## Clinical Focus

# Key Elements of Robust Vocabulary Instruction for Emergent Bilingual Adolescents

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**Purpose:** In this clinical focus article, the authors argue for robust vocabulary instruction with emergent bilingual learners both in inclusive classroom settings and in clinical settings for emergent bilinguals with language and literacy disorders. Robust vocabulary instruction focuses on high-utility academic words that carry abstract meanings and appear in texts across content areas (e.g., *diminish*, *ambiguous*). For emergent bilinguals, vocabulary instruction should be infused with morphological analysis emphasizing Latin roots to support students to problem-solve meanings of new, unfamiliar words and make connections between semantic clusters of related words in English. An innovative and critical component of this instructional approach is to support emergent bilinguals to leverage their linguistic resources by making connections to their home languages. Five design principles for teaching emergent bilinguals to engage in morphological analysis with Latin roots are presented. These design principles are illustrated with

examples of evidence-based practices from intervention materials for instruction. Examples are drawn from varied instructional contexts. We present a synthesis of findings from implementation trials of our instructional program. Finally, application of the approach to clinical settings for speech-language pathologists are addressed.
**Conclusions:** Clinical practice with emergent bilingual learners at intermediate and advanced stages of proficiency should incorporate robust vocabulary instruction for emergent bilinguals from a variety of cultural and linguistic backgrounds. Clinicians should focus on high-utility academic words, and they should teach morphological problem-solving skills for generative word learning. Clinicians should leverage emergent bilingual learners' home language resources for developing morphological problem-solving skill.
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Emergent bilinguals—students who come from a home where a language other than English is spoken and who are in the process of developing English proficiency for accessing grade-level content—represent the fastest growing group of students in U.S. schools, currently comprising nearly 10% of the school-age population (U.S. Department of Education, 2017). Bilingualism offers extensive social, economic, and cognitive benefits (see Kroll & Dussias, 2016, for a review). Yet the road to bilingualism can be challenging for these students who often do not

receive the quality and intensity of instruction needed to develop advanced language proficiency but nonetheless are expected to quickly become adept at academic English in school. Their challenge is compounded by the fact that a majority of emergent bilingual learners in the United States attend schools with histories of low academic achievement, many of which are situated in high concentrations of poverty (Han, 2012; Snow, Burns, & Griffin, 1998). Thus, this diverse population is widely considered among the most vulnerable of learners, as indicated by disparities in academic achievement (U.S. Department of Education, 2013), low graduation rates (Rumberger, 2011), and lagging enrollment and degree attainment in postsecondary education (Kanno & Cromley, 2015). Moreover, emergent bilinguals with language and literacy disorders are often overlooked, or teachers and clinicians are uncertain about intervention practices that show promise to support academic language development (Geva, Xi, Massey-Garrison, & Mak, in press).

The purpose of this clinical focus article is to describe the background and motivation for a vocabulary intervention program we developed for middle school emergent bilingual learners. We situate this description in the context of a

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consensus around principles of effective vocabulary instruction that has been established across various student populations. The program English Learners' Robust Academic Vocabulary Encounters (EL RAVE) adheres to these principles and adds a novel dimension by focusing on morphological analysis with Latin roots, which leverages students' linguistic assets (i.e., home languages) for learning when possible. We present a synthesis of findings from several implementations of EL RAVE and provide examples of intervention practices. In synthesizing findings, we detail the program's effectiveness with emergent bilinguals from a range of cultural and linguistic backgrounds and suggest how the instruction shows promise for use by speech-language pathologists working with emergent bilinguals with communication disorders in clinical settings.

## Background for Design Elements of EL RAVE

In this section, we provide an overview of research that led to the specific design elements incorporated into EL RAVE, our academic vocabulary intervention program for middle school emergent bilingual learners. The overview focuses on (a) the evidence base demonstrating that the consensus on effective vocabulary instruction characterized elsewhere in this clinical forum (e.g., McKeown) is directly relevant to and beneficial for addressing challenges of English literacy development facing emergent bilinguals and (b) research findings demonstrating the advantages of teaching morphology as part of vocabulary instruction. This review also addresses implications of morphology instruction for students with language and literacy disorders.

### Emergent Bilinguals Benefit From Robust Vocabulary Instruction

A puzzling, yet widely observed, pattern in the literacy development of emergent bilinguals is an "uneven profile" of language and literacy skills. Several cross-sectional and longitudinal studies have revealed that many emergent bilinguals whose phonological processing, decoding, and word recognition skills are within a standard deviation or exceed grade-level norms in reading in English often perform 1–2 *SD*s below national norms on measures of listening and reading comprehension (Lesaux, 2006; Lesaux, Crosson, Kieffer, & Pierce, 2010; Lesaux & Siegal, 2003). A major mechanism driving this disconnect likely is vocabulary knowledge. Vocabulary knowledge in English has been repeatedly documented as an area of difficulty for emergent bilinguals in underresourced U.S. schools (August & Shanahan, 2006; Carlo et al., 2004; Galloway & Lesaux, 2015; Goldenberg, 2011; Kieffer, 2010; Lesaux, Kieffer, Faller, & Kelly, 2010; Nakamoto, Lindsey, & Manis, 2008; Proctor, Carlo, August, & Snow, 2005; Reed, Petscher, & Foorman, 2016; Uccelli, Galloway, Barr, Meneses, & Dobbs, 2015; Verhoeven, 2011) and is associated with comprehension difficulties (Mancilla-Martinez & Lesaux, 2010). Disparities in literacy outcomes between emergent bilinguals and their peers on the National Assessment of Educational

Progress reading assessment have been shrinking over the last decade, and yet multilingual eighth graders (both currently and formerly designated English learners) lagged 12 scale points behind monolingual learners in 2015 (Kieffer & Thompson, 2018). There is a tremendous need for educators to provide interventions to accelerate academic vocabulary learning of emergent bilingual adolescents, as effective interventions could have a significant impact on literacy outcomes and, ultimately, on comprehension outcomes (Galloway & Lesaux, 2015). For emergent bilinguals with language and literacy disorders, the role of clinicians in providing such interventions may be even more critical.

