Breadth or Depth: The Role of Vocabulary Knowledge in Iranian EAP Students' Reading Comprehension Performance

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Abstract

Two main features of vocabulary knowledge, namely breadth and depth, have a fundamental role in vocabulary research. This research aimed to study the relationship between vocabulary knowledge and reading comprehension, and to investigate which feature of vocabulary knowledge, breadth or depth, had better impact on identifying reading comprehension performance. Therefore, three language tests were used, including a reading comprehension test, Vocabulary Levels Test, and Word Associates Test. 64 students majoring in Medicine at Ferdowsi University of Mashhad, Iran, participated in the study. The outcomes of the two-tailed Pearson Correlations and multiple regression analyses declared that test results on vocabulary breadth, depth of vocabulary knowledge, and reading comprehension were positively correlated and breadth and depth of vocabulary knowledge were closely interrelated.

Keywords: vocabulary breadth, depth of vocabulary knowledge, reading comprehension

Introduction

Vocabulary knowledge is recognized to have a direct relationship with reading ability. Anderson and Freebody (1981, cited in Nagy & Scott, 2006) note that "instrumentalist hypothesis" supposes a direct relationship between vocabulary knowledge and reading comprehension. Furthermore, Nation and Coady (1988, cited in Cummins 2002) sum up the relationship between vocabulary knowledge and reading by stating that, in general, research emphasizes the significance of vocabulary knowledge for reading and the significance of reading for learning vocabulary items. Analyzing research on the relationship between vocabulary and reading, they also identify that the number of difficult words has always been indicated to be the most important predictor of readability.

The notion of word difficulty has been recognized in different studies. Speaking of first language acquisition, McMurray (2007) recognizes sound pattern, being abstract/concrete, part of speech as well as frequency of occurrence as some the factors affecting word difficulty. Reviewing L2 vocabulary learning, Nation (1982) detects that the aspects which affect the difficulty or complexity of lexical items are pronouncability, part of speech, similarity to L1 words, the learner's proficiency level, and the kind of test used to study the learners' vocabulary knowledge. Laufer (1997) also notes that aspects such as orthography, inflectional complexity, similarity to L1 words and idiomaticity are among the components which can make words hard or easy to learn.

Looking at the issue from various points of view, Lewis (1993, cited in McDonough & Shaw, 2003) highlights the significance of teaching prepositions, modal verbs and de-lexical verbs as part of the vocabulary development for reading. In addition, through teaching collocations and motivating foreign language learners to work with dictionaries, Ur (1996) seeks to examine how collocations can be used for improving reading skills.

The significance of vocabulary knowledge is also recognized in the field of teaching English for Academic Purposes (EAP) as well as English for Specific Purposes (ESP). Qian (1999, 2000) has illustrated that university students require knowing a core vocabulary large enough to help them to read and understand English texts in their corresponding fields. There has

also been an extensive study on the need for EAP courses, which make reference to the insufficiency of vocabulary knowledge among undergraduate students in Hong Kong's largest English-Medium university (Evans & Green, 2007). This arises from the fact that words more often used in academic texts are difficult for learners (Cohen et al., 1988 cited in Coxhead, 2000) because in general most students are less familiar with such words than with technical vocabulary in their own fields. The reason for this issue is that academic lexical items take place with lower frequency than general-service words do (Worthington & Nation, 1996; Xue & Nation, 1984). It can, thus, be assumed that words of relatively higher frequency in academic texts can be defined as an independent group, and can be referred to as 'academic words'.

The importance of vocabulary knowledge and its role in promoting reading comprehension in general, and reading EAP/ESP texts in specific, has indicated a number of researchers to organize vocabulary lists for pedagogic aims. The earliest instance is the General Service List of English Words (West, 1953), which is a group of 2,000 headwords each demonstrating a word family. Xue and Nation (1984) compiled the University Word List (UWL), consisting of 836 words, not contained in the 2,000 words of the General Service List, but common in academic texts. According to Nation (1990), the words on this list account for 8% of the words in a typical academic text.

The most recent attempt to compile a list of words with mostly academic use is The Academic Word List developed by Coxhead (2000). The list consists of 570 word families not included in the most frequent 2000 words of English. The main idea for compilation of the list, according to Coxhead, is to use it as a basis for making sound decisions regarding the selection of vocabulary items worth focusing on during class time as well as independent study activities.

