is in the presence of general academic vocabulary within informational text. General academic vocabulary needs to be situated firmly within the reading and language arts block and then extended to other subject areas across the curriculum. The fact that general academic vocabulary has a high frequency rating and a high dispersion index underscores the value of this instruction. General academic vocabulary words are likely to appear often in a broad array of texts that students read in school, making instruction of this vocabulary essential across content areas. Instruction in these words can

provide students with the opportunities to develop understandings of the morphological features of vocabulary within the French/Latin layer of English and the polysemous nature of vocabulary.

Conclusions

In this chapter, we distinguished general academic vocabulary from the content-specific vocabulary of subject areas such as social studies (e.g., *geography*, *environment*), school-task vocabulary that teachers and students need to communicate about tasks (e.g., *learning logs*, *adverb*), and the literary vocabulary of narrative texts (e.g., *gusted*, *hollered*). There is evidence that general academic vocabulary is prominent in content area texts. There is also evidence that students benefit from instruction that promotes morphological awareness. In the decade to come, we are hopeful that reports of instructional projects and interventions on general academic vocabulary will increase. We predict that such attention to the linguistic patterns and meanings of general academic words will contribute to higher levels of comprehension with content area texts and content for many students, particularly students who are English Language Learners as well as those who struggle in becoming proficient readers.

Questions for Discussion

1. Identify a lesson from the beginning, middle, and end of the teachers' manuals for the primary reading/language arts program that your educational agency uses. Follow the same procedure for the science program used by your educational agency. Make a list of the words that are the focus of vocabulary instruction in both of the programs.
    - (a) Sort the words in each list according to the four categories that are described in this chapter.
    - (b) How consistent is the representation of different categories in the two lists to the information presented in this chapter?
    - (c) How well-represented is general academic vocabulary in the words that are identified for instruction?

2. Next, locate the text that accompanies the lessons that you have just analyzed. Study these texts for the presence of general academic words (e.g., *conditions*, *process*, *reasons*, *specific)*. If

possible, enter sample portions of the texts into one of the available analyzers on the Internet.

    (a) What portion of the words in the texts consists of general academic text?

    (b) How attentive is instruction in the teachers' manuals to the presence of this general academic text?

3. Using the same lessons from the teachers' manuals and the accompanying student texts, examine treatment of morphological connections across words.

    (a) How many words within the student texts belong to morphological families, which have similar meanings but differ in affixes and inflected meanings (e.g., *reason*, *reasonable*)?

    (b) How many words within the student texts are compound words (where two free morphemes form a new word such as *rainforest*)?

    (c) How many instances can you find where several words occur together consistently to convey a special meaning as in *scientific method* or *learning log*?

    (d) What is the nature of instruction that addresses these different forms of morphological complexity?

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