



The Journal of Language Teaching and Learning™

2018

Volume 8/Issue 2

Article 6

EFL Vocabulary Growth in Intensive Language Study

Meral Öztürk, Department of English Language Teaching, Uludağ University, Bursa, Turkey, mozturk@uludag.edu.tr

Recommended Citations:

APA

Öztürk, M. (2018). EFL vocabulary growth in intensive language study. *The Journal of Language Teaching and Learning*, 8(2), 80-88.

MLA

Meral Öztürk. "EFL Vocabulary Growth in Intensive Language Study." *The Journal of Language Teaching and Learning* 8.2 (2018): 80-88.

The JLTL is freely available online at www.jltl.org, with neither subscription nor membership required.

Contributors are invited to review the Submission page and manuscript templates at www.jltl.org/Submitonline

As an online journal, the JLTL adopts a green-policy journal. Please print out and copy responsibly.





The Journal of Language Teaching and Learning, 2018(2), pp.80-88

EFL Vocabulary Growth in Intensive Language Study

Meral Öztürk¹

ARTICLE INFO

Article History:

Received January 08, 2018

Revisions completed April 04,
2018

Published June 30, 2018

Key Words:

EFL Vocabulary Growth

Written Receptive Vocabulary Size

Intensive Language Study

Proficiency Level

ABSTRACT

Investigations into typical vocabulary growth rates of EFL (English as a Foreign Language) learners are important to the setting of more realistic targets as well as to the evaluation of the success of language programs. Previous research into second language vocabulary growth was conducted in settings which were not particularly conducive to substantial vocabulary growth. They involved either explicit but limited language instruction as part of a school curriculum or indirect incidental learning through degree study in English. The present study investigates the vocabulary growth of EFL learners in a setting which is expected to induce more growth owing to a greater amount of explicit language instruction. The growth in the written receptive (i.e. reading) vocabulary sizes of 410 EFL learners in an intensive language program in a major Turkish university was studied over one academic year. Vocabulary sizes of learners from a range of English language proficiency levels were measured using the Vocabulary Size Test (Nation and Beglar, 2007). The results suggested greater annual growth than those reported in previous research. The study also indicated that vocabulary growth rates were not stable across proficiency levels, and showed a fall-rise pattern. However, when proficiency was determined lexically, the results suggested that growth slowed down as the vocabulary size increased. These results point to the limitations of explicit instruction in more advanced levels of proficiency as far as vocabulary learning is concerned. Universities are advised to evaluate cost against benefits before implementing these programmes.

© Association of Applied Linguistics. All rights reserved

Investigations into the vocabulary growth of L2 learners are of uttermost importance to all learning partners involved (i.e. learners, teachers, materials writers, and researchers; Schmitt, 2010, p.4 and p. 70). This line of research contributes to norm-setting in L2 vocabulary learning. Norm-setting studies reveal typical growth rates expressed in number of new words gained by learners in a variety of L2 contexts (Cobb & Horst, 2000; Milton, 2009; Ozturk, 2015; Ozturk, 2016; Richards, Malvern & Graham, 2008; Schmitt & Meara, 1997). The results from these studies also have important implications for the design and evaluation of language programs. The normal growth rates that emerge from this line of research can be used to guide decisions about vocabulary sizes to be targeted in these programmes leading to more

¹ Department of English Language Teaching, Uludağ University, Bursa, Turkey, mozturk@uludag.edu.tr, 0224 2942253

realistic targets to be set. The success of the program can also be evaluated against these targets or against growth rates of learners in other programs.

