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The Relationship Between Vocabulary Size and Vocabulary Depth: A Study of IELTS Test Takers in Pakistan

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Abstract

This study investigated the relationship between the vocabulary size and the vocabulary depth of Pakistan's undergraduate college and university IELTS test-takers. It follows the correlation study. The receptive vocabulary size and the vocabulary depth were accumulated from one hundred ninety-one undergraduate IELTS test takers. It focused on the correlations between two language assessments: the vocabulary size test (VST) and the Word Associations Test (WAT). Receptive vocabulary size was calculated by using the VST by Nation and Begler and the Word WAT by Read (1993) and used for the depth of student vocabulary. The correlation and linear regression were analyzed using SPSS. The independent sample t-test was used to analyze the difference between male and female significant and minor city scores on the VST and WAT. The results reveal a strong and high relationship between vocabulary size and vocabulary depth. The group comparison results revealed no difference in the scores of males and females or major and minor cities on the VST. There was a minor difference in the scores of males and females or major and minor cities on the WAT. Teachers should teach many related vocabulary items as profoundly as feasible.

Keywords: Vocabulary, vocabulary size, vocabulary depth, correlation, linear regression

1. Introduction

According to Schmitt (2014), vocabulary has become an essential topic in language teaching. Vocabulary is commonly recognized as one of the essential components of second language acquisition (Schmitt, 1999). Vocabulary knowledge means that the reader uses appropriate words relevant to the context. Nation (2001) has explained the development of vocabulary knowledge from a more comprehensive viewpoint by combining form, meaning, and use of vocabulary. He explained all aspects of vocabulary knowledge in detail. The dimension of vocabulary is seen as knowing the oral and written varieties of the words, their surface meanings, and their primary uses (Li & Kirby, 2015).

In the field of teaching and learning, many researchers have made a distinction between the two dimensions of vocabulary knowledge: VS (Vocabulary Size) and VD (Vocabulary Depth) (Bogaards & Laufer, 2004; Haastrup & Henriksen, 2000; Read, 2000). Milton (2009), in his book "Measuring Second Language Vocabulary Acquisition," declared that these two dimensions of vocabulary knowledge (VK) are not different and that they are related to each other.

According to Read (2000), "Vocabulary size estimates a student's vocabulary size using a graded sample of words covering numerous frequency levels" (p. 126). Vocabulary size is the number of words a learner knows at a certain level. Many researchers used different tools to measure vocabulary knowledge (Wesche & Paribakht, 1996). A vocabulary size test (VST) allows us to gather a large amount of data that can be interpreted in a short time (Nation, 2001). The effect of Meara's vocabulary size test is sensitive to elements like second language learners' mother tongue and their second language proficiency (Read, 2000).

1.1 Purpose of the study

The main aim of this study is to investigate the relationship between vocabulary size and vocabulary depth of IELTS test takers in Pakistan and how vocabulary size is correlated with vocabulary depth scores at the graduate level.

1.2 Research Questions

Q 1. Is there any statistically significant difference between the scores of Pakistani male and female IELTS test takers on VST?

Q 2. Is there any statistically significant difference between the scores of Pakistani male and female IELTS test takers on WAT?

Q 3. Is there any relationship between the scores of Pakistani IELTS test takers on VST and WAT?

1.3 Research Hypotheses

Ho1. There is no relationship between vocabulary size and vocabulary depth of IELTS test takers in Pakistan.

Ho2. There is no difference between the scores of Pakistani male and female IELTS test takers on VST.

Ho3. There is no difference between the scores of Pakistani male and female IELTS test takers on WAT.

2. Literature Review

Vocabulary is the word body in a particular language. Vocabulary is essential in learning a language. It has been discussed how much vocabulary is needed by a learner who wants to attain proficiency in any language. If a learner wants to achieve native proficiency, then it is necessary to have a native level of vocabulary (Nation & Meara, 2002). We can convey very little without grammar, but we can convey nothing without vocabulary.

2.1 Vocabulary Knowledge

The knowledge of vocabulary has too much attention in recent years. In L2 proficiency, the knowledge of vocabulary can be a good indicator. Vocabulary plays a vital role in reading, speaking, listening, and writing in our daily conversation. VK is more than just citing a word. The vocabulary knowledge requires that the reader use the most appropriate word related to the given context. VK is very important because, in this category, the readers must be formative in their understanding of the meaning of a word.

