

2012

Partial Word Knowledge: Frontier Words in the L2 Mental Lexicon

Alla Zareva

Old Dominion University, azareva@odu.edu

Follow this and additional works at: https://digitalcommons.odu.edu/english_fac_pubs

 Part of the [First and Second Language Acquisition Commons](#)

Repository Citation

Zareva, Alla, "Partial Word Knowledge: Frontier Words in the L2 Mental Lexicon" (2012). *English Faculty Publications*. 43.
https://digitalcommons.odu.edu/english_fac_pubs/43

Original Publication Citation

Zareva, A. (2012). Partial word knowledge: Frontier words in the L2 mental lexicon. *IRAL: International Review of Applied Linguistics in Language Teaching*, 50(4), 277-301. doi: 10.1515/iral-2012-0011

Partial word knowledge: Frontier words in the L2 mental lexicon

ALLA ZAREVA

Abstract

The study set out to examine the partial word knowledge of native speakers, L2 advanced, and intermediate learners of English with regard to four word features from Richards' (1976) taxonomy of aspects describing what knowing a word entails. To capture partial familiarity, the participants completed in writing a test containing low and mid frequency content words, accompanied by a word knowledge scale. The analysis showed that there were three distinctive patterns of partially familiar vocabulary but their distribution across the three groups was quite different, which indicated that partial knowledge was linked to different word features across the three proficiency groups. It was also of interest to explore whether the participants maintained similar associative connections for their frontier words and whether a word association task would capture partial familiarity. Overall, participants' associative domains for frontier words did not reveal any consistent associative behavior that would distinguish between proficiency groups.

1. Background

There is a unanimous agreement among lexical researchers that adults' mental lexicon is highly organized. The fact that educated native speakers (NSs) of English know several thousand words – the more conservative estimates range from 14,000 to 20,000 words (Nusbaum et al. 1984; Goulden et al. 1990; D'Anna et al. 1991; Zechmeister et al. 1995; Zareva et al. 2005), while the more liberal ones suggest 50,000 words and more (Aitchison 2003) - which they can access very fast (in 200 ms [Aitchison 2003]) upon recognition, says a lot to that effect. In addition, most NSs are impressively fast at finding the words they need in speech production – for example, in prepared discourse, NSs of English maintain a rate of approximately 150 words per minute which suggests that it takes roughly one third of a second for a NS to retrieve a word

he/she needs to use in a sequence of words. Of course, these are only average estimates which, nonetheless, are quite useful in helping us get an idea about the size and the nature of the lexical task in second language (L2) learning.

By and large, L2 users are thought to have much smaller vocabulary sizes than NSs which claim, however, does not help us much to decide how to distribute the lexical learning effort accordingly across different proficiencies. In this regard, it is more realistic to argue that L2 vocabulary sizes crucially depend on learners' proficiency level, rather than lump all L2 users together in one unitary, yet, shapeless group. Indeed, in comparing three groups of participants at differing levels of proficiency – NSs of English, L2 advanced, and L2 intermediate learners of English – Zareva et al. (2005) found that size-wise, there were no meaningful differences between the NS (range 8,500–20,700 words) and advanced L2 group (range 7,900–20,700 words), while the average vocabulary size of the L2 intermediate level participants (range 4,900–14,800 words) was way below the NSs' and the advanced L2 learners' vocabulary size alike. What seems to be evident, then, is that given that at the higher levels of proficiency the L2 lexicon closely approximates to NSs' lexical size and the demands for it to be functional are equally pressing, it has to be highly organized as well. In this regard, there have been several attempts to set up a framework of meaningful criteria that account for the organization of lexical knowledge, where the notion of knowing a word has been operationalized with respect to a number of features related to a word's form, meaning, function, and features it projects onto the syntactic level. In reviewing some of these frameworks, however, Meara (1996) rightly noted that most of the researchers, who have tried to specify the components of lexical knowledge (Nation 1990, 2001; Wesche and Paribakht 1996; Singleton 1999; Gass and Selinker 2001) have more or less re-iterated Richards' (1976) taxonomy of seven aspects of word knowledge, identified as follows:

1. to know the probability of encountering a word in speech or writing;
2. to know the limitations of word use according to function and situation;
3. to know its syntactic properties;
4. to know the word's underlying form as well as its derivations;
5. to know the associations between the word and other words in the language;
6. to know the semantic value of the word;
7. to know many of the meanings associated with the word.

Regardless of the framework one may choose to adhere to, the fact that for an adult language user word knowledge is best described in terms of a set of features that capture what it means to know a word suggests that knowing a word is not an either-or state of affairs. Rather, for most words, it should be conceptualized along a continuum where, at the one extreme, we have complete familiarity with words, i.e. knowledge of all seven aspects (in Richard's terms) for every word that falls there and, at the other extreme, we would have

unfamiliar words. Thus, assuming degrees of knowing or not knowing a word is an approach that recognizes both the graduated nature of word knowledge as well as the cumulative nature of the process of lexical learning. In other words, such an approach takes that, between the two extremes, there are intermediate levels of word knowledge where individuals are not certain about some aspects of their knowledge of a specific word even though they may have encountered that word before (Dale 1965).

To capture those intermediate levels of knowing a word and find out what information is available from familiar words that is not completely available from the partially familiar or the unfamiliar ones, first language (L1) researchers (e.g., Dale 1965; Shore and Durso 1990; Durso and Shore 1991) began using a scale of word familiarity. The most commonly used scale is the one proposed by Dale (1965), who distinguished between 4 stages of knowing a word:

Stage 1: "I never saw it before".

Stage 2: "I've heard of it, but I don't know what it means."

Stage 3: "I recognize it in context – it has something to do with ..."

Stage 4: "I know it." (Dale 1965: 398).

Similar scales have also been used in L2 studies (e.g., Paribakht and Wesche 1993; Knight 1994; Hulstijn et al. 1996; Wolter 2001; Hulstijn and Laufer 2001; Zareva et al. 2005; Zareva 2007) to account for familiarity effects, especially when words from a range of frequency bands are used as stimulus words (SWs). Thus, it would be safe to say that, in the last couple of decades, conceptualization of word familiarity in L2 research shifted from *assumptions* about familiarity to *obtaining evidence* of familiarity, based on participants' ratings and verification of knowledge of words from a range of frequency bands. However, very little research has been done on the relationship between L2 users' language proficiency and their partially familiar words with the aim of identifying the features that are most frequently absent from their word knowledge. Having better understanding of the status of those words in L2 learners' minds would help us put stronger emphases in our vocabulary teaching practices on aspects that the L2 learners themselves may unknowingly overlook and, at the same time, allow us to de-emphasize other aspects that may be self-evident to the L2 learners.