Previous research on L2 vocabulary growth has focused on written receptive (i.e. reading) vocabulary and has shown rather low rates of growth in comparison to L1 (Cobb & Horst, 2000; Milton, 2009; Ozturk, 2016; Richards et al. 2008; Schmitt & Meara, 1997). While L2 learners typically learn about 200-500 words a year, L1 learners gain 1,000-2,000 new words. This slow growth is rather discouraging in view of vocabulary size targets identified for certain reading tasks. For academic reading, for example, about 10,000 words need to be known (Hazenberg & Hulstijn, 1996). For reading novels, 8,000-9,000 words are necessary, and reading newspapers also requires knowledge of 8,000-9,000 words (Nation, 2006). These targets look gigantic as a typical L2 learner will need between 12-20 years of language study to achieve one of these targets given she/he regularly gains 500 words a year.

The low rates of learning obtained in previous research can be explained in terms of the nature and amount of exposure that the learners received. Most of these studies focused on vocabulary learning in academic settings where L2 vocabulary is acquired largely incidentally through academic reading in English. Incidental learning of new vocabulary from reading in an L2 has been repeatedly shown to be minimal in the order of around 1 new word in 12 (cf. Horst, Cobb & Meara, 1998 & Horst, 2005 for a review), and therefore growth rates are accordingly low. Other studies looked at vocabulary growth of learners in mainstream education studying a language as part of a school curriculum alongside other school subjects (Milton, 2009; Richards et al., 2008), which typically involves explicit focus on language during limited class hours. Although deliberate learning of words has been shown to be more effective than incidental learning (cf. Nation, 2011, p.535), the time devoted to language study, 4-6 hours a week, may not be adequate for attaining the desired growth.

The present study will look at L2 vocabulary growth in a different context than in previous studies. It will investigate written receptive vocabulary growth in pre-sessional intensive language courses. These courses are offered prior to English-medium degree study in ESL and EFL contexts in an attempt to compensate for learners' linguistic shortcomings in a short time, and they are likely to provide enhanced focus on vocabulary. Consequently, vocabulary growth will be expected to be faster in this kind of context than the contexts of previous studies. The present study will investigate university level EFL learners in an intensive English program receiving 28-30 hours of weekly instruction in preparation for a partly English-medium degree study. This context should be conducive to greater vocabulary growth as it involves explicit study as well as extended exposure.

The present study will also consider the rate of vocabulary growth over language proficiency levels. While the relation of *vocabulary size* to language proficiency has been investigated in previous research to some extent, *vocabulary growth* has not been researched in relation to proficiency. While there are reasons to expect the speed of vocabulary growth to increase with increasing proficiency, it will be hypothesized here that the speed with which vocabularies expand will decrease as the learners get more proficient.

2. Second Language Vocabulary Growth

Previous research into L2 vocabulary growth used either longitudinal or cross-sectional data. Longitudinal studies often measured learners' vocabulary size over one year using a pretest-posttest design. These studies were conducted in a variety of L2 contexts and revealed rather small gains. In a study by Richards et.al. (2008), learners of French as a foreign language in secondary schools in Britain gained only about 400 words on average over two school terms. Japanese university students in Schmitt and Meara's research (1997) are reported to have gained 330 words at the end of the academic year. First year English majors in a Serbian university in Danilović and Grujić's study (2014) gained 300 words over

one academic year, and there were no significant gains in a group of ESL learners in a university in Hong Kong over 6 months in Cobb and Horst (2000). Studies that cover a longer time span also found similarly small annual gains. English majors in a Turkish university in Ozturk (2015) made no significant gains after three years of English-medium study. The three groups of EFL learners in a vocational high school in Taiwan (Webb & Chang, 2012) scored annual mean gains of 156, 161 and 300 words respectively over their four years of instruction. Spanish EFL learners in Terrazas-Gallego and Agustin-Llach (2009) gained 148, 122, and 186 words annually from one grade level to the next between the 4th and the 7th grades. One exception is Laufer (1998). Laufer's high school students in Israel made impressive receptive gains in one year which averaged 1600 words.