2.2 Nation's Model

Nation (2001) claimed three main segments in word knowledge: meaning, form, and use. These three terms cover all categories of vocabulary knowledge. The first component is formed and further divided into three parts: spoken form, written form, and word parts. The spoken and written form are significant parts of the word framework. The spoken category is related to the knowledge of phonology, the written category depends on orthographic (e.g., spelling) representation, and the word part is the knowledge of morphology. The second component is meaning, divided into form and meaning, concepts and referents, and associations. The last category of the word framework is "use".

Schmitt (2007) argued that features of word knowledge are learned in stages; for example, learners may also recognize the meaning of a written word but not the spoken form. It's challenging to master all the elements of word knowledge, or even for native speakers to pick up new meanings and functions for vocabulary they know from the other methods. The critical point is that Nation's (1990, 2001) framework, further expanded in the 3rd column, is related to receptive and productive knowledge. In Table 2.1, there is the 3rd column of receptive and productive knowledge. These two terms are used in different kinds of language knowledge. When receptive and productive are adapted to vocabulary, these terms cover all the characteristics of a word and what is involved in knowing about a word.

2.3 Vocabulary Size

English is taught as a second and third language in many countries. Students in these countries are educated in their native language, yet they must study English materials relating to their studies. As a result, estimating a realistic minimal VS for these children may be helpful. Knowing the first 2,000 words may improve their ability to comprehend further information. As a result, students will comprehend more of the speech they receive and the writing they read (Sener, 2010).

It may be sufficient to learn 3 or 5-K-word families to begin reading actual texts. Students' vocabulary may need to be closer to 10K word families if the topic is complex, such as in university courses. According to Nation and Waring (1997), if a student wants a vocabulary equal to that of a native speaker, a vocabulary size of 15K or 20K word families may be sufficient.

There are two main approaches for measuring the size of the vocabulary. The first is based on dictionary sampling, whereas the second is based on a corpus or a frequency list obtained from a corpus. The dictionary-based strategy entails selecting a dictionary large enough to contain all of the words that learners may be familiar with (Nation, 2001). A random sample of words from the dictionary is chosen, and the learners are tested on them. The sample consisted of one word for every 100 in the dictionary. The overall vocabulary size would be calculated by multiplying the learners' test scores by 100. This method has long been the most common way to measure the native speaker's vocabulary size. This approach is used by Goulden, Nation and Read (1990), and Zechmeister et al. (1991).

Read (2000) examines that vocabulary size estimates a student's vocabulary using a graded sample of words at various frequency levels (p. 126). The quantity of words a person knows is their vocabulary size. The purpose of vocabulary size in the case of second language learners is to estimate how many common words they know based on their knowledge (Nation, 2000).

2.4 Vocabulary Size Test

The test was first originated by Nation (1983) to measure the learner's vocabulary size. The Vocabulary Size Test was created to give a reliable, accurate, and thorough measurement of a learner's receptive vocabulary size from the first 1,000 to the fourteenth 1,000 English word families (Schmitt, 2010). The VST is divided into five sections: 2000, 3000,5000-word level and the university word level, 10000, and 14,000. Each test item represents one of the 100-word families. If a test taker correctly answers all of the questions, it is considered that they are familiar with the English language's most common 14,000-word families. To raise a test-overall taker's vocabulary size to the fourteenth 1,000-word family level, multiply their score by 100. As a result, it covers a wider variety of frequencies than the VLT and words at all frequencies up to 14,000 frequency levels.

2.5 Vocabulary Depth

Warning and Nation (2004) declared that the whole aspects of vocabulary knowledge signify that a learner shows a complete command of words. Vocabulary depth is about how well the student knows a word, including pronunciation, spelling, meaning, frequency, and morphological and syntactic properties. The depth of vocabulary knowledge is concerned with understanding the various aspects of a given word (Horst & Meara, 1998).

Vocabulary depth assesses different aspects of vocabulary knowledge; it is used to measure knowledge of morphemes and the Word Associates Format (Read 1993, 1998) and the English derivatives and precision of meaning (Schmitt, 2010) and (Collex & Collmatch 2007), which are used to measure knowledge of word networks.