There is some evidence that the contribution of vocabulary knowledge to comprehension in the target language (L2) may have greater impact on bilingual students than on their native-speaking peers (Proctor et al., 2005; Verhoeven, 2000). Moreover, there is evidence that emergent bilingual learners not only know fewer words but also tend to have looser semantic networks among words in their vocabularies (Verhoeven, 2011) and less developed metalinguistic knowledge about word parts (Carlo et al., 2004; Kieffer & Lesaux, 2012). Consequently, accessing word meanings may not operate efficiently enough to allow comprehension to proceed.

Interventions to promote vocabulary growth among emergent bilingual learners have shown that many underlying principles of effective instruction for emergent bilinguals align with those that have been proven effective for monolingual learners. In fact, a widely held consensus regarding effective vocabulary instruction has emerged from decades of research on practices that promote word learning (Baumann, Kame'enui, & Ash, 2003; McKeown, Beck, Omanson, & Pople, 1985; National Reading Panel, 2000; Stahl & Fairbanks, 1986). The following dimensions of effective or "robust" vocabulary instruction (Beck, McKeown, & Kucan, 2002) comprise essential components:

- focus on a small number of high-utility words including general academic words;
- provide both contextual and definitional information about target words;
- engage learners in multiple, diverse, high-quality encounters; and
- incorporate frequent opportunities for interactions in which students talk about and use academic words.

A thorough discussion of the principles of robust instruction is found in Margaret McKeown's introductory article in this volume.

Experimental studies conducted over the last two decades have shown that interventions that embody many or all of the principles of robust instruction have been effective with emergent bilingual learners. For example, Carlo et al.'s (2004) Vocabulary Improvement Project presented fifth-grade emergent bilinguals with high-interest topics (e.g., immigration) and sets of carefully selected high-utility target words for each topic. Participants were Spanish–English bilinguals in the upper elementary grades of a transitional bilingual program. In addition to incorporating

multiple encounters and definitional information about activities for interactions with the words, the intervention also taught students to be aware of polysemy and to make use of cognate relations (immigration–inmigración). Emergent bilinguals showed greater growth than a "business as usual" comparison group on knowledge of target words (including both synonym and depth of knowledge tasks), understanding polysemy, and reading comprehension.

More recently, Snow and colleagues (e.g., Lawrence, Capotosto, Branum-Martin, White, & Snow, 2012; Snow, Lawrence, & White, 2009) developed Word Generation, which similarly reflects many principles of robust instruction. Word Generation units are dilemma driven; that is, they are designed to engage students in use of target general academic words to debate and write persuasively on topics of interest to adolescent audiences. Participants were linguistically diverse emergent bilinguals who were classified by the district as "limited English proficient." Overall, students in the intervention made sustained gains in word knowledge that were significantly greater than those in "business as usual" comparison groups, with the notable observation that emergent bilinguals at more advanced levels of English proficiency benefited more than students at earlier phases of English learning (Lawrence et al., 2012).

As another example, Lesaux, Kieffer, et al. (2010) tested the Academic Language Instruction for All Students intervention with linguistically diverse language minority learners, that is, students whose home language was not English and who represented a full range of English proficiency. In Academic Language Instruction for All Students, students read an informational text and then were guided to focus on a small number of judiciously selected target words. Students were taught to make personal connections to the word meanings. Instruction in morphology was integrated into the lessons, such that students were guided to associate the words with derivational forms, such as the relation between "research" and "researcher."

Finally, both Vaughn et al. (2009) and a team led by August (August, Branum-Martin, Cardenas-Hagan, & Francis, 2009) tested vocabulary interventions based on principles of robust instruction that were embedded in disciplinary instruction and compared these to "typical" instruction using the standard curriculum. In Vaughn's intervention, emergent bilinguals, who were designated "limited English proficient" by the school district and were majority Spanish–English bilinguals, were taught a small set of high-utility general academic words and sets of content-specific terms relevant to the social studies content. August's intervention similarly focused on both general academic words and content-specific terms in the context of teaching science content. Sixty-three percent of participants were designated *English language learners*, who were Spanish–English emergent bilinguals, whereas the rest were non–English language learners. Both interventions showed gains in word learning as measured by differences from pre- to posttest assessments of target word knowledge.

In summary, intervention studies with adolescent emergent bilinguals have demonstrated that instruction that provides multiple encounters with target words and analysis and use of the words is effective at promoting word knowledge (August et al., 2009; Carlo et al., 2004; Lesaux, Kieffer, et al., 2010; Proctor et al., 2011; Snow et al., 2009; Vaughn et al., 2009). Thus, these studies suggest that principles of instruction shown to be effective for promoting vocabulary learning with native English speakers (Baumann et al., 2003; McKeown et al., 1985; National Reading Panel, 2000; Stahl & Fairbanks, 1986; Wright & Cervetti, 2017) are, overall, effective for emergent bilinguals (Goldenberg, 2011). These studies provide evidence that both emergent bilinguals and their native English-speaking peers (whose word knowledge tends to be higher initially) can increase their vocabulary knowledge at comparable rates. In contrast, in the face of no intervention, disparities between these groups in both vocabulary knowledge and reading achievement tend to increase over time (Kieffer, 2008; Nakamoto, Lindsey, & Manis, 2007). Arguably, however, it is not sufficient for emergent bilinguals to increase vocabulary knowledge at comparable rates; in order to close the gap, interventions designed to accelerate vocabulary learning for emergent bilinguals are needed (Crosson, McKeown, Moore, & Ye, 2019; Galloway & Lesaux, 2015). Incorporating instruction in morphological analysis to promote learning a broader semantic network of words may be effective toward that end.