The following study was designed to compare two groups of adult L2 learners of English at two levels of proficiency (L2 advanced and intermediate learners) with NSs of English on their frontier words, to use Trembly's term (1966 cited in Durso and Shore 1991). Trembly (1966) explained that frontier words, or partially familiar words, are the ones that exist 'in the frontier region between the point where every word is known and the point where no words are known' (p. 229). Thus, those are words with a somewhat intermediate status in one's lexicon of which status language users may not even be fully aware. For the purposes of this study I adopt the term *frontier words* for words that were

judged as familiar by the participants but could not be acceptably explained. To capture partial word familiarity, I used a knowledge scale on which the participants rated their word knowledge as *unfamiliar* ("I have not seen this word before and I don't know what it means") or *familiar* with two levels of certainty – a lower one ("I think this word means ...") and a higher one ("I know that this word means ..."). In either case, the participants had to verify their word knowledge by giving an explanation or a synonym that reflected both the lexical class (LC) of the test item and, at least, one of its meanings, which in turn allowed for identification of their *frontier* words. After having verified their familiarity with the SWs, the participants were asked to write down up to three word associations (WAs) to the words they had explained in order to examine how their frontier words were interconnected in their mental lexicon.

It has to be pointed out here that the test design did not allow for examining all seven aspects of word knowledge as specified by Richards (1976), but it captured meaningfully four of them, i.e.: (1) knowledge of a word's underlying form; (2) knowledge of its syntactic properties; (3) knowledge of the semantic value of the word; and (4) knowledge of the associations between the word and other words in the language. As important as all seven features are, the four chosen for investigation in this study are the ones that can successfully be examined by using a single word task, which in itself is a rigid measure of word knowledge. It was also believed that those four features are the ones a language user needs to know before attempting to use a word in a phrase or sentence since they project themselves onto the syntactic level. In addition, it was of interest to identify the most prominent lexical features that render some words partially familiar for a particular proficiency level and see whether the differences across groups, if any, could point to aspects that English language teachers may need to stress on more in their teaching practices.

Finally, it was considered interesting to find whether a WA task could capture the effects of partial familiarity across the three proficiency groups. A small number of L1 studies have examined the type of associative responses as a function of participants' familiarity with SWs. By and large, earlier L1 research (e.g., McNeill 1966, 1970) suggested that a shift in association pattern from predominantly syntagmatic (WAs with a different from the stimulus LC) for young children to predominantly paradigmatic (WAs with same as the stimulus LC) for adults. This shift could be explained either by the acquisition of new features of words, which would result in participants' choosing responses that shared the maximum number of features with the stimuli or by change in the strategies used in searching and matching stimulus-responses features. Stolz and Tiffany (1972) empirically confirmed the first hypothesis and concluded that the primary cause of the response shift was greater familiarity with word features. They also suggested that the methodological implication of this finding should be seen in the application of WA tests as "a rather sensitive index

of the state of one's lexical knowledge about a given word" (Stolz and Tiffany 1972: 45). Early L2 associative research (e.g., Meara 1978) picked it from there and advanced the idea that since the L2 lexicon tends to show a syntagmatic bias, it is probably because it is underdeveloped in terms of organization, quality of word knowledge or both. However, more recent research (e.g., Wolter 2001) has shown that L2 learners at the intermediate level of proficiency and higher have a preference for syntagmatic connections among the words they know, which leaves us with the question of whether partially familiar words have associatively different selectional features than familiar words.

In light of these questions, the following null hypotheses were tested:

First, to find out what words had the status of partially familiar vocabulary, I had to find out what words the participants could identify as unfamiliar. Hence, the first hypothesis tested the assumption that there were no differences among the three groups in the percentage of words they identify as unfamiliar.

Second, the test format required from the participants to verify their knowledge with the words they identified as familiar, which in turn provided evidence of partial familiarity with some of those words when the participants could not acceptably verify the SWs. Thus, the second hypothesis tested whether there were no differences among the three groups in the overall percentage of their partially familiar words.

Next, it was expected that the category of frontier words is not a unitary one and it can be subdivided into three other subcategories, reflecting patterns of partial familiarity. First, it may contain words the participants thought they knew but their explanations show that they actually did not, so the third hypothesis tested whether there were no differences among the participants in the percentage of words they judged as familiar but, in actuality, they had no knowledge of. The second pattern of frontier words related to words for which the participants may not have a good sense of their LC, yet they may have some knowledge of their meaning; thus, hypothesis four tested if there were no differences among the three groups on the percentage of such words. The last pattern of partially familiar vocabulary referred to participants' knowledge of the LC of some SWs, but no knowledge of their meaning; hence, the fifth hypothesis examined the assumption of no difference among the participants in the percentage of words for which they knew the LC but not the meaning.

Finally, hypothesis six and seven related to the paradigmatic and syntagmatic associative connections the participants maintained for their frontier vocabulary and examined the assumption of no differences among the three groups in the percentage of their paradigmatic and syntagmatic connections.

2. Method

2.1. Participants

Altogether, 120 students – both NSs and L2 learners of English – participated in the study. The NSs ($n = 40$: males [$n = 14$] and females [$n = 26$]) were undergraduate students (mean age 21.7) of different majors at two U.S. universities.

The L2 learners of English, males ($n = 34$) and females ($n = 46$) at an average age of 24.5, were L1 speakers of seventeen different languages (Chinese [$n = 12$], Japanese [$n = 8$], Korean [$n = 1$], Cantonese [$n = 1$], Portuguese [$n = 3$], Spanish [$n = 6$], French [$n = 1$], Russian [$n = 1$], Bulgarian [$n = 34$], Taiwanese [$n = 1$], Thai [$n = 4$], Vietnamese [$n = 1$], Indonesian [$n = 3$], Nepali [$n = 1$], Albanian [$n = 1$], Hungarian [$n = 1$], and Kriol [$n = 1$]). At the time of the experiment, they were either attending ESL Programs to prepare them for admission to different university-based academic programs or were actively pursuing undergraduate and graduate degrees at U.S. universities. All non-native speakers (NNSs) had learned English in their respective native countries through formal instruction ($M_{Advanced} = 9.9$ and $M_{Intermediate} = 8.5$ years of instruction) and had lived in the U.S.A. or other English speaking countries for an average of 1.8 years.

The L2 participants were placed in two proficiency groups – an advanced learner group ($n = 40$) and an intermediate learner group ($n = 40$) – based on their *TOEFL* scores. All *TOEFL* tests were taken in controlled settings. For the purposes of this study, the cut-off *TOEFL* score was set at 550, i.e. participants with a score of 550 and above were placed in the L2 advanced group, while participants with a score below 550 were placed in the L2 intermediate group. The participants in the L2 advanced group had a mean *TOEFL* score of 584 on a paper-based format (range 550–630) and 242 on a computer-based format (range 223–300) which, according to the concordance tables developed by the *TOEFL* program, roughly corresponds to 560–597 points on a paper-based test. The participants placed in the intermediate learner group had a mean paper-based *TOEFL* score of 475 (range 427–500) and a mean computer-based test score of 199 (range 190–207), corresponding to 520–537 paper-based test score.