Read (2003) described the notion of depth of word knowledge, which is even more absorbing out of the second language vocabulary acquisition study belief than the quantitative perspectives of linguistic knowledge. As for the efficiency of the learner's vocabulary, several researchers have highlighted this knowledge's complicated and complex dynamics. Word knowledge means understanding more than its specific meaning in a given text, which is self-evident. Learners must also understand collocation, synonyms, alternative definitions, hyponyms, phonetics, pronunciation, grammatical, and semantic relationships with other words. As a result, vocabulary must not be viewed as a single aspect but as a multidimensional structure.

2.6 Word Association Test (WAT)

Since the 1950s, WAT has been used to infer the evolution and structure of native speakers' cognitive lexical items, especially for children. The Word Associates Test (WAT) is a vocabulary depth test that assesses the knowledge of synonymy, polysemy, and collocation of the

test takers. The depth of vocabulary is based on the idea of the word association. It consists of a lexical item or six or eight other words, half of which are semantically and collocational related to the target word and the other half are not (Read, 1993).

Qian (2002) uses a modified version of the WAT (Read, 1993; 1998) called the Depth of Vocabulary Knowledge assessment (DVK). The DVK is a reliable test that measures three components of word knowledge: collocation, synonym, and polysemy. According to Qian and Schedl (2004), learners are more likely to recognize the value of many word meanings when filling out the DVK. According to Qian and Schedl (2004), WAT can be a suitable alternative multiple-choice item as a vocabulary knowledge measure in evaluating English as a Foreign Language (TOEFL).

2.7 Vocabulary Knowledge Scale (VKS)

The Vocabulary Knowledge Scale (VKS) tests the depth of vocabulary knowledge. It was developed by Wesche and Paribakht (1996). This scale is a 5-point self-report scale. We know how well a student knows about vocabulary items on this scale. It measures small gains in knowledge to compare the effectiveness of different vocabulary instructional techniques. John Read (1993) stated that VKS is an instrument of two different scales. The first scale elicited responses from test-takers, and the second scale was used for response scoring. The first scale of VKS is based on five different steps and categories. In the 1st step, the word is not recognized, and in the 2nd step, its meaning is missing, but the word is recognized. There is a difference between the 3rd and 4th steps. Step 5: Move from receptivity to product knowledge.

2.8 The Impact of Gender on Vocabulary Size and Depth

Gender gaps in reported reading methods, vocabulary knowledge, and reading comprehension were shown to be substantial in Saudi Arabian male and female EFL students (Al-Nujaidi, 2003). The results of the subjects on the reading test revealed gender differences favoring females. On all types of reading comprehension problems, female students outscored male students. Gender differences were substantial for the other reading comprehension questions, such as scan, skim, and interpretation, except for guessing the context research question. In general, female students could correctly answer two more reading comprehension questions than male students on the reading test.

Several studies have looked into gender differences in various aspects of cognition or learning. Gender variations have been studied in three areas: verbal skills, mathematical skills, and visual-spatial abilities (Llach, 2009). Gender differences in language learning have been proven numerous times, indicating that girls are better language learners than boys. Lexical creations in language learners' works might be a sign of productive vocabulary use.

Catalan (1992) researched 210 Spanish EFL students in the sixth grade of elementary school. Their average age is 12 years old, and there are 105 girls and 105 boys in the group. They are from a selected school in the middle of Logrono, a region in northern Spain. Students were given four tests: the WAT, the VLT, a writing composition test, and a cue word test. The students were given ten minutes for each of the vocabulary tests. The result shows no difference between the males and females on WAT and VLT scores.

Farhady (1982) looked at the listening comprehension of 800 students and discovered significant differences between men and women, with female learners showing more extraordinary male learners. According to Eisentine (1982), females outperformed males in differentiating dialects. In 10 general English assessments, Boyle (1987) discovered that female EFL Chinese students in Hong Kong outperformed males. Ellis (1994) claimed that females' more extraordinary performance in foreign and second language learning could be related to their more positive attitude toward language learning, despite the lack of perfect consistency in research.

Languages have generally been labelled as feminine subjects, whether based on data or misinformed stereotyped opinions. Kolb and Whishaw (2001) and Mildner (2008) could agree with the concept that women have always had an advantage in language. According to this hypothesis, although prehistoric males were mostly hunters who roamed vast lands, prehistoric women were primarily gatherers who could have profited more from creating fine-tuned tools for social interaction, one of which was language (Wallentin, 2009).

