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Vocabulary Knowledge as a Predictor of Performance in Writing and Speaking: A Case of Turkish EFL Learners

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Abstract

This paper reports on empirical research that endeavors to investigate the role of vocabulary knowledge in the writing and speaking performance of 54 B2 level Turkish learners of English as a foreign language (EFL). The measured aspects of vocabulary knowledge (productive vocabulary size, receptive vocabulary size, and depth of vocabulary knowledge) were all found to correlate significantly with performance in writing and speaking (measured through the writing and speaking components of a proficiency test). Multiple regression analyses showed that vocabulary knowledge accounts for 26% of variance in writing performance and 17% of variance in speaking performance. Therefore, the study offers evidence that vocabulary knowledge is a significant predictor of performance in productive language skills. Suggestions for further research and pedagogical implications are given based on the findings of the research.

Key words: Vocabulary knowledge, speaking, writing, productive skills

Introduction

Vocabulary knowledge is an essential component of linguistic competence; however, surprisingly, the neglect of vocabulary in language teaching and learning research has been a recurring theme of discussion over an extended period. As Wilkins (1972, p. 109) stated, “Linguists have had remarkably little to say about vocabulary and one can find very few studies which could be of any practical interest for language teachers”. This neglect of vocabulary was mentioned in research by Richards (1976), Levenston (1979), Meara (1980), Ellis (1995), Coady and Huckin (1997), as well as countless others, indicating that researchers became both concerned and interested in this issue. The neglect of vocabulary has been attributed to factors such as “the influence of structuralism and the Chomskyan school of linguistics” (Tozcu & Coady, 2004, p. 475) or to the difficulty of integrating vocabulary into a structure-based syllabus (Sinclair & Renouf, 1988, p. 143).

Meara and Buxton (1987, p. 142) express their delight in finding that this neglect is “no longer the case” and that vocabulary acquisition “...may not yet have advanced to the status of flavour of the month” but is “...heading in that direction”. Very recently, Gonzalez-Fernandez and Schmitt (2017, p. 282) have called attention to an “explosion in the amount of vocabulary research taking place” and mentions Nation’s (2013) estimation that “over 30% of all the research on vocabulary since 1900 was published in the previous 11 years”. Although there has been a substantial increase in vocabulary-related research in second/foreign language acquisition, some issues still require substantiation through empirical research. One such issue is the relationship between vocabulary knowledge (both receptive and productive) and productive language skills (i.e. writing and speaking). Many studies have inquired into the effect of vocabulary knowledge on reading comprehension (e.g. Qian, 1999; 2002; Ouellette, 2006; Shiotsu & Weir, 2007; Lervåg & Aukrust, 2010; Mehrpour & Rahimi, 2010) and on listening comprehension (e.g. Bonk, 2000; Stæhr, 2008; 2009; Mehrpour & Rahimi, 2010). However, little research has been conducted with the aim of

identifying the potential impact of lexical knowledge on writing and speaking performance. The present research will endeavor to empirically relate vocabulary knowledge to achievement in productive skills. Before elaborating on the research concerns and methodological specifications of the study, it is necessary to present a brief overview of current research on the topic of vocabulary knowledge and its effect on the acquisition of major language skills.

Literature Review

Vocabulary Knowledge

Contemporary accounts of word knowledge (i.e. a multi-dimensional vocabulary knowledge construct) point to three components of lexical knowledge: form, meaning, and use. For instance, in Nation's (2013) framework of the dimensions of word knowledge, the three main components are identified as form, meaning, and use. 'Form' involves knowledge of the spoken and written forms of a word in addition to the ability to recognize its parts. 'Meaning' is interpreted as understanding the form-meaning relationship, concept and referents that a word signifies, and its association with other words. Finally, 'use' refers to knowing the grammatical functions of the word, the collocations of the word, and the constraints on the use of the word. Another framework to conceptualize word knowledge was the components approach explicated by Read (2000), which defined different aspects of word knowledge such as forms, meanings, collocations, word parts, and register.

Cremer, Dingshoff, de Beer and Schoonen (2010) claim that vocabulary knowledge does not only involve knowing a multitude of words, but also necessitates acquiring various types of knowledge regarding each word and creating semantic networks among multiple lexical items. Therefore, it can be asserted that vocabulary knowledge is not a unitary competency; rather, it can be broken down into separate competencies or masses of cognition. One of the earliest attempts to create such a division was proposed by Anderson and Freebody (1981), who contrasted

the 'breadth' and 'depth' of vocabulary knowledge. In their account, breadth, or size, of vocabulary simply refers to the number of words known by a speaker of an L2. On the other hand, depth is defined as the extent of knowledge that one has about each word. In other words, breadth and depth imply the quantity and quality of lexical knowledge, respectively. Gonzalez-Fernandez and Schmitt (2017, p. 283) claim that breadth and depth of vocabulary knowledge do not grow in a parallel fashion, yet the two aspects are related and contribute to one another. For instance, as the number of words one knows grows, so does the number of word forms (i.e. prefixes and suffixes), which in turn increases the depth of vocabulary knowledge of the speaker. Schmitt (2010) refers to this developmental process as the 'incremental nature' of language acquisition. According to his assertions, the learning of each aspect of a vocabulary item proceeds from zero knowledge to partial mastery and then to precise knowledge. Moreover, different aspects of word knowledge are learned at different rates. In other words, some aspects of vocabulary are learned before others.