### Morphology Instruction Promotes Word Learning and Comprehension

In light of the massive "word learning burden" (McKeown, Deane, Scott, Krovetz, & Lawless, 2017) faced by school-age learners, it is widely understood that awareness of morphological relationships is an aspect of word knowledge that is essential for vocabulary acquisition. For example, Anglin's (1993) seminal exploration of morphological understanding among native English speakers revealed that the surge in word learning observed around third grade is driven by growth in awareness of derivational relations between words. The vocabulary demands of school texts parallel this shift. Nagy and Anderson (1984) estimated that 60%–80% of new words that students encounter in text are morphologically complex. Yet students are not always sensitive to morphological relationships. Carlisle and Stone (2005) discovered that when derivations had a phonological (e.g., clinic and clinician) or orthographic shift (e.g., space and spatial), such variations often made it more difficult for students to detect morphological relationships.

Evidence suggests that morphological knowledge—in the absence of morphological instruction—predicts unique variance in vocabulary knowledge and perhaps in reading comprehension (cf. Bowers, Kirby, & Deacon, 2010; Carlisle, 2010; Kieffer & Lesaux, 2008; Nagy, Berninger, & Abbott, 2006; Wagner, Muse, & Tannebaum, 2007). In a longitudinal investigation with native English speakers followed from third to fourth grade, Levesque, Kieffer, and Deacon (2018) found that morphological skills

contributed to the development of reading comprehension over time. Critically, it was not simply awareness of morphological relations that predicted comprehension but, instead, the ability to apply knowledge of derivations to problem-solve word meanings.

The evidence base for morphology instruction for the general population of school-age learners is growing and demonstrates that providing explicit instruction in morphological relationships is effective for a range of literacy outcomes. For example, Bowers et al. (2010) conducted a meta-analysis of 22 studies of morphological instruction with students through eighth grade, comprising a total of 2,652 students across all studies in the meta-analysis. In comparison to control conditions, students in morphology instruction showed stronger intervention effects, with large average effect sizes (mean $d = 0.65$) for knowledge about morpheme constituents and moderate effect sizes (mean $d = 0.35$) for vocabulary outcomes. Average treatment effects for morphology interventions were smaller for reading comprehension outcomes (mean $d = 0.28$). Notably, the authors reported with caution that effects for students with learning difficulties were greater than for participants in samples not characterized as "less able." For example, treatment effects were larger for the students with learning difficulties on vocabulary and spelling (mean $d = 0.58$ less able; mean $d = 0.40$ comparison). This was also true for reading comprehension (mean $d = 0.67$ less able; mean $d = 0.27$ comparison). Of note and related to Levesque et al.'s findings, Bowers and colleagues found that instruction of morphology was most effective when it was integrated within language arts instruction and presented via a problem-solving stance, wherein features were not present in most of the studies reviewed.

For students with language and literacy disorders, the evidence base for morphology instruction is smaller but growing; it provides moderate, but promising, evidence for interventions targeting morphology in clinical settings. Goodwin and Ahn (2010) conducted a meta-analysis of 17 morphology interventions carried out with students with language and literacy disorders from preschool through 12th grade. Participants included students with speech and language delays, as well as English language learners, and children with learning and reading disabilities. A total of 79 effect sizes were extracted across literacy outcomes, including vocabulary, morphological awareness, and reading comprehension. As would be expected, differential intervention effects were found for different literacy outcomes. Medium effect sizes were found for morphological awareness and vocabulary (mean $d = 0.40$ for both outcomes). Notably, the largest morphology intervention effects on improving overall literacy outcomes were for children with speech and language delays (mean $d = 0.77$, $SE = 0.07$, $p < .01$), followed by emergent bilinguals (mean $d = 0.62$, $SE = 0.18$, $p < .01$).

Since Goodwin and Ahn's (2010) systematic review, some research addressing the effectiveness of morphology intervention for students with language and literacy disorders has further strengthened the research base in favor

of this approach in clinical settings. Brimo's (2016) small-scale study employed a pre–post design with third graders in a school for students with learning disabilities. Brimo demonstrated that a small group intervention (two to three students per group) focusing on morphological awareness of affixes was associated with pre–post differences and large effect sizes: $d = 0.48$–$2.58$ for several morphological processing tasks. Wolter and Dilworth (2014) compared two interventions, one focusing on orthographic patterns versus one focusing on morphological patterns, with 27 second graders who had been referred to the researchers for language and literacy disorders by speech-language pathologists and teachers. The intervention focused on inflectional and derivational affixes and emphasized a problem-solving or "detective" approach. The two groups had similar outcomes on an orthography task, but the morphology group ($d = 1.49$) outperformed the orthography group ($d = 0.19$) in reading comprehension.

Across these studies, a growing research base has emerged showing that morphological awareness is susceptible to improvement through intervention and shows positive impacts on vocabulary knowledge, morphological awareness, and improvement in reading comprehension for children in the general population, for children who have language and literacy disorders, and for emergent bilingual students. The evidence for children with language and literacy disorders is at Levels IIa, IIb, and III per the American Speech-Language-Hearing Association's "level of evidence" classification system (American Speech-Language-Hearing Association, n.d.), as randomized controlled trials are not yet available. Most interestingly, Goodwin and Ahn noted a trend indicating that emergent bilingual students and students with speech and language delays showed the greatest intervention effects from morphology instruction. Drawing from these evidence bases, we expect that interventions that incorporate morphological analysis to improve vocabulary knowledge should be effective for emergent bilinguals who have language and literacy disorders. Morphology instruction incorporated into robust vocabulary instruction may offer a leverage point in clinical settings for emergent bilingual students.

### Expanding the Focus of Morphology Intervention to Explicitly Teach Latin Roots

It is important to note that morphology intervention research to date, with a few notable exceptions (Bowers & Kirby, 2010; Crosson & McKeown, 2016; Crosson, McKeown, Moore, & Ye, 2019; Crosson & Moore, 2017; Goodwin, 2016; McKeown, Crosson, Beck, & Moore, 2018; Pacheco & Goodwin, 2013), has largely been confined to a focus on inflectional affixes (i.e., the relationship between *walk* and *walks*) or a focus on derivational affixes (i.e., the relationship between *research* and *researcher*). Yet the key constituents of language that carry meaning are the lexical morphemes—that is, the roots. Morphological analysis of roots should be highly generative given that roots tend to carry meaning far more so than affixes do. Consider that the word *credible* contains the root *cred*, from Latin for "believe," but if a

learner does not know the meaning of *cred*, knowledge about the derivational affix attached to this word is not likely to be helpful. Even though connections to roots may not always be straightforward, there are reasons to focus on roots, rather than focusing solely on inflectional or derivational affixes. Words that students analyze in elementary grades are often of Germanic origin and thus comprise "bases" (also called *root words* or *stems*) to which prefixes and suffixes can be cleanly and efficiently added and subtracted. However, academic words rarely contain such transparent bases, and the root is rarely a freestanding base word. Because the root is the major component of the word that carries its meaning, morphological analysis of words likely to appear in academic texts calls on knowledge of Latin roots.