2.9 The Role of Vocabulary Size and Depth in Language Skills

In a similar study, Qian (2002) examined the role of vocabulary breadth and some vocabulary depth features (collocation, synonymy, and polysemy) in academic reading comprehension. He observed a correlation of 0.77 among the TOEFL subsets of reading comprehension and vocabulary depth and a significant correlation of 0.74 between a test of vocabulary breadth and subsets of TOEFL reading.

When the relationship between vocabulary knowledge and reading comprehension was investigated, a strong correlation (r =.60, p.001) was found between overall reading comprehension and the 2K frequency level (Al-Nujaidi, 2003). It is in line with Laufer's considerable research on the subject, which reveals a connection between 0.50 and 0.75 between VK and RC.

Stæhr (2008) examined the correlation between VS and reading, writing, and listening skills in English as a foreign language (EFL). 88 EFL students from Denmark's secondary schools took part in the study. The learner's VS was highly related to their reading and writing abilities and slightly correlated to their listening ability. However, vocabulary size may still account for a large percentage of the variation in listening scores. All three linguistic abilities have a significant (p.001) correlation with vocabulary size. It produced a strong correlation of 0.83 with reading comprehension, 0.69 with listening, and a significant and relatively high correlation of 0.73 with writing.

2.10 Relationship Between Vocabulary Size and Vocabulary Depth

The VS and VD have been distinguished by researchers in vocabulary teaching and the learning process. However, Milton (2009) evaluated many studies in his excellent book "Measuring Second Language Vocabulary Acquisition" and suggests that these two factors are not separate and may be related to one another.

Both VS and VDK are connected (Read, 2004) because learners' vocabulary knowledge increases as their Vocabulary grows, so the depth cannot exist without size. Many studies have demonstrated a link between the two (e.g., Nurweni & Read 1999; Vermeer 2001). Schmitt & Meara (1997) discovered a modest significant relationship of 0.62 between VS and VD in secondary and post-secondary students of Japanese.

Schoonen and Verhallen (1998) contrasted performance on two cloze passages, considered measures of reading comprehension ability, using Dutch primary school pupils. The results revealed that the breadth test had a good correlation with the depth test and that each word test contributed about 5–10% of the predicted cloze score. However, in addition to the variance explained by the breath test, the depth exam explained some additional variation in the cloze scores.

Schmitt and Meara (1997) researched 88 young Japanese students to investigate the relationship between the size of Vocabulary and the depth of Vocabulary. They indicated that when the student's knowledge of word association was correlated with a vocabulary size of

different levels, the correlation between the size of Vocabulary and depth of Vocabulary was impartially high (r =.62, p .50). The hypothesis is that size and depth are two measurements of vocabulary knowledge.

Chui (2006) investigated the size and depth of English word knowledge among Hong Kong university students. She used the Productive VLT to measure VS and a self-constructed depth-of-knowledge test to measure lexical competence across various elements with 186 participants. Chui chose 20 words from Coxhead's (2000) AWL. The data revealed that people knew a lot of high-frequency words but not so much about low-frequency ones. They only taught the words with one meaning, not their different meanings.

Mehrpour et al. (2011) investigated how learners' VK affects their reading comprehension. They also tried to analyze whether there was a connection between the two dimensions of VK, namely, depth and breadth. The participants in this study were 60 EFL students (30 males and 30 females). VST and WAT were used to collect and analyze the data. The findings also demonstrated that VD and VS are positively connected, meaning learners with a broad vocabulary also had a deeper understanding of the words.

Ibrahim (2012) employed two phases: quantitative and qualitative methods. The data was collected from 93 learners and used three tests of language. The data were analyzed using linear regression and correlational analysis and discovered that vocabulary size was a more significant predictor of reading comprehension than vocabulary depth. The results show that the depth of Vocabulary plays an essential role in guessing the lexical or vocabulary depth that received more attention from testers and teachers.

Zhang (2015) found a relationship among learning strategies, vocabulary breadth, and vocabulary depth. He used three instruments for 150 university students from China. In SPSS Software, Pearson correlation and more than one regression were used to analyze the outcomes. This study indicates that word association is necessary for both breadth and depth of knowledge. Vafaee (2016) explored a correlation between receptive vocabulary size (breadth) and the depth of Vocabulary. He took a sample of two hundred sixty-three Persian intermediate college students. The test was divided into four parts. His results were different from those of Zhang (2015). The reason for the differences in the samples of both studies.