Another distinction concerning vocabulary knowledge has been made between receptive and productive forms of knowledge (Laufer, 1998). Receptive knowledge means the ability to comprehend words when reading in or listening to an L2, while productive knowledge denotes the mastery of using words in speech or writing. Furthermore, productive knowledge has also been divided into two separate competencies: namely controlled and free productive vocabulary (Laufer, 1998). Controlled productive vocabulary refers to the ability to provide the whole word when given part of the word as a cue, whereas free productive vocabulary is being able to use words spontaneously and without cues within the flow of natural speech. Receptive knowledge is believed to be mastered before productive knowledge (Laufer, 1998; Ozturk, 2015). The reason for this is the relative complexity of the production process as opposed to the reception process. Schmitt (2014) claims that knowing the form-meaning link of a word is enough for the reception of it, whereas its

production requires many more aspects of word knowledge such as word class, functions, or collocations. In other words, as Read (2000) states, “productive knowledge is a more advanced skill than receptive knowledge”. Studies comparing the levels of productive and receptive mastery of vocabulary in language learners (e.g. Laufer & Paribakht, 1998; Nemati, 2010) have indicated a significant difference between receptive and productive mastery in favor of the former being the less advanced skill.

The extent of vocabulary, i.e. vocabulary size, an L2 learner requires to effectively communicate in a language is a further significant issue in the mastery of vocabulary. Nation (2006) claims that a vocabulary size that includes between 2,000-3,000 word families will provide 95% coverage in everyday conversation, while a vocabulary knowledge of between 6,000 and 7,000 will offer 98% coverage. These size requirements are usually established for receptive skills. Gonzalez-Fernandez and Schmitt (2017) point to the difficulty of setting size requirements for writing since “different writers are able to use the vocabulary they possess to better or worse effect” (p. 285). It can be assumed that the same difficulty would apply to setting a sufficient vocabulary size for speaking, as a person with a relatively greater vocabulary may still have difficulty speaking convincingly.

Vocabulary Knowledge and Major Language Skills

The relationship between reading comprehension and vocabulary knowledge has been extensively researched. Many studies have been conducted to empirically validate the relationship between reading comprehension/performance and different aspects of vocabulary knowledge. In actual fact, justice cannot be done to all of these studies within the limits of this research paper, however an attempt will be made to consider some that can be regarded illustrative. In such an empirical study, Qian (1999) investigated the relationship between depth and breadth of vocabulary knowledge and reading comprehension in English. The results of the multivariate analyses conducted on the data indicated a high and positive correlation between scores for

vocabulary size, vocabulary depth and reading comprehension. In another study by the same author (Qian, 2002), it was found that depth of vocabulary is as effective as size in predicting performance in reading comprehension. Ouellette (2006) used receptive and expressive vocabulary measures to examine the impact of vocabulary knowledge on word recognition and reading comprehension. The findings of the study revealed the predictive power of different types of vocabulary knowledge on distinct reading skills and reading comprehension. In a study conducted to empirically validate the relative contribution of syntactic knowledge and vocabulary breadth on performance in reading tests, Shiotsu and Weir (2007) discovered significant impacts of both variables on performance in text reading comprehension tests. Another finding from this research is that syntactic knowledge is relatively more predictive than vocabulary breadth of reading comprehension performance. Finally, Mehrpour and Rahimi (2010) analyzed the impact of general vocabulary knowledge and an awareness of the specific vocabulary content in a reading test on the performance of their participants in the test applying an experimental research design. Their findings demonstrated that the participants in the experimental group significantly outperformed those in the control group, indicating the significant effect of general and text-specific vocabulary knowledge on reading comprehension test performance. The studies mentioned in this paragraph and many others (e.g. Laufer, 1992; Henriksen, Albrechtsen, & Haastrup, 2004; Stæhr, 2008; Alavi & Akbarian, 2012; Cheng & Matthews, 2016) contribute to the hypothesis that vocabulary knowledge is significantly related to reading comprehension and performance. Based on this well-substantiated relationship, many research studies (e.g. Beck, Perfetti & McKeown, 1982; Pany, Jenkins & Schreck, 1982; McKeown, Beck, Omanson & Perfetti, 1983; Tozcu & Coady, 2004; Nelson & Stage, 2007) have been carried out to prove the efficiency of vocabulary instruction in improving the reading comprehension skills of EFL/ESL learners.

As with reading comprehension, listening comprehension is also thought to be related to the extent of vocabulary that one possesses. However, as Bonk (2000) states, “The question of how much lexis is necessary to listen to and comprehend texts in an L2 remains largely unaddressed in the literature” (p. 16). Although the amount of vocabulary necessary to aid comprehension in listening texts has not been identified, there are studies which have attempted to establish a relationship between lexical knowledge and listening comprehension. One such study was conducted by Nissan, DeVincenzi, and Tang (1996), who attempted to determine the variables which increase difficulty in TOEFL test dialogue listening questions. Their finding indicated that one such variable is the existence of infrequent lexical items in the dialogue, which may be interpreted as an indication of the relationship between lexical knowledge and listening test performance. Later, Bonk (2000) endeavored to establish a relationship between listening comprehension and vocabulary knowledge by analyzing the relationship between the number of familiar lexical items and gist comprehension of listening texts of increasing lexical difficulty. The results of this research revealed that listening comprehension correlated with text-lexis familiarity at .45, which indicates a moderate correlation. As Bonk (2000) points out, although a correlation between the amount of familiar lexis and comprehension may not be an efficient predictor of general comprehension levels, the “percentage of familiar lexis may however determine a floor effect for good comprehension of a text” (p. 18). To support this conclusion, it is possible to cite certain other research. Mecartty (2000), for instance, found that vocabulary knowledge is a significant predictor of L2 listening ability, accounting for approximately 14% of the variance in this skill. An important scholar in vocabulary-related research, Stæhr carried out a study in 2008 to investigate the relationship between vocabulary size and reading, listening and writing skills in an EFL context and found that receptive vocabulary size is strongly related to the participants’ reading and writing abilities and moderately associated with their listening ability. As an extension

