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VEDRAN DRONJIC
Northern Arizona University

How (Not) to Teach English Vocabulary

Teachers of English as a second or foreign language often state that they lack an understanding of how to teach vocabulary in a principled, evidence-based way sensitive to students' needs. Vocabulary teaching is typically unsystematic, not adequately supported by curricula and teaching materials, and shaped by beliefs based in opinion or myth. A large amount of research on L2 vocabulary learning and processing is now available, and most of this work is on English vocabulary. The present article synthesizes this body of knowledge to achieve the following: (a) establish how many words learners need to know for different purposes; (b) discuss the scientific evidence for commonly held beliefs about vocabulary teaching; (c) recommend sound, research-informed teaching practices; and (d) refer the audience to a range of freely available high-quality tools that can facilitate lexical instruction in English.

Not too long ago, vocabulary was not a priority for second language researchers. After the cognitive revolution of the 1950s (e.g., Broadbent, 1958; Chomsky, 1959; Miller 1956), a generative approach to syntax and phonology became the chief preoccupation of theoretical linguists, particularly in North America. The nascent discipline of second language acquisition followed suit, getting consumed by syntactic concerns and largely remaining so well into the 1990s (Richards, 1976; Zimmerman, 1997). Research on vocabulary thrived in fields such as corpus linguistics, lexicography, cognitive psychology, educational psychology, psycholinguistics, and reading science, but it was only in the late 1990s that widespread and concerted efforts at studying vocabulary learning took root in the field of second language acquisition.

Vocabulary instruction also may seem like an afterthought in the second language classroom. Although we have enjoyed more than two decades of plentiful and systematic research on second language vocabulary acquisition, and although there is much to learn from neighboring fields of cognitive science, teacher candidates are not being taught how to deal with vo-

cabulary in the classroom, which commonly held beliefs and practices are actually counterproductive, and which tools and resources for better and more systematic lexical instruction are readily available to them.

To begin addressing this need, this article aims to achieve the following:

1. Outline the complexity of vocabulary knowledge and the magnitude of the task facing learners;
2. Examine the question of how many words a learner needs to know to be able to achieve various goals;
3. Answer several questions that practitioners often have about lexical instruction;
4. Recommend best practices based on empirical findings; and
5. Catalog a number of resources for English vocabulary teaching and learning.

While the focus of this article is on the learning and teaching of English vocabulary in a second- or foreign-language context, many of the discussed principles are likely to be generalizable to the teaching of vocabulary in other languages.

What Is There to Know?

At a very basic level, knowing a word means understanding the connection between its form and meaning. However, even a brief look at one commonly cited description of lexical knowledge (Nation, 2013) reveals the extreme complexity of any competent language user's knowledge of words. Knowing a word's form entails knowing what sound segments it is made up of, where it is stressed, what lexical tone it carries (if applicable), how it is written, and what smaller meaningful parts (or morphemes) it is composed of. The knowledge of a word's meaning, at a minimum, includes knowing the word's sense (its inherent meaning), its reference (what entities from the real world it represents), its connotations (the emotional nuances of a word's meaning, such as the contrast between *fatherly* love and *paternal* rights), and its multiple meanings (e.g., the *head* of an animal vs. the *head* of a department).

Lexical knowledge also involves knowing how a word relates to other words: what words have similar meanings; what words have opposite meanings; how a word fits in a lexical hierarchy (e.g., *mammal—carnivore—dog—poodle*); what other words are found at the same level of the hierarchy (e.g., *poodle*, *golden retriever*, *boxer*); how representative of a category a word is (A robin is more "birdy" than an ostrich or a penguin.); what words have similar sounds, and so on. Finally, speakers also know how words are used: what grammatical environments a word seeks out; what words it tends to co-occur with; when it is appropriate to use it; and so forth. Adding to the

complexity, all the foregoing types of knowledge can be receptive (auditory or visual) or productive (spoken or written), the latter typically being thought of as indicating a higher degree of competence. It should be evident from the above that different aspects of lexical knowledge are likely to call for different instructional approaches and that there can be no one best way to teach vocabulary.

How Many Words Does a Learner of English Need to Know?

Vocabulary size can be measured in various ways. For instance, we could count the number of word forms a person knows. Under this approach, knowing *play*, *plays*, *playing*, and *played* would mean having a vocabulary size of 4. Another approach could be to count the number of "dictionary entries" known to a language user. In this case, a speaker who knew *play*, *plays*, *playing*, and *played* would have a vocabulary size of 1 or, more likely, 2, since *play* can be both a verb and a noun. To complicate matters, both the verb and the noun *play* have multiple meanings (e.g., *to play a game* vs. *to play someone*). Also, different words often have identical forms (e.g., your local *bank* vs. the *bank* of a river). When we undertake to quantify vocabulary knowledge, we must decide how to treat multiple meanings of a single word as well as what to do about words that share a form.