3. Research Methodology

3.1 Research Design

The results of VST and WAT are obtained for every participant in the sample, and the scores of both variables are then correlated. The result is expressed as a correlation coefficient that shows the relationship between VST and WAT.

3.2 Population and Sample of the study

There were two phases to selecting the sample. In the first phase, 75 male and 80 female undergraduate students were selected from different IELTS academies in Lahore, Faisalabad, Islamabad, Multan, Bahawalpur, and Sargodha. 20 females and 35 males participated online through Google forms in the second phase.

3.3 Data collection procedure

The researcher contacted the academy's administrations for the sake of data collection. It was made sure that the data collection process was completed during the lecture; no one was allowed to leave their classroom with the test in their hands. The data collection took four months, with visits to Faisalabad, Islamabad, Multan, Lahore, Sargodha, and Bahawalpur. After finishing it, they returned the VST to the invigilator and spent the rest solving the WAT. They were instructed to fill out the Demographic Information Sheet and submit it to the proctor once they had finished the test. After the submission was completed, the researcher scored all of the tests. One mark was given for each correct answer. For incorrect responses, no points were deducted.

Due to the COVID-19 situation, data were collected online through Google forms. The online data collection procedure was started from July to August 2021. The researcher developed the VST and WAT, made the answer keys, provided automatic feedback for students, and set the points for a correct answer during question development. Google forms automatically give points for each question and total scores on both tests. The researcher automatically received the scores of each of the participants.

3.4 Research instruments

For this study, the researcher used two quantitative instruments. The first instrument was a vocabulary size test (VST), which measured fourteen frequency levels of the learner's vocabulary knowledge. The 2nd instrument was the Word Associations Test (WAT) to assess the knowledge of vocabulary depth. The test was first originated by Nation (1983) to measure the learner's vocabulary size. The VST is divided into five sections: 2000, 3000, 5000-word, and the university word level; 10000 and 14,000. Each test item represents one of the 100-word families. If a test taker correctly answers all of the questions, it is considered that they are familiar with the English language's most common 14,000-word families.

Read (1989, 1993, 1994, 1995) developed The Word Associates Test, assessing vocabulary depth. The most recent edition of the vocabulary depth (Read, 1994; 1995) contains 40 items that assess two components of vocabulary knowledge: meaning and collocation, or the paradigmatic and syntagmatic. The Word Associates Tests were evaluated using a mark scheme with a maximum score of 160.

3.5 Data analysis techniques

The whole data set was analysed statistically to answer the research questions. The data analysis was divided into four stages, with many objectives. the data was statistically evaluated to answer the five research questions stated at the start of this chapter. After entering all of the data into the SPSS system, the data was separated into two categories: male and female, and primary and minor cities. The independent sample t-test was used to analyze the data of the male and female groups and major and minor cities in Pakistan. Before conducting t-tests, key assumptions for the independent t-test were checked. Kolmogorov-Smirnov Test was conducted to check the normality of the data.

3.6 Ethical consideration

The researcher had to pay attention to the ethical considerations in the current investigation before implementing the data collection procedure. The supervisor of this study project was consulted for advice on conducting human research ethically. The supervisor provided the required ethical principles, and they followed them. The first step was to get a permission letter from the head of the department to conduct the study. The information was given about the title of the research and the aim of this study in the permission letter. The researcher maintained the policy of research ethics and the students' privacy throughout the research process.

4. Results and Discussion

The section deals with the analysis of collected data by performing different statistical tests to answer the research questions and a detailed discussion of the findings.

4.1 Group Comparisons Scores on VST and WAT

4.1.1 Male and Female Scores on VST

To address the study's first research question, independent sample t-tests were run to check the comparison between the groups.

Table 4.1 Male and Female Descriptive statistics on the VST for the total sample (N=191)

	Gender	N	Mean	Std. Deviation	Std. Mean	Error
VST	Male	107	83.598	16.7314	1.6175	
	Female	84	83.810	14.5482	1.5873	

Table 4.1 shows the descriptive statistics result that there was no difference in the scores of males (M=83.59, SD=16.73) and females (M=83.81, SD=14.54) on the VST. How far this difference is significant was later revealed through an independent sample t-test.