Cross-sectional studies, on the other hand, mainly focused on annual growth rates over successive years of language education within a given learning context. These studies revealed rather regular growth rates over the years. The vocabulary size of EFL learners in a private school in Greece differed by about 500 words from one year to the next in a study reported in Milton (2009). English majors from four adjacent years in a Turkish university in Ozturk (2016) also displayed differences of similar magnitude in vocabulary size. Milton concludes that 'vocabulary learning among classes of learners is, generally, a very regular business' (p.81). This regularity needs to be treated with caution, however, as it disguises the high amount of variability around the mean vocabulary scores within groups. This variability also results in large overlaps between adjacent groups. David (2008) reports such variability among French L2 learners in Britain whereby some learners in a year-group scored higher than the typical learner in the next year-group and some scores were even as high as the highest scores in the next group. Milton (2009, p.80) also reports considerable overlap between adjacent year-groups. This variability indicates different learning rates for different learners under seemingly similar learning conditions.

Previous research has operationalized growth as a function of time. There is no research, to our knowledge, which considered growth in relation to second language proficiency. This is rather surprising in the light of studies which have shown vocabulary size to be closely related to overall proficiency in the second language (Alderson, 2005; Golkar & Yamini, 2007; Nemati, 2010; Staehr, 2008; Tahmasebi, Ghaedrahmat & Haqverdi, 2013): more proficient learners know more words and vocabulary size linearly increases with proficiency. The linear increase in vocabulary size might be interpreted to imply a parallel linear increase in growth rate. On the basis of this, vocabulary growth could be expected to be faster in learners with larger vocabularies in comparison to learners with smaller vocabularies. Learners with large vocabularies are experienced word learners and therefore learning new words would be easier and faster for them. They would also make better use of context as they will be familiar with more of the contextual words making it easier to guess the meanings of new words. However plausible these predictions are, we would like to argue the opposite: that vocabulary growth displays an inverse relationship to proficiency. The rate of vocabulary uptake is hypothesised here to be high in the earlier stages of L2 acquisition but to slow down in higher proficiency levels. This hypothesis is made on the following grounds. First, early L2 instruction tends to give explicit attention to vocabulary usually through direct teaching and testing, which will serve to facilitate learning. In later stages, learners are often left to their own devices to learn vocabulary as there are too many words to teach realistically in the limited classroom time. This lack of emphasis is likely to have a negative washback effect on learning. Second, early L2 instruction tends to focus on high frequency words as these are thought to be more useful in L2 use. Learners are likely to meet these words several times afterwards in the coursebook and in other input material they might encounter because they are frequent. Therefore, these words will be consolidated more firmly than lower frequency words which are less likely to be met again. More proficient learners, having already acquired high frequency vocabulary and on their way to learn lower frequency words, will receive less amount of exposure to new vocabulary.

These predictions will be investigated in the present study in a semi-longitudinal design over one year of language study. More specifically, the following research questions will be investigated:

1. At what rate do L2 learners' vocabularies grow over one year of intensive language study?
2. Does the L2 vocabulary growth rate decrease with overall language proficiency?

3. Method

3.1. Participants

The participants were 410 students from a variety of academic disciplines attending pre-sessional English language courses at Uludag University in Turkey. On admission to the university, the students take a written multiple-choice proficiency test in English, which measures grammar, vocabulary and reading comprehension. Since 30% of content courses are taught through the medium of English, those who fail the test are not allowed to go on with their studies. Instead they are asked to participate in a full-time English language program for a whole academic year. At the end of the academic year, the learners sit in a different version of the proficiency test again, and on the basis of their performance they are either asked to repeat the English program or allowed to start their studies.

The participants in the present study were drawn from the English language program described above from each of the three proficiency groups to which they had been assigned, at the beginning of the program, according to the results of the university's English proficiency test: elementary, pre-intermediate and intermediate. There were no advanced learners as having passed the proficiency test they had already commenced their studies. In the program, learners receive instruction for 28-30 hours a week. In addition to a main course, there are separate courses for grammar, reading, writing, and speaking. In the second term, all learners participate in an extensive reading program. They are asked to read one graded reader a week appropriate to their level of proficiency over a period of 10 weeks.

