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Breadth and Depth of Vocabulary Knowledge and Their Effects on L2 Vocabulary Profiles

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Abstract

Breadth and depth of vocabulary knowledge have been studied from many different perspectives, but the related literature lacks serious studies dealing with their effects on vocabulary profiles of EFL learners. In this paper, with an aim to fill this gap, the relative effects of breadth and depth of vocabulary knowledge on L2 vocabulary profiles were analysed. In the first stage of the study, learner essays (n=84) and native essays (n=75) were compared in terms of vocabulary profiles through the use of an online database, and each participant obtained vocabulary profile scores from four different levels. In the next stage, the learners' depth and breadth of vocabulary knowledge were measured by using two different vocabulary tests, and then the scores they obtained on these tests were hierarchically regressed on their profile scores. The results suggested that both breadth and depth of vocabulary knowledge had significant and robust effects on the L2 vocabulary profiles of the EFL learners; however, depth of vocabulary knowledge appeared to be a better predictor of vocabulary profiles than breadth of vocabulary knowledge.

Keywords: L2 lexicon, vocabulary level, vocabulary profiles, breadth and depth of vocabulary

1. Introduction

It has been discussed that, unlike syntactic and morphological developments, lexical development in L2 has been ignored since the 1950s, and from the 2000s onwards a rediscovery period of L2 lexicon has been underway (Meara, 2002). Quite naturally, there are various parameters to consider when addressing the issue. First of all, L1 and L2 lexicons have seemingly different structures. However, there are also claims as to the existence of structural similarities between L1 and L2 lexicons. For example, Wolter (2001) suggests that as the second language speakers of English gain depth of knowledge, their mental lexicon begins to resemble that of native speakers.

Another important issue is the selection of the target words for foreign language learners. The choice of these words plays an important role in the process of learning. The frequency of lexical items in the English language has been one of the criteria used in the selection of words to be taught. The term frequency refers to how often words occur in written or spoken registers. Nation (1990) suggests that 80% of the productions in the English language, written or spoken, are actually made up of about 2,000 words. In other words, there are about 2,000 words in the English language that are repeated in every possible context and register. Another point worth mentioning is the dimensions of L2 vocabulary knowledge. Knowing only the dictionary meanings of a number of words, which is known as the breadth dimension, is not enough for meaningful production. One also needs knowledge concerning different facets of target words, such as their different meanings, collocations and connotations, which are known as the depth dimension.

A couple of questions would arise at this point: How many of these top 2,000 words can EFL learners at certain proficiency levels recognize? How many of these words find their way into the EFL learners' written productions? How do the breadth and depth of an EFL learner's vocabulary knowledge affect his or her production? Some answers to these questions will be discussed in the literature review part of this paper through a revision of related literature relevant to L2 lexicon with particular emphasis on vocabulary profiles and breadth and depth of vocabulary knowledge. However, it is obvious that there are no easy answers to these questions, and they have not even been addressed so far in the Turkish EFL context. Therefore, vocabulary profiles of EFL learners and the factors affecting them arise as the two issues to be dealt with so as to fill this theoretical gap related to L2

lexicon. The present study serves this purpose by focusing on the vocabulary profiles of EFL learners, first by comparing them with native speakers of English and then analysing the results in relation to the breadth and depth of their vocabulary knowledge in English.

1.1 Related Literature

The number of words that an individual can recognize and understand is generally referred to as the receptive vocabulary, and the total number of words that an individual can use during production is called the productive vocabulary. It has been found that the receptive vocabulary of an individual outnumbers his/her productive vocabulary (Fan, 2000; Laufer, 1998; Webb, 2008), and the size of L2 productive vocabulary is broadly proportionate to the size of L2 receptive vocabulary (Meara & Fitzpatrick, 2000). Receptive vocabulary grows faster at lower levels; however, it is the productive vocabulary that grows faster at higher levels of foreign language proficiency (Webb, 2008).