A third approach to measuring vocabulary knowledge would be to group words that are transparently related in form and meaning into word families. For instance, we would count *play*, *plays*, *playing*, *played*, *player*, *players*, *playful*, *playfulness*, *playable*, *unplayable*, and so forth as a single word family. Note that compounds such as *horseplay* and *playtime* would not count as members of this word family. Also, regardless of the words' morphological relatedness, researchers treat words such as *depart* and *department* as members of different word families because of the distance between their meanings. Despite certain shortcomings (Gardner, 2007), this last approach, counting word families, has been the preferred way of expressing vocabulary size in second language studies, and this is why we are adopting it here.

Counting in word families, native English-speaking university students have been shown to have a receptive vocabulary of around 17,000 families, excluding proper nouns (D'Anna, Zechmeister & Hall, 1991; Goulden, Nation, & Read, 1990; Zechmeister, Chronis, Cull, D'Anna, & Healy, 1995). Assuming continued growth of as many as 1,000 families per year during the years of one's formal education (Biemiller & Slonim, 2001), but with a lot of interpersonal variation (Coxhead, Nation, & Sim, 2015), the average university graduate can probably be expected to understand no more than 20,000 word families (Nation, 2013), with uneven growth later in life, depending on one's specific experiences.

Studies that have aimed to estimate how many word families a learner

of English needs to know to achieve satisfactory levels of comprehension have typically looked at what percentage of the running words in a text is covered by a certain number of the most frequently used word families. Another approach has been to estimate learners' vocabulary size and determine what size is sufficient for adequate comprehension as shown by a test. Laufer and Ravenhorst-Kalovski (2010), in line with previous estimates (e.g., Nation, 2006), state that a learner needs to know at least 95% of the words in a text to be able to achieve minimally acceptable levels of comprehension and at least 98% of the words for adequate comprehension. We should note that knowing 95% of the words in a text means not understanding 15 words on a page of 300 words, resulting in heavy reliance on a dictionary. With 98% coverage, the number of unknown words on a page drops to 6, a level at which successful guessing is thought to become feasible.

The basic vocabulary size required by a learner of English has been estimated at 3,000 word families (Schmitt & Schmitt, 2014). A vocabulary of this size would allow the comprehension of around 89% of the words in a written text, around 94% of the words in a movie, and around 96% of the words in a conversation (Nation, 2006). To achieve adequate (98%) comprehension of written text, a learner needs to know between 8,000 and 9,000 word families, whereas the same coverage of spoken discourse can probably be achieved with a vocabulary of 6,000 to 7,000 families (Nation, 2006). If teachers are content with their students relying on a dictionary fairly heavily, which will result in a choppy, dysfluent reading experience, they can set an instructional goal for a vocabulary of around 4,000 to 5,000 families for high-intermediate learners (Laufer, 2013; Laufer & Ravenhorst-Kalovski, 2010; Schmitt, Cobb, Horst, & Schmitt, 2017).

Why Should We Teach Vocabulary?

The shortest possible answer to this question is that vocabulary should be taught because it is the single best predictor of comprehension, typically accounting for at least 50% of learners' scores on tests of listening or reading (Grabe, 2009; Stæhr, 2009; Stanovich, 1986, 2000). Another important argument in favor of a concerted effort at teaching vocabulary is that learners in a typical integrated-skills classroom without a specific focus on vocabulary simply do not know enough of it. Teachers typically devote their energy to grammar, assuming that students will be sufficiently exposed to at least the most frequent vocabulary in order to pick it up effortlessly (Horst, 2014).

Laufer (2000) synthesized the findings of several studies that had measured the vocabulary size of learners of English as a foreign language. The numbers are demoralizing: The average English major at a Chinese university knows 4,000 word families after up to 2,400 hours of instruction; the average Japanese university student knows no more than 2,300 word families after up to 1,200 hours of instruction; the average Israeli high school gradu-

ate knows around 3,500 word families after 1,500 hours of instruction; and so on. This is to say that the typical learner in the typical classroom does not even master the core high-frequency English vocabulary of 3,000 word families but tends to plateau around 2,000 word families (Cobb, 2007, 2008). In other words, vocabulary will not teach itself; teachers must approach this task systematically and dedicate class time to it consistently.

Do Students Learn Useful Words?

It is generally accepted in cognitive science that the frequency with which something is encountered is a major determinant of how quickly it is learned and how it is subsequently processed (Hasher & Zacks, 1984; also Baayen, 2010). It is thus reasonable to expect that the most frequently used (and therefore the most useful) words will be acquired by second language (L2) learners. One thing that is often overlooked in this line of reasoning is that instructed L2 learners do not encounter the same kinds of words with the same kinds of frequencies as children acquiring a first language (L1) in naturalistic settings. Rather, the lexical input in L2 learning situations passes through the multilayered filter of curricular pressures, teacher decisions, learning situations, and learning materials. Language courses, even when provided in university-based intensive English programs, are not designed to support effective vocabulary learning (Folse, 2010). Textbooks are typically not written with a lexical curriculum in mind, and it is even quite common for books intended for less advanced learners to use more difficult vocabulary than books intended for more advanced learners (Hsu, 2009). Thus, learners in L2 classrooms without a systematic lexical curriculum are often found to lack complete knowledge of even the most frequent 2,000 word families, and the words students do know are sprinkled over a range of frequencies (Cobb & Horst, 2011). In fact, even when teachers dedicate a substantial amount of energy to vocabulary instruction, they often do it in a haphazard way, devoting precious classroom time to very low-frequency words such as *cummerbund* and *grungy* (Horst, 2014), neither of which is found among the 16,000 most frequent word families in English.