of that study, Stæhr (2009) investigated the relationship between depth and breadth of vocabulary knowledge and listening comprehension. He obtained significant positive correlations between the variables and found that vocabulary knowledge accounts for half of the variance in the listening scores of the participants of his study. More recently, Cheng and Matthews (2016), Wang and Treffers-Daller (2017) and Matthews (2018) added further empirical evidence for the fact that L2 vocabulary knowledge can predict success in listening comprehension.

Even though researchers have undertaken a considerable amount of investigation regarding the relationship between the use of vocabulary and quality of writing, fewer studies exist which have inquired into the relationship between the vocabulary knowledge of EFL/ESL learners and their performance in writing exams. To exemplify studies investigating the relationship between the use of vocabulary and writing quality, it is pertinent to cite Astika (1993), who determined that the vocabulary section of a holistic scale accounted for 84% of the variance in the general assessments of composition quality. Similarly, Engber (1995) and Daller and Phelan (2007) measured the lexical sophistication of essays written by their participants and detected significant correlations between the scores for measures of lexical sophistication and teachers' holistic judgments of composition quality. Adopting a different approach, Laufer and Nation (1995) obtained significant correlations between productive vocabulary size and the lexical sophistication of the written compositions of participants. Some further studies (e.g. Stæhr, 2008; Albrechtsen, Haastrup, & Henriksen, 2008; Milton, Wade, & Hopkins, 2010) have contributed to the assumption that measures of vocabulary size are closely related to the rating of written work by L2 learners. More recently, Johnson, Acevedo, and Mercado (2016) supported these findings with a study which discovered a positive association between a productive knowledge of high-frequency word-families and L2 writing performance.

Milton (2013) claims that “studies investigating the relationship between vocabulary and language proficiency almost

never offer an insight into the relationship between vocabulary and speaking ability” (p. 69). He adds that, at the time, Zimmerman’s work (2004) was the only research proving the existence of such a relationship. Milton et al. (2010) based on this gap in the literature, included the speaking skill in their analysis of the relationship between vocabulary knowledge and all four skills. They obtained a statistically significant positive correlation ($r = 0.71$) showing the effect of vocabulary on speaking performance. Hilton (2008) investigated the contribution of lexical knowledge to perceptions of spoken fluency and demonstrated high correlations between lexical knowledge and various indicators of spoken fluency. Another research study investigating the same relationship was conducted by Oya, Manalo, and Greenwood (2009) with Japanese learners of English, whereby the researchers measured the vocabulary knowledge of participants and speaking performance in a story-retelling task. The results of the analysis revealed relationships between vocabulary knowledge and various indicators of speaking performance such as fluency, complexity and accuracy. The growing research interest in this issue lead to recent studies proving the existence of an association between vocabulary knowledge and speaking proficiency (Koizumi & In’nami, 2013; Uchihara & Clinton, 2018; Uchihara & Saito, 2019).

Another important point to be mentioned regarding vocabulary knowledge is that the measures of that knowledge usually involve the recognition or production of written words and ignore the recognition and production of spoken words. A review of the literature regarding vocabulary knowledge revealed a lack of tests of phonological vocabulary knowledge.

The above-cited research studies aimed to bring to light the potential relationship between various aspects of vocabulary knowledge and the four major language skills. As a result of an extensive review of the literature undertaken for the current research, it can be iterated that receptive skills have attracted considerably more attention than productive skills within the scope of vocabulary research. Results extrapolated from reading

and listening research have documented strong relationships between vocabulary knowledge and comprehension with reading and listening. Nonetheless, it would not be unfounded to postulate that research concerning the relationship between vocabulary knowledge and productive language skills is scarce. Based on this scarcity, the present research attempts to investigate the currently under-researched relationship between vocabulary knowledge and performance in FL writing and speaking. The results of the research will contribute to an understanding of the indicators of performance in productive skills. With this aim, the following research questions will be addressed within the scope of this correlational study:

RQ1. Are the measured aspects of vocabulary knowledge (productive vocabulary size, receptive vocabulary size and vocabulary depth) intercorrelated?

RQ2. Which aspect(s) of vocabulary knowledge (productive vocabulary size, receptive vocabulary size and vocabulary depth) is more closely associated with writing performance?

RQ3. Which aspect(s) of vocabulary knowledge (productive vocabulary size, receptive vocabulary size and vocabulary depth) is more closely associated with speaking performance?

Method

Design

The research design of this study was inspired by Qian (1999; 2002) and Stæhr (2008; 2009) in that this study endeavors to relate different aspects of vocabulary knowledge to measured performance of language skills. It is a correlational case study, since it tries to determine the relationship between vocabulary knowledge and performance in productive skills.