Studies concerning language learners' vocabulary size are generally related to what minimum number of words international students need to know for their studies (Sutarsyah, Nation, & Kennedy, 1994). For oral communication, the most frequent 2,000 words in the English language seem to suffice most of the time (Schonell et al., 1956). According to Hirsh and Nation (1992), to be able to read an unsimplified text in English for pleasure, the reader needs a vocabulary size of around 5,000. Nation (2006) also suggests that EFL learners need a vocabulary size between 6,000 and 7,000 for listening, and 8,000 and 9,000 for reading. Similarly, in order for a language learner to begin reading authentic texts, a vocabulary size of 3,000 words is regarded as the threshold, and 5,000 words will be enough to be able to read them (Schmitt, Schmitt & Clapham, 2001). Another claim is that native speakers of English have around 20,000 words at their disposal (Goulden, Nation & Read, 1990). For non-natives, a vocabulary knowledge of around 10,000 words in English is considered as a requirement for university education (Hazenberg & Hulstun, 1996). However, these figures should be regarded with precaution, especially for foreign language learners because their vocabulary sizes are not stable and may fluctuate because some lexical items are known at one point and in time these might be forgotten (Meara & Rodriguez, 1993). Therefore, the testing of L2 vocabulary level is both an important and a very challenging job. Conventionally, a dictionary is used for sampling L2 vocabulary to be tested, but this methodology is somewhat problematic as many dictionaries cannot provide frequency information for the lexical items. Even if they can, the dynamic and ever-changing nature of language requires systematic modifications about frequency levels. For example, it is very possible that there have been shifts recently in the top 2,000 most frequent words in the English language because of the media and the internet.

Research related to vocabulary sizes of foreign language learners has a wide spectrum. It is not a new topic. It goes back as far as 1920s, and not only for the English language (Thorndike, 1924) but also for some other languages like German (Morgan & Oberdeck, 1930). However, it is claimed that vocabulary size tests developed and utilized during the twentieth century are so full of serious weaknesses that almost all research related to the issue is useless and misleading (Nation & Coxhead, 2014). There are some tests, on the other hand, which have been used effectively in quite a number of studies. Originally constructed by Nation (1990), the Vocabulary Levels Test (henceforth VLT) is one of these tests and is used as a diagnostic tool for lexical knowledge in English. The test addresses the 2,000, 3,000, 5,000 and 10,000 frequency levels plus a section for academic vocabulary. The following excerpt in Figure 1 is taken from the second version of the test (Schmitt, Schmitt, & Clapham, 2001).

The 2000 word level

1.	accident	
2.	debt	____ loud deep sound
3.	fortune	____ something you must pay
4.	pride	____ having a high opinion of yourself
5.	roar	
6.	thread	

Figure 1. An excerpt from the VLT

In this test, which is composed of 10 groups of items and related explanations for each level, the test taker is

supposed to match the explanations on the left with the target words on the right. Each correct answer is calculated as one point and the maximum score is 30 for each level. In total, the test taker can obtain a maximum score of 150.

1.2 Breadth and Depth of Vocabulary Knowledge

As already mentioned above, learners' lexicon has two important aspects known as breadth and depth of vocabulary knowledge. Breadth of vocabulary knowledge refers to linear and unidimensional aspects while depth is related not only to word meanings but also to semantic relationships, collocations and syntactic patterning. The latter kind of knowledge mostly comes from implicit learning of words through extensive reading (Cobb, 1999). Knowing a word involves much more than being able to recall the meaning of a foreign word in your language (Ünaldı, 2011); other factors such as pronunciation, spelling, word associations, limitations, discourse features, frequency of the word in the target language and many other aspects are also to be considered (Akpinar, 2013; Milton, 2009; Nation, 1994; Qian, 1998; Zhang, 2012).

Haastrup and Henriksen (2000) regard lexical competence in three different dimensions: (1) partial-precise (different levels of comprehension of the same lexical item), (2) receptive-productive, (3) depth-of-knowledge; the depth dimension of lexical competence 'involves the knowledge of a word's different sense relations to other words in the lexicon, e.g. paradigmatic (antonymy, synonymy, hyponymy, gradation) and syntagmatic (collocational restrictions)' (p. 221). In this respect, lexical development is a process through which a network is built making the links in the mental lexicon stronger, and it takes language learners considerable effort and time to build such lexical networks.