Can Students Acquire an Adequate Vocabulary Just by Doing Large Amounts of Reading and Guessing Unknown Word Meanings From Context?

One commonly held belief is that extensive reading not accompanied by focused lexical instruction is sufficient to build a functional L2 vocabulary just as it is sufficient to build an L1 vocabulary. Research on how many times a word needs to be encountered in incidental learning contexts (i.e., without a deliberate effort to learn vocabulary) before a basic form-meaning connection is established in the learner's mind points to somewhere between 6 and 20 encounters (Herman, Anderson, Pearson, & Nagy, 1987; Jenkins,

Stein, & Wysocki, 1984; Nation, 1982; Rott, 1999; Saragi, Nation, & Meister, 1978; Zahar, Cobb, & Spada, 2001), with 6 often being cited as the minimal required number of encounters. Cobb (2007) demonstrates that words outside the most frequent 2,000 families are not encountered by L2 readers often enough for learning to take place unless this is set as an explicit goal.

Moreover, it has been shown that, for guessing meaning from context to occur, the ratio between unknown and known words needs to be no greater than 1:20 (Laufer, 1989; Na & Nation, 1985). For a typical learner with a vocabulary size of 2,000 word families, unknown words occur with a ratio of 1:10, which does not allow for successful guessing (Cobb, 2007). After reading a text without the specific goal of learning new words, L2 readers typically retain no more than 1 out of every 12 tested words, or less than 1 word for each 1,000 words read (Horst, Cobb, & Meara, 1998; Zahar et al., 2001). Equally dishearteningly, when the sentential context supports guessing the meaning of an unknown word, learning does not tend to occur (Mondria & Wit-De Boer, 1991), presumably because L2 readers are apt to conclude that they know the word and do not actively try to commit it to memory. Zahar et al. (2001) estimate that the typical L2 learner might need as many as 29 years to learn 2,000 word families just from extensive reading, and a student who devoted a substantial amount of time outside the classroom to reading might take 7 years to achieve the same goal. To sum up, L2 learners cannot acquire a functional vocabulary without a concerted effort to learn words or without deliberate instruction on the teacher's part, especially since explicit instruction is demonstrably more effective for the initial stages of vocabulary acquisition than incidental learning from reading (Sonbul & Schmitt, 2009).

Should Teachers Insist on a Monolingual Dictionary?

Monolingual dictionaries are usually assumed to be superior to their bilingual counterparts. Teachers may even go so far as to ban the use of bilingual dictionaries in class. The line of reasoning is that monolingual dictionaries provide much more detailed information, particularly when it comes to the various meanings of a word and how a word can be used in a sentence. Other frequently used arguments are that monolingual dictionaries expose students to more English input, encourage resourcefulness and problem-solving skills, and avoid nudging learners in the direction of relying on translation to their L1. If we set this last argument aside until the next section, because it cannot be taken for granted that relying on L1 translation is inherently bad, it would seem hard to argue against the other benefits just mentioned. However, one obvious problem is often overlooked: To use a monolingual dictionary, one must first have acquired at least a basic English vocabulary. A look at the list of words required to use a typical monolingual dictionary targeted at learners reveals that a user needs to know between

2,000 and 3,000 words, 95% of which come from the 4,000 most frequent word families (Schmitt & Schmitt, 2014). In other words, most students lack sufficient command of English to use a monolingual dictionary efficiently, even if the dictionary is specifically targeted at learners. In fact, the typical learner quite literally needs a bilingual dictionary just to be able to cope with a monolingual one!

One well-known study (Laufer & Hadar, 1997; Laufer & Melamed, 1994—both articles appear to report on the same study) compared the relative efficacy of three dictionaries—monolingual, bilingual, and bilingualized[1]—among high-intermediate and advanced Israeli learners of English who varied in level of dictionary-using skill (unskilled, average, and good). The findings indicated that, for unskilled users, the monolingual dictionary was always the least helpful when dealing with new words. The bilingualized dictionary performed the best with unskilled and average dictionary users, whereas the good users performed equally well with all three dictionaries. These results mean that we cannot assume that a monolingual dictionary is the best choice even for fairly advanced learners.

One thing to note about the above study is that the three dictionaries were not comparable; the bilingual dictionary was of the poorest quality (Lew & Adamska-Sałaciak, 2014). A subsequent study (Lew, 2004) with 700 Polish-speaking participants at a range of proficiency levels, including English-teaching majors, compared the three types of dictionaries using meticulously constructed and fully comparable dictionary entries. This study found that the bilingual dictionary format was the best across proficiency levels, followed by the bilingualized format. Monolingual dictionary entries were the least effective at supporting comprehension. Other studies that have found in favor of linking the L2 word to be learned to the L1 include Dziapa (2001; cited in Lew, 2004), Laufer and Shmueli (1997), Oskarsson (1975), and Wingate (2002). Quality being roughly comparable, bilingual or bilingualized dictionaries are the best solution for most learners. Also, as an anonymous reviewer pointed out, teachers should aim to make their students good users of dictionaries as part of vocabulary instruction.