3.2. Materials

Learners' vocabulary sizes were measured with the Vocabulary Size Test (Nation & Beglar, 2007). The Vocabulary Size Test is a multiple-choice test that is divided into 14 sections. Each section represents a different frequency level. The words in the 1K section, for example, are words selected from among the most frequent 1000 words in the English language, and those in the 2K section are from the second most frequent 1000 words, and so on. Each section measures a selection of 10 vocabulary items from the corresponding frequency band, which represents a sampling rate of 1 in 100. Thus, a correct response indicates knowledge of 100 words. In the present study, only the first five sections (50 items) were tested in order to prevent learners from getting frustrated with too many unknown words in the lower frequency levels. The test was given in normal class hours at the beginning of the academic year and again at the end. Kuder-Richardson 21 reliability coefficients were .78 for the pretest and .63 for the posttest. Although these coefficients were not as high as that would be desired they could be considered acceptable given the fact that KR 21 somewhat underestimates actual reliability.

4. Results and Discussion

The data were examined using a 2x3 analysis of variance with *proficiency* being the between-subjects factor with three levels and *time* being the within-subjects factor with two levels. Both main effects (time: $F(1)=608,37$ $p=.000$; proficiency: $F(2)=204,207$ $p=.000$) and the two-way interaction (time vs proficiency: $F(2)=19,49$ $p=.000$) were significant. Bonferroni tests were used for multiple comparisons of all effects. In

reporting the results in this section, test scores were converted to vocabulary size scores by multiplying a score by 100 in order to make them more meaningful.

4.1. Vocabulary Growth Rates Over Time

The results of the test (cf. Table 1) indicated that learners' scores on the test as a whole increased significantly from the pre-test (1845 words) to the post-test (2668 words). On average, learners gained 823 words over the academic year. The greater majority of learners (91%) improved their vocabulary size to some extent while only 6% of the learners regressed to a smaller vocabulary size and another 3% did not make any improvement whatsoever over their initial sizes. Most learners improved remarkably. Nearly half of the learners (42%) gained 1000 or more words increasing their vocabularies in quantities comparable to native speakers. Fourteen learners (3%) gained over 2000 words.

Table 1. Mean Scores of Proficiency Groups in the VST (in number of words over 5000)

Proficiency Groups	Pretest	Posttest	Growth
Elementary	1389 (562)	2386 (464)	997* (607)
Pre-Intermediate	2160 (455)	2780 (456)	620* (523)
Intermediate	2590 (433)	3321 (512)	731* (544)
Mean	1845	2668	823*
SD	(692)	(572)	(594)

*Significant at the .05 level/ Standard deviations are in parenthesis

These gains are clearly higher than those obtained in other studies of EFL learners in regular language courses (Milton, 2009; Richards et al. 2008) or those in English-medium degree programs (Cobb & Horst, 2000; Ozturk, 2016; Schmitt & Meara, 1997). However, full-time language study does not seem to benefit all learners equally given the lack of improvement in 9 % of the learners. An explanation for the lack of satisfactory growth in these learners could be offered in terms of motivational factors. Motivation has been shown to be an important factor that facilitates both language learning in general (Gardner, 1985; Gardner & Lambert, 1972; Schmidt & Watanabe, 2001) and vocabulary learning in particular (Gardner & McIntyre, 1991; Tseng & Schmitt, 2008). In the present study, learners' motivation might have decreased as a result of having to undertake full-time language study over a whole academic year, which might be perceived by some learners as an unnecessary delay to the more important study of the content area. In addition, a future need for English which is also partial (only 30% of the courses) may be too vague to motivate some learners into extending much effort to learn a language. To increase motivation, universities can tie in language syllabuses and course content more closely with learners' respective content areas.