2.2. Materials and procedure

The test instrument contained 25 SWs selected from three lexical categories: nouns ($n = 15$), verbs ($n = 5$), and adjectives ($n = 5$) at the ratio of 3 : 1 : 1, which is the closest to the distribution of these lexical classes in natural lan-

guage (see Appendix A). All verbs in the test sample were transitive to ensure that they can be associated with an external and internal argument. Given the inherent LC ambiguity of many English words (i.e. the same form may belong to several lexical classes – for instance, the word *play* can be a noun and a verb), a guiding principle in the SW selection was to have words that are grammatically completely unambiguous. Thus, the words in the sample were selected so that they could belong to only one lexical class, i.e. they could be either nouns, or verbs, or adjectives. This was an important step in the test items selection in light of the fact that the acceptability of the participants' verifying explanations as well as the classification of their WA responses was based on their relationship to the LC of the SWs.

In addition, each lexical category contained only low and mid frequency words. The frequency of each item was identified by its u-value, which is the frequency of occurrence per million tokens weighted by D (Dispersion value), taken from *The Educator's Word Frequency Guide* (Zeno et al. 1995) (see Appendix A). Words with a u-value below 1.000 were considered low-frequency words and words with a u-value of 1.000 and above were considered mid-frequency words. The distribution between the low- and mid-frequency words in the test sample was maintained at the ratio of 3 : 1, i.e., the sample contained more low-frequency words ($n = 15$) than mid-frequency ones ($n = 5$) which, however, were not equally distributed across the three lexical classes. The decision to limit the test sample to low and mid-frequency words, and exclude the high-frequency ones from testing, was motivated by the nature of the studied phenomenon and the proficiency level of the L2 participants in the study – i.e., with the higher proficiency levels (L2 intermediate and advanced), frontier words are more likely to occur among learners' knowledge of mid- and low-frequency vocabulary than the high-frequency ones. At the same time, it was not considered wise to limit the sample selection to low-frequency words only, as some L1 researchers did (e.g., Lockett and Shore 2003), since the test instrument used in this study required from the participants to provide verifiable evidence of their word knowledge (i.e., to provide an explanation or synonym to the SWs) and low-frequency words usually do not have synonyms and are not very easy to define, which may discourage the participants to respond to them.

The participants completed the test instrument in writing. Each SW was accompanied by a word familiarity scale on which they rated their word knowledge along three options, corresponding to three degrees of word familiarity. Choosing the first option (“[I] I have not seen this word before and I don't know what it means”) did not require from them any further explanation. A choice of one of the two other options (“[II] I think this word means ...” or “[III] I know that this word means ...”) required from them to verify their familiarity by writing down a synonym or a brief explanation of the word. After

having verified their familiarity with the SWs in option II or III, the participants were asked to write down up to three WAs that first came to their mind when they encountered the SW in the last option (“[IV] I associate this word with ...”).

2.3. *Coding of responses and WA classification procedure*

The data were analyzed in several steps. First, to find out how the participants compared on unfamiliar words, the number of items they self-reported as unfamiliar in option I (“I have not seen this word before and I don’t know what it means”) was counted and then transformed into a percentage, showing the percentage of unfamiliar words for each participant. Next, the overall unacceptable responses from either option II (“I think this word means ...”) or III (“I know this word means ...”) were counted and turned into percentages, indicating the percentage of words the participants thought they knew but in reality they did not quite know. These responses formed the overall percentage of their frontier words, i.e. words of which the participants had some partial knowledge, since they could recognize them as words they have seen before, but they could not correctly define them.

For a response (an explanation or synonym) to be considered acceptable, it should have reflected (1) the syntactic properties of the SWs as well as (2) broadly, at least, one of the meanings of the SWs. Not accounting for one of those criteria in an explanation or synonym rendered a response unacceptable and the SW frontier. The decision concerning response acceptability was based on the criteria used in lexicography for defining words by part of speech, as outlined in detail by Landau (2001). In brief, the explanation of a noun should immediately answer the question “What is it?” and in order to answer that question it should contain a noun (either quantified or not) in the first part of the definition. For example, “a place where animals are slaughtered” as an explanation of the SW *abattoir* satisfied the conditions, while the explanation “to strike repeatedly” did not. The definition of verbs was expected to begin with another verb, with or without infinitival particle “to” (e.g., *concede* [SW] – “to give in” [acceptable response]). The definition of adjectives could contain some of the introductory words and phrases used for defining adjectives, such as *able to*, *to be*, *being*, *belonging to*, *full of*, *having the quality of*, etc., a participle, or another adjective in the first part of the definition (e.g., *lackadaisical* [SW] – “lazy”, “to be lazy”, “not caring”, “uninterested” [acceptable responses] vs. “apathy” [unacceptable synonym]).

The analysis of the category of partial knowledge showed that it, indeed, was not uniform and the unacceptable responses could further be classified into three sub-categories, i.e.:

1. Responses which showed that a participant had no knowledge of the SW and/or had completely misinterpreted its meaning – for example, in the case of *abattoir* (SW), the explanation “to strike repeatedly” showed no knowledge of any of the criteria of acceptability, though the word was self-reported as familiar.
2. Responses that did not account for the LC of a word, yet revealed some knowledge of its meaning – for instance, with the word *lackadaisical*, the explanation “don’t care or pay attention” indicated some semantic familiarity with the SW though it did not account for the LC of the stimulus.
3. Responses that reflected knowledge of the LC of a word, but failed to reflect correctly its meaning – the example *solstice* (SW), explained as “a type of holiday”, illustrates a response that fell into this sub-category.

Finally, the WAs given to the partially familiar words were classified. Overall, a total of 422 WAs in response to partially familiar words were collected ($n_{\text{NSs}} = 118$, $n_{\text{L2 Advanced}} = 205$, and $n_{\text{L2 Intermediate}} = 99$). To maintain consistency in the WA classification and substantially limit the inconsistencies related to the syntactic ambiguity of some WAs, the classification of the WA responses was based on criteria described in great detail in Zareva (2007) which, for the most part, are criteria proposed by L1 WA researchers and adopted by some L2 researchers (Piper and Leicester 1980; Söderman 1993; Wolter 2001). In brief, in the absence of phonological (also called *clang*) WAs, the responses were classified into two types - *paradigmatic*, if they shared the same LC with the SW, or *syntagmatic*, if they did not. Unfortunately, there is no standard way of dealing with the form ambiguity of some WA responses but, for the purposes of this study, when a response could be classified as either paradigmatic or syntagmatic (e.g., *penance* – *sin*), it was coded as (potentially) paradigmatic since the analysis focused on WAs generated by adults to what they considered familiar words (for more details, see Zareva 2007).