Context and Participants

Data for this study was collected at a School of Foreign Languages in a state university in the south-eastern part of

Turkey. As the medium of instruction in the Engineering, Architecture and Medicine Faculties is English, around 1460 students must either prove their language proficiency through a test score (from international tests or an in-house proficiency test) or undertake an intensive EFL program to be entitled to continue their studies.

The participants of the study were 54 students enrolled at the afore-mentioned intensive EFL program at a state university in Turkey. Students from three B2 level EFL classes were recruited. The sampling method used in this research is cluster sampling. The students in the institution receive instruction in different classes, which can be regarded as natural clusters. A simple random sample of three clusters was selected from among a total of 21 clusters, i.e. B-2 level classes. The students had been categorized into A1, A2, and B1 level classes at the beginning of the academic year using a placement test prepared by the institution. Most progressed to B2 level having successfully completed the first three modules (each after an 8-week instruction period) and evidenced their achievement through a sum of scores from the quizzes they received throughout each module together with a module exit test. All the participants had Turkish as an L1. 32 of the participants were male, while 22 were females. The mean age of the participants was 19.4 with a range of between 18 and 23. They came from similar educational backgrounds and had received at least 9 years of English instruction beginning in the 4th grade of primary school. Following the selection of the clusters, the researcher introduced himself and the purpose of his research, obtained oral consent from the participants regarding their inclusion in the study, and elaborated on the procedure for the study and what was expected of them within the context of the research. Two students from one of the classes refused to participate, consequently the number of participants was reduced from 56 to 54.

Instruments

Milton (2013, p. 67) proposed that “different dimensions of vocabulary knowledge might need to be measured separately and their effects combined if the full nature of the relationship with language skill is to be seen”. With this same necessity in mind, three different measures of vocabulary knowledge were used along with the writing and speaking components of a proficiency test prepared by the same institution at which the participants studied to determine scores for their receptive vocabulary size, productive vocabulary size, vocabulary depth and performance in writing and speaking. It was decided to include one measure of receptive vocabulary size and one measure of productive vocabulary size based on Stæhr’s (2008) assumption that “we would expect stronger correlations between two receptive measures (e.g. receptive vocabulary and reading) or between two productive measures (e.g. productive vocabulary and writing) than between a receptive and productive measure (e.g. receptive vocabulary and writing)” (p. 142). Following are descriptions of the instruments used in this study:

Receptive Vocabulary Levels Test (RVLT). The improved version of VLT (Version 1) by Schmitt, Schmitt and Clapham (2001) based on the original version by Nation (1983; 1990) was used as a measure of receptive vocabulary size for the current study. There are five sections in the test measuring four levels of word frequency and an academic word level. The test indicates students’ mastery of the first 2000, 3000, 5000, 10000 word families in English together with the mastery of academic vocabulary. There are 30 questions for every word frequency level and the questions involve matching words with their definitions.

The 10000 and academic word levels were excluded from the analyses due to the extremely low mean of correct answers by the participants (2.4 for the 10000 word level and 2.1 for the academic word level). 15 of the 54 participants scored zero in the 10000 word level, while 16 scored zero for the academic word level. Therefore, it was assumed that they had not yet acquired the first 10000 word family as well as the academic vocabulary and a

decision for the exclusion of the scores from these sections was deemed feasible.

Productive Vocabulary Levels Test (PVLТ). Laufer and Nation's (1999) Productive Vocabulary Levels Test was used to measure the participants' levels of productive vocabulary size. This test was devised as the productive version of Nation's (1983; 1990) receptive VLT and was similarly comprised of 5 sections measuring knowledge of the 2000, 3000, 5000, 10000 and academic word frequency levels. Using a completion task format, the test asks students to fill gaps in sentences with an appropriate word based on the initial letters provided as cues.

To create parallelism between the scores obtained from the receptive and productive VLTs, it was decided to also exclude students' scores from the 10000 and academic word levels for the productive VLT.

Word Associates Test (WAT). This test was developed by Read (1993) to measure learners' receptive vocabulary depth with regard to three aspects of word knowledge, i.e. synonymy, polysemy, and collocation (Qian, 2002). In the test, there are 40 items which have one stimulus word above and four words in two boxes below. The left box comprises synonyms, whereas the right box contains collocations. The test-taker is expected to choose a total of four words from the two boxes (one to three words from each box adding up to a total of four correct answers).

Writing Performance Test (WPT). To assess the writing performance of the students, their scores from the writing component of the proficiency test administered at the end of the academic year were used. For this component, students were expected to write an argumentative essay, which was then holistically rated by two blind raters based on a writing rubric (See Appendix 1) which aimed to assess students' performance on five quality aspects (i.e. task achievement, organization, use of English, vocabulary, and punctuation/spelling/mechanics) in four gradually increasing levels of achievement. The raters had been engaged in calibration training before the exam. The ratings of the two independent raters were then checked for consistency and, in

case of a 20 points differential out of a total score of 100, a third rater was utilized and the skewed score was replaced with the rating given by the third rater for the sake of inter-rater reliability. This latter process was undertaken for 6 of 54 student papers. The inter-rater reliability for the WPT was assessed and a correlation coefficient of .86 was obtained, indicating a high degree of inter-rater reliability.