Nation (2001) noted that breadth or size of vocabulary knowledge is the number of words that language learners recognize. One of the measures generally used to investigate the size of vocabulary knowledge is Vocabulary Levels Test (VLT) which has a matching format (Nassaji, 2004). It contains various word-frequency levels ranging from high frequency (2000-word level) to low-frequency words (10,000-word level).

This test has become extensively used as a vocabulary assessment for L2 learners, and has been taken by a number of researchers (e.g., Laufer & Paribakht, 1998; Qian, 1999, 2002) as a suitable measure of vocabulary size.

According to Akbarian (2010), "depth of vocabulary knowledge refers to how well the language learner knows a word" (p. 392). Various kinds of knowledge combined with a word have been identified such as knowledge of pronunciation, spelling, stylistic features, collocational meanings, antonymy, synonymy, and hyponymy (Nation, 1990; Read, 2000; Richards, 1976). Word Associates Test (WAT) promoted by Read (1993, 2000) is a usually used measure, evaluating some of these factors. In this test, based on Read (2004, p. 221), the target word and associates have three basic relationships: "paradigmatic (synonyms), syntagmatic (collocates) and analytic (words representing a key element of the meaning of the target word)". Since these factors are significant, they emerge regularly in the discussions of vocabulary knowledge (e.g., Nation, 1990, 2001; Qian, 2002; Read, 1993, 2000).

There have been some researches based on the relationship between breadth and depth of vocabulary knowledge. Schmitt and Meara (1997) found that correlations between vocabulary breadth and WAT (as a depth test) were relatively high (.61 for receptive knowledge and .62 for productive knowledge). In another study, Nurweni and Read (1999) noted that the correlation between the scores on the tests of breadth and depth of vocabulary knowledge was .62 and the relationship became even stronger (r =.81) with high-proficiency students. According to Nurweni and Read (1999), Akbarian (2010) found that VLT (breadth test) and WAT (depth test) had a great deal of common shared variance for Iranian ESP graduate students ($R2$= .746). There is also some practical evidence advocating the effect of vocabulary breadth and depth on reading comprehension. In Laufer's (1992) study, high correlations between vocabulary breadth and reading comprehension were demonstrated. Laufer (1992) stated that the scores on reading comprehension correlated with both scores on the VLT (r = .50) and those on the EVST (Eurocentres Vocabulary Size Test) (r = .75). Laufer (1992) concluded that vocabulary breadth is a good sign of reading comprehension. De Bot et al. (1997) further revealed that various aspects of

vocabulary knowledge, like word morphology and word associations are closely related to reading comprehension processes. Qian (1999, 2002) examined the relations among vocabulary breadth, depth of vocabulary knowledge, and reading comprehension across Chinese and Korean readers. Qian (1999) found that scores on vocabulary breadth, depth of vocabulary knowledge, and reading comprehension were highly correlated, and that depth of vocabulary knowledge made a particular contribution to the prediction of learners' reading comprehension performance. Later, Qian (2002) organized a similar study with 217 participants from 19 different L1 backgrounds and gained the same consequences, supporting the significance of the role of both depth and breadth of vocabulary knowledge in reading comprehension. In addition, Huang (2006) found that breadth and depth of vocabulary knowledge and reading comprehension are positively correlated. However, Vermeer (2001) discussed that too little is known about the relationship between breadth and depth of word knowledge. Vermeer concluded that there might not be an abstract distinction between the two dimensions. According to the above-mentioned studies, more empirical evidence on the role of vocabulary knowledge in EAP students' reading comprehension performance is necessary. The general aim of this study was to discover the role of vocabulary knowledge in Iranian EAP university students' reading performance. In this study, the relationship between vocabulary breadth, depth of vocabulary knowledge, and reading comprehension was investigated.

Based on the purpose of this study, the following questions were addressed:

1. Is there any relationship between Iranian EAP learners' vocabulary breadth, depth and reading comprehension?
2. Which one of the two factors of vocabulary knowledge, that is, breadth or depth, contributes more to the reading comprehension performance?

Method

Participants

64 students majoring in medicine at Ferdowsi university of Mashhad, Iran, took part in this study (36 males and 28 females). The participants' age ranged from 18 to 21. The participants were chosen from two intact classes.