The definitions above commonly involve a sort of multidimensionality, and in general terms this multidimensionality could be regarded as the depth of vocabulary knowledge. There are several tests that are used to measure the depth of receptive English vocabulary knowledge. One of these tests, originally called the word association test (WAT), was developed by Read (1993) and later modified by Qian and Schedl (2004) into the Depth of Vocabulary Knowledge Test (henceforth DVK). It measures three dimensions of vocabulary knowledge: synonymy, polysemy, and collocation. The test consists of 40 items and in each item an adjective is given as a stimulus to the test taker along with eight other words separated into two columns, and the test taker is supposed to decide on the four correct options for each prompt. An example is given in Figure 2.

12. Narrow minded

(A) bigoted	(B) intolerant	(E) remark	(F) creation
(C) stupid	(D) uniform	(G) people	(H) wisdom

Figure 2. A sample question from the Word Association Test

When scoring the test, the participants are given one point for each correct answer, and the total score represents the depth of vocabulary knowledge for the test-taker. The maximum possible score one could get on this test is 160.

Research based on testing the breadth and depth of vocabulary by using the measures explained so far mainly focuses on the receptive aspect of L2 vocabulary. For example, Qian (2002) found a significant correlation between the depth and breadth of vocabulary knowledge, and he regarded the shared variance between these two variables as an evidence revealing that the word association test that he used in his study measured different aspects of vocabulary knowledge from those measured by a conventional vocabulary size test. Akbarian (2010) investigated the relationship between vocabulary size and depth for 112 ESP learners. The results of regression analyses showed that the VLT and DVK scores had a common shared variance, but when the participants were divided into two groups according to their VLT scores as low and high, the shared variances also changed accordingly. This change led the researcher to claim that the DVK test does not measure depth of vocabulary knowledge and this test is actually a measure for breadth masquerading as a depth test.

These two aspects of L2 vocabulary knowledge have also been related to other language skills. In his study, Qian (1999) showed that there is a significant and positive correlation between vocabulary size, depth of vocabulary knowledge, and reading comprehension; and that depth of vocabulary knowledge is a strong predictor of reading comprehension levels. Similarly, in their studies Farvardin and Koosha (2011) found that vocabulary breadth, depth of vocabulary knowledge, and reading comprehension were positively correlated, and vocabulary breadth was a stronger predictor of reading comprehension than depth of vocabulary knowledge. The results of their

study also revealed that breadth and depth of vocabulary knowledge were closely interrelated. Zhang (2012) analysed the effects of vocabulary and grammar on reading comprehension in the EFL context. Again, the VLT and DVK tests were used to measure vocabulary knowledge and their results were compared to implicit and explicit grammar knowledge. The results revealed that vocabulary knowledge was more predictive of L2 reading comprehension when compared to grammar knowledge. Interestingly, the results also suggested that implicit grammar knowledge had a stronger effect on reading comprehension compared to explicit knowledge. In addition to these, lexical inferencing success is another variable which has been studied in relation to the breadth and depth dimensions. It was reported that there is a positive correlation between L2 lexical inferencing success and depth and breadth of word knowledge. In the same study, it was also revealed that the depth of word knowledge was a stronger predictor of lexical inferencing success in reading. (Marzban & Hadipour, 2012)

1.3 Vocabulary Profile

Another aspect of L2 vocabulary knowledge is the proportion of vocabulary items from different frequency levels. The term vocabulary profile (VP) refers to 'the percentage of words a learner uses at different vocabulary frequency levels in her writing-or, put differently, the relative proportion of words from different frequency levels" (Laufer & Nation, 1995, p. 311). In the related literature three different levels are frequently mentioned. According to Nation and Heatley (1996) the first level includes the most frequent 1000 words in the English language; the second one includes the second 1000 most frequent words, and the third includes words that are not in the first 2000 level, but which are frequent in academic texts. VocabProfile (henceforth VP) is an online database which is mainly used for text analysis with this orientation and is based on word frequency profiles created by Heatley, Nation and Coxhead (2002). When a text in English is keyed in the input screen, it categorizes the words into four groups based on the frequency levels of each lexical item in the text. These four groups are referred to as the first 1,000 (K1), the second 1,000 (K2), academic word list (AWL), and off-list words. It is claimed that a typical native speaker scores 70% on K1, and 10% on each of the other three categories, and this variance is regarded as an indication that native speakers rely less on the first 1,000 words when compared to non-natives (Morris & Cobb, 2004).

