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The Predictor Factor of Reading Comprehension Performance in English as a Foreign Language: Breadth or Depth

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Abstract

The present study explored the association among vocabulary breadth/size, depth/quality of vocabulary knowledge, and reading comprehension in English as a foreign language. The main intention of this research was to explore the association of vocabulary knowledge depth/quality and reading comprehension performance. This study was also intended to find out which aspects of vocabulary knowledge, breadth/size or depth/quality, has more significant association with determining EFL learners' reading comprehension performance. The Vocabulary Level Test (VLT), Word Associates Test (WAT), and Reading Comprehension test (IELTS) have been administered among all the respondents. The participants were 220 adult male and female EFL learners who were learning English in advanced level in BAHAR institute, Shiraz, Iran. The findings revealed that 1) test scores on vocabulary size/ breadth, depth/ quality of vocabulary knowledge, and reading comprehension were positively correlated, 2) vocabulary size/ breadth was a stronger predictor of reading comprehension than depth/ Quality of vocabulary knowledge.

Keywords: vocabulary breadth/size, depth/quality of vocabulary knowledge, reading comprehension

1. Background

Reading comprehension is commonly known as an interactive mental process between a readers' linguistic knowledge, knowledge of the world, and knowledge about a given topic (Rahmani & Sadeghi, 2011). Reading is a complex process; L2 reading is even more complex. Success in reading comprehension is regularly depicted as an essential element to the academic success of EFL learners. Reading ability has always been viewed as critical to academic success (Bernhardt, 1991; Carrell, 1991; Urquhart and Weir, 1998; Levine, A., Ferenz, O., Reves, T., 2000; Grabe and Stoller, 2002).

Researchers have long documented the prominent role in which vocabulary performs in assisting reading comprehension (Beck, Perfetti, & McKeown, 1982; Cunningham & Stanovich, 1997; National Reading Panel Report, 2000; Coyne, Simmons, & Kame'enui, 2004; Stahl & Nagy, 2006). For the last twenty years or so, studies based on the association of vocabulary knowledge and reading comprehension has been an interesting topic in L2 research area. . Thus, in a consistent manner, research brings to the light that vocabulary knowledge more significant than other elements such as grammar knowledge, heavily relates to reading comprehension (Koda, 1989; Qian, 1999) and strategies of reading comprehension (Haynes & Baker, 1993). Furthermore, second language reading is not simple for numerous language learners; the majority of learners require more time to improve their vocabulary knowledge for reading comprehension performance in the target language. Laufer (1997) has claimed, "no text comprehension is possible, either in one's native language or in a foreign language, without understanding the text's vocabulary" (p.20). Therefore, the lack of capability in comprehending the word definitions may lead L2 readers to have difficulty in improving their reading comprehension skills. As a result, vocabulary knowledge appears to be an influential aspect in reading performance (Richard & Rodgers, 2001).

The difference among breadth/size and depth/quality is that breadth/size underlines the whole numerous forms of vocabulary that L2 language learners have with boundary word definitions, whereas depth/quality concentrates on the different dimensions correlated with a single word (Wesche & Paribakht, 1996; Qian, 1999; Read, 2000; Guo, 2011). In vocabulary learning studies, this difference has frequently been created among two factors of vocabulary knowledge: Vocabulary breadth/size and depth/quality (Meara, 1996; Haastrup & Henriksen, 2000; Read, 2000); though it is obvious that both of them are apparently related (depth without breadth is rationally not possible). Furthermore, Qian

(1999) remarked that breadth/size and depth/quality of vocabulary knowledge revealed in research depicted close relationship in reading comprehension.

There are two vocabulary tests that have seen wide recognition and application: Nation's vocabulary levels test and Read's word associates test. Both tests are commonly applied evaluate of the English vocabulary knowledge for L2, (Nation, 2001; Schmitt, Schmitt & Clapham, 2001). Nation's vocabulary levels test (1990) is used to measure vocabulary breadth/size and requires test takers to compare words with their short definitions or synonyms. The latest test version has a multiple choice format, with each target word displayed in a short non-defining sentence followed by four definitions as options, (Nation & Gu, 2007). Read's word associates test (1993, 1998) is applied to assess the depth/quality of vocabulary knowledge and is in the form of a less open-ended test. Test takers are required to choose the words correlated with the objective word.