Speaking Performance Test (SPT). Participants' speaking performance was evaluated through their scores from the speaking component of the same in-house proficiency test prepared by the testing office of the same institution. The students were expected to deliver a speech on a topic they picked from a pot. Holistic ratings were determined by two trained raters again based on a speaking rubric (See Appendix 2). The rubric assessed students' performance based on five performance indicators (i.e. task achievement, lexical resource, grammatical range and accuracy, fluency and coherence, and pronunciation) in four gradually increasing levels of achievement as was done for writing. The inter-rater reliability coefficient was found to be .73, indicating moderate to high reliability. It is acknowledged that the correlations between vocabulary measures and writing/speaking measures could be inflated as a result of the existence of a vocabulary portion in the writing/speaking rubrics used for holistic judgments.

Procedure

The three vocabulary measures were administered to the participants in a single session, which lasted approximately 100 minutes. As there were 3 clusters, a total of three testing sessions were conducted. All testing sessions were administered by the researcher and supervised by the class teacher. The researcher was present during the testing sessions to ensure that the participants received identical instructions and sufficient time to answer the questions. The same form of each measure was used for each of the clusters to ensure the same level of difficulty. The proficiency test, from which students' writing and speaking

performance scores were obtained, was administered at the end of the academic year. The students were randomly assigned to the teams of raters for the writing and speaking tests and, for the writing component, blind rating was performed. After the scores from the vocabulary measures and holistic judgment scores for the writing and speaking tests were obtained, descriptive and reliability statistics were computed to ensure the reliability of the data. Subsequently, Pearson correlation coefficients were calculated to understand the relationship among the measured aspects of vocabulary knowledge. Finally, stepwise multiple regression analyses were conducted to determine the extent of the effect of different aspects of vocabulary knowledge on speaking and writing performance.

Results

Descriptive and Reliability Statistics

The findings from the descriptive and reliability analyses are presented in Table 1. The statistics chosen for reporting involve the means, standard deviations, score ranges, Maximum Possible Scores (MPS) and reliability coefficients (Cronbach's alpha for the vocabulary knowledge tests and inter-rater reliability coefficients for the skills tests).

Table 1. Descriptive and reliability statistics for the RVLT, PVL, WAT, WPT, and SPT ($n = 54$)

	Min	Max	MPS	Mean	SD	Reliability
RVLT	12	62	90	36.50	10.63	.78
PVL	3	37	54	20.85	7.75	.75
WAT	29	95	160	60.98	16.94	.81
WPT	46	97.5	100	73.03	13.65	.86
SPT	56	99	100	78.12	9.74	.73

Note. MPS = maximum possible score, RVLT = receptive vocabulary levels test, PVL = productive vocabulary levels test, WAT = word associates test, WPT = writing performance test, SPT = speaking performance test.

As Table 1 illustrates, all the measures used for the study displayed moderate to high reliability coefficients (Best & Kahn, 2006), indicating that they were all reliable measures of the defined constructs. When the mean scores for the vocabulary knowledge measures are analyzed, it can be seen that all the tests presented above average difficulty for the participants (36.50 out of 90 for the RVLT, 20.85 out of 54 for the PVLt, and 60.98 out of 160 for the WAT). These mean scores seem to be low considering the fact that the participants had been assessed as B2 level learners of English. However, the standard deviations for these measures appear to be relatively high (10.63 for the RVLT, 7.75 for the PVLt, and 16.94 for the WAT), which can be interpreted as an indication of the high dispersion of the scores. In other words, although mean scores are low, high standard deviations mean that there are outliers in the sample. As for the skills test, the means (73.03 for the WPT and 78.12 for the SPT) indicate that they presented moderate to low levels of difficulty for the participants.

As the sample was not large, it was decided to check for the assumption of normality through the analysis of skewness/kurtosis values and the Shapiro-Wilk tests of normality for all five variables. The findings are presented in Table 2.

Table 2. Normality statistics for the RVLT, PVLt, WAT, WPT, and SPT

	<i>Skewness</i>		<i>Kurtosis</i>		<i>Shapiro-Wilk</i>		
	Value	Std. Error	Value	Std. Error	Statistic	n	p
RVLT	.462	.325	.214	.639	.972	54	.236
PVLt	.000	.325	.149	.639	.974	54	.278
WAT	.527	.325	.440	.639	.961	54	.135
WPT	.005	.325	.896	.639	.969	54	.179
SPT	.044	.325	.305	.639	.990	54	.929

Note. RVLT = receptive vocabulary levels test, PVLt = productive vocabulary levels test, WAT = word associates test, WPT = writing performance test, SPT = speaking performance test.

As can be observed from Table 2, two of the five variables (RVLT and WAT) displayed moderate positive skewness (.462 and .527, respectively). However, the p values obtained from the Shapiro-Wilk tests indicated that the distribution of cases for each variable is close to being normal, since Shapiro-Wilk tests did not reveal statistical significance for any of the variables.

Addressing the Research Questions

RQ1. Are the measured aspects of vocabulary knowledge (productive vocabulary size, receptive vocabulary size and vocabulary depth) intercorrelated?

To determine the relationships among the three aspects of vocabulary knowledge, Pearson correlations were calculated. The results of this analysis are displayed in Table 3:

Table 3. Pearson correlations among receptive vocabulary size, productive vocabulary size, and depth of vocabulary knowledge ($n = 54$)

Test	RVLT	PVLT
WAT	.84*	.73*
RVLT	-	.87*

Note. * indicates that the result is significant at $p < .001$ (two tailed). RVLT = receptive vocabulary levels test, PVLT = productive vocabulary levels test, WAT = word associates test.