Should Translation Be Avoided at All Costs?

It should already follow from the above that translation is a natural part of learning second language vocabulary. Also, beginning learners typically have the intuition that when they learn a new L2 word they first link it to its L1 translation. For instance, an English speaker learning Spanish would connect *mano* to *hand*. In the process of trying to use *mano* in a Spanish sentence, the speaker would access this form by going from the idea of a hand to the L1 form *hand* and then to the L2 form *mano*. In comprehension, the reverse process would happen, whereby hearing or seeing *mano* would activate the L1 form *hand*, which would then activate the appropriate mean-

ing. In other words, we have here the situation often referred to as "speaking the L2 through the L1." Another intuition that many learners (anecdotally) report on is that, at a certain level of proficiency, they are able to shift from the described situation to "thinking in the L2," which, more accurately, simply means not having the L1 mediate lexical access in the L2.

This led psycholinguists to formulate and test developmental models (Kroll & Stewart, 1994; Potter, So, Von Eckhardt, & Feldman, 1984) that state that beginning learners link L2 word forms with meanings via L1 translation equivalents, while more advanced learners are able to establish direct links between meanings and L2 word forms, thus cutting out L1 mediation. On balance, studies of precision-timed translation, picture naming, and priming (the automatic activation of a stimulus based on the prior presentation of another stimulus) have confirmed the existence of this developmental pattern (e.g., Chen & Leung, 1989; Francis, Tokowicz, & Kroll, 2013; Kroll & Curley, 1988; Kroll & Stewart, 1994). It is important to note that lexical-access processes tested in psycholinguistic experiments happen on a time scale of under one second and are typically automatic and not amenable to voluntary control. Regardless of how hard some teachers may try to cut out the L1 from vocabulary learning, it will always be there, at least for a while, because this is how the adult brain naturally learns. More important, at a certain level of proficiency, learners transition from L1 concept mediation to directly linking L2 words with concepts; no special teacher intervention is required.

One important area in which teachers can draw on their students' existing vocabulary knowledge is in the case of cognates, words that are similar in form and meaning between two languages, such as English *mother* and Spanish *madre* (see Helms-Park & Dronjic, 2016 for a recent comprehensive overview). Cognates are learned more easily, processed more efficiently, and not forgotten as quickly as noncognates (Costa, Caramazza, & Sebastián-Gallés, 2000; Davis et al., 2010; de Groot & Keijzer, 2000). The presence of cognates also boosts scores on L2 lexical tests (Cobb, 2000; Petrescu, Helms-Park, & Dronjic, 2017). While cognates are often thought to be recognized automatically, there is evidence that, when the L1 and L2 use different scripts, learners may require explicit instruction on recognizing and using cognates to achieve full learning benefits (Helms-Park & Perhan, 2016). This is possibly also the case with cognates that are not recognizable at first glance (e.g., Italian *cane*, and Welsh *ci*, both meaning "dog" and cognate with English *hound*; or Italian *pioggia* and Catalan *pluja*, both meaning "rain"), but this remains to be investigated empirically.

L2 learners occasionally run into the problem of false friends, words that can be (a) historically related to each other but have developed different meanings, such as Spanish *actual* ("current") and English *actual* ("real"); or (b) completely unrelated to each other historically or in meaning but simi-

lar in form, such as Spanish *burro* ("donkey") and Italian *burro* ("butter"). Moreover, cognates may overlap in meaning only partially, such as Romanian *intoxica* ("to poison") and English *intoxicate* ("to stupefy with the use of a chemical substance"; formerly also "poison").

Another troublesome facet of vocabulary learning is the fact that concepts may map onto words differently across languages. When the match is imperfect, the learner needs to understand the differences between the L1 and L2 words. For instance, Serbo-Croatian–speaking learners of English often say things such as "She drank from a plastic glass" when the intended meaning is "plastic cup"; the main Serbo-Croatian translation equivalent of *glass* (the vessel) is *čaša*, but, unlike its English counterpart, a *čaša* can be made of any material as long as it has no handles, whereas anything with handles is a *šolja*, the main translation equivalent of *cup* and *mug*. In all the foregoing examples, most learners will require explicit negative feedback to overcome the impulse to use such words with a nontarget-like meaning.

Is Rote Memorization a Bad Way of Learning Vocabulary?

Now that the inevitability of translation in L2 lexical acquisition is evident, we need to ask the question of how best to begin learning a new word. Memorization is not a particularly popular way to learn, chiefly because it is seen as boring and uncreative. However, no complex cognitive function is logically possible without having a vast bank of stored knowledge on which to operate (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956; Krathwohl, 2002). To avoid condemning learners to rote memorization, teachers and researchers alike have resorted to teaching vocabulary through pictures or by using mnemonic tools such as the keyword technique. In this kind of learning, an English speaker trying to remember the Spanish word *perro* ("dog") would first find an English word that sounds similar to it, for instance *pear*, and then form a mental image that somehow links the two together, for example, a dog sniffing a pear. This image would, then, facilitate access to the form or meaning of *perro* when it became necessary in real-time language usage.