4.2. Proficiency Level

Overall scores of the groups in the pre-test were significantly different from one another and linearly increased with proficiency (1389, 2160, and 2590 respectively, see table 1). This suggests that the groups were distinct in lexical proficiency as well as overall proficiency at the beginning of the study, and that the division into proficiency levels was justified. At the post-test, the scores also increased significantly from one level to the next indicating that the groups remained distinct at the post-test (2386, 2780, 3321 words respectively).

All three proficiency groups made significant gains from the pre-test to the post-test. However, the magnitude of the gains differed between groups. The elementary group improved the most gaining 997 words on average from the pre-test to the post-test, and the pre-intermediate group improved the least with a mean gain of 620 words (see the last column of table 1). The gains did not, however, linearly change with proficiency. They were highest in the elementary level, dropped in the pre-intermediate level and rose again in the intermediate level. This pattern of slowing down first then speeding up again is against our initial hypothesis that predicted a linear decrease in growth rate over proficiency levels.

Although scores in the pretest and posttest suggest the groups were lexically distinct, the greater homogeneity that was expected within proficiency groups in terms of vocabulary size was not obtained. The range of vocabulary sizes within a given proficiency group was large with some overlaps between groups. Figures 1 and 2 below display the spread of scores in the pre-test and post-test respectively. The triangles over the lines represent the group mean while the lines that go up and down from the triangle represent scores that are higher and lower than the mean. The points where the lines end represent the maximum and minimum scores. Thus, figure 1 shows that the elementary group's scores on the pre-test go higher than the mean of the pre-intermediate group and as high as the mean of the intermediate group. In other words, some learners in the elementary group had larger vocabularies than some of the better students in the pre-intermediate group as well as than the average learner in the intermediate group. On the other hand, some of the learners in the intermediate group had vocabulary sizes similar to the average learner in the elementary group.

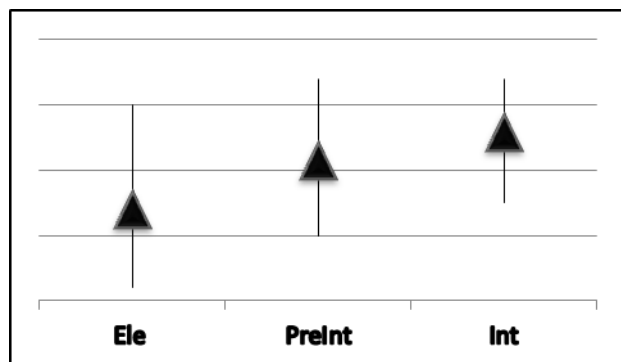


Figure 1. Plot of maximum, minimum and mean scores in the pre-test

In the post test (cf. Figure 2), the overlaps between the group scores seem to persist in spite of substantial gains in overall vocabulary size. Again, some better elementary learners scored as high as some better

learners in the pre-intermediate group and even as some of those in the intermediate group. This suggests that the proficiency groups were not sufficiently homogeneous or distinct from one another in terms of lexical proficiency.