As shown in Table 3, receptive vocabulary size and productive vocabulary size are both significantly correlated with depth of vocabulary knowledge ($p < .001$). Receptive vocabulary size produced a correlation coefficient of .84, indicating a strong relationship between a learner's receptive vocabulary size and the depth of this learner's vocabulary knowledge. Productive vocabulary size produced a slightly lower correlation of .73, but the strength of the relationship is again very high. Therefore, based on the analysis, the two different aspects of vocabulary size must be considered as having equally strong associations with the depth of vocabulary knowledge. Furthermore, the Pearson

correlation between receptive vocabulary size and productive vocabulary size ($r = .87$, $p < .001$) indicates a strong association between two aspects of vocabulary size.

RQ2. To what extent is vocabulary knowledge (productive vocabulary size, receptive vocabulary size and vocabulary depth) associated with writing performance?

To determine the contribution of vocabulary knowledge to successful writing performance, the Pearson product-moment correlations between aspects of vocabulary knowledge (See Table 4) and scores from the WPT were checked.

Table 4. Pearson correlations among aspects of vocabulary knowledge and writing performance ($n = 54$)

Test	RVLT	PVLT	WAT
WPT	.49*	.48*	.39**

Note. * indicates that the result is significant at $p < .001$ (two tailed) and ** indicates that the result is significant at $p < .01$ (two tailed). RVLT = receptive vocabulary levels test, PVLT = productive vocabulary levels test, WAT = word associates test, WPT = writing performance test.

The Pearson correlation coefficients that were obtained indicated that the students' writing performance is statistically significantly associated with the aspects of vocabulary knowledge. This result is an indication of the relationship between various aspects of vocabulary knowledge and writing performance. However, the strength of the obtained relationship is moderate. Next, a stepwise multiple regression analysis was conducted (See Table 5) to see the relative contribution of each vocabulary knowledge aspect to the writing performance of the participants.

Table 5. Multiple regression analysis ($n = 54$)

Procedure	Variables	R^2	R^2 change
All variables	RVLT, PVLT, WAT	.258**	.258**
Stepwise – step 1	WAT	.148*	.148*
Stepwise – step 2	PVLT	.234*	.086*
Stepwise – step 3	RVLT	.258**	.024**

Note. * indicates that the result is significant at $p < .001$ (two tailed) and ** indicates that the result is significant at $p < .01$ (two tailed). RVLT = receptive vocabulary levels test, PVLT = productive vocabulary levels test, WAT = word associates test.

The multiple regression analysis (Table 3) showed that the three variables taken together can predict approximately 26% (25.8%) of the variance in the writing scores. To calculate the unique contribution of each of these three variables, a stepwise multiple regression analysis was conducted, in each step of which one of the variables was entered into the equation. The results of this procedure show that vocabulary depth alone can account for almost 15% (14.8%) of the variance in writing performance when entered into the model at the first step (F change = 9.050, $p < .001$). When productive vocabulary size is added to the model at the next step, almost 9% (8.6%) is added to the variance explained by vocabulary depth (F change = 6.809, $p < .001$). This is a significant increase and represents the predictive power of the two variables when combined (23.4%). Finally, receptive vocabulary size was inserted into the regression model and this added approximately a further 2% (2.4%) to the variance already explained by the two previously inserted variables (F change = .821, $p < .01$). Although the change is statistically significant, the increase in the predictive power of the regression model is very small. The indication from the results of the stepwise multiple regression procedure is that depth of vocabulary and productive vocabulary size are the main components of vocabulary knowledge in writing performance and receptive vocabulary size contributes little. However, caution needs to be exercised when interpreting these results since receptive vocabulary size displayed high correlations with both productive vocabulary size ($r = .87$) and

vocabulary depth ($r = .84$) as is seen in Table 3, and this may have caused multicollinearity.

Q3. To what extent is vocabulary knowledge (productive vocabulary size, receptive vocabulary size and vocabulary depth) associated with speaking performance?

As was done for the previous research question, Pearson correlations between the measures of vocabulary knowledge and the SPT were analyzed in the first instance. The results are presented in Table 6 below:

Table 6. Pearson correlations among aspects of vocabulary knowledge and speaking performance ($n = 54$)

Test	RVLT	PVLT	WAT
SPT	.40*	.39*	.34*

Note. * indicates that the result is significant at $p < .01$ (two tailed).

RVLT = receptive vocabulary levels test, PVLT = productive vocabulary levels test, WAT = word associates test, SPT = speaking performance test.

As a result of the correlation analyses, it was learned that the participants' speaking performance is statistically significantly associated with all measured aspects of vocabulary knowledge having low to moderate correlations. Based on this finding a stepwise linear multiple regression analysis was conducted to determine the individual contributions of each aspect of vocabulary knowledge. The results can be seen in Table 7:

Table 7. Multiple regression analysis ($n = 54$)

Procedure	Variables	R^2	R^2 change
All variables	RVLT, PVLT, WAT	.167*	.167*
Stepwise – step 1	WAT	.113*	.113*
Stepwise – step 2	PVLT	.153*	.040*
Stepwise – step 3	RVLT	.167*	.014*

Note. * indicates that the result is significant at $p < .05$ (two tailed). RVLT = receptive vocabulary levels test, PVLT = productive vocabulary levels test, WAT = word associates test.