The keyword technique does lead to strong retention of form-meaning connections when the task is simply to recall words one by one without time pressure and without a requirement to use the learned words in a speaking or listening task (e.g., Atkinson & Raugh, 1975; Rodríguez & Sadowski, 2000). However, when investigated in a time-sensitive lexical-processing experimental paradigm, the keyword technique has been shown to lead to a slow, unnatural type of processing that is not conducive to real-life language use (Barcroft, Sommers, & Sunderman, 2011). Similarly, learning with the help of pictures is less effective in terms of naturalness of lexical processing than learning by simple translation to the L1 (Altarriba & Knickerbocker, 2011; Lotto & de Groot, 1998). In other words, the best way to learn an

initial form-meaning connection is simply to pair the L2 word with the L1 translation equivalent suitable to the meaning the learner is currently dealing with. (For an interesting qualitative treatment of rote learning strategies in the Chinese learning tradition, see Gu, 2003). Interestingly, it also seems that the more experienced a learner is with foreign languages the better the results of learning through translation equivalents (Tokowicz & Degani, 2015). We should keep in mind, though, that linking a meaning and a form is only the beginning of the long process of vocabulary learning. Most of the remaining aspects of lexical knowledge cataloged at the beginning of this article should be learned through massive amounts of meaningful L2 input and practice (Nation, 2013).

Should Words Be Taught in Lists of Items of the Same Kind (e.g., *Apple*, *Pear*, *Peach* …)?

Most often, *apple* is taught in a group with *peach*, *pear*, *plum*, *orange*, *banana*, *strawberry*, and other fruits. The same happens with professions, types of furniture, means of transportation, items of clothing, and many other groups of words at the same level of lexical organization, that is, examples of a superordinate category. This is done because textbooks tend to present these words together, because picture dictionaries group these words together, and because it is assumed that such groupings will lead to more natural learning, better retention, and facilitated conversation about a topic (Tokowicz & Degani, 2015).

Unfortunately, learning new words in semantic sets of this type can lead to significantly worse memorization and to slower processing compared to randomly grouped words (Finkbeiner & Nicol, 2003; Tinkham, 1993; Waring, 1997) because of interference among the semantically related items and the establishment of incorrect associations between the various forms and meanings, particularly for similar-sounding items (e.g., *pear* is easily confused with *peach*). Fortunately, the communicative usefulness of new vocabulary can still be preserved by introducing thematically related words that do not belong to the same category, such as *table*, *fruit*, *cell phone*, *glasses*, *newspaper*, *cup*, and *coffee*. Thematic learning has been shown to be superior to learning words in random groups (Tinkham, 1997), and it is therefore the most promising of the three approaches, striking a balance between what is good for learners and what is good for the communicative curriculum.

Are Certain Types of Words Easier to Learn Than Others?

In short, yes. Some words are easier to learn than others. We have already seen above that cognates are easier to learn than noncognates. Thus, Spanish *torre* ("tower") is easier for an English speaker to remember than *reloj* ("clock"). Similarly, concrete words such as *leg* are easier to learn than

abstract words such as *menace*. Furthermore, general words (e.g., *fatherly*) are easier than register-specific ones (e.g., *paternal*), nonidiomatic lexical items such as *die* are easier than their idiomatic counterparts (*make up one's mind*), and words with few meanings (*papaya*) are easier to learn than words with many meanings (*set*). Words that have a sound structure resembling the typical sound structure found in a learner's first language are easier to remember than words that have a less familiar sound structure. For instance, the English word *cuckoo* is easier to learn than the word *ostrich* for speakers of languages that have a strong preference for syllables with one consonant and one vowel (e.g., Japanese or Mandarin). Words that are similar in form to other words (e.g., *owe/own*; *cue/clue*, etc.). are harder to learn than words with less easily confusable forms. L2 words are also easier to remember when they are paired with a frequent L1 translation equivalent. For example, for an English learner, the Serbo-Croatian word *bolestan* would be remembered better if translated as "sick" than as "infirm" (some references for the foregoing ease vs. difficulty parameters: de Groot, 2006; Laufer, 1990; Tokowicz & Degani, 2010). This means that teachers can anticipate which words might be harder for their students and provide more support. Also, teachers can share this information with students, thus encouraging them to be proactive and pay more attention to words that fall in the difficult category.

A Note on What Comes Afterward

As stated at the beginning, this article has focused on the very initial stages of learning a second language word, the establishment of a form-meaning connection in the learner's mind. Once this initial step has been successfully taken, there is a long way ahead to lexical proficiency. There is almost too much to learn, including synonyms, antonyms, meaning neighbors, the lexical hierarchies that a word belongs to, the grammatical and lexical company a word likes to keep, and so much more. In many languages, complex morphology must be learned as well, with a single word often having dozens, hundreds, and even thousands of different grammatical forms, often irregular and involving capricious changes in stress patterns, sound segments, and lexical tone. Just take the Serbo-Croatian words related to baking as an example; the root is {pek-}, but notice the alterations in lexical tone and the last consonant of the root: *pȅći* "to bake," *pèčemo* "we bake," *pèku* "they bake," *pècite* "bake! (imperative)," *ȉspekoh* "I finished baking," *ȉspeče* "you finished baking," *prepèkosmo* "we overbaked," *pȅcijahu* "they were baking," *napèkoste* "you (plural) finished baking a substantial amount," and literally hundreds of forms on top of these. Fortunately, learners and teachers of English are mostly spared this type of complication. The trade-off is that a larger number of different, morphologically unrelated word forms must be committed to memory; for instance, *to write*, *signature*, *to copy*,

and *to enroll* all share the same root in Serbo-Croatian ({pís-}: *písati*, *pótpis*, *prepísati*, *upísati*) as do *dog* and *rabies* in Hebrew ({k-l-v}: *kélev*, *kalévet*), whereas they must be memorized as completely unrelated forms in English.