There are many studies in which VP database was used as the measure of vocabulary profiles. Morris and Cobb (2004) compared TESL students' academic performances in grammar courses with their vocabulary profiles which was analysed through the use of VP. The results showed that the participants' academic performances correlated significantly with their vocabulary profiles and particular attention is drawn to AWL. The researchers concluded that an ideal vocabulary profile would include a Kl score of less than 85%, and an AWL score of over 5%. Meara and Fitzpatrick (2000), with an aim to test active vocabulary knowledge of adult EFL learners, used a VP framework and suggested that it could be used as a tool in determining some aspects of L2 productive vocabulary. The VP framework has also been used as a measure to analyse spoken register. For example, Meara, Lightbown and Halter (1997) used it to analyse vocabulary in ESL teachers' speech. They found that the number of unusual words, words that are above the K1 level, was very low. However, their interpretation was that the richness of vocabulary could not be measured by such quantitative means. It is obvious that vocabulary size and profiles are more than just quantifiable aspects of L2 lexicon. They have to be regarded with other parameters if sound judgments are to be made.

1.4 Present Study

Depth and breadth of L2 vocabulary knowledge and L2 vocabulary profiles are two different frameworks that have been used in numerous studies separately; however, the related literature lacks research dealing with both at the same time. Hence, the present study seeks to establish an intersection between these two frameworks by analysing the relationship between Turkish EFL learners' breadth and depth of vocabulary knowledge and their productive vocabulary profiles. By taking into account the points covered in the previous research, the following research questions emerged as the main concerns of the present study:

1). To what extent do learner and native written productions differ in terms of vocabulary profiles?

2). To what extent do depth and breadth of vocabulary knowledge affect EFL learners' vocabulary profiles?

2. Method

2.1 Participants, Instruments and Data Collection Procedures

Initially, the participants were 161 EFL learners at a state university in Turkey. Their ages ranged between 19 and 23, and most of the participants were males (n=113). At the time when the current study was carried out, all of the participants had completed an intensive English program and were registered for an ESP course at the same institution. At the beginning of the program their English proficiency levels were tested through the use of

Oxford Placement Test version 2 and it was observed that their proficiency levels varied from B1 to B2 language proficiency levels (Allan, 1992). The participants were asked to write essays in 50-minute sessions after choosing one from among several prompts. These prompts, taken from the LOCNESS corpus, included general topics such as money, equality, feminism, university degrees and prison systems. The participants were not allowed to use any references or dictionaries. The essays produced by the participants were digitalized and a corpus was constructed. The native corpus, which provided a yardstick for comparison, was taken from the Louvain corpus of native English essays (LOCNESS), and both groups of essays were about similar topics. For the sake of reliability, native and learner essays on the same topics such as technology, education and higher education were included in the study. Also, to increase the reliability of the calculations, for both groups, only the essays with more than 300 words were chosen. Some information about the learner and native essays is provided in the following table.

Table 1. Comparison of the native and learner essays

Group	N	Words in total	Essay Type
Learner	84	25200	Argumentative
Native	75	22500	Argumentative

After the essay-writing process, the learners sat for the VLT and DVK tests. To test their vocabulary levels, the four levels of the VLT test (2,000, 3,000, 5,000 and 10,000) were administered each in 50-minute session. No dictionaries or references were allowed, but the participants were encouraged to ask for further instructions about the test. After one week, the same participants were given the same four level DVK test, again in 50-minute sessions. Some participants could not take either the VLT or DVK test, and they were extracted from the study group. Thus, a total of 84 learner essays were processed in the VP database. Although there were not too many, symbols and figures were excluded from the essays to prevent a pile up in the off-list words. Afterwards, the first 300 words of both native and learner essays were keyed in the database.

2.2 Data Analysis

The first research question was addressed through the use of a parametric comparison test of means. The learner and native group mean scores were compared for the K1, K2, AWL and off-list words. After the data were gathered from the VP database, average scores of groups were compared through a t-test.

To answer the second research question, a hierarchical regression analysis was carried out. In general terms, strict assumptions have to be met to carry out a robust regression analysis. These assumptions were tested before going on with the main analysis. Sampling size is the first important issue to test, and according to Coakes (2005) for a standard regression, at least twenty times more cases than predictors are needed; this assumption was met with a sample size of 84.