The regression procedure revealed a combined impact of vocabulary knowledge aspects on speaking performance, explaining approximately 17% (16.7%) of the total variance. The stepwise regression conducted with vocabulary depth as the first variable showed that depth alone accounts for 11.3% of the variance (F change = 6.653, $p < .05$). The addition of productive vocabulary into the equation added a further 4% to the amount of variance explained (F change = 2.712, $p < .05$), taking the total amount of variance to 15.3%. At the final step, receptive vocabulary size was entered into the model and a small change was observed in the total amount of explained variation (F change = .464, $p < .05$). Receptive vocabulary size added a further 1.4%. The results from the regression analysis can be interpreted by stating that the basic components of vocabulary knowledge in speaking performance are vocabulary depth and productive vocabulary size with a small contribution from receptive vocabulary size.

Discussion and Conclusions

The present study found strong associations among aspects of vocabulary knowledge. It can be asserted that vocabulary depth, receptive vocabulary size, and productive vocabulary size are separate but related domains of lexical knowledge. This finding is in line with Gonzalez-Fernandez and Schmitt's (2017, p. 283) claim that breadth and depth of vocabulary knowledge do not grow in a parallel fashion, but are related and contribute to one another. The relatively high correlation obtained between productive and receptive aspects of vocabulary size may be said to contradict the assertion that receptive mastery of vocabulary always precedes productive mastery (Laufer, 1998; Ozturk, 2015). However, given that the participants of the current research were B2 level learners of EFL, it can be assumed that they have developed productive mastery along with receptive mastery.

Another finding obtained from the research is that aspects of vocabulary knowledge have a combined effect on predicting EFL learners' writing performance. This finding supports the findings

of various studies (Engber, 1995; Daller & Phelan, 2007; Stæhr, 2008; Albrechtsen et al., 2008; Milton et al., 2010; Johnson et al., 2016), which have proved the existence of a relationship between vocabulary knowledge and assessments of writing quality. The variance in writing performance scores explicated by aspects of vocabulary knowledge in this study is approximately 26%, which is a significant percentage. However, further research is needed to establish other variables that may create a more predictive model explaining writing performance.

As was mentioned in the review of the literature, studies investigating the relationship between vocabulary knowledge and speaking ability are scarce. Those that prove such a relationship (Zimmerman, 2004; Hilton, 2008; Oya et al., 2009; Milton et al., 2010; Koizumi & In'nami, 2013; Uchihara & Saito, 2016; Uchihara & Clinton, 2018) are quite recent and need to be supplemented with further empirical research. This study is one step in that direction. It was found that vocabulary knowledge can account for a portion of the variance in L2 learners' speaking performance. It is considered that this is the most important contribution of this research to the field of vocabulary learning.

One important limitation of the current research is that vocabulary size and depth measures that were used to collect data for this research involve the recognition or use of written words, whereas in listening and speaking the spoken forms of words must be used or recognized. In fact, this limitation is shared by most studies investigating the relationship between vocabulary knowledge and oral/aural skills (i.e. speaking and listening). As Stæhr (2009, p.596) states, "...orthographic word knowledge is undoubtedly a prerequisite for the ability to read and write but is less important for listening and speaking, whereas phonological word knowledge is highly important for listening and speaking but is less important for reading and writing". To the best of our knowledge, no well-validated measure of phonological vocabulary knowledge currently exists. Therefore, it was decided to rely on orthographic measures of vocabulary knowledge. Another issue that can be regarded as a limitation is that the sample size of the

study was not large, yet tests of normality that were conducted proved that the participants' scores in this study, obtained from the five different measures used for this research, were normally distributed which eliminated this concern.

There are certain areas for potential further research that need to be mentioned based on the current study. First of all, there is a clear need for the development of a test that can measure the phonological vocabulary knowledge of EFL/ESL learners. Since the current research draws conclusions regarding the speaking skill, which requires the use and recognition of spoken words, the administration of a phonological vocabulary knowledge test may have assisted in providing more valid results. Secondly, experimental research findings may illustrate the impact of vocabulary instruction on the development of the speaking skill. If, through experimental research, the effect of expanding vocabulary knowledge on speaking can be corroborated, speaking-based language teaching syllabi can be modified to include more vocabulary-related activities. Finally, a longitudinal, observation-based study could be conducted to observe the simultaneous development of L2 learners' speaking skills and their vocabulary knowledge.

As for the pedagogical implications of the present research, it is suggested that L2 learners be supported with word-families-based, supplemental vocabulary instruction, since this research has contributed to the assumption that vocabulary knowledge is one of the predictors of performance in writing and speaking. In other words, vocabulary instruction contributes to the mastery of productive skills which makes it important for language instructors to place more emphasis on the development of learners' vocabulary knowledge. It should also be noted that vocabulary instruction would also assist learners in listening and reading comprehension by increasing the likelihood of determining the propositional meanings of utterances.