Obviously, it is not enough to just store all this complex knowledge in memory. It is crucial that the learner be able to deploy it rapidly, accurately, and with cognitive efficiency. Fluent language comprehension and production cannot be achieved if words are not recognized or selected for production and uttered quickly and reliably, in a way that does not tax our severely limited conscious cognitive resources. The same applies to grammatical processing, but this is not the focus of the present article. This bundle of speed, reliability, and lack of reliance on controlled, conscious processes is referred to as automaticity in the literature (Dronjic & Bitan, 2016; Segalowitz, 2010). Only when "lower-level" language processes are automatized, that is, when they happen rapidly, without effort, and without disrupting conscious thought, always yielding accurate, reliable results in a similar amount of time, can the learner hope to be able to dedicate his or her conscious resources to the myriad demanding "higher-level" tasks such as comprehending discourse or text, repairing misunderstandings, inferring implied meanings, planning for appropriateness, fixing communication breakdowns, and, well, just enjoying communication! In the lexical domain, this can be achieved only through a very large amount of meaningful language use, both in the receptive and the productive modalities. Apart from teaching vocabulary explicitly and encouraging students to pay conscious attention and invest energy in enlarging their vocabulary, the best thing teachers can do is to provide plenty of opportunity for meaningful communication, making sure to supply large amounts of correction of erroneous forms (lexical and grammatical errors). Repetition through practice leads to automatization, so it is crucial that what is repeated is repeated accurately!

Best Practices

The concluding section of this article presents a list of best practices in vocabulary instruction based on the empirical evidence reviewed above. It also lists several useful resources available to teachers of English free of charge. Resources for languages other than English exist but are sparser. Because of space restrictions, the overview of suggested teaching principles is of necessity fairly "high-level"; for more specific suggestions, see, for instance, Zimmerman and Schmitt (2005), an earlier publication in this vein that also appeared in *The CATESOL Journal*, or Nation (2013), which contains a wealth of suggestions for curricular and classroom practices. A selection of links to online resources mentioned in this section are available in the Appendix.

To reiterate, the number of words that a learner knows is the best predictor of comprehension of spoken discourse and written text. We have also

seen that teachers must teach vocabulary in a deliberate, systematic way and encourage active learning outside class. Left to their own devices or at the mercy of textbooks, learners will falter.

Before beginning to teach vocabulary systematically, teachers will want to have an idea about their students' vocabulary size. Two readily available tests are the Vocabulary Size Test (Beglar, 2010; Nation & Beglar, 2007) and the Vocabulary Levels Test (Nation, 1990; Schmitt, Schmitt, & Clapham, 2001; Webb, Sasao, & Ballance, 2017). Both are available in multiple paper-and-pencil and electronic formats. A picture version of the Vocabulary Size Test is also available (Anthony & Nation, 2017). A productive version of the Vocabulary Levels Test (Laufer & Nation, 1999) is available in multiple forms, and one place where it can be accessed is Tom Cobb's website, the *Compleat Lexical Tutor* (Cobb, n.d.). Another option for a quick low-stakes assessment of vocabulary size, often used for placement purposes, are various versions of the Yes/No test (Huibregtse, Admiraal, & Meara, 2002; Meara & Buxton, 1987; Meara & Jones, 1990); one version is available from Paul Meara's website, *Lognostics* (Meara, n.d.).

Once they have an idea of their learners' vocabulary size, teachers will need tools that can inform them about word frequency. A variety of frequency lists can be downloaded from the *Compleat Lexical Tutor.* Some frequency lists (e.g., Coxhead, 2000; Gardner & Davies, 2013) contain general-use academic vocabulary, which is particularly helpful to L2 learners in high school or those preparing for tertiary-level study in English. Vocabulary profilers are another useful tool, allowing teachers to quickly determine whether a text they intend to use in class uses words that are appropriate for their learners and to adjust texts in difficulty by substituting more or less frequent vocabulary. Concordancers are tools that provide users with corpus-derived information about collocation, and they are helpful when authentic examples of usage are required (see Appendix for links to vocabulary profilers and concordancers).