On the other side, there is The International English Language Testing System (IELTS) which is the test being used for reading comprehension performance. It superseded the English Language Testing System (ELTS) in 1990. IELTS is generally approved as a trustworthy assessing tool in investigating whether candidates are ready to instruct or study in an English medium. In 2007, IELTS was investigated further over a million candidates in a single 12 months period for the first time ever, making it the world's most accepted English language test for higher immigration and education.

The most important concern of this research is to find out whether a person's vocabulary proficiency level can be predicted through reading comprehension item types. To be more specific, it studies whether EFL learners with various levels of vocabulary knowledge, operationalized in vocabulary levels test (VLT) and word associates test (WAT), differ in their performance on IELTS reading comprehension item types

2. Vocabulary Level Test, Word Associate Test, and Reading Comprehension

Using VLT and Eurocentres Vocabulary Size Test (EVST), Laufer (1992, as cited in Zhang & Annual, 2008) examined the association among the scores of vocabulary size and reading comprehension. The results revealed that, at all levels (less than 2000, 3000, 4000, 5000) there were significant relationships among the scores of vocabulary knowledge and reading comprehension. Her findings lent support to the assumption of L1 researches that claimed vocabulary is a stable and robust predictor of reading comprehension.

Nassaji (2004), in his article "the relationship between depth of vocabulary knowledge and L2 learners' lexical inferencing strategy use and success" attempted to discover how second language learners' depth of vocabulary knowledge correlates to the type and level of lexical inferencing strategy use and how this relation intervenes learners' success in derivation word definition from content. Nassaji used 21 adult intermediate ESL learners from various language backgrounds, involving Persian, Arabic, Spanish, Chinese, and Portuguese to read a passage containing 10 unfamiliar words to obtain their meaning from context. In a recent time, all had arrived in Canada and were taking English courses to enhance their skill. Nassaji reported the WAT split-half reliability was 0.89 in this study (2004).

Similarly, Schoonen and Verhallen (2008) conducted a WAT test in elementary schools in the Netherlands to find out the lexical improvement scope for children studying Dutch as a second language and found out that they lagged behind in comparison to their native-speaking peers.

In Canada, Qian used Read's WAT test in his study of the associations among second language vocabulary knowledge and reading comprehension skill in adult English learners (1999, 2008). Qian and Schedule (2004) found that word associates items would be a possible alternative to formal multiple-choice items as evaluates of vocabulary knowledge in the English as a Foreign Language Test (TOEFL).

In a similar research, Chen (2009) used WAT as a tool to evaluate the depth of vocabulary to investigate the association between knowledge of vocabulary, syntactic knowledge, and reading comprehension. The respondents were 138 people from five English classes in college of western Taiwan who had educated English as a foreign language for not less than 3 years. The results of this research were similar to prior relevant researches which illustrated that breadth and depth of vocabulary knowledge affected L2 learners' reading comprehension (Davis, 1968; Qian, 1999, 2002; Wallace, 2008).

3. Research Methodology

The quantitative approach was chosen and the correlational design was used to describe the probable relation among the variables. Location of this research was BAHAR Institute in Shiraz city of Iran and the population of this study was students who were registered in advanced levels of English proficiency in BAHAR Institute to improve their English competency. The sampling strategy was chosen to be the accidental sampling (convenience sampling). The sample size was 220 male and female adult language learners. The data were gathered by three various research instruments: the test to assess breadth/size of vocabulary knowledge (VLT), the test to assess the depth/quality of vocabulary knowledge (WAT), and reading comprehension test (the academic reading section of IELTS).

To carry out the analysis, Statistical Package for Social Science (SPSS), version 16.0 for Windows Vista Home Premium, was used to run statistical analysis of the instruments. A two-tailed Pearson product moment correlation coefficient were calculated. Additionally and the multiple linear regression was applied to discover the further association of independents' variable and predicting reading comprehension.

In particular, the study explored the following research hypothesis:

Ho1: There is no significant relationship between EFL learners' vocabulary depth/quality and their reading comprehension performance subtest of IELTS.