A focus on Latin roots for morphological analysis is a novel approach that extends the possible impact of morphology inventions (Crosson & McKeown, 2016; Crosson, McKeown, Moore, & Ye, 2019). While the research base for this approach is still growing, recent studies lend empirical evidence to the hypothesis that instruction about Latin roots improves word learning. Bowers and Kirby (2010) investigated how effectively fourth- and fifth-grade English-speaking monolingual students learn to use morphological analysis including roots to support target word learning and infer meanings of unfamiliar words. Controlling for initial vocabulary knowledge and in comparison to a control group, students who participated in the intervention were better able to identify novel words that included freestanding root words and bound roots (e.g., *rupt* in *disrupt*) taught during the intervention, concluding that teaching morphological analysis helps students learn vocabulary beyond the words taught. Similarly, Goodwin and colleagues (Goodwin, 2016; Pacheco & Goodwin, 2013) investigated a range of morphological problem-solving strategies in interventions with adolescents, including some analysis with bound Latin roots, and found that morphology instruction was effective at supporting morphological awareness, with larger effects for language minority students. Both Goodwin's and Bowers and Kirby's (2010) interventions point to potential benefits of teaching roots.

## Morphology Instruction: Five Design Principles for Morphology Instruction for Emergent Bilinguals

In this section, our focus is on the five design principles that we used to create the EL RAVE intervention, illustrated with examples from instruction with emergent bilinguals, but, first, we provide an overview of the EL RAVE instruction itself.

### EL RAVE Intervention

Our research program investigates the role of morphology intervention focused on Latin roots on the development of academic word knowledge and morphological problem-solving skill for emergent bilingual adolescents. The curriculum

as a whole is a supplemental vocabulary program that comprises eight units, with each unit consisting of eight daily, 15-min lessons during which students are supported to develop deep, flexible knowledge of general academic words, high-utility Latin roots, and extension words that carry the target Latin roots and are semantically related to the general academic words. Target words were selected from lists of academic words, including the Academic Word List (Coxhead, 2000) and the Academic Vocabulary List (Gardner & Davies, 2013). These lists are compiled from large databases of academic texts and represent words that appear across academic domains. About 75% of these words contain Latin roots (Lubliner & Hiebert, 2011). Words were selected for EL RAVE through consensus across the research group about the utility of the word, the ease of explaining the root in relation to word meaning, and whether the root appeared in other useful academic words.

Lesson 1 begins with introduction to four target academic (e.g., *indicate, ambiguous, induce, suspend*) words and their Latin roots (e.g., *dic*, meaning "tell or say"). Words are first introduced in sentence-level contexts (e.g., The blue dot on your GPS map *indicates* where you are located), and friendly definitions are provided (e.g., When you *indicate* something, you show it or point it out.). The teacher guides students to integrate target word meaning with context ("How does the meaning of *indicate* fit in this context?").

After introducing each target academic word and its root, a "Spanish Friend," or a high-frequency word in Spanish that carries the root, is introduced for each root (i.e., , for the root, *dic*, meaning "tell or say," students are guided to consider the Spanish Friend *dice*, meaning "s/he says"). If participating students speak other Latinate languages, other Friends are introduced (e.g., in French, Portuguese, and Haitian Creole, *dis, diz,* and *di* mean "says" in each language, respectively). The teacher then guides students to examine both semantic and orthographic connections between the target academic word, its root, and Spanish and Other Friends, and the class creates a public record of this thinking on a words and roots chart. Closure to Lesson 1 is provided via a fast-paced review of word meaning, root identification, and root meaning.

Lesson 2 begins with a fast-paced review of roots from Lesson 1. For example, the teacher might call out root meanings, and students write the roots that correspond to those meanings on mini dry erase boards. The main goal of Lesson 2 is to deepen understanding of first two words from Lesson 1 (*indicate, ambiguous*). Each word is presented in two paragraph-level contexts, and students are guided to integrate word meaning with context. Contexts (approximately 75 words each) represent concrete and abstract senses when possible (*ambiguous* shapes; *ambiguous* statements). Following introduction to each word, students engage in "activate vocabulary" interactions applying target words to discuss a personal context (e.g., "What symptoms might *indicate* that you are about to come down with a cold?"). Closure to the lessons is provided via final review of first two words linking "everyday" language to word meanings.

Lesson 3 begins with a fast-paced review of roots from Lesson 1 (e.g., one student acts out root meaning; others call out the root). The main goal of Lesson 3 is to deepen understanding of last two words (*induce*, *suspend*) from Lesson 1 by analyzing two paragraph-level contexts that use the target words. As in Lesson 2, students are guided to integrate word meaning with context. Students then engage in "activate vocabulary" interactions for each of these two words. Closure is provided via a final review of second two words linking "everyday" language to target word meanings.

Lesson 4 begins with introduction to four target academic and their Latin roots (e.g., *conform–form, deviate–via, consent–sent, circumstances–circum*) and is parallel to Lesson 1; Lessons 5 and 6 follow the same sequence set out in Lessons 2 and 3. That is, Lesson 5 is the same as Lesson 2 but focuses on the fifth and sixth target words in the unit and their roots (e.g., *conform, deviate*). Finally, Lesson 6 is the same as Lesson 3 but focuses on the seventh and eighth target words in the unit and their roots (*consent, circumstances*).