In terms of instruction, the basic curricular goal should be to get learners to a vocabulary size of at least 3,000 word families, followed by teaching midfrequency vocabulary (up to 9,000 word families). Vocabulary items that do not fall in the first 9,000 word families should be addressed only in passing by quickly providing a translation or letting learners look them up, and only when this is crucial for comprehension (Nation, 2013). These goals are achievable only through active, focused instruction. A good approach is to set a weekly quota for the number of words or word families that will be taught and reviewed. If we take a class in Intensive English as an example, and this class meets 5 days a week for 8 weeks, a goal of 100 words per week, or 20 words per day (approximately 4 words per hour) does not seem too far-fetched. With such a target, a dedicated learner could commit 800 new words to memory over the duration of the course, and this includes

only words taught through direct, explicit instruction. During the course of a year, a learner in such a class would benefit from a vocabulary increase of 4,800 words. With some instruction in regular derivational morphology, this could easily translate into knowledge of 4,800 new word families! Even in a scenario half as ambitious (10 words a day or 50 words a week), the learner would end the year with 2,400 more word families, still a massive gain.

In the process of teaching vocabulary, recycling is key. After the initial presentation of a word and its translation, practice sessions should be spaced (Benjamin & Tullis, 2010; Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Pavlik & Anderson, 2005). It is more conducive to retention to have learners recall a word and use it in exercises on multiple occasions separated in time than to do the same amount of work in one sitting. It is difficult to determine the precise spacing of presentation and practice sessions (Tokowicz & Degani, 2015) that would lead to optimal retention. Practice testing is an extremely effective way of recycling vocabulary (Dunlosky et al., 2013; Kang, Gollan, & Pashler, 2013) and can be achieved through in-class pop quizzes and weekly vocabulary tests as well as through individual retrieval practice (see below).

Here is what a solid instructional practice might look like: Present a set of words needed for a task (e.g., reading or listening) ahead of time and have learners match the words with an L1 translation. A bit later, the words would be encountered in the listening or reading, and a little later they could also be strategically planted in comprehension questions. The same words could then appear in a free-communication task at the end of the lesson as well as in a piece of written homework. Five to 10 minutes at the end of each day of instruction could be dedicated to having students make flashcards with the day's words, which they could later use for systematic vocabulary review on their own time. The next day, 5 or 10 minutes of class time could be dedicated to a pop quiz on the group of words taught the previous day, followed by another pop quiz a day later, and, finally, the words could appear in the weekly practice vocabulary test at the end of the day on Friday. Since human semantic memory, which is responsible for the storage of word meanings, is consolidated through slow-wave sleep (Ackermann & Rasch, 2014), it is crucial that a word be encountered on multiple days.

Apart from regular pop quizzes and weekly vocabulary-review tests, students should be encouraged to use the Leitner box (or "hand-computer") method (Mondria & Mondria-De Vries, 1994) to help them review vocabulary systematically and in a spaced fashion. This is a system in which new flashcards are placed in the first compartment of a box with five to seven compartments. At each review session, a vocabulary item on a flashcard that was successfully recalled is promoted to the next compartment (for review on a subsequent day). Once a card has made it through all the compart-

ments, it is put away for periodic future recycling. Any time a card is not successfully answered, it is demoted to the first compartment. There are also numerous flashcard programs of varying quality that simulate the Leitner system on a computer or mobile device and allow synchronization across devices (Godwin-Jones, 2011; Pham, Chen, Nguyen, & Hwang, 2016). Webb and Nation (2017) review two apps, Anki and Flashcards+, favorably. A basic software version is also available from the *Compleat Lexical Tutor*. However they may decide to manage their cards, students should be encouraged to have the L2 word on one side, accompanied by information such as part of speech, stress, example sentence, and other words belonging to the same word family, with the L1 translation on the other side. In accordance with the learning principle of transfer-appropriate processing (Morris, Bransford, & Franks, 1977; Veltre, Cho, & Neely, 2015), review sessions should not only be in the L2-to-L1 direction, but also in the opposite direction, from the L1 to the L2; students will need to use words in comprehension and production, and it is known that lexical processing in the L1-L2 direction takes more effort with more tenuous memory associations (Kroll & Stewart, 1994).

At learning, words are memorized better if they are presented in lists or sentences than if they are presented in simple or elaborated text (Laufer & Shmueli, 1997). As seen above, words that resemble each other in form (e.g., *cue* and *clue*) should not be presented at the same time, although the temptation to present such items together may be strong. Words that belong to a semantic set, such as types of fruit, should be presented on separate learning occasions. Only one sense of a word should be introduced at a time; teachers should resist the impulse to present multiple new meanings or to contrast them. Contrasting is not harmful if one sense is already well established in memory. Words are remembered better when learners are asked to generate meaningful example sentences (Gollub & Healy, 1987). Also, form-based elaboration helps recall, and this can be achieved by generating other members of the word family (e.g., *teach*, *teacher*, *teaching*, *teachable*, etc.), by transcribing the word using the International Phonetic Alphabet or a similar transcription system, and even by transcribing the word into the L1 writing system by approximating its pronunciation (Tseng, Doppelt, & Tokowicz, under review; cited in Tokowicz & Degani, 2015). As mentioned earlier, establishing the form-meaning relationship in memory is only the initial step in word learning. One excellent collection of suggestions for pedagogical practices beyond this level is found in Nation (2013).