Table 4.2 Independent Sample T-test for Male and Female Comparison on VST

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
VST	Equal variances assumed	.465	.496	-.092	189	.927	-.2114	2.3047	-4.7576	4.3348
	Equal variances not assumed			-0.093	185.025	.926	-.2114	2.2663	-4.6821	4.2593

The values obtained from Levene's test (.496 for VST) reveal that the assumption of equal group variance was met. The independent sample t-test shows no difference in the scores of males and females t (190) =-.469, p=.927 on the VST test. Thus, the hypothesis of no difference between the two groups is accepted for VST.

4.1.2 Male and Female Scores on WAT

To address the study's second research question, independent sample t-tests were run to check the comparison between the groups. The comparison results among males and females from the WAT are discussed in this section. Table 4.3 summarizes the descriptive statistics of students' WAT scores to show how they were distributed.

Table 4.3 Male and Female Descriptive Statistics on the WAT for the total sample (N=191)

	Gender	N	Mean	Std. Deviation	Std. Mean	Error
WAT	Male	107	100.374	13.4210	1.2975	
	Female	84	98.119	12.1352	1.3241	

Table 4.3 shows the descriptive statistics result that there was a minor difference in the scores of males (M=100.3, SD=13.4) and females (M=98.11, SD=12.13 on the WAT test. How far this difference is significant was later revealed through an independent sample t-test.

Table 4.4 Independent Sample T-test for Male and Female Comparison on WAT

		Levene's Test for Equality of Variances t-test for Equality of Means								
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Std. Error Interval of the Difference	Lower	Upper
WAT	Equal variances assumed	2.392	0.124	1.202	189	.231	2.2548	1.8764	-1.4467	5.9563
	Equal variances not assumed			1.216	185	.225	2.2548	1.8538	-1.4025	5.9120

The values obtained from Levene's test (.124 for WAT) reveal that the assumption of equal group variance was met. The independent sample t-test shows no difference in the scores of males and females t (190) =-.124, p=.231 on the WAT test. Thus, the hypothesis of no difference between the two groups is accepted for WAT.

4.1.3 Correlation Between Vocabulary Size and Vocabulary Depth

Table 4.5 Pearson product-moment Correlation Between VST and WAT

		VST	WAT
VST	Pearson Correlation	1	.650**
	Sig. (2-tailed)		.000
	N	191	191
WAT	Pearson Correlation	.650**	1
	Sig. (2-tailed)	.000	
	N	191	191

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.5 shows the results of correlation analysis which demonstrate a positive relationship among students' scores on the VST and WAT. There was a positive correlation between the VST and WAT, r = 0.650, n = 191, p = 0.000. Which shows a moderate positive correlation r =.65, p< .001 among the VST and WAT. The first research question has been answered.

Table 4.6 Model Summary of Simple Linear Regression of VST and WAT

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate
1	0.650[a]	0.422	0.419	9.3292

R = .65 correlates vocabulary size and depth in the model summary. R 2 = .42 is the proportion of variance in the dependent variable (WAT), which can be predicted from the independent variable (VST). This value indicates that 42.2 % of the variance in the WAT can be predicted from the VST. It is the overall measure of the strength of association and does not reflect the extent to which any particular independent variable is associated with the dependent variable. R 2 is also called the coefficient of determination.

Table 4.7 Simple Linear Regression of VST and WAT

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	56.405	3.802		14.573	.000
	VST	.522	.045	.650	11.717	.000

Table 4.7 presents the results of the simple linear regression. The first column shows the predictor variable (VST), B = .52 shows the regression equation for predicting the dependent variable WAT from the independent variable VST, and Beta shows the standardized coefficient. The independent variable vocabulary size had a high correlation with the dependent variable vocabulary depth (r = .65) and shows that a= .522 for intercept and b= 56.405 for the slope as a percentage of rising in the independent variable and the subsequent change in the dependent variable.

4.2 Discussion

The findings of the current investigation are discussed in various points in this section. There are different discussions for each research question.

The current study results are similar to Al-Nujaidi (2003) results. In this study, the vocabulary sizes of males and females appeared to be similar. There were no significant variations in vocabulary size between males and females. The mean of the males (M = 3.37, SD = 3.38) and females (M = 4.36, SD = 4.50) on the VST was determined. All the participants were university students. In the Catalan study (1992), males and females appeared to be similar in the mean (M = 9.49, SD = 4.91) and males (M = 8.79, SD = 4.53) in vocabulary size. There was no difference between the boys and girls (Fantecha, 1998). The mean score of girls (M=83.00, SD=24.822) and boys (M=81.00, SD=25.247).