Ho2: There is no significant relationship between EFL learners' vocabulary breadth/size, vocabulary depth/quality, and reading comprehension performance.

Ho3: The breadth/size of vocabulary knowledge does not predict reading comprehension performance more powerfully than the depth/quality of vocabulary knowledge.

4. Results

4.1 Correlation between WAT & IELTS

Ho1: *There is no significant relationship between EFL learners' vocabulary depth/quality and their reading comprehension performance subtest of IELTS.*

In the Pearson correlation analysis, the results suggested that both IELTS and WAT had positive correlation. Based on Table 4.1, therefore, it is concluded that there is significant correlation (r=.684, $p<0.05$) among EFL learners' vocabulary depth/quality and their performance of IELTS reading comprehension based on the Guilford Rule of Thumb table (1956). It can be concluded that the above hypothesis is rejected so, there is significant relationship between EFL learners' vocabulary depth/quality and their reading comprehension performance subtest of IELTS.

Table 4.1. Correlation between Scores on the WAT and IELTS (n=220)

TESTS	IELTS
Word A Test (WAT)	.684**

**Correlation is significant at the 0.05 level (2-tailed)

This finding lends affirm to Qian's (1999, 2002) asserted that depth of vocabulary knowledge is influential in reading comprehension.

4.2 Correlation among VLT, WAT, and IELTS

Ho2: *There is no significant relationship between EFL learners' vocabulary breadth/size, vocabulary depth/quality, and reading comprehension performance.*

In order to expose the association among vocabulary breadth/size and vocabulary depth/quality with reading comprehension, the Pearson correlation coefficient analysis was administrated. The data displayed that the breadth/size of vocabulary knowledge (r=.834, p<.05), as well as the depth/quality of vocabulary knowledge(r=.684, p<.05), was meaningfully correlated with reading comprehension. The correlation coefficient among VLT and WAT was .919, and the scores on both tests significantly and positively correlated with one another; therefore, based on the data displayed in Table 4.2 it cannot be posited that there exists no relationship between EFL learners' vocabulary breadth/size, vocabulary depth/quality, and reading

comprehension performance. As a result, hypothesis 4 is rejected. It means that there is significant association among vocabulary breadth/size, vocabulary depth/quality, and reading comprehension. In other words, based on Guilford's Rule of Thumb (1956), the vocabulary breadth/size and vocabulary depth/quality were strongly correlated(r=.919, p<0.05).

Table 4.2. Correlation between Scores on the IELTS, VLT, & WAT (n=220)

TESTS	**IELTS**	**VLT**	**WAT**
IELTS	1.000		
VLT	.834**		
WAT	.684**	.919**	1.000

**Correlation is significant at the 0.05 level (2-tailed)

The inter-correlations among the three tests are all both positive and statistically significant. The correlation between the VLT and WAT (r=*.919*) is the highest, and the correlation between the VLT and IELTS (r=*.834*) is higher than that between the WAT and IELTS(r=*.684*). Therefore, based on Guilford's Rule of Thumb table (1956), there is a very highly positive correlation among the VLT and WAT while this relationship among the IELTS and VLT is highly positive. Moreover, based on Guilford's Rule of Thumb table (1956), there is a moderate and positive association among IELST and WAT.

Consequently, as shown in the findings of the Pearson product moment correlation (Table 4.2), it can be administrated that there are significantly positive relationships between two vocabulary knowledge tests and IELTS reading comprehension.

The results were similar to prior relevant researches which depicted that vocabulary breadth/size and depth/quality knowledge affected L2 learners' reading comprehension (Davis, 1968; Qian, 1999, 2002; Wallace, 2008). Based on Chall (1987), vocabulary knowledge of reader facilitates text perception and reading comprehension can assist readers

enhance their knowledge of vocabulary. Vocabulary is a fundamental bridge connection among sentences and understanding. The present results confirmed vocabulary knowledge has a superior role that controls readers' reading understanding skills for this certain research. Through the results from Pearson correlation coefficient analysis, and the high positive correlation between breadth/size and depth/quality of vocabulary knowledge (r=.919, p<.05), it can be concluded that the language learners with a larger breadth/size of vocabulary may have perfect presentation on the vocabulary depth/quality test. It may be supposed that knowing further vocabulary would permit the language learners to need more depth/quality of vocabulary knowledge.