A Note on Learning Beyond the Word Level

One crucial aspect of vocabulary learning (at its intersection with syntax) not dealt with in this article is the learning of multiword units, collocation, phrasal frames, chunks, and formulaic sequences. These are, without a doubt, crucial for fluent performance in a second language, and they need

to be taught through a combination of explicit and incidental (exposure-driven) techniques. For good treatments of this topic, see Nation (2013), Chapter 12, as well as Webb, Newton, and Chang (2013).

Conclusion

The most important takeaway of the present article is that not teaching vocabulary explicitly and not teaching it in a principled, evidence-based way is a major disservice to learners, since lexical knowledge is a strong predictor of success at L2 learning. Research in second language acquisition, psycholinguistics, and other areas of cognitive science has produced a substantial amount of knowledge about word learning that is ready for implementation in the classroom. Formidable efforts by corpus linguists, language testers, and second language vocabulary researchers have produced a range of freely accessible and easy-to-use tools to support systematic, evidence-based vocabulary teaching. I have provided a short list of these resources in the Appendix. The onus is now on textbook writers, teachers, and administrators to start making more systematic use of these tools to guide students toward more favorable learning outcomes. It is my hope that this article is a small step in the right direction.

Author

Vedran Dronjic is an assistant professor of Applied Linguistics at Northern Arizona University, where he teaches in the PhD, MA, and undergraduate programs and directs the Language and Memory Lab. He holds a PhD from the University of Toronto. He investigates the psycholinguistics/neurolinguistics of morphological learning/processing, vocabulary, and reading.

Note

[1]Bilingualized dictionaries combine the typical detailed entry from a monolingual dictionary with the translations found in bilingual dictionaries.

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Appendix
Resources for Teaching Vocabulary

I hope this short list of resources is useful to those who wish to make vocabulary a central part of their teaching. Please tell others about any resources you try out and find useful. If you find this list helpful, please pass it on to others.

- For a quick overview of many of the points I made in the article, you may wish to look at these videos:
    - Part 1: https://www.youtube.com/watch?v=XvAVMJH7B04
    - Part 2: https://www.youtube.com/watch?v=u01B5zevMHc
- If you are interested in learning more about learning and teaching vocabulary, this book is highly recommended.
- A good place to start exploring lexical tools is Tom Cobb's website, the *Compleat Lexical Tutor* (often referred to as *"Lextutor"*). This website makes available a wealth of vocabulary-related tools and is used by teachers, students, and researchers. I strongly encourage you to explore this website when you have time, try out the various tools, and see which of these might work for you, your colleagues, and your students.
- Frequency-based word lists can help you and your colleagues organize your lexical curriculum in a systematic way. This page on *Lextutor* has several lists available for download. Stuart Webb's webpage also has frequency lists available for download. Also, see this entire website (New General Service List; New Academic Word List). If you are looking to get into the issue of frequency a bit more deeply, you can look into SUBTLEXus, a frequency list based on words, not word families, that correspond to the spoken register particularly well, as it is based on movie subtitles. Be warned: SUBTLEXus is a bit more advanced because of the various frequency statistics it provides. All the other lists found here will be straightforward to use.
- If your students are in high school or are preparing for postsecondary study, you will want to focus on teaching them academic vocabulary. Lists of academic vocabulary are available here and here.
- If you are going to teach vocabulary systematically, you will need to know your students' vocabulary size. You might wish to try using the Vocabulary Size Test. There is an online version as well as a paper version (including a number of bilingual forms) available from Paul Nation's website. A picture version of the Vocabulary

Size Test is available here. You might also try the Vocabulary Levels Test and the new version of this test. More vocabulary tests can be found on *Lextutor,* including the productive Vocabulary Levels Test. Paul Meara's website offers access to the Yes/No test. For tests that go with the New General Service List and the New Academic Word List (linked above), see here.

- To determine the frequency profile of the words in any text you plan to use in your classes, you can use this vocabulary profiler available on *Lextutor.* Do not be put off by the busy design. The instructions are found in the profiler text box. Go over them. This box is where you paste the text you want to analyze. Then just click on "Submit Window" and see how helpful the results are!
- To encourage efficient form-function learning (the foundation for subsequent usage-driven learning), have your students use the Leitner box (see this video) to manage their flashcards. There are numerous free flashcard apps they can use on their mobile devices. Here are some examples. *Lextutor* also offers a basic solution. I personally think that nothing beats good old-fashioned *actual cards* and a box!
- Graded readers are an important tool for vocabulary learning after a basic form-meaning connection is remembered. They are also excellent tools for enhancing reading fluency (for example, through speed reading). Some free graded readers are available on Paul Nation's website. Nation (2013) features a wealth of excellent suggestions on how to use graded readers. Here are more graded readers.
- To teach collocation, you will need to know which words tend to appear together. Concordancers are a useful tool for these purposes. Two freely available ones can be found here and here. This tool can be used both to explore collocation and academic vocabulary.
- When thinking about teaching a word, you need to consider which of its senses to teach. Wordnet is an outstanding freely available tool that can show you numerous different senses of a word as well as how words fit in hierarchies of meaning. I encourage you to explore it.

This is only a brief list of resources available to the vocabulary teacher. It is by no means exhaustive, but it is more than enough to get you started if you are interested in approaching vocabulary more systematically in your teaching.