Llach (2009) demonstrates no qualitative or quantitatively significant statistical differences in lexical innovation among EFL Spanish male and female learners. There was no significant difference between girls and boys. The mean of the boys (M = 0.70, SD = 0.93) and girls (M = 0.67, SD = 0.83). Chiang (2018) found no gender differences in receptive vocabulary size. The male (M = 87.9, SD = 531.20) and female (M = 92.73, SD = 600.44) means were calculated. Meherpour (2014) found that there was also no significant difference between males' and females' scores on the vocabulary size test. In other words, in their vocabulary depth test, both males (M = 76.60, SD = 7.83) and females (M = 82.96, SD = 8.08) performed equally well.

The current study results are similar to Fontecha's (1998) results. The sample size of this study included 250 Spanish EFL learners (111 girls and 139 boys). They are university students. Al-Nujaidi (2003) collected data from 112 females and 104 males, and the total participants in this study were 216 students. The participants of this study came from seven different universities in Saudi Arabia.

Llach (2009) collected data from 168 boys and 130 girls, and they were in the second grade of secondary school and were 13.32 years old on average. The students in this research (Meherpour, 2014) were 60 advanced English as a Foreign Language learners (30 men and 30 women) chosen from five Shiraz language teaching facilities. The researchers collected data from graduate and undergraduate students in the previous studies. Therefore, the current study results are similar to those of the previous studies.

According to Catalan (2005), male or female dominance in foreign languages can vary depending on the tests used or the language assessment tasks assigned to students. Sunderland (2000) found that girls generally do better on essays instead of course books, which require a consistent application; boys do better on multiple-choice and testing.

4.2.1 Comparison Between Male and Female Scores on WAT

The current study results are similar to those of Moreno (2005) and Meherpour (2014). Moreno (2005) found that there was no statistically significant difference between the scores of male (M = 76.60, SD = 7.83) and females (M = 82.96, SD = 8.08) on the WAT. Meherpour (2014) found a minor significant difference between males' and females' scores on the vocabulary depth test. In other words, in their vocabulary depth test, both males (M = 80.06, SD = 6.67) and females (M = 84.86, SD = 6.67) performed equally well (Meherpour, 2014). The significant differences between males and females depend on the learners, as well as research showing no significant differences between male and female L2 learners (Moreno, 2005). The results of Catalan's study show that there was no difference between the scores of male (M = 21.33, SD = 3.48) and females (M = 21.07, SD = 3.31) on the WAT (Catalan, 1992). The results demonstrate that the means achieved by male and female students in the two tests are nearly identical.

There are many reasons for the results of the current study being similar to the previous research results. The first reason is the sample size and level of the participants. The researcher collected the data from 107 males and 84 females. The sample size of the current study was 192 university students. Catalan (1992) collected data from 105 girls and 105 boys (n=210). They were Spanish EFL graduate students.

The current research results do not compare to Alfatle (2016) and Kuleli (2015) results on vocabulary size and depth. In this previous research, females performed better than males, but in the current study, male students performed better than females in both tests. Sokmen (1993) found a significant difference between males and females based on primary responses in WAT. The results of Jiménez and Moreno (2004) matched those of Sökmen. Other investigations (Jiménez Catalán, 1992; Jiménez Catalán & Ojeda, 2008) revealed significant differences in favor of female students in terms of the number of words produced by female and male EFL students. Girls' increased vocabulary development may be associated with their more tremendous enthusiasm for English (Catalán, 1992).

In these studies, girls perform better than boys in both composition and WAT, producing many more word kinds than their male counterparts in both. It shows that females' productive vocabulary is more lexically rich than males' (Hellekant, 1994; Brantmeier, 2003).

Moreno (2004) claims that due to biological causes, "it is widely acknowledged that boys take longer to mature than girls." Therefore, girls' maturity may have had a bearing on their L2 vocabulary growth in fifth grade, whereas boys were still growing towards it. However, in sixth grade, boys' vocabulary acquisition rates seemed to increase faster than girls. Boys' mean number of types showed a spurt, growing by almost six and a half words, whereas girls' mean number of types only increased by almost two words in the same period.

There are many reasons for the difference in previous and current research results. The first reason is the sample size and skill level of the participants. For example, Hellekant (1994) conducted tests on 32 females, and 25 (n = 57) males and Brantmeier (2003) collected data from 64 students. Moreno's (2004) collected data from 124 boys and 101 girls (n = 225). The sample size of the current study is not similar to the previous research. Therefore, the current study results are not similar to the previous studies.