Lesson 7 focuses on deepening knowledge of target words, improving fluency of access to Latin roots, and teaching students to use Latin roots for morphological analysis of unfamiliar words that carry the root (i.e., "root-related words"). The teacher begins by leading an active processing activity with target words and roots. For example, in "Picture This," students are guided to associate a target word and root with an image and to justify the association. The teacher then leads an activity to introduce a "root-related word" for each root. For example, in Word Drama, each root-related word is presented in short (approximately 25-word) scripts (e.g., Script: "Art Lesson;" Roles: Friend 1, Friend 2, Art Teacher; Art Teacher: Why are you drawing your dog like that? Student 1: Why? What's wrong with it? Student 2: It has two tails! Student 1: So? Student 2: It looks *deformed*!). Students act out the brief scripts, and after each teacher asks: (a) What do you think [root-related word (*deformed*)] means? (b) What is the root (*form*="shape")? (c) How does the root connect to the meaning? Closure is provided via a final review by adding root-related words to the publicly displayed words and roots chart.

Lesson 8 begins with an active processing activity focused on deepening understanding of all eight target words. For example, in the activity, "Show Us," the teacher describes situations that incorporate the target words and students act out the situations (e.g., "A new food is *inducing* an allergic reaction"). Teacher then leads an activity to introduce a second "root-related word" for each root. For example, in "Overheard Conversations," each root-related word is presented in one to two sentence-level sentence bubbles (< 20 words), such as "Sorry we're late! We took a *circuitous* route to get here." Teacher guides students to (a) identify the word that contains a root, (b) circle the root, and (c) use the meaning of the root to figure out the meaning of the root-related word. Finally, closure to the entire unit is provided via an activity called *Rapid Fire Roots*. Here, students independently complete a chart (similar to the publicly displayed chart), providing each root, root meaning, words, and root-related words taught in the unit and doing so as quickly as possible. Examples of instructional practices are provided in Supplemental Materials S1–S6 (the full curriculum is not yet publicly available).

## EL RAVE Design Principles for Instruction With Emergent Bilinguals

While the EL RAVE intervention was designed for inclusive settings in whole-group instruction, the design principles of effective morphology instruction for emergent bilinguals are adaptable to small-group intervention or one-on-one intervention by clinicians. Below, we present five design principles that we used to create the intervention, illustrated with examples from instruction with emergent bilinguals.

The design principles underlying EL RAVE are as follows:

- make cross-linguistic connections to other Latinate languages whenever possible to help students learn and remember root meaning;

- teach semantic networks among words that carry the root;

- explicitly teach orthographic and phonological shifts;

- teach for fluency of access to root meanings; and

- emphasize a flexible, problem-solving orientation toward using Latin roots for learning academic word meanings.

### Make Cross-Linguistic Connections to Other Latinate Languages Whenever Possible to Help Students Learn and Remember Root Meaning

Teaching cognate awareness has long been recognized as a productive means to support vocabulary growth (e.g., Dressler, Carlo, Snow, August, & White, 2011; Nagy, García, Durgunoğlu, & Hancin-Bhatt, 1993). However, teaching emergent bilingual students about broader morphological relationships beyond cognates—especially for academic words in English—may be a way to bolster vocabulary learning. A study by Lubliner and Hiebert (2011) underscores the advantage of teaching cross-linguistic connections in addition to cognates. They found that 75% of English academic words in the Academic Word List corpus shared cognates with Spanish, but for 62% of these pairs, the Spanish words were not high frequency and thus not likely to be accessible enough to support learning the English word. Clearly, the existence of a Spanish–English cognate relationship is only useful for learning the word in English if emergent bilingual students know the first language (L1) cognate. Simply holding cognate status is not sufficient. While many cognates are direct, with Latinate and English words nearly identical in meaning and alike orthographically, the relationship between English and Latinate languages is much more extensive. By definition, words have a cognate relationship because they share a root. Typically,

this root is shared in not just the cognate pair but also in other high-frequency words in Spanish and in other academic words in English

For example, the academic word *innovative* has a Spanish cognate *inovador*, but because this is not a high-frequency Spanish word, learning that *innovative* has a cognate in Spanish may not support access to the meaning of the target word. Yet the Latin root shared by the cognate pair, *nov*, appears in very high frequency Spanish words, such as *nuevo* and *nueva*, and in several other academic words in English, such as *novice, novelty,* and *renovate.* This root also appears in high-frequency words in languages such as Haitian Creole (*nouvo*), Croatian (*novi*), Portuguese (*novo*), and Romanian (*nou*). Accessing the related meaning in English and students' home languages (L1) via the Latin root holds potential for learning several academic words in English that do not have direct cognates in students' home languages. Taking advantage of these common roots greatly increases the portion of the wordstock accessible for cross-linguistic connections. Moreover, it may strengthen and extend networks within and across languages, which is a sensible approach given the interrelated nature of the bilingual's language systems (Kroll & Bialystok, 2013; Kroll, Dussias, Bogulski, & Valdes-Kroff, 2012).

In the EL RAVE intervention, students are shown connections between Latin roots and words across multiple languages. For example, *conform* has the Latin root *forma*, meaning "shape." This same root appears in words for "shape" in Spanish (*forma),* Portuguese (*forma*), and Haitian Creole (*fòme*), morphologically linking all of these words to the English word *conform*. Importantly, the study of roots holds potential to support students who have not had the opportunity to develop academic language in their L1 (Crosson, Matsumura, Correnti, & Guerrero-Arlotta, 2012), which, in light of restrictive policies in U.S. schools (National Academies of Sciences, Engineering, and Medicine, 2017), is common. The EL RAVE intervention promotes cross-linguistic transfer to a range of high-frequency words in L1 rather than using cognates, which rely on well-developed L1 proficiency.

To teach such cross-linguistic connections explicitly, the intervention begins with an introductory unit called *Think Like a Linguist.* In this unit, students learn about language change over time, analyze clusters of related languages to consider connections among languages, and study a language family tree to make sense of the historical roots of clusters of linguistically related languages. During subsequent units, students are guided to refer to the language family tree to see how Latinate languages comprise words that carry the same roots as academic words in English. Supplemental Figure S1 illustrates how students are explicitly guided to make connections between the Latin roots from target academic words and high-frequency words in their L1.