After this assumption was checked, outliers were tested by taking into account the Mahalanobis distance values and in the data set no value greater than 8.91 was detected. According to Field (2009) in small samples (n=100) and with fewer predictors values greater than 15, and in very small samples (n=30) with only 2 predictors, values greater than 11 are potentially problematic. Therefore, in terms of outliers, the data used in the current study were reliable.

As the third step in assumption testing, multicollinearity was checked. Multicollinearity refers to extreme levels of correlations among variables to be tested, which might cause problems about the reliability of the calculations. The variance inflation factor (VIF) scores among the coefficients provide insights about multicollinearity. Generally, VIF scores greater than 10 and an average VIF score greater than 1 are serious concerns (Field, 2009). From this perspective, related calculations about the current data revealed no multicollinearity.

Other assumptions for regression analysis like normality, linearity, homoscedasticity and independence of residuals were also examined through residual scatterplots (Coakes, 2005). An analysis of the related histogram, scatterplot and P-P plot revealed that the differences between the obtained and predicted K1 scores were normally distributed and the residuals were also in a linear relationship with it.

After checking these assumptions, VLT and DVK scores of the participants were regressed on the K1 scores. The rationale for excluding the K2 level words from regression analysis is that in the related literature some evidence as to non-native speakers' reliance on the K1 level has been substantiated (Morris & Cobb, 2004). A two-stage

hierarchical multiple regression was conducted with K1 scores as the dependent variable. In the process, VLT scores were entered as the first independent variable of the regression model, and in the next step, DVK scores were entered into the model.

3 Results

3.1 Findings Concerning Vocabulary Profiles

Regarding the first research question, the mean differences between the learner group and the native group were considered in terms of vocabulary profiles. To assess these differences, the learner and native group scores gathered from the VP database were calculated. The participants' essays were processed through VP and the database categorized the words into four parts as K1, K2, AWL and OL. The following table provides a comparison of the groups regarding the scores obtained for each of these categories.

Table 2. Comparison of the learner and native group for vocabulary profiles

Word level	Group	N	Mean	%	SD
K1	Learner	84	257.773	85.92	11.076
	Native	75	239.920	79.97	10.808
K2	Learner	84	14.690	4.90	5.680
	Native	75	17.400	5.80	6.445
AWL	Learner	84	15.809	5.27	7.329
	Native	75	13.706	4.57	7.003
Off-list	Learner	84	11.881	3.96	5.938
	Native	75	28.053	9.35	10.077

Group means, percentages and standard deviations concerning vocabulary profiles are presented in Table 2. While analysing the table, it should be considered that each essay was composed of 300 words exactly. Accordingly, as can be seen from the table, the learner group used more words from the K1 and K2 levels compared to the native group. For the learner group, 85.92% of the words that were used in the essays belong to the K1 words whereas 79.97% of the words in the essays written by the native group come from the same level. There seems to be no notable difference between the two groups in the use of AWL words. To understand whether these differences are statistically significant, an independent samples t-test was conducted, and the results are shown in the following table.

Table 3. Independent samples t-test comparing word levels of the learner group and the native group

		Levene's Test		t-test		
Word level		F	Sig.	Df	T	Sig. (2-tailed)
K1	Equal var. assumed	.766	.383	10.262	157	.000
	Equal var. not assumed			10.277	155.747	.000
K2	Equal var. assumed	1.515	.220	-2.818	157	.005
	Equal var. not assumed			-2.798	148.536	.006
AWL	Equal var. assumed	1.005	.318	1.844	157	.067
	Equal var. not assumed			1.849	156.265	.066
Off-list	Equal var. assumed	12.620	.001	-12.482	157	.000
	Equal var. not assumed			-12.142	116.969	.000

Before carrying out the t-test, variances for each level of words were calculated through Levene's test, and as the above table suggests, the variances are equally distributed except for the off-list words; therefore, the related

t-test results can be used for interpretations. Accordingly, the difference between the learner group means and the native group means for the K1and K2 words appear to be meaningful as the difference between K1 mean scores of the learner group (M=257.773, SD=11.076) and the native group (M=239.920, SD=10.808) are statistically significant; t (10.262) =157, p = .000). The same applies to K2 scores for the learner group (M=14.690, SD= 5.680) and the native group (M=17.400, SD=6.445); t (-2.818) =157, p = .005). However, no difference can be observed in AWL scores of the groups. There also seems to be a statistically significant difference between the two groups regarding the OL words. However, as the results of the equality of variance test suggest, the variance between the group scores do not seem to be equal, which is very likely to be stemming from the relatively high standard deviation in the native group's scores (SD= 10.077).