Brantmeier (2003) and Hellekant (1994) collected data from high secondary schools. Moreno (2004) collected data from the participants of 4th, 5th, and 6th-grade students. In the current study, the researcher collected data from graduate and undergraduate students, and therefore, the results of the current study are not similar to the previous studies.

4.2.2 Correlation Between Vocabulary Size and Vocabulary Depth

The findings revealed that the scores positively connected the two measures. There is a strong correlation between the VST and the WAT (r =.65). The VD score is more strongly connected to the VS score. The present study results are similar to those of the Chen (2020) study. The strong correlation shown in this study (r =.61) leads us to support the hypothesis that size and depth are closely interrelated. It was agreed with the results reported by Sen and Kuleli (2015). The strong correlation shown in this study (r =.69) leads us to conclude that size and depth are closely interrelated.

This finding is similar to other studies conducted in various contexts. (e.g., Schmitt & Meara 1997; Akbarian 2010; Rashidi & Khosravi 2010; Ibrahimi 2012; Zhang 2015; Rehman & Iqbal 2019). Based on this result, the aspects of vocabulary knowledge, vocabulary size (VS), and depth are all intimately related to one another. Moghdam (2012) revealed that VS and VD of vocabulary knowledge were positively correlated. Also, learners with a high vocabulary are likely to better understand the words.

Many researchers point out that VS and VD have a strong correlation (e.g., Qian, 1999; Alfatle, 2016; Elmasry, 2012). The results of the current research support this claim. The correlation between VS and VD scores was high and positive (0.65). There was a solid and positive relationship between VS and VKS scores: 0.89 in the first group (TOKO), 0.72 in the second group (YLI), or 0.95 when the two groups were combined (Harkio, 2016). Elmasry found a positive (r =.59) correlation between vocabulary size and the depth of vocabulary knowledge. Alfatle (2016) found a strong (r =.62) relationship between VS and VD. Meherpour (2014) discovered a strong and significant correlation (r =.71, p.01) between vocabulary breadth and depth of knowledge.

Rashidi and Khosravi (2010) examined 38 university-level EFL students who had at least 3K word families in their vocabulary. The VLT and VD were used to determine the amount of vocabulary. As a result, depth was primarily defined in collocation and meaning. The correlation between size and depth was observed to be quite strong (r = 0.81, = 38, p<0.01). The test methods used in Li's (2015) study were similar to those seen in Nashidi and Khosravi's (2010) study; the VLT measured VS, and the WAT measured VD. Li examined Chinese EFL students studying English for at least 6 years. There was a significant and positive relationship between VS and VD (r = 0.66, n = 30, p.01).

5. Conclusion and Pedagogical Implication

The current study investigated the correlation between vocabulary size and the depth of the vocabulary of IELTS test-takers in Pakistan. It focused on the intercorrelations between two language assessments: the vocabulary size test (VST) and the Word Associations Test (WAT). This research used a quantitative method with 191 IELTS test takers. The Statistical Package for Social Sciences (SPSS) Version 23 was used to examine the data. Correlational and regression analyses were used to examine the data obtained from the two language assessments. The quantitative results show that the two language tests have moderately strong intercorrelations. The t-test shows no difference in the scores of male and female Pakistani IELTS takers on VST and WAT.

In IELTS courses, learners' VS should be enhanced through various activities to increase their vocabulary size for understanding the texts. Teachers should teach many related vocabulary items as profoundly as feasible. Teachers should also make sure that students are taught more vocabulary words, learn them more thoroughly, or that their vocabulary memory improves as they are taught vocabulary items more thoroughly.

6. Recommendations

Given the limitations listed above, there are a few areas where future vocabulary research can improve. For one aspect, similar study efforts in Pakistani universities would be helpful to see if students' vocabulary sizes meet the official figures and learn more about overall vocabulary learning quality. The results can compare university students in Punjab to those in other provinces.

More quantitative research methods should investigate the size and depth of learners at various stages in the educational system. Such a study will give objective evaluations of the various programs in Pakistan. Quantitative vocabulary investigations are also required to assess the vocabulary knowledge of graduates of English programs. Such research will assist learners, programs designers, or teachers at the university level in providing their students with skills to succeed in their career prospects as English teachers, translators, or whatever other occupation they choose.

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