Instrumentation

The instruments used in the study contained three language tests, namely, a reading comprehension test, Vocabulary Levels Test, and Word Associates Test. The reading comprehension test for the this study was selected from the university of Michigan examination for the certificate of proficiency in English by Briggs et al. (1997). The test included two reading comprehension texts with the same readability level (12 on the Flesch-Kincaid Grade Level readability scale). Each passage was followed by ten multiple-choice questions. Therefore, there were 20 multiple-choice questions overall.

For determining the size of participants' vocabulary knowledge, the researcher used version 2 of VLT, improved and verified by Schmitt et al. (2001). It concluded 1000, 3000, 5000, and 10,000 word frequency levels. Each level of the test contained 30 aspects. Each part illustrates a different vocabulary level in English ranging from high-frequency to low-frequency words. Below, a VLT item is represented. The maximum possible score was 120, with one point for each item at the four levels.

1 business
2 clock _____ part of a house
3 horse _____ animal with four legs
4 pencil _____ something used for writing
5 show
6 wall

As it is demonstrated, the test takers matched each meaning to the suitable number of the correct word.

Depth of vocabulary knowledge was measured by Word Associates Test (WAT) which was originally developed by Read (1993, 2000). This test was approved to measure test-takers' depth of receptive English vocabulary

knowledge in terms of three components: synonymy, polysemy, and collocation. The test used in the present study was version 4.0 of the WAT. The split-half reliability of the test in the study by Qian (2002) was 0.89. The maximum possible score was 160 for the 40 items.WAT contains 40 items. In each item, there is a stimulus word at the top with four synonyms in the right box and four associates or collocations in the left box. The test takers were assumed to choose just four of the options as correct answers. The followings are sample items of this test.

Initial	top	crooked	punctual	Time	performance	beginning	speed
Careful	closed	first	proud	Condition	mind	plan	sister

Procedure

The three tests, the RC, VLT and WAT, were conducted to each participant in a single testing session. To remove the possibility of an order effect, the tests were carried out in a counterbalanced order. That is, each participant took the three tests in one of six different orders. The orders are as follows:

1. RC- VLT- WAT
2. RC- WAT- VLT
3. VLT- RC- WAT
4. VLT - WAT- RC
5. WAT- RC- VLT
6. WAT- VLT- RC D.

Results

To answer the posed research questions, a two-tailed Pearson correlation was accomplished on the scores, gained from the participants' performance on VLT, WAT and RCT. For determining the more powerful predictor of reading comprehension, multiple regression analyses were run by using software SPSS 17.0 to distinguish the relationship among the RCT, VLT, and WAT and to forecast the reading comprehension performance by the two independent variables (breadth and depth).

After the data collection procedure, the scores gained from the participants' performance on the three instruments were investigated statistically. Table 1 illustrates the related descriptive statistics.

Table 1
Descriptive statistics of the scores on RC, VLT, and WAT

Test	Maximum Score	Score Range	Mean Score	Standard Deviation
RC	17	7 (35%) - 17 (85%)	13.1 (65.75%)	2.89
VLT	105	55 (45%) - 105 (87.5%)	87.5 (73%)	8.45
WAT	132	97 (70%) -132 (94%)	113.3 (80%)	11.29

As is shown in Table 1, the mean scores of the participants' performance on VLT, WAT and RCT are respectively 87.56, 113.32 and13.15.

A two-tailed Pearson correlation analysis was carried out to find the answer to the first research question on the scores gained from VLT, WAT and RCT. Table 2 shows the results.

Table 2
Two-tailed Pearson correlation on the VLT, WAT and RCT scores

Test	RC	VLT	WAT
RC	—	.63**	.88**
VLT	.63**	—	.80**
WAT	.88**	.80**	—

As it is shown in Table 2, all variables are positively and significantly correlated to each other. The correlation between the RC and WAT (r =.88) is higher than that the one between the RC and VLT (r = .63); the correlation between the VLT and WAT is the highest (r = .80).

To answer the second research question, multiple regression analyses were carried out. To determine the more powerful predictor of reading comprehension, the scores on VLT and WAT were used as the independent variables and the scores on RC as the dependent variable. As is represented in Table 2, the independent variable WAT has a stronger correlation with the dependent variable RC (r = .88, p< .01) than the independent variable VLT (r = .63, p< .01). Thus, at first, the independent variable WAT was

entered into the regression comparison. The first part of Table 3 (labeled A) presents the outcomes where WAT was entered first into the equation, followed by VLT.