3.2 Findings Concerning Breadth and Depth of Vocabulary Knowledge

In order to answer the second research question, a multiple hierarchical regression analysis was conducted. Before going on to the results of this analysis, it can be a good idea to examine the descriptive statistics for the three variables (K1, VLT and DVK) provided in the following table.

Table 4. Descriptive statistics for K1, VLT and DVK scores

	Mean	SD	N
K1	257.773	11.076	84
VLT	74.660	8.868	84
DVK	106.679	12.508	84

In Table 4, the mean scores for the words from the K1 level that were used in the learners' essays, and their scores obtained from the VLT and DVK tests are shown. It should be noted that the mean score for the K1 level is 257.773 out of 300. The VLT and DVK scores are out of 120 and 160 respectively. The difference between standard deviation of the two test scores should also be highlighted (SD_{VLT}= 8.868; SD_{DVK}= 12.508). At this point, an analysis of the correlation levels between these variables is needed. The following table serves this purpose.

Table 5. Correlations among K1, DVK and VLT scores

Word level	K1	VLT	DVK
K1	1		
VLT	-.233*	1	
DVK	-.376**	.499**	1

*Correlation is significant at the .05 level (2-tailed).

**Correlation is significant at the .01 level (2-tailed).

As can be deduced from the correlation matrix provided in Table 5, all three variables are significantly correlated; however, while the correlation between DVK and VLT scores is positive, the correlations between K1 and the other two variables, VLT and DVK scores, are negative. With a cause-and-effect rationale, it would be very convenient to claim that as the VLT and DVK scores go up, the use of K1 level words go down; however, a correlation analysis is not appropriate for such claims; further, more complex analyses are called for. With this orientation, when the VLT and DVK scores were regressed respectively on the frequency scores of the K1 level words, the following model summary came out as a result.

Table 6. Model summary for the regression analysis

Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. (F Change)
1	.233[a]	.054	.043	10.837	.054	4.699	1	82	.033
2	.380[b]	.144	.123	10.371	.090	8.535	1	81	.005

a. Predictors: (Constant), VLT.

b. Predictors: (Constant), VLT, DVK.

c. Dependent Variable: K1.

The results obtained from the hierarchical multiple regression reveal that in the first stage the VLT scores contribute significantly to the regression model, F (1, 82) = 4.699, $p < .05$, and they account for a 5.4% of the variation in K1 scores. When the DVK scores are introduced in the second stage as the next variable, they explain an additional 14.4% of variation and this change in R^2 is statistically significant, F (1, 81) = 8.535, $p < .001$. In other words, participants' VLT scores caused a 5.4% change, and their DVK scores further added a 9% to the variance change. Together the two independent variables accounted for 14.4% of the variance in the K1 scores, and both differences were statistically significant. However, the DVK scores appeared to have a greater impact on the variance over and above the VLT scores. One point is worth mentioning here; the calculations regarding the coefficients for the two variables yielded beta scores with negative values. These values, along with some others, are presented in the following table.

Table 7. Coefficients for VLT and DVK scores

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	SE	(β)		
1	*Constant*	279.485	10.085		27.713	.000
	VLT	-.291	.134	-.233	-2.168	.033
2	*Constant*	296.097	11.202		26.433	.000
	VLT	-.075	.148	-.060	-.506	.614
	DVK	-.307	.105	-.346	-2.922	.005

a. Dependent Variable: K1.

As is clear from the above table, standardized β values are -.233 for the VLT scores alone, and -.06 for VLT and -.346 for the DVK scores when calculated together. These negative values indicate negative relationships indicating that as the VLT scores increase, the K1 scores decrease, and this decrease is statistically significant. It should be noted that greater β scores mean greater effects. When the DVK scores enter the model, however, the decrease becomes even greater. This means that the participants become less dependent on the K1 words as their VLT scores increase. Their dependence on this group of words lessens even more significantly as the participants' DVK scores go up. The results of the hierarchical regression analysis reveal that, even when the VLT score is taken into consideration, the DVK score is a unique predictor of how independent an individual is from the K1 level words. To better visualize the relationship among these variables, Figure 3 can be analysed.