This approach seems to be appealing and engaging for emergent bilinguals, even those from non-Latinate language backgrounds, because of its explicit recognition of the multiplicity of languages and the resemblances among languages. The stance of our approach is that of exposing the workings of language, English in particular, as a kind of a giant jigsaw puzzle cobbled together over centuries by its users.

## Teach Semantic Networks Among Words That Carry the Root

Learners who can analyze the meaning constituents of words are more likely to recognize that words of the same families are related in meaning and may even successfully infer meanings of unknown words whose parts are familiar (McCutchen & Logan, 2011; Taft, 2003). Moreover, knowing the meanings of a word's morphological constituents may lead to a more stable and precise representation of the word in memory (Bowers et al., 2010), that is, greater depth of word knowledge. Improved lexical quality may enable more successful comprehension of contexts in which the word occurs (Perfetti & Hart, 2002; Perfetti & Stafura, 2014). Indeed, learning roots seems to enrich students' semantic networks by building connections that are analyzable through the words' lexical morphology. These connections can strengthen knowledge of the words taught and give access to other academic words that share the root (Snow & Kim, 2007).

In the EL RAVE intervention, connections between Latin roots and semantic clusters of words that carry the root are analyzed throughout instruction. Links are made between these words, as well as to high-frequency words in Latinate languages, which for many emergent bilinguals correspond to their L1. Returning to the example of *conform*, which carries the Latin root *forma*, meaning "shape," this word is morphologically linked to many words that carry the root, such as *format, uniform,* and *formative.* This element of the intervention is aligned with the Common Core State Standards (Council of Chief State School Officers, 2010) for vocabulary acquisition and use, which calls for students to use Greek and Latin roots to infer word meanings in Grades 6, 7, and 8.

To teach semantic networks of words that carry high-utility Latin roots, students are guided to notice relations through roots, and they are given multiple opportunities to do this. Words that carry the target root are referred to as "root-related words." For example, in one activity, *Make the Connection*, students are provided a context that contains a root-related word and are asked to identify the root and then explain how the root's meaning makes sense with the meaning of the root-related word. Supplemental Figures S2 and S3 illustrate how semantic webs are built in instruction. Students are guided to track these connections on word charts in their student books, which also serve as a record of the root, root meaning, and connections to high-frequency words in students' Latinate home languages, as well as serving as a record of networks of semantically linked root-related words.

## Explicitly Teach Orthographic and Phonological Shifts

As previously mentioned, when morphologically related derivations contain an orthographic or phonological shift from the base word, these shifts make detection of the relationship more difficult for some learners. Similarly, in

the case of Latin roots, discerning the meaning of words that carry target-bound roots might be tricky because of the orthographic and phonological variation involved. For example, the words *reside, sedentary,* and *residue* all share the Latin root *sid/sed*, meaning "to sit or settle," and their meanings all have a clear connection to the root. However, the root *sid/sed* is not orthographically or phonologically stable across words, so the connection may be difficult for students to make on their own.

In the EL RAVE intervention, orthographic variation is taught explicitly, such that when a bound root is introduced, any variations are introduced from the outset. For example, the root of the target word *consent* is *sent*, meaning "feel," and when introduced, students are told that the root can be either "s-e-n-s" or "s-e-n-t."

### Teach for Fluency of Access to Root Meanings

Psycholinguistic research has demonstrated that bilinguals show faster and more accurate reading of cognates suggesting that bilinguals activate both languages to their advantage (Kroll et al., 2012). Similarly, it is possible that accessing roots that correspond to known, high-frequency words in Spanish should render the words more efficiently accessible. Moreover, instruction is purposefully designed to build fluency of access to written representations of target words and their roots. Such practice is built in throughout the intervention lessons. For example, in brief review activities, students are asked to write the roots on personal dry erase boards to strengthen orthographic representations and link these to root meanings. In another example, as illustrated in Supplemental Figure S4, students are given the target word meanings and are asked to write as quickly as possible the target word, the root, and the root's meaning.

The goal of the series of fluency-building activities in EL RAVE is to emphasize roots to strengthen connections between orthographic and semantic representations, as one path to incrementally build lexical representations of target academic words (Bowers et al., 2010).

### Emphasize a Flexible, Problem-Solving Orientation Toward Using Latin Roots for Learning Academic Word Meanings

Finally, and most important, EL RAVE is deliberately designed to teach a problem-solving stance toward morphologically complex words. As such, emergent bilingual students receive instruction in learning the meanings of bound Latin roots and how to apply this information for problem-solving new words. The goals of instruction are not only to teach that bound roots are meaning-carrying constituents found within words but also to teach cognitive flexibility in applying root meanings. Such flexibility is important, as relations between root and word meanings have evolved over time; thus, the relation is not always readily apparent.

Examples of how students are guided to develop a curious, detective-like stance toward using bound roots for morphological problem solving are illustrated in Supplemental Figures S4 and S5. Critical to note is that students are to consider how the meaning of the root fits with the root-related word. As bound roots can be polysemous,

discerning the meaningful relation between bound root and word meaning sometimes requires considerable inference or even a metaphoric leap. Our position is that such challenge contributes to building the cognitive flexibility essential for morphological problem solving (Crosson & McKeown, 2016)—the kind of cognitive work with morphemes that is associated with improved comprehension outcomes (Levesque et al., 2018).

## EL RAVE: Evidence of Effectiveness From Implementation Trials

Below, we present a synthesis of three studies in which we investigated this approach with emergent bilingual learners. Cumulatively, they offer preliminary evidence for the promise of this instruction for supporting vocabulary learning among emergent bilingual adolescents. All trials have been carried out in whole-group settings in the context of English as a second language instruction. The adaptability of this approach for clinicians, including speech-language pathologists, is addressed in the following section.