3. Results

A series of One-way ANOVAs was conducted to examine the relationship between language proficiency and participants’ partial word knowledge. The independent variable was language proficiency with three levels (NSs, L2 advanced, and L2 intermediate learners). The dependent variables were: (1) percentage of words the participants self-reported as unfamiliar; (2) percentage of participants’ frontier words; (3) percentage of responses which showed that the participants had no knowledge of some SWs and/or had completely misinterpreted their meaning; (4) percentage of responses that did not account for the LC of some SWs but revealed some knowledge of their meaning; (5) percentage of responses that reflected knowledge of the LC of some SWs but did

Table 1. Group means and standard deviations for the group of NSs, L2 advanced, and L2 intermediate learners of English

	N			Mean			SD		
	NSs	L2 Adv.	L2 Intrm.	NSs	L2 Adv.	L2 Intrm.	NSs	L2 Adv.	L2 Intrm.
% Self-reported unfamiliar words	40	40	40	50.8	55.4	72.3	21.3	15.3	16.8
% Total frontier words:	40	40	40	9.6	19.2	25.0	9.1	18.3	23.8
% defined words but no knowledge	40	40	40	5.2	6.4	16.0	6.7	12.2	19.5
% wrong LC but close meaning	40	40	40	3.0	3.1	2.0	5.3	6.0	7.6
% correct LC but wrong meaning	40	40	40	1.4	9.7	7.0	3.1	10.8	11.2
% paradigmatic WAs	40	40	40	27.5	36.1	29.7	41.6	35.5	35.2
% syntagmatic WAs	40	40	40	45.0	43.9	43.0	47.1	37.7	42.1

not reflect correctly their meaning; (6) percentage of participants' paradigmatic WAs generated to partially familiar words and (7) percentage of their syntagmatic WAs.

Proficiency level showed significant main effects on several of the dependant variables (see Table 1 for means and standard deviations). First, there were significant differences among the three groups of participants on their percentage of self-reported unfamiliar words, $F(2, 117) = 15.830$, $p < .001$, $\omega^2 = .20$, which indicated that the percentage of self-reported unfamiliar vocabulary can largely be explained by level of proficiency. The three groups also differed in the overall percentage of partially familiar words, i.e., words they believed they knew and attempted to explain, but the explanation revealed partial knowledge of those words, $F(2, 117) = 7.438$, $p < .01$, $\omega^2 = .10$. There was a high degree of inter-rater agreement among the two judges who rated the acceptability of the explanations and synonyms provided to the SWs by the three groups of participants - Pearson correlation for the group of NS, $r = .929$, $p < .001$, L2 advanced learner group, $r = .964$, $p < .001$, and the L2 intermediate group, $r = .972$, $p < .001$.

When the category of partially familiar vocabulary was broken down into the three subcategories that captured the main reasons for those responses to be considered partial, there were significant differences among the three groups in the percentage of responses which revealed participants' lack of knowledge of some SWs and/or some misinterpretation of their meaning, $F(2, 117) = 7.435$, $p < .01$, $\omega^2 = .10$, and in the percentage of responses that reflected knowledge of the LC of some SWs but no adequate knowledge of their meaning, $F(2, 117) = 8.083$, $p < .01$, $\omega^2 = .12$. However, the differences in participants' percentage of responses that did not account for the LC but revealed some knowledge of the meaning of the SWs turned out nonsignificant ($p = .706$). Thus, the results indicated that, overall, the participants across the three proficiency levels had a stronger sense of LC than meaning of their partially familiar vocabulary.

To find out where exactly the differences among the three proficiencies were, post hoc comparisons were conducted. All post hoc comparisons were adjusted to .05 alpha level of significance, based on Bonferroni rationale to control for Type I error. The comparisons of participants' percentage of self-reported unfamiliar words revealed significant differences between the L2 intermediate learners and the native speaking group (95% CI = 11.726, 31.2741; $p < .05$) as well as the L2 advanced participants (95% CI = 7.126, 26.674; $p < .05$), indicating a much higher percentage of unfamiliar vocabulary among the intermediate learners than the NSs and the advanced learners alike. Similar differences were observed with the comparison of their defined words that actually showed lack of familiarity (95% CI_{NSs} = 3.298, 18.303 and 95% CI_{L2 Adv.} = 2.247, 17.252; $p < .05$) (see Figure 1).

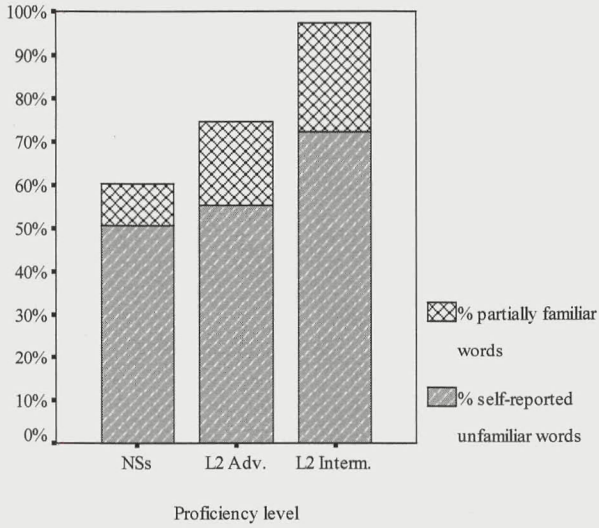


Figure 1. *Percentage of self-reported unfamiliar and overall percentage of partially familiar words*

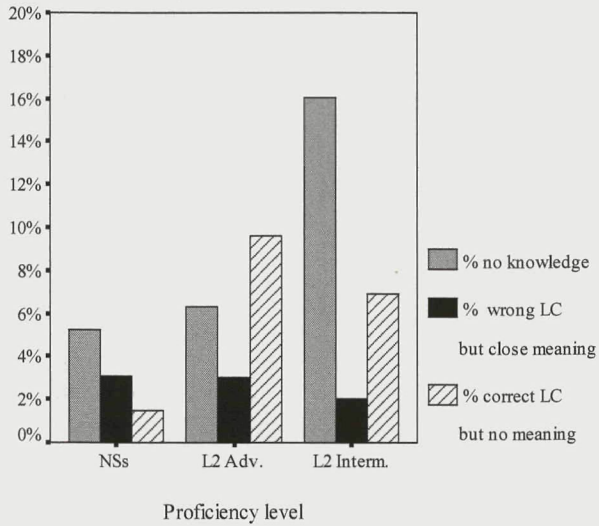


Figure 2. *Effects of proficiency level on participants' familiarity misconceptions*

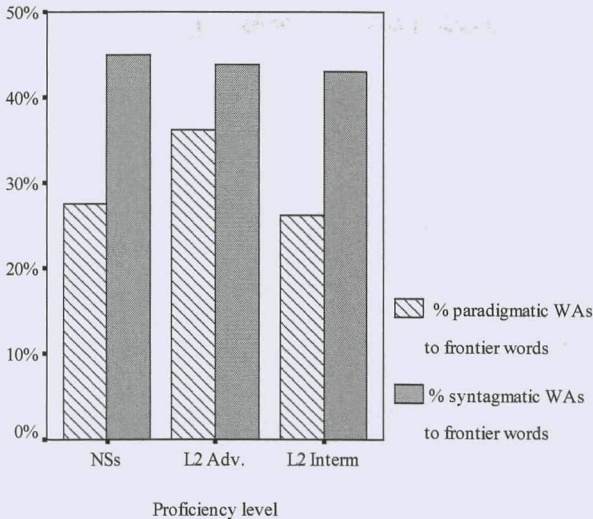


Figure 3. Participants' percentage of paradigmatic and syntagmatic WAs generated to frontier words

The intermediate learners also differed significantly from the NSs in the overall percentage of partially familiar words (95 % CI = 5.618, 25.383; $p < .05$) and in the percentage of responses that showed LC knowledge of the SWs but no adequate knowledge of their meaning (95 % CI = .439, 10.411; $p < .05$). Quite surprisingly, the advanced learners also differed from the NSs in that respect (95 % CI = 3.113, 13.086; $p < .05$), and I will elaborate on this finding in the discussion section. Figure 2 shows the three different types of familiarity misconceptions across the three groups of which only the percentage of responses that failed to account for the LC but revealed some knowledge of the meaning of the SWs was nonsignificant.