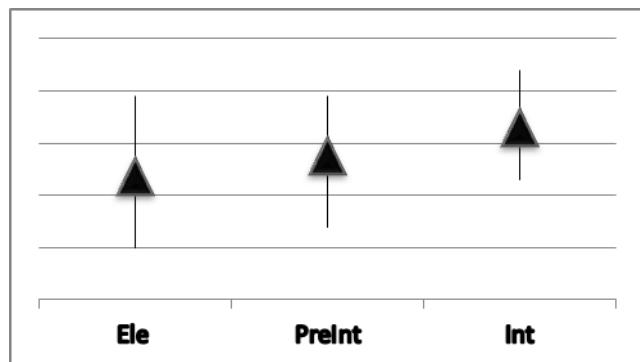


Figure 2. Plot of maximum, minimum and mean size scores in the post-test

This overlap might be due to a bias towards other language skills (i.e. grammar knowledge and reading comprehension ability) in the institutional proficiency test used in the present study to place the students in proficiency groups. While vocabulary size and proficiency are closely related (Alderson, 2005; Golkar & Yamini, 2007; Nemati, 2010; Tahmesabi et.al., 2013), proficiency in a language involves more than vocabulary knowledge. Therefore, it is possible that while the groups were distinct in terms of general proficiency, they were not distinct with respect to lexical proficiency. If proficiency was defined lexically, more consistent patterns of vocabulary growth could be observed. In order to check this possibility, learners were reassigned into proficiency groups on the basis of their pre-test vocabulary scores. Scores ranged from 0 to 34, and in forming the groups the range of correct items was divided into three equal parts. Learners who scored up to 11 were placed in the low group (N=69). The mid group (N=222) answered 12-22 items correctly, and the high group (N=119) produced more than 23 correct answers. The results (see Table 2) suggest that the low group gained the highest number of words (i.e. 1428 words), and the gains decreased linearly with the level (863 and 396 words respectively). Thus, learners who knew more words gained fewer words. This finding parallels an observation by Milton and Meara (1995) who note that low level European learners on an exchange program in a British university benefited more vocabulary-wise from this experience than better learners. This supports our earlier prediction that growth rate will slow down in later proficiency levels.

Table 2.

Vocabulary Gains of Lexically-Formed Proficiency Groups

Proficiency Group	Pre-test score	Number	Average Gain
Low Group	0-11	69	1,428 (503)
Mid Group	12-22	222	863 (501)

High Group	23-34	119	396 (456)
-------------------	-------	-----	---------------------

N.B. Standard deviations are in parenthesis

An important implication of these results to L2 vocabulary growth research concerns the composition of proficiency groups. Groups identified by their year of study or by overall L2 proficiency might involve so much variability in lexical proficiency that the developmental patterns that emerge from the study of these groups might be hugely distorted. Further research needs to consider growth in terms of lexical proficiency levels.

5. Conclusion

The present study suggested that full time language study induced faster growth of L2 vocabulary than regular language courses that formed only a part of the curriculum as well as English-medium degree courses. However, learners from different proficiency levels benefited from intensive study to different degrees. The lowest proficiency learners benefited most while higher proficiency learners benefited the least. It can be concluded on the basis of these results that intensive language study is advisable in lower proficiency levels. With higher-level learners, the universities need to evaluate costs against benefits. Is the improvement in vocabulary size and language proficiency in general worth the time spent on language study with delayed onset of content study? Further research is needed to give a more qualified answer to this question.

The present study was limited to the growth of vocabulary in intensive language study. Further research can investigate development in general proficiency as well as in various language skills in intensive language programs.

The present study also revealed that L2 vocabulary does not grow at a steady speed, but that the growth rate decreases with proficiency level of the learners. Effective remedial intervention might be necessary at points where vocabulary uptake slows down. This intervention might involve explicit vocabulary instruction, vocabulary exercises, vocabulary quizzes, or extensive reading. Training learners in the use of vocabulary learning strategies is also important, as vocabulary learning is a life-long enterprise that must extend beyond the language classroom.