The results in Table 4.2 indicated that the scores on the three language tests were positively correlated with one another, which prove the association among vocabulary breadth/size, depth/quality of vocabulary knowledge, and reading comprehension. That is, the wider and the deeper one's vocabulary knowledge is the better reading comprehension he or she has. Among the inter-correlations of the three tests, it is intriguing that the correlation was the highest between the scores on the VLT and WAT (r=.919). It revealed that the two variables, vocabulary breadth/size and depth/quality of vocabulary knowledge, were themselves highly correlated. The high correlation shown in this study (r =.919) may be lead to suppose that the development of breadth/size and depth/quality of vocabulary knowledge is closely interrelated and may even be interdependent. This appears plausible, for one would not normally have vocabulary breadth/size knowledge without also acquiring some depth/quality knowledge.

4.3. Correlation among variables and Predicting Reading Comprehension

Ho3: *The breadth/size of vocabulary knowledge does not predict reading comprehension performance more powerfully than the depth/quality of vocabulary knowledge*.

Multiple regression analysis was administrated in this phase to predict reading comprehension performance from, on the one hand, vocabulary breadth/size, and on the other hand, depth/quality of vocabulary knowledge. To determine the more powerful predictors of reading comprehension, scores on the VLT and WAT were taken as the predictor (or independent) variables and score on the IELTS as the criterion (or dependent) variable. Table 4.3., summarizes the findings of the forward method of multiple regression analysis. The column labeled R^2 indicates the proportion of the total variance in the criterion variable (IELTS in this case) accounted for by the predictor variables (the VLT and WAT in this case), and R^2 is an estimate of the population value. Adjusted R^2 value, however, is developed for the model to better fit the population (compensating for the optimistic bias of R^2 value) and is of concern for models with more than one predictor. Reporting both the R^2 and the adjusted R^2 is important when there are numbers of predictors and a small sample size (Green, Salkind, & Akey, 1997). R Square change, the difference between an R Square value for the predicting predictor and an R Square value for the predictor being entered, is the highlight of the regression analysis, indicating the dimensions of the contribution of a variable at the point where it is entered into the regression equation.

Table 4.3. Multiple Regression Analysis using score on IELTS as Criterion Variable and scores on the VLT and WAT as Predictor Variables

Model	R	R^2	Adjusted R^2	Change Statistic
				R Square Change
1	.834[a]	.696	.695	.696
2	.861[b]	.741	.738	.044

a. Predictors: (Constant), VLT score

b. Predictors: (Constant), VLT score, WAT score

c. Dependent Variable: IELTS

The previous phase indicated that the predictor variable VLT has a stronger correlation with the criterion variable IELTS (r=.834, p<.01) than the predictor variable WAT (r=.684, p<.01). Therefore, the predictor variable VLT was chosen to be entered into the regression equation first.

As it is illustrated in Table 4.3., when VLT was entered into the equation, the R value was .834 and the R^2 value and the adjusted R^2 value were .696 and .695, respectively. VLT alone accounted for 69.6 %(R^2=.696) of the variance in the criterion variable IELTS. Also, VLT, as a predictor, explained a significant amount of the IELTS variability (F (1, 218) = 499.768, p<.05).As VLT remained in the equation, WAT was then added at the second step. At this point, the R value changed to .861, R^2 and Adjusted R^2 value also changed to .741 and .738 respectively. VLT and WAT jointly accounted for 74.1% (R^2=.741) of the variance in IELTS but the WAT measure did not predict significantly over and above the VLT measure (R^2 Change = .044, F (2, 217) = 309.824, p<.05). The entry of WAT at the second step contributed only an additional 4.4% (R^2 Change =.044) of the variance in IELTS. In other words, WAT did not explain a significant proportion of IELTS variance after controlling for the effect of VLT.