Finally, to see whether the WAs task alone could capture differences across proficiency levels regarding partially familiar vocabulary, the three groups were compared on their percentage of paradigmatic and syntagmatic associations they generated to frontier words. All comparisons turned nonsignificant ($p = .410$ [paradigmatic] and $p = .979$ [syntagmatic]) (see Figure 3). All pairwise t -tests comparing the percentage of paradigmatic and syntagmatic responses within each group were nonsignificant ($p > .05$) indicating that those were only chance differences. The implications of this finding will be elaborated in the discussion section.

4. Discussion

As noted elsewhere in the literature, the development of vocabulary knowledge is subject to partial increments. Be it in L1 or L2, there are words which we are certain we know and we are able to prove it, as well as words we know that we do not know. In-between these two extremes, there is an intermediate level of partially familiar vocabulary (some words being more familiar than others) which has not been clearly operationalized. If we consider Richards' (1976) seven features describing what knowing a word entails, not knowing one or more of the features would render a word partially familiar. Thus, words that fall into this intermediate level of word knowledge may range from "I know there is such a word, but I don't know what it means" in Dale's (1965) terms to words that have been encountered in one form or another for which a person may not have a good idea of their frequency distribution (feature 1 in Richards' framework), for example, yet know the rest of the aspects. There might be even words which one believes he/she knows but, in actuality, one does not. Thus, it is clear that partial knowledge is not just an intermediate level, but a level that is also arranged on a continuum.

While it is not possible to say which aspects are more important than others, it is possible to say that knowledge of some aspects can be tested at a single word level, while knowledge of others can only be tested at a syntactic, discourse, or pragmatic level. The present experiment was set to examine comparatively the partial word knowledge of three groups of adults at different levels of proficiency – NSs, L2 advanced and intermediate learners of English – with regards to four word features, namely: knowledge of a word's underlying form, its syntactic properties, semantic value, and knowledge of the associations between the word and other words in the language. Those features were chosen because they could be examined by means of a single word task, in which the participants had to verify their knowledge of the test items without contextual support. The test items were selected from three lexical categories (nouns, verbs, and adjectives) and each lexical category contained only low and mid frequency words. To control for LC ambiguity, only words that are syntactically unambiguous were included in the test instrument. Seven hypotheses were tested in the study and I shall elaborate on the findings regarding each of them in the paragraphs below.

The first hypothesis tested the assumption that there were no differences among the three groups in the percentage of words they identified as unfamiliar and the hypothesis was rejected. The L2 intermediate learners self-reported a much greater percentage of unfamiliar words than the NSs and the advanced learners - that is, while the L2 intermediate participants identified 72 % of the low and mid frequency words as unfamiliar, the NSs did so for 51 % of those words and the advanced learners – for 55 %. After the participants identified

the words they considered unfamiliar, they had to verify their knowledge of the words they judged as familiar by writing down an explanation or synonym that reflected both the LC of the item and at least one of its meanings. This in turn provided evidence for their partial familiarity with some of the words they thought they knew but, in actuality, they failed to define acceptably. Thus, the second hypothesis tested whether overall the participants differed in the percentage of their frontier words and, indeed, the results indicated that, in addition to the words self-reported as unfamiliar, the L2 intermediate learners had another 25 % of frontier words, which they failed to explain acceptably, and in that they significantly differed from the NSs (9.5 %), but not from the advanced learners (19 %). This overall difference prompted further investigation into the nature of the participants' partial lexical knowledge since, after analyzing the explanations and the synonyms they provided, it was possible to identify distinctive patterns of misinterpretations. The first pattern of misinterpretations among the partially familiar words contained words the participants thought they knew but their explanations or synonyms showed that they either completely misinterpreted the stimulus or did not know any of its meanings. In this regard, Laufer (1997) has rightly noted that, in a reading comprehension task, some words may not even be recognized by readers as unfamiliar and be completely misinterpreted because of their "deceptive transparency" (p. 25). She further explained that such cases usually include: (1) words with deceptive morphological structure (e.g., *drawback* can easily be misinterpreted as "something that draws you back" if the consisting morphemes are interpreted literally); (2) idioms whose deceptive transparency is of different nature, yet in some ways similar to the words with deceptive morphological structure (e.g., *look up a word* which, if interpreted literally, does not make much sense); (3) false friends - i.e. L2 words that resemble L1 words in form, yet have a completely different meaning (e.g., *become* in English and "bekommen" in German, meaning 'to get, to obtain'); (4) polysemous words, with whose multiple meanings an L2 learner may not be familiar (e.g., *transport* as a verb can mean "to transfer from one place to another" but it can also mean "to carry away with strong and pleasant emotion") and (5) synforms, which include pairs of words with similar forms but different meaning (e.g., *economic/economical, then/than, etc.*).

Indeed, some of these cases could easily be recognized among the responses the participants in this study gave, more so in the intermediate and advanced learner data than among the NSs' responses. Since words with complex morphological structure and idioms were not used in the sample and the test-takers were allowed to explain whichever meaning of a SW they chose to explain, the most common types of misinterpretations included synforms. For example, the intermediate students commonly misinterpreted the SW *perfect* as "perfect", the advanced learners - *parable* as "parabola", and the NSs - *virtuosity*

as “virtuousness”. In addition to the misinterpretations, there was a good deal of responses that showed no knowledge whatsoever of the prompt word - for instance, in the NSs’ responses, *prefect* was explained as “utopia”, *abattoir* as “to strike repeatedly”, etc; some L2 advanced learners explained *bracelet* as “to hold”, *bursar* as “cover”, *forgo* as “false”, etc.; and some intermediate students had *amoral* explained as “good things”, *concede* as “forwarded”, *custodian* as “daily”, etc. Overall, this category accounted for 5 % of the NSs’ frontier words, 6 % of the advanced learners’, and 16 % of the intermediate learners’ partially familiar words. What I find disturbing here is the overall state of the intermediate learners’ lexical knowledge of mid and low frequency words. If we add the percentage of words they judged as unfamiliar (72 %) to their partially familiar vocabulary (25 %), we get the striking 97 % of low and mid frequency words that they were uncertain about, of which there was evidence they actually did not know 88 % (72 % + 16 % defined but, in fact, unfamiliar words). This figure is quite disturbing in light of the fact that those were participants with a mean paper-based TOEFL score of 475 who have studied English for an average of 8.5. years and who were planning to move to degree granting programs at U.S. universities in the very near future. Yet, those learners maybe have only about 12 % of low and mid frequency sight vocabulary, of which approximately 7 % consists of vaguely familiar ones. Going into English-based academic programs with such a state of lexical knowledge may turn out to be a set up for the students (and the programs too) since their vocabulary knowledge will very likely hold them back in their academic comprehension and production. For instance, most studies show that the threshold for reading comprehension is largely lexical (Laufer 1997) and while text coverage in academic texts by the first most frequent 2,000 words of English is still high (about 78 %), the role of mid and low frequency vocabulary (including academic, technical, specialized vocabulary, etc.) significantly increases from 10 % in the conversational register to 22 % in academic texts (Nation 2001). Thus, the perceived importance of mid and lower frequency vocabulary and learners’ efforts to improve their knowledge of those words should reflect the demands their academic studies will put on them in the future.