References

- Alderson, J. C. (2005). *Diagnosing Foreign Language Proficiency: The Interface Between Learning and Assessment*. London: Continuum.
- Cobb T., & Horst, M. (2000). Vocabulary sizes of some City University students. *City University (HK) Journal of Language Studies*, 1: 59-68.
- David, A. (2008). Vocabulary breadth in French L2 learners. *Language Learning Journal*, 36 (2): 167-180.
- Danilović, J. R., & Grujić, T. S. (2014). Vocabulary growth at tertiary level: How much progress can Serbian EFL learners make in a year? *Zbornik Instituta za Pedagoska Istrazivanja*, 46 (1): 200-218.
- Gardner, R. C. (1985). *Social psychology and second language learning*. London, UK: Edward Arnold.
- Gardner, R. C., & Lambert, W. E. (1972). Motivational variables in second-language acquisition. In J.W. Berry & G. J. S. Wilde (Eds.), *Social psychology: The Canadian context*. Toronto, ON: McClelland and Stewart.
- Gardner, R. C., & MacIntyre, P. D. (1991). An instrumental motivation in language study: Who says it isn't effective? *Studies in Second Language Acquisition*, 26, 57-72.
- Golkar, M., & Yamini, M. (2007). Vocabulary, proficiency and reading comprehension. *The Reading Matrix*, 7(3): 88-112.
- Hazenbergh, S., & Hulstijn, J.H. (1996). Defining a minimal receptive second-language vocabulary for non-native university students: An empirical investigation. *Applied Linguistics*, 17 (2): 145-163.
- Horst, M. (2005). Learning vocabulary through extensive reading: A measurement study. *The Canadian Modern Language Review*, 61 (3): 355-382.
- Horst, M., Cobb, T., & Meara, P. (1998). Beyond a Clockwork Orange: Acquiring second language vocabulary through reading. *Reading in a Foreign Language*, 11, 207–223.
- Milton, J. (2009). *Measuring Second Language Vocabulary Acquisition*. Bristol: Multilingual Matters.
- Milton, J., & Meara, P. (1995). How periods abroad affect vocabulary growth in a foreign language? *ITL Review of Applied Linguistics*, 107-108: 17-34.
- Nation, I.S.P. (2011). Research into practice: Vocabulary. *Language Teaching*, 44 (4): 529-539.
- Nation, I.S.P. (2006). How large a vocabulary is needed for reading and listening? *The Canadian Modern Language Review*, 63 (1): 59-82.
- Nation, I.S.P., & Beglar, D. (2007). A vocabulary size test. *The Language Teacher*, 31 (7): 9-12.
- Nemati, A. (2010). Proficiency and size of receptive vocabulary: Comparing EFL and ESL environments. *International Journal of Educational Research and Technology*, 1(1): 46-53.
- Ozturk, M. (2015). The vocabulary growth of the advanced EFL learner. *The Language Learning Journal*, 43(1): 94-109.
- Ozturk, M. (2016). Second language vocabulary growth at advanced level. *The Language Learning Journal*, 44(1):6-16.
- Richards, B., Malvern, D., & Graham, S. (2008). Word frequency and trends in the development of French vocabulary in lower-intermediate students during Year 12 in English schools. *Language Learning Journal*, 36 (2): 199-213.
- Schmitt, N. (2010). *Researching Vocabulary: A Vocabulary Research Manual*. Basingstoke, UK: Palgrave Macmillan.
- Schmitt, N., & Meara, P. (1997). Researching vocabulary through a word knowledge framework: Word associations and verbal suffixes. *Studies in Second Language Acquisition*, 20: 17-36.
- Staehr, L. S. (2008). Vocabulary size and the skills of listening, reading and writing. *The Language Learning Journal*, 36(2): 139-152.
- Tahmasebi, G. A., Ghaedrahmat, M., & Haqverdi, H. (2013). The relationship between language proficiency and Iranian EFL learners' knowledge of vocabulary depth versus vocabulary breadth. *Latin American Journal of Content and Language Integrated Learning*, 6(2): 96-111.
- Terrazas-Gallego, M., & Agustin-Llach, M. P. (2009). Exploring the increase of receptive vocabulary knowledge in the foreign language: A longitudinal study. *International Journal of English Studies*, 9(1): 113-133.
- Tseng, W. T., & Schmitt, N. (2008). Toward a model of motivated vocabulary learning: A structural equation modeling approach. *Language Learning*, 58, 357–400.
- Schmidt, R. & Watanabe, Y. (2001). Motivation, strategy use, and pedagogical preferences in foreign language learning. In Z. Dornyei and R. Schmidt (Eds.), *Motivation and Second Language Acquisition*. Honolulu: University of Hawaii, Second Language Teaching Center. pp. 313-359.
- Webb, S. A., & Chang, A. C. (2012). Second language vocabulary growth. *RELC Journal*, 43(1): 113-126.