In the multiple regression analysis, the outcome suggested that breadth/size and depth/quality of vocabulary knowledge contributed significantly to the prediction of reading comprehension performance. When comparing the unique contribution they made, however, the analysis yielded results that the vocabulary breadth/size and depth/quality of vocabulary measure accounted significantly for 74.1% of the variance in reading comprehension performance, so it

turned out that vocabulary breadth/size is a more effective predictor of reading comprehension performance than depth/quality of vocabulary knowledge. This result runs against the original hypothesis; thus hypothesis 5 is rejected. Nevertheless, due to the stronger correlation with reading comprehension that vocabulary breadth/size shows in this study, this result does not seem surprising. The one that had a powerful association with reading comprehension (as shown in the correlation phase) would be the stronger predictor of reading comprehension performance.

5. Conclusion

Based on Nassaji (2004), depth/quality of vocabulary knowledge facilitates inferencing, therefore improving vocabulary acquisition through reading. What has to be stated is that the relationship among depth/quality of vocabulary knowledge and reading comprehension seem to have a lower relationship contrasted to breadth/size of vocabulary knowledge and reading comprehension. Conversely, depth/quality of vocabulary knowledge presented less predictive power than vocabulary breadth/size, while still contributed to conclusive reading. Hence, from the results mentioned above, it can be deduced that learners' low vocabulary depth/quality will lead to low reading comprehension performance as well.

All above mentioned findings suggested that the breadth/size of vocabulary knowledge was in a very high positive association with reading comprehension and also it appeared to be in a stronger relationship with reading comprehension than vocabulary depth/quality. To add to this, from the results in this study it could be inferred that the learners with a larger breadth/size of vocabulary appeared to have better performance on the vocabulary depth/quality test. With regard to this point, it may be assumed that knowing more vocabulary would allow learners to acquire more depth of vocabulary knowledge. Moreover, from the scores illustrated in Table 4.1 it can be concluded that the depth/quality of vocabulary knowledge contributed to perform well in reading comprehension, but still offered less predictive power than vocabulary breadth/size. This may have resulted from the way most Iranian EFL learners learned vocabulary when they first studied English; that is, to memorize vocabulary lists. Basically, in Iran EFL learners are encouraged and expected to strengthen and improve their breadth/size of vocabulary knowledge more than their vocabulary depth/quality. The pedagogical instruction in almost all English institutes in Iran is based on improving and focusing on meaning rather than form and structure; as a result, most Iranian EFL learners' vocabulary breadth/size is wider than their depth/quality of vocabulary knowledge.

The particularly robust link between vocabulary breadth/size and depth/quality in this study may have been resulted from the high language proficiency of the participants. Since they were mostly advanced English learners whose vocabulary knowledge was generally richer, the breadth/size and depth/quality of their vocabulary knowledge could interrelate with each other to a large extent. It may also be explained by the overlapping construct of the two measures. Despite the fact that WAT explores more and deeper aspects of vocabulary knowledge, the synonymy and polysemy that WAT attempts to measure is actually the basic word meaning that the VLT requires, and the knowledge of collocation have more or less correlation with knowledge of individual word meaning.

From the data illustrated in Table 4.3 it can be concluded that vocabulary breadth/size and depth/quality of vocabulary knowledge are both good predictors of reading comprehension in their own right, but neither of them is sufficient to account for the variance in reading comprehension when they co-exist. The finding that both vocabulary breadth/size and depth/quality of vocabulary knowledge were competing for the existing supply of the variance in reading comprehension, but that neither one made it to the significance level, is confirmed by the close interrelationship and interdependence between vocabulary breadth/size and depth/quality of vocabulary knowledge (as found in testing hypothesis 2). Theoretically, breadth/size and depth/quality of vocabulary knowledge may be discussed separately; but, apparently, in practice, they are actually inseparable and interrelated. Again, there is no denying that the role of vocabulary knowledge on reading comprehension is essential, but which aspect of vocabulary knowledge, breadth/size or depth/quality, plays a more crucial role on reading comprehension, remains in debate.

Given the results in the present study, however, it may be no longer meaningful for this population (i.e., adults EFL learners in Advanced level) to argue for which aspect of vocabulary knowledge is more important in that they are both useful predictors of reading comprehension. Instead, combining the two dimensions of vocabulary knowledge in vocabulary assessment may be more beneficial than keeping them apart. Nevertheless, the results might depend on language proficiency levels of the learners. That is, the result of the present study could be due to the strong relation of vocabulary breadth/size and depth/quality that the participants had. These Iranian EFL learners were in advanced level and might be different from those in lower levels.

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