The second pattern of frontier words contained words for which the participants did not show a good sense of LC in their explanations, yet revealed some knowledge of their meaning. The results indicated that the cumulative effect of this sub-category of partially familiar words was very small (NSs – 3 %, L2 advanced learners – 3.1 %, intermediate group – 2 %) and the differences among the three groups were not meaningful. It is highly possible that the cases that fell in this sub-category were simply slight deviations from participants’ otherwise good definitional skills. Examples to this effect include instances of the NSs explaining *naïve* with “lack of experience”, “someone who is inexperienced or immature” or “to have a lack of knowledge”, or the advanced learners

explaining *toxic* with “pesticides” or ‘poison’, and the intermediate learners explaining *bursar* with “to manage money” “to pay tuition”. Another possibility is to argue that by an intermediate level of L2 proficiency, adult L2 learners already have a well-developed sense of words’ LC which is the reason why, in a single word task, their explanations or synonyms only occasionally failed to capture the LC of the prompt words.

The last pattern of partially known vocabulary contained responses that reflected knowledge of the LC of some SWs but no knowledge of their meaning and this category sharply distinguished NSs from NNSs. Quite surprisingly, the advanced learners’ dominated the pattern with almost 10 % of their responses falling in this sub-category, followed by the intermediate participants - with approximately 7 %, while the NSs had only 1.4 % such responses. This again supports what I proposed as a possibility above - i.e., that of all four aspects of word knowledge tested in this study, knowledge of the syntactic category of words is the aspect that seems to be the least problematic for adults at the higher level of proficiency. However, knowledge of the semantic value of words shows to be the greatest obstacle, particularly for the advanced learners. Responses in the advanced group data that were classified in this category revealed a different degree of deviation from the actual meaning of the SWs (for instance, for the SW *parable*, the explanations ranged from “proverb” and “a kind of expression” to “representation”) which indicated a good sense of LC but a vague to non-existent knowledge of the meaning. With the intermediate students, the examples did not contain vagueness, but rather a clear indication of non-existent semantic knowledge as illustrated, for example, by the synonyms they gave to *concede* - “to decide”, “to confess” .

Overall, if we look at the three patterns of partially familiar words (see Figure 2), the distribution across the three groups is quite different. The NSs’ pattern is dominated by words they considered familiar and attempted to explain but the explanations showed they had no knowledge of these words, followed by words whose LC was not acknowledged in the explanation, and finally - a very small percentage of words whose grammatical class was accounted for but the meaning did not seem to be known. The greatest difference between the NS group and the advanced learner group, as shown on the graph, is in the much higher percentage of words whose meaning was vaguely familiar to non-existent to the advanced learners. By and large, these 10 % of mid and low frequency vocabulary may be the most difficult category to move to a status of familiar since chances are that even the learners themselves are not aware they do not know the meanings of these words. Thus, even if they encounter them in context, unless the context is constrained, they will be most likely unable to successfully guess their meaning. The same holds true for the intermediate learners, though their greatest problem with frontier words is with the ones they think they know but they do not. This category was not further analyzed

to single out the misinterpretations from the responses that show unfamiliarity with more than one of the tested features, but the fact that it may account for as high as 16 % of the intermediate learners' mid and low frequency frontier words is already disturbing. When we add to those 16 % another 7 % of words whose meaning they do not know, the task of changing the status of these two sub-categories from frontier to familiar will require a lot of intentional effort on their part.

Finally, it was of interest to find out whether the participants maintained a similar percentage of paradigmatic and syntagmatic associative connections to their frontier words across the three proficiency levels and whether it would be possible to capture partial familiarity with a WA task. The general assumption behind using WA tests to probe language users' organization of the mental lexicon is that WAs reveal how lexical knowledge is organized semantically or how words are interconnected in the mental lexicon. Moreover, as far as NS of English are concerned, it has been found that adults tend to associate predominantly paradigmatically for words they know; however, their syntagmatic associations significantly increase with unfamiliar vocabulary (Stolz and Tiffany 1972). However, to my knowledge, their associative behavior to partially familiar vocabulary has not been studied. In any event, the general assumption is that, for NSs of English, paradigmatic responses indicate a higher degree of lexical familiarity than syntagmatic or clang associations (WAs that resemble the SW only in form but show no semantic relation to the stimulus, e.g., *conceive* [SW] – *perceive* [WA]).

Even though the analysis of the WA responses to vaguely familiar words was based on a relatively small number of associations ($N=422$), it allowed for some useful conclusions to be drawn regarding both questions posited above. In general, examining the qualitative features of participants' WA domain for their frontier words did not turn out to be revealing of any consistent associative behavior that would distinguish between participants' level of proficiency or associative habits. Overall, the results showed that when the L2 learners had partial familiarity with SWs, their response pattern closely resembled that of NSs' associative behavior, which suggests that familiarity rather than proficiency promotes type-specific associations. At first glance, it seems that all participants maintained a somewhat syntagmatic preference when generating WAs to frontier words; however, none of the within group differences between syntagmatic and paradigmatic associates was significant, which indicated that the seemingly syntagmatic bias is actually a chance difference between the two types of associations across the three groups. In this regard, I should note that the participants were somewhat reluctant to write down associations to words they were not certain about and it is evident (see Figure 2) that they did not respond 100 % with WAs to the words in this category. Secondly, these chance differences may be a result of having more mid than low frequency words in the