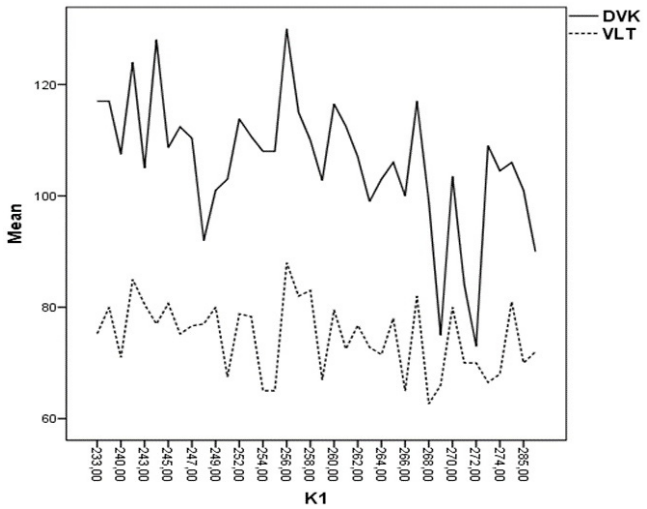

Figure 3. A comparison of the DVK and VLT scores

In the multiple line chart presented in Figure 3, the axis labelled as 'K1' represents the average scores for the K1 level words, and the axis labelled as 'Mean' represents the mean scores for the DVK and VLT tests. It should be remembered that the DVK scores are over 160, and the VLT scores are over 120. It is obvious from the figure that the VLT scores, represented with the dotted line, reveal a slight downward fluctuation, and this trend is actually in line with the findings presented in Table 5. As the VLT scores increase, the number of words from the K1 level decreases. The DVK scores, represented with the flat line, also exhibit a downward trend, but this trend is much more distinctive when compared to the one with the VLT scores. The similar fluctuation pattern between the two lines verifies the high correlation between the variables.

3.3 Summary of the Findings

The findings of the current study can be summarized as the following:

- When compared to native speakers of English in terms of vocabulary profiles, the EFL learners who participated in this study are significantly more dependent on the most frequent 1000 words in the English language.
- There is statistically no significant difference between the learner and native essays in terms of quantity of academic words. The learner group who participated in the current study can make use of as many academic words as native speakers of English can.
- For the EFL learners, the breadth and depth of vocabulary knowledge are closely correlated, and both dimensions of vocabulary knowledge have significant effects on the learners' vocabulary profiles.
- The depth of vocabulary knowledge, when compared to the breadth dimension, is a stronger predictor of how independent EFL learners are from the K1 level words.

4. Discussion

The purpose of this study was twofold: to investigate vocabulary profiles of EFL learners by comparing them to those of native speakers of English and to analyse the effects of the breadth and depth of vocabulary knowledge of these learners on their vocabulary profiles. To this end, 84 essays written by EFL learners were compared to 75 essays written by native speakers of English in terms of vocabulary profiles. The results of this comparison are in line with the previous studies to some extent. First of all, the hypothesis that native speakers rely less on the K1 words is supported with the current study; however, there was no evidence to support the hypothesis that native speakers make use of more words from the AWL level (Morris & Cobb, 2004). It has been suggested that learners capable of using words from the AWL level or Greco-Roman origin are academically more successful. However, quantitative analysis of such words are likely to yield misguiding interpretations because through quantitative analysis it is virtually impossible to tell whether these words are used in the right context with proper connotations and/or collocations. This is why the results of both the previous studies and the present one concerning AWL quantity in L2 lexicon cannot be regarded as conclusive without further analysis.