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Appendix 1. Writing Assessment Rubric

TASK ACHIEVEMENT (30PTS)	ORGANIZATION (20PTS)	USE OF ENGLISH (20PTS)	VOCABULARY (20PTS)	PUNC./SPELL./MECHANICS (10 PTS)
23-30 pts. -task <u>fully</u> achieved - <u>great</u> variety of ideas - <u>very good</u> knowledge of subject -entirely relevant to topic -appropriate format, length and register	16-20 pts. Appropriate thesis statement; effective introductory paragraph ;topic is stated; suitable transitional expressions; conclusion logical and complete	16-20 pts. Accurate use of grammar and structures; hardly any errors of agreement, tense, word order articles, etc. ;meaning clear; being able to use complex structures; great variety of ideas	16-20 pts. -wide range of vocabulary and very good choice of words -accurate form and usage -meaning clear	8-10 pts. -hardly any spelling mistakes -left and right margins, all needed capitals, paragraph indented and punctuation; very neat
16-22 pts. -task <u>adequately</u> achieved -adequate variety of ideas -adequate knowledge of subject - <u>some</u> gaps or redundant information -acceptable length and register -e few irrelevant ideas	11-15 pts. Thesis statement Body paragraph and Concluding paragraph are acceptable but some ideas aren't fully developed; Body paragraph may not fully support the thesis statement and problems of organization occur	11-15 pts. Adequate use of grammar and structures; some errors of agreement, etc.; meaning almost clear; some mistakes in use of complex structures	11-15 pts. -adequate range of vocabulary and choice of words -some errors of form and usage -meaning sometimes not clear	6-7 pts. -few spelling mistakes -some problems with margins , capitals and punctuation -paper is legible
8-15 pts. -task achieved only in a <u>limited</u> sense -limited variety of ideas (development of ideas not complete) -limited knowledge of subject - <u>frequent</u> gaps - <u>often</u> <u>inadequate</u> length and register -some irrelevant ideas	6-10 pts. Poor introduction; too many problems with ordering of ideas; poor supporting ideas and conclusion	6-10 pts. Limited use of grammar and structures; numerous errors of agreement, etc. Which has a negative effect of communication -limited use of structures	6-10 pts. - <u>limited</u> range of vocabulary and choice of words - <u>frequent</u> errors of form and usage -meaning often not clear	3-5 pts. -frequent spelling mistakes -serious problems with margins , capitals and punctuation -parts of essay not legible

0-7 pts.	-task <u>poorly</u> achieved -poor variety of ideas - <u>major</u> gaps and pointless repetition - <u>no</u> <u>apparent</u> effort to consider the topic carefully -too many irrelevant ideas	0-5 pts.	Absence of introduction; or conclusion; no apparent organization of body meaningful paragraphing; nearly impossible to read	0-5 pts.	- poor use of grammar & structures -meaning very often not clear -reader can't understand what the writer was trying to say -poor variety of structures	0-5 pts.	-poor range of vocabulary and choice of words; repetitive -too many errors of form and usage -meaning not clear -mainly translation from mother tongue	0-2 pts.	-severe spelling mistakes -poor usage of capitals and punctuation -no essay format (margins)
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Appendix 2. Speaking Assessment Rubric

Task Completion Have students fully addressed all parts of the task? Have students presented an answer to the question with relevant, fully extended and well supported ideas?	The content barely relates to the task.	5
	The response partially addresses the requirements of the task.	10
	The response generally addresses the requirements of the task.	15
	The response addresses the requirements of the task well.	20
Lexical Resource Have students got enough vocabulary to express their ideas clearly? Is the vocabulary used to express ideas correct?	The range of vocabulary is extremely limited; there are numerous lexical errors often affecting meaning.	5
	The resource is limited to basic vocabulary which is used repetitively, and may be inappropriate to the task.	10
	The resource is adequate with some repetition; there are lexical errors but meaning is barely affected.	15
	The resource enables the student to complete the task well; there are few lexical errors and meaning is not affected.	20
Grammatical Range and Accuracy Have students used a relevant range of grammatical forms to express ideas and convey their opinions? Have students used grammatical forms accurately?	The range of sentence structures used is extremely limited, and numerous grammatical errors often affect meaning.	5
	The range of sentence structures is adequate; there are grammatical errors but meaning is not often affected.	10
	Complex and basic sentence structures are attempted; there are few grammatical errors and meaning is not affected.	15
	A variety of complex and basic sentence structures is used well; grammatical errors are rare and meaning is not affected.	20
Fluency and Coherence Are students able to put their message across in a clear manner, with limited hesitation and appropriate speed? Are ideas appropriately linked together?	Some information is linked coherently but the response lacks progression. There are some basic cohesive devices, but these may be inaccurate or repetitive. The speaker has some ability to communicate their message, but with frequent hesitation which sometimes makes comprehension difficult.	5
	Information is linked coherently with clear progression. Cohesive devices are used effectively, but connections may not always be appropriate or clear. There is some hesitation, but this does not affect comprehension.	10
	The response sequences information and ideas and there is clear progression throughout. The speaker communicates their message well. Speed and hesitation are not an issue in comprehension.	15
	The response skillfully connects ideas with clear progression. Hesitation is not a concern and the speed adds to fluency rather than detracts from it.	20
Pronunciation Are students able to use appropriate speed and intonation? Do they use correct pronunciation?	Pronunciation errors frequently impact on comprehension and make it difficult to follow.	5
	There are pronunciation errors but these do not impact on comprehension to a great extent.	10
	Pronunciation does not impact on comprehension.	15
	Control of intonation, stress, pauses, and pronunciation actually adds to rather than detracts from their message.	20