sample and it is likely that the syntagmatic trend may turn into a syntagmatic bias if high frequency words are included for testing as well. For instance, Stolz and Tiffany (1972) found that their group of L1 subjects responded with more syntagmatic WAs to the higher frequency than the lower frequency adjectives they used in their study, which they suggested might be an indication of "information learned relatively early in a person's experience with a word" (p. 44). Whether or not this is the case with frontier words, we do not know, hence, I can only speculate about the reasons motivating participants' associative behavior. But since this category included words the participants attempted to explain, it suggests that they believed they had experienced these words before in some context. By and large, it is logical to assume that the higher the frequency of a word, the greater the chances are for a word to be experienced in a greater variety of contexts than a lower frequency word. In addition, higher frequency words tend to have more meanings than low frequency ones, which makes them suitable for use in diverse situations. For example, the word with the highest frequency used as a SW in this study was the noun *studio* and there are five meanings listed under this entry in *Longman Dictionary of English Language and Culture* (1992), compared with the lowest frequency noun in the list *virtuosity*, which has only one meaning listed in the same dictionary. Naturally, the more varied semantic content a word has, the less restricted its use is to a particular context which may, consequently, encourage its use in syntagmatic strings – for instance, some of the most common WAs of the SW *studio* were collocates such as "art, music, recording, dance, apartment, TV" which show a good variety of different contexts the word may have been experienced in. Low frequency words, on the other hand, have one or a couple of meanings, at most, and very few synonyms that can be given as paradigmatic responses; thus, quite naturally, they would evoke more context-situated associations of syntagmatic nature – for example, a common association given to the SW *cassava*, which has only one meaning listed in the same dictionary, was "leaves" to form the syntagmatic string "cassava leaves".

As to the question whether a WA task can capture partial vocabulary knowledge, as far as this study goes, the answer is in the negative though, in the absence of other research on L2 learners' partial lexical knowledge, it is hard to say. It seems, though, that the relative difficulty of the lexical task and the frequency of the stimuli would influence more the type of WAs L2 users will generate to frontier words rather than their proficiency level. To my knowledge, there is only one L2 WA study on the effects of word frequency on type of associative responses L2 users generate and my results support some of its findings. Söderman (1993) compared the WA of NSs and L2 advanced learners on frequent and infrequent stimuli. She found that level of proficiency did not play much of a role when her subjects responded to either word frequency. The results of my study fully support such a conclusion, adding to the subject pop-

ulation intermediate L2 learners. She also noticed that some of her subjects, both NSs and NNSs, tended to respond syntagmatically to both frequencies, which was contrary to her expectation that high frequency words would elicit primarily paradigmatic responses, while low frequency stimuli would promote mainly syntagmatic associations. Needless to say, the findings from this study regarding the sensitive of a WA task to partial familiarity are tentative and more research is needed in this area of inquiry. One problem that may not be easy to overcome, though, is the small number of WAs generated to frontier words since the nature of these words is such that they are difficult to uncover as, overall, they are not dominating the L1 or the L2 lexicon. Nonetheless, some effort in this direction will be worthwhile.

5. Conclusion

In conclusion it should be pointed out that a test format which comes with a lexical knowledge scale and requires from test-takers to provide evidence for their word familiarity allows for identification of 10 % to 25 % of partially familiar vocabulary that a check-list test format, for example, would not capture. It is also important to note that the percentage of frontier words, or partially familiar vocabulary, increases with a decrease in proficiency and it can be as high as 25 % for L2 intermediate learners who, in addition to having much lower vocabulary sizes than advanced learners or NSs (Zareva 2005), probably, do not have sufficient experience with mid and low frequency words as well. The analysis of the category of frontier words revealed that there were three distinctive patterns that accounted for partial familiarity; however, the distribution of these patterns differed across the three proficiency groups. The most general conclusion to be drawn from this line of investigation is that both the advanced and intermediate learners need to work on their lexicons but from somewhat different angles. The advanced learners need to improve on the words they consider familiar and they know their LC but not their meaning. The intermediate learners need to work on that aspect too; however, the highest percentage of their frontier words contained words they thought they knew but they did not, i.e., their explanations showed that they either completely misinterpreted the meaning of those words or they had no knowledge of any of their features.

This study tested only four of Richards' (1976) seven features describing what knowing a word means and, overall, the results indicated that knowledge of words' LC, even for words tested in isolation, is already consistently present at an intermediate level of proficiency. The other three features cause far greater problems across the three proficiency levels – the greatest problem for the intermediate students being misinterpreting the underlying form of words, followed by not knowing their meaning once words are categorized for LC, while for

the advanced learners – not knowing the meaning of words judged as familiar seemed to be the greatest obstacle. Even though testing words in isolation has been most often criticized for depriving test takers from context that may disambiguate the meaning of words, studies in reading comprehension show that “unless the context is very constrained, which is a relatively rare occurrence, or unless there is a relationship with a known word identifiable on the basis of form and supported by context, there is little chance of guessing the correct meaning” (Kelly 1990: 203). Thus, knowing as many features of a word as possible out of context will undoubtedly result in higher degree of L2 comprehension and production. In this regard, working with dictionary definitions may remedy some of the problems L2 intermediate and advance learners experience with mid and low frequency frontier words since a monolingual dictionary definition usually imparts specific information about a word as well as some constraining information. At minimum, it will supply unambiguous information about a word’s underlying form and its variants, its grammatical class, semantic values, and the definition itself offers some information about what other words it associates with. The lexical task for L2 learners at the higher levels of proficiency (intermediate and above) should be seen not only in increasing their vocabulary size and improving its interconnectedness and functionality, but also in moving words from the status of frontier to familiar which, in turn, will improve their lexical size, connectivity, and functionality. Likewise, part of the instructors’ task should be to raise learners’ awareness of the disadvantages of partially familiar vocabulary (since, for the most part, they are usually not aware of their partial familiarity with some words), so that they themselves develop sensitivity to identifying frontier words in their lexicons and moving them to a stable status of familiarity.

On a final note, this study was an attempt to shed some light on the phenomenon of partial word knowledge which all language users experience, be it in their L1 or L2, in the process of developing their lexicons. It should be noted that the methodology I used in the experiment to study the phenomenon is exploratory in nature and so are the findings. The methodological difficulties of studying frontier words stem from several factors, which deserve to be taken into consideration in future studies. First, frontier words are “well-hidden” in one’s lexicon and, more often than not, a person is not even aware of the status of those words. This issue becomes even more complicated in an L2 context, where we may logically expect that the proportion of partially known words in the L2 is much higher (even at the advanced levels of proficiency), compared to their proportion in the L1. Similarly, we should also expect that, with the higher proficiency L2 users, the likelihood of uncovering frontier words among their low- and mid-frequency vocabulary is much greater than finding such words among their knowledge of high-frequency ones. Thus, by virtue of the nature of partial lexical knowledge, test items should be predominantly selected from

the low- and mid-frequency bands which, in turn, may cause problems with participants' response rate to the test items. In other words, a second important consideration in studying frontier words, should be related to a careful selection of test items that reflect the nature of partial word knowledge, while at the same time will yield sufficiently large data samples to work with. One limitation of the present study was that the data samples the test instrument yielded were relatively small, which explains the tentativeness of the findings. A third important methodological consideration is related to the selection of a test format, which may also influence participants' response rate. In the present study, a vocabulary knowledge scale was used to probe into participants' partially known words which, however, did not "force" them to explain every test item but gave them a choice to respond only to the ones they considered familiar. In fairness, I should say that such a test format does have certain advantages when it comes to capturing partial familiarity, but it may also have discouraged some participants from responding to all words in the test. In this regard, future research methodologies should consider using test formats that are encouraging higher, yet reliable response rate to as many items as possible. Finally, as one of the reviewers suggested, the issue of frontier words may also be well-served by a single subject approach, which would allow to establish a sizable set of frontier words for an individual subject and examine which word features are more susceptible to change over time and which may be more resistant to change. Thus, more research on frontier words, both quantitatively and longitudinally, will give us better understanding of how to approach these words empirically, instructionally, and pedagogically.