### Study 1

A four-unit (8-week) version of EL RAVE was implemented by two teachers in an urban, northeastern school district, in one 7th-grade and one 9th-grade class ($n = 21$ students). Students had immigrated from 10 different countries: Nepal ($n = 10$), El Salvador, Honduras, Ghana, Kenya, Uganda, Tanzania, Vietnam, Somalia, and Uzbekistan. Ten students reported that they immigrated at the age of 11 years or older to the United States. Eighty-six percent of students reported that they attended school in another country before immigrating to the United States. When students were asked to identify their primary language (L1), the most frequent response was Nepali, followed by Spanish. Other languages were Swahili, Yoruba, Kinyarwanda, Luganda, Lingala, Kirundi, Vietnamese, Somali, Uzbek, and Russian. Three quarters of students reported speaking "only" or "mostly" their L1 at home, and 50% reported they can read in their L1.

As the primary goal was to collect feasibility and usability data for iterative development of the intervention, a pretest–posttest design was implemented with no comparison group. We administered five researcher-designed measures, all of which suggested a positive impact of the intervention on academic word learning (with effect sizes $d = 0.78$–$2.25$). The tasks were (a) Roots Knowledge (i.e., knowledge of target root meanings in which students match roots to synonyms), (b) Word Knowledge (i.e., knowledge of target word meanings in which students match words to synonyms), (c) Evaluation of Academic Vocabulary (i.e., depth of knowledge of target words that assessed students' understanding of syntactic features, semantic features, and constraints of word use; Crosson, McKeown, & Ward, 2019), (d) Morphological Analysis Task (i.e., ability to infer meaning of noninstructed low-frequency words with target roots), and (e) "Slasher" Task (an orthographic processing task

adapted from Lesaux, Kieffer, et al., 2010). For Slasher, two forms were administered: a "target word version" for which improvement in fluency was expected and a "filler version" (comprising noninstructed words matched to target words for length, part of speech, orthographic neighborhood, and bigram frequency) for which improvement from pre to post was not expected. Significant differences were found only for the target word form, confirming our predictions. Descriptive statistics, results from two-tailed $t$ tests, and effect sizes computed with Cohen's $d$ are presented in Table 1.

## Study 2

A four-unit (8-week) version of EL RAVE (same unit as Study 1 trial) was implemented by four teachers in an urban, southeastern school district with a population of emergent bilinguals that was demographically distinct from the population in Study 1. Four middle school teachers participated in the trial with 73 emergent bilingual participants. In this study, the majority of participants (68%) spoke Spanish as a home language. Other languages included Tongan, Navajo, Yiddish, Mayan, and Somalian. Also distinct from the Study 1, 95.7% of the students were U.S. born. This demographic profile is consistent with trends showing that the majority of school-age emergent bilinguals are not immigrants but instead are born in the United States. (Hernandez, Denton, & Macartney, 2008). Approximately half reported that they spoke both English and Spanish at home, and 70% reported they could read in their home language.

Similar to Study 1, the primary goal was to collect feasibility and usability data for iterative development of the intervention; thus, a pretest–posttest design was implemented with no comparison group. We administered the same researcher-designed measures as utilized in Study 1 and found significant improvement from pre to post on every measure, with effect sizes of $d = 0.56–1.5$ (see Table 2).

## Study 3

A within-subject study with 87 emergent bilinguals of diverse language backgrounds in five classrooms across two schools, Grades 6–12, was carried out in the culturally and linguistically diverse northeastern district that participated in the intervention in Study 1. Eighteen home languages were represented, including Nepali, Yoruba, Urdu,

Kiswahili, Russian, Maay Maay, Spanish, French, Burmese, and Arabic.

The primary goal of Study 3 was to compare the effects of EL RAVE to the effects of a highly effective vocabulary intervention that did not incorporate instruction in morphological analysis using Latin roots. EL RAVE reflected the five design principles described above, including opportunities for morphological analysis, problem solving, and cross-linguistic connections. The counterfactual condition offered robust vocabulary intervention (RAVE; for details, see Margaret McKeown's contribution to this issue) and comprised instruction on the same target words, with some overlapping instructional components, but no morphological instruction and no cross-linguistic connections. Thus, the implementation trial was designed to compare EL RAVE, a rigorous, high-quality condition of robust instruction, which has demonstrated effectiveness with emergent bilinguals. Study 3 was designed to investigate to what degree the intervention infused with instruction in bound Latin roots (i.e., EL RAVE) would provide added value for emergent bilingual adolescents' knowledge of target academic words, morphological analysis skills, and lexical access of academic words. It was expected that the intervention infused with morphology instruction would produce stronger outcomes for learning academic words by strengthening their semantic and orthographic representations, which are essential components of the lexical quality of a word's representation in memory and critical to skilled comprehension (Perfetti & Hart, 2002; Perfetti & Stafura, 2014).

Results suggested that there are added benefits to EL RAVE and that infusing morphology instruction in Latin roots produces no adverse effects. EL RAVE was found to be equally effective (i.e., no significant differences between conditions) when compared to robust vocabulary instruction for teaching meanings of target academic words, with effect sizes for EL RAVE of $d = 0.8–1.55$. For orthographic processing, EL RAVE showed a small, significant advantage ($p = .04$, $d = 0.39$). Finally, the intervention infused with morphology instruction showed significantly higher results ($p < .0001$) on a task of morphological problem solving, with a large treatment effect ($d = 1.33–1.48$). In summary, evidence suggests that the intervention focusing on morphological analysis of roots led to robust semantic representations of target academic words, enhanced morphological analysis skills to fuel vocabulary growth, and supported orthographic processing for emergent bilingual adolescents

**Table 1.** Summary of results from Study 1 implementation trial with linguistically and culturally diverse emergent bilinguals who were recently arrived immigrants.

| Tasks | $n$ | Proportion mean (*SD*) | | $t$ | $p$ | Cohen's $d$ |
| | | Pre | Post | | | |
|---|---|---|---|---|---|---|
| Roots Knowledge | 20 | 0.27 (0.13) | 0.59 (0.32) | 4.76 | .0001 | 1.06 |
| Word Knowledge | 20 | 0.25 (0.16) | 0.52 (0.24) | 6.77 | < .0001 | 1.51 |
| Evaluation of Academic Vocabulary | 21 | 0.61 (0.11) | 0.76 (0.12) | 4.25 | .0004 | 0.93 |
| Morphological Analysis Task | 19 | 0.34 (0.12) | 0.53 (0.23) | 3.40 | .0032 | 0.78 |
| Slasher Task (target words) | 20 | 42.15 (20.17) | 69.15 (23.36) | 10.0 | < .0001 | 2.25 |