Table 3
Multiple Regression Analyses

Variables	R2	Adjusted R2
A:		
1- WAT	0.835*	0.832*
2- WAT, VLT	0.850	0.845
B:		
1- VLT	0.659*	0.653*
2- VLT, WAT	0.850	0.845

*p < .05

As is illustrated in Table 3, the contribution of both vocabulary breadth and depth to the success in reading comprehension is statistically significant. As it is clear, depth of vocabulary knowledge accounted for 83.5% (R2= 0.835) and size of vocabulary knowledge accounted for 65.9% (R2= 0.659) of the variance in reading comprehension performance of the participants of the study.

Discussion

Based on the results of this study, it was found that the scores gained from three tests, VLT, WAT and RCT were highly and positively correlated to each other. It should be mentioned that the correlation between depth and reading comprehension was higher than that of size and reading comprehension. That is , the wider EAP learners' vocabulary knowledge, the better they can deal with reading comprehension. Moreover, like earlier research conducted in the same area (Nurweni & Read, 1999; Qian, 2002; Akbarian, 2010; Farvardin&Koosha, 2011), the strongest correlation was found between size and depth of vocabulary knowledge. The high correlation illustrated in the study (r = .80) leads us to suppose that the breadth and depth of vocabulary knowledge is closely interrelated and could be even interdependent. It can be inferred that one would not normally have vocabulary size knowledge without acquiring some depth knowledge. In addition, the overlapping concept of the two measures may have an impact

on the results. Although WAT explores more and deeper facets of vocabulary knowledge, that is, the synonymy and polysemy, WAT actually tries to measure the basic word meaning that the VLT requires, and the knowledge of collocation is more or less affected by knowledge of individual word meaning.

Further results of the multiple regression analyses revealed that the size of vocabulary knowledge can be regarded as a predictor of EFL learners' reading comprehension success as well as the depth of vocabulary knowledge since both size and depth contributed significantly and positively to the prediction of reading comprehension. In other words, it can be stated that vocabulary depth is as important as vocabulary size.

In spite of the fact that both size and depth contribute to the success in reading comprehension, in this study it was revealed that depth of vocabulary knowledge contributed more to such success. This finding is contrary to what Akbarian, (2010), Farvardin and Koosha (2011) have found but it is in line with Qian's (2002) finding who reported that although the two dimensions of word knowledge had significant overlapping variance that contributed to the prediction of reading comprehension, depth had a stronger relationship to reading comprehension than size did.

This study tried to find the possible role of two dimensions of vocabulary knowledge, i.e., size and depth, in reading comprehension performance of EAP learners. Therefore, the scores acquired from three measures namely, VLT, WAT and RCT were investigated statistically. The results suggested that both breadth and depth are useful predictors of reading comprehension performance and even a combination of the two associates better with reading comprehension than either one alone. The findings may be applied to teaching new vocabulary and developing materials for Iranian EFL students. Also, the outcomes suggested that size, depth and reading comprehension are positively and significantly correlated to each other and both size and depth are of equal significance in Iranian EAP learners' success in reading comprehension performance and comparatively, depth correlated more strongly to the success of Iranian EAP learners' in reading comprehension performance than size of vocabulary knowledge.

The results may have some pedagogical implications for EAP practitioners as well as learners, and also material designers. Language teachers might find the outcomes of this study useful in that it prepares them with information about the importance of vocabulary size as well as depth in different language skills especially reading comprehension. Owing to the significant importance of vocabulary knowledge, language teachers should put more focus on their students' attempt to make their vocabulary knowledge wider and deeper. On the other hand, they can make their language learner aware of the fact that success in learning a language in part can be attained by mastering the vocabulary. As Schmitt (1990) suggested what language learners become conscious of, what they pay attention to, and what they notice, influence and in some ways determine the outcome of their learning. Moreover, it is hoped that material and syllabus designers develop appropriate materials with respect to the importance of different aspects of vocabulary knowledge and incorporate these aspects and dimensions of vocabulary knowledge in EAP materials to equip EAP language learners with sufficient reservoir of vocabulary.

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Biodata

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