Old Dominion University
(azareva@odu.edu)

Appendix A. List of the SWs used in the study grouped by LC and frequency of occurrence

Lexical category	U-value	SWs
Nouns	.0326	virtuosity
	.0424	bursar
	.0588	crampons
	.0653	abattoir
	.4153	parable
	.5556	inception
	.5651	edifice
	.5751	prefect
	.6393	solstice
	.6626	penance
	.6986	cassava
	.9539	promontory
	1.2348	custodian
3.0000	bracelet	
9.8213	studio	
Verbs	.1961	entrust
	.4292	unnerve
	.4498	forgo
	.5229	instill
	.9684	concede
Adjectives	.0326	amoral
	.0925	putative
	.2531	lackadaisical
	1.0000	naïve
	4.000	toxic

References

- Aitchison, J. 2003. *Words in the mind: An introduction to the mental lexicon*. New York: Basil Blackwell.
- D'Anna, C. A., E. B. Zechmeister and J. W. Hall. 1991. Toward a meaningful definition of vocabulary size. *Journal of Reading Behavior*. 23. 109-122.
- Dale, E. 1965. Vocabulary measurement: Techniques and major findings. *Elementary English*. 42.395-401.
- Durso, F. T. and W. J. Shore. 1991. Partial knowledge of word meaning. *Journal of Experimental Psychology*. 2. 190-202.
- Gass, S. M. and L. Selinker. 2001. *Second language acquisition: An introductory course*. Mahwan, NJ: Lawrence Earlbaum.
- Goulden, R., P. Nation and J. Read. 1990. How large can a receptive vocabulary be? *Applied Linguistics*. 11. 341-363.

- Hulstijn, J. H. and B. Laufer. 2001. Some empirical evidence for the involvement load hypothesis in vocabulary acquisition. *Language Learning*. 51. 539-558.
- Hulstijn, J. H., M. Hollander and T. Greidanus. 1996. Incidental vocabulary learning by advanced foreign language students: The influence of marginal glosses, dictionary use, and reoccurrence of unknown words. *Modern Language Journal*. 80. 327-339.
- Kelly, P. 1990. Guessing: No substitute for systematic learning of lexis. *System*. 18. 199-207.
- Knight, S. 1994. Dictionary use while reading: The effects on comprehension and vocabulary acquisition for students of different verbal abilities. *Modern Language Journal*, 78. 285-299.
- Landau, S. I. 2001. *Dictionaries: The art and craft of lexicography*. Cambridge, MA: Cambridge University Press.
- Laufer, B. 1997. The lexical plight in second language acquisition: Words you don't know, words you think you know, and words you can't guess. In J. Coady and T. Huckin (eds.), *Second language vocabulary acquisition*, 20-34. Cambridge, MA: Cambridge University Press.
- Lockett, J. N. and W. J. Shore. 2003. A narwhal is an animal: Partial word knowledge biases adults' decision. *Journal of Psycholinguistic Research*. 32. 477-496.
- Longman dictionary of English language and culture*. 1992. Essex, England: Longman.
- McNeill, D. 1966. A study of word association. *Journal of Verbal Learning and Learning behavior*. 5. 548-557.
- McNeill, D. 1970. *The acquisition of language*. New York: Harper and Row.
- Meara, P. 1978. Learners' associations in French. *Interlanguage Studies Bulletin*. 3. 192-211.
- Meara, P. 1996. The dimensions of lexical competence. In G. Brown, K. Malmkjaer and J. Williams (eds.), *Competence and performance in language learning*. Cambridge, MA: Cambridge University Press.
- Nation, I. S. P. 1990. *Teaching and learning vocabulary*. New York: Newbury House.
- Nation, I. S. P. 2001. *Learning vocabulary in another language*. Cambridge, MA: Cambridge University Press.
- Nusbaum, H. C., D. B. Pisoni and C. K. Davis. 1984. Sizing up the Hoosier mental lexicon. Measuring the familiarity of 20,000 words. (*Research on Speech Production Report No. 10*). Bloomington, IN: Indiana University.
- Paribakht, T. and M. Wesche. 1993. The relationship between reading comprehension and second language development in a comprehension-based ESL program. *TESL Canada Journal*. 11. 9-29.
- Piper, T. H. and P. F. Leicester. 1980. Word association behavior as an indicator of English language proficiency. (ERIC Document Reproduction Service No. ED 227 651).
- Richards, J. C. 1976. The role of vocabulary teaching. *TESOL Quarterly*. 10. 77-89.
- Shore, W. J. and F. T. Durso. 1990. Partial knowledge in vocabulary acquisition: General constraints and specific detail. *Journal of Educational Psychology*. 82 (2). 315-318.
- Singleton, D. 1999. *Exploring the second language mental lexicon*. Cambridge, MA: Cambridge University Press.
- Söderman, T. 1993. Word associations of foreign language learners and native speakers. The phenomenon of shift of response type and its relevance for lexical development. In H. Ringbom (ed.), *Near-native proficiency in English*, 98-182. Abo, Finland: Abo Akademi.
- Stolz, W. S. and J. Tiffany. 1972. The production of "child-like" word associations by adults to unfamiliar adjectives. *Journal of Verbal Learning and Learning Behavior*. 11. 38-46.
- Tremblay, D. 1966. Laws of learning general and specialized vocabularies [Summary]. Proceedings of the 74th Annual Convention of American Psychological Association, 1. 229-230.
- Wesche, M. and S. Paribakht. 1996. Assessing second language vocabulary knowledge: Depth versus breadth. *Canadian Modern Language Review*. 53. 13-40.
- Wolter, B. 2001. Comparing the L1 and L2 mental lexicon. *Studies in Second Language Acquisition*. 23. 41-69.
- Zareva, A. 2007. Structure of the L2 mental lexicon: How does it compare to native speakers' lexical organization? *Second Language Research*. 23. 123-153.

- Zareva, A., P. Schwanenflugel, and Y. Nikolova. 2005. Relationship between lexical competence and language proficiency: Variable sensitivity. *Studies in Second Language Acquisition*. 27. 567-595.
- Zechmeister E. B., A. M. Chronis, W. L. Cull, C. A. D'Anna and N. A. Healy. 1995. Growth of functionally important lexicon. *Journal of Reading Behavior*. 27. 201-212.
- Zeno, S. M., S. H. Ivens, R. T. Millard and R. Duvvuri. 1995. *The Educator's word frequency guide*. Touchstone Applied Science Association (TASA).

Copyright of IRAL: International Review of Applied Linguistics in Language Teaching is the property of De Gruyter and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.