**Table 2.** Summary of results from Study 2 implementation trial with a majority of Spanish–English emergent bilinguals who were U.S. born.

| Task | n | Proportion mean (SD) | | t | p | Cohen's d |
|---|---|---|---|---|---|---|
| | | Pre | Post | | | |
| Roots Knowledge | 72 | 0.32 (0.20) | 0.63 (0.28) | 10.20 | < .0001 | 1.20 |
| Word Knowledge | 72 | 0.33 (0.17) | 0.57 (0.25) | 9.65 | < .0001 | 1.14 |
| Evaluation of Academic Vocabulary | 73 | 0.73 (0.13) | 0.81 (0.16) | 4.79 | < .0001 | 0.56 |
| Morphological Analysis Task | 69 | 0.42 (0.14) | 0.60 (0.20) | 9.11 | < .0001 | 1.1 |
| Slasher Task (target words) | 63 | 38.27 (20.00) | 60.57 (19.63) | 11.88 | < .0001 | 1.5 |

across a range of home languages, both Latinate and non-Latinate. Results from this study are fully presented in Crosson and Moore (2017) and McKeown et al. (2018).

### *Summary of Findings Across the Three Trials*

Across the three trials of EL RAVE, we found that (a) feasibility tests (with pre–post comparisons) have shown the approach to be effective for two populations of emergent bilinguals in distinct contexts (i.e., U.S. born emergent bilinguals who are majority Spanish speakers vs. recent immigrant populations emergent bilinguals who are culturally and linguistically diverse) as evidenced by similar treatment effects for most measures, suggesting that the intervention was equally effective in both contexts and (b) an intervention trial contrasting EL RAVE with robust vocabulary instruction demonstrated that EL RAVE is equally effective at supporting word learning and shows some advantages for bilingual learners with respect to morphological problem solving and lexical processing accuracy. Thus, the three trials provide preliminary and promising evidence that this novel approach is effective with emergent bilingual learners. It is important to note that EL RAVE's instructional approach is intended for emergent bilinguals at the intermediate and advanced levels of English language proficiency. While evidence suggests that it is effective for a wide range of emergent bilinguals, connections from high-frequency words in students' home languages to Latin roots is helpful to students who speak a home language that is Latinate.

### *Strategies for Adapting the Design Principles of EL RAVE in Clinical Settings*

While the EL RAVE intervention has, to date, been implemented in whole-group instruction in English as a second language settings, the instructional principles, nature of interactions, and content hold promise for use in clinical settings with emergent bilinguals with communications disorders. Returning to the research on morphological interventions with students who have language and literacy disorders, evidence points toward effectiveness of clinical practice that incorporates morphological training, especially when it is integrated with other meaning-focused aspects of literacy and when children are supported to take a problem-solving or "detective-like" approach, both of which are intentionally designed into the EL RAVE curriculum.

Intervention components can be implemented in small groups or in individual clinical sessions with modification.

For clinicians working in Tiers 2 and 3 intervention settings and, in particular, speech-language pathologists, some modifications may be important. First, it may be important to provide additional time for oral application. For example, speech-language pathologists might slow down the pace of lessons to allow multiple opportunities for students to use the target vocabulary words orally. This may be done in parallel with the classroom teacher, allowing the teacher to proceed at a Tier 1 pace. Second, it may be important to incorporate opportunities for review and practice. Supplemental Figure S6 illustrates an activity from EL RAVE that is provided for review. Activities such as this review activity can be frequently interwoven into instruction over time and may benefit emergent bilingual learners with language and literacy disorders. Note that students could generate a variety of responses to such a review activity, thus tasks such as these could be implemented in both a whole-class setting and later with a clinician for individual practice. Third, we recommend that speech-language pathologists and other specialists collaborate with classroom teachers who are implementing the instructional approaches of EL RAVE by providing additional opportunities for emergent bilinguals with language and literacy disorders to pronounce the target words, discuss syllable stress and part of speech, and focus on selected words for the development of specific articulation skills. Future research is needed to test these modifications, to develop further adaptations, and to determine which students with communication disorders benefit most from this program.

### Conclusions

In summary, we advocate that clinical practice with emergent bilingual learners at intermediate and advanced stages of proficiency incorporate robust vocabulary instruction for emergent bilinguals from a variety of cultural and linguistic backgrounds. In light of both the evidence base reviewed and our findings from implementation trials of EL RAVE, we recommend that clinicians focus on high-utility academic words, and they teach morphological problem-solving skills for generative word learning. Furthermore, clinicians may leverage emergent bilingual learners' home language resources for developing morphological problem-solving skill. However, even for learners whose

home languages are not Latinate, there can be benefits for introducing morphological connections. We concur with Wolter and Collins (2017) that morphological analysis "may be an especially important skill to improve reading success for students at risk for or diagnosed with specific learning disabilities such as dyslexia and oral and written language learning disability as this skill promotes written word decoding and identification as well as related vocabulary abilities."

Our work suggests that explicit instruction about bound Latin roots can be beneficial for developing the kinds of robust word representations essential to comprehension. For emergent bilingual adolescents, the vocabulary learning challenge is largely driven by sparser representations of general academic words. For these learners, morphology instruction such as that offered in EL RAVE emphasizes not only cross-linguistic connections to home languages but also development of semantic networks of morphologically related words and the cognitive flexibility that can facilitate vocabulary growth. Indeed, equipping students with the knowledge and metalinguistic skills to improve academic vocabulary knowledge could be beneficial for many adolescent learners in U.S. schools, and this may be especially true for students who are designated emergent bilinguals (National Academies of Sciences, Engineering, and Medicine, 2017).

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