The breadth and depth dimensions of L2 lexicon were another concern of the present study. The results of the

VLT and DVK tests revealed statistically significant correlations, which conforms to the previous research (Akbarian, 2010; Qian, 1999; Qian, 2002). These two tests have been used in reference to variables such as reading (Farvardin & Koosha, 2011; Qian, 1999), grammar (Zhang, 2012) and lexical inferencing (Marzban & Hadipour, 2012). In addition to these variables, these two vocabulary measures were used in relation to the L2 vocabulary profiles in the present study, and since the breadth and depth dimensions of vocabulary knowledge have not been addressed previously in reference to their effects on vocabulary profiles, the relevant results could be counted as a contribution to the related literature. Furthermore, when compared to the breadth dimension, the depth of vocabulary knowledge seems to be a stronger predictor of lexical inferencing success through reading (Marzban & Hadipour, 2012) and reading comprehension in general (Qian, 1999). The results presented in this paper add a new dimension to these discussions by showing that when compared to the breadth dimension, the depth of vocabulary knowledge is a stronger predictor of vocabulary profiles of EFL learners.

The results of the current study have some clear implications. To begin with, it has been suggested that the rediscovery period of L2 lexicon (Meara, 2002) is very likely to yield a related comprehensive theory, and in the process, every possible aspect of L2 lexicon needs to be analysed. Vocabulary profiles of EFL learners is one of these aspects, and the results introduced in this paper are very likely to contribute to our understanding of L2 lexicon in that the differences between the learner and native vocabulary profiles are significant at certain levels. According to these results, EFL learners are highly dependent on the first 1,000 most frequent words in the English language. More than 85% of the words used by these learners actually come from this level. Learners with higher vocabulary size show a slight tendency towards the post-1,000 frequency zones while learners with higher depth of vocabulary knowledge seem to be significantly more independent from this first 1,000 band. As was discussed previously, relevant literature draws attention to an ideal vocabulary profile including the Kl scores of less than 85% and the AWL scores of over 5% (Morris & Cobb, 2004). Moreover, Meara and Fitzpatrick (2000) have claimed that VP taps the extent of non-native speakers' productive vocabulary more effectively than some other tests in use. For the current study, calculations based on the VP database yielded comparable results with these studies. Therefore, it has been reconfirmed that this database has the potential to be used as a powerful complementary tool in determining certain aspects of L2 productive vocabulary.

In addition to this, the current results indicate that receptive and productive L2 vocabulary are highly interconnected, and changes in the receptive domain seem to have some effects on the productive one. Language teaching professionals who are confused because they cannot find reflections of the vocabulary introduced in classes could be better oriented if familiarized with the multiple aspects of the target lexicon. Trying to teach new words through unidimesional approaches will help learners build up target vocabulary but will sure fall short on the way to production. However, it should be born in mind that building up a network of vocabulary that is rich in terms of both breadth and depth dimensions takes considerable amount of time (Haastrup & Henriksen, 2000).

There are some limitations of the current study especially in terms of the measuring tools which were used during the process. First of all, some caution is needed while making interpretations about the results of word association tests as they might not be measuring what they claim to measure. The test which was developed by Qian and Schedl (2004) and used in this study is obviously based on some assumptions about the representativeness of the test items both in terms of frequency and language skills because the items that are being tested in DVK might be questioned in terms of representativeness and it is a receptive-skill-based test. Furthermore, although understanding the depth of vocabulary knowledge is not as easy as it might sound, it should not mean that the DVK results are meaningless. As the results of the current study suggest, although they are significantly correlated, DVK is a much stronger predictor of higher level vocabulary profiles when compared to VLT. As the depth of vocabulary knowledge increases, EFL learners' dependence on the K1 level words significantly decreases. Therefore, the DVK test actually measures different dimensions of lexical knowledge from the VLT test.

5. Conclusion

Breadth and depth of vocabulary knowledge have been the concern of numerous studies, but the related literature lacks studies dealing with their effects on the vocabulary profiles of EFL learners. In this respect, the results of the current study revealed several important aspects of L2 lexicon somewhat different from those of L1 lexicon, thus contributing to the literature by confirming some of the previous findings and casting doubt on some others. The study revealed valuable information concerning the effects of the breadth and depth of vocabulary knowledge on L2 vocabulary profiles. This may enable us to explain and predict EFL learners' lexical needs as well as improve our understanding of L2 lexicon in general. While dealing with such aspects of L2 lexicon, its dynamic nature should not be ignored. As EFL learners' vocabulary is unsteady in general and abounds with

fluctuations, we should be alert to the possibility of hasty conclusions and conduct more sceptical studies for more reliable results.

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