

# The Relationship between Vocabulary Size and Reading Comprehension: A Case Study on Saudi High School EFL Learners

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## Abstract

Second language (L2) learners' vocabulary knowledge is crucial to their success in learning a L2 and is largely dependent on their vocabulary knowledge. Further, L2 students can only master a target L2 by developing effective reading, writing, listening, and speaking skills, which again, are all dependent on their vocabulary knowledge. Therefore, the current study investigates Saudi high school EFL learner's vocabulary size and its effect on reading comprehension. A sample (n=108) of Saudi high school EFL learners completed two research instruments: (i) the vocabulary size test (VST) [1] and (ii) an adapted reading comprehension test[2]. The results highlight that on average, Saudi EFL learners' vocabulary size was 2025 word families – this enabled them to understand up to 90% of written texts. Also, while vocabulary knowledge was a significant predictor of effective reading comprehension among these participants, the significance of vocabulary knowledge on reading comprehension is regulated by English proficiency. This paper provides useful insights for Saudi Arabian educational stakeholders to improve reading comprehension in L2 contexts in line with the United Nations Sustainable Development Goal Four (SDG-4): providing all students with highly motivated, well-supported, and well-qualified teachers to develop English-language skills via coherent inter-school curricula and continued access to qualified and experienced English-language teachers [3].

**Keywords:** Saudi (L2) learners; vocabulary knowledge; proficiency level.

## Introduction

In addition to knowing a particular word's form (e.g. spelling and conjugations in the case of verbs) vocabulary knowledge also includes understanding how a particular word fits into a given L2 more generally. For example, a study on vocabulary knowledge revealed that 'knowing' a word means much more than being able to recognize its definition and its lexical/logical connections with other words (in terms of meronymy, for example); 'knowing' a word also entails understanding how it is used in real-world lexical contexts [4]. Therefore, acquiring a comprehensive L2 lexicon is considered to be crucial for successfully learning a given second language. Indeed, the acquisition of receptive vocabulary (as opposed expressive vocabulary, defined next) is considered crucial for successfully learning an L2 [5-10]. Specifically, receptive vocabulary is defined as all the words that a learner knows in their particular target L2 while expressive vocabulary is defined as all the L2 words a learner can produce in spoken or written form [11]. Indeed, vocabulary knowledge and reading comprehension are closely linked as having a high level of lexical knowledge in a target L2 helps students to understand the gist and intricacies of written texts. Further, regular reading practice appears to help increase the size of learners' lexicons [11]. With this in mind, it seems logical that to be able to predict an L2 learner's success in reading comprehension, we need to measure the size of their lexicon consistently to discover what vocabulary size is required to enable them to comprehend L2 written texts successfully. Although several studies have addressed the linkages between reading comprehension and vocabulary knowledge, other studies report that L2 English language struggle with reading in English, and this is especially true for Saudi Arabian learners. This, in turn, affects Saudi L2 learners' potential to achieve academic success in English [12]. Thus, it is crucial to investigate the process by which Saudi Arabian students process meaning from reading academic texts in English, as their target L2. With this in mind, the present study investigates the effect of learner's English L2 vocabulary size on their reading comprehension achievement.

## Literature Review

### 2.1 Vocabulary Knowledge

The literature on vocabulary knowledge takes into consideration the intricate multidimensional nature of what it means to 'know' a word; for example, for one to be able to claim to 'know' a particular word, one must also have mastered the associated linguistic knowledge associated with it, such as morphology (prefixes, suffixes, conjugations), spelling (American/British English variations), and pronunciation [13-16] as well as its semantic and syntactic linkages to other words in terms of antonymy, hyponymy, meronymy, and collocation [17-19].

In the literature, [16]'s nine-stage categorization of word knowledge, which is comprised of the nine requirements that must be fulfilled for one to claim that one 'knows' a given word, is generally accepted to be the most comprehensive. This includes knowledge of the (i) spoken form, (ii) written form, (iii) parts that carry meaning, (iv) link between form and meaning, (v) concepts and relationships, (vi) associated vocabulary, (vii) grammatical functions, (viii) collocations, (ix) register and frequency. Therefore, the claim is that although one may claim to 'know' a word unless one can satisfy all nine of [16]'s requirements for vocabulary knowledge, one may only be considered to have partial knowledge of the vocabulary in question.

Relatedly, [20] posits that different aspects of vocabulary knowledge can be learned before others: specifically, one may acquire knowledge about a particular word's meaning and form before understanding its semantic and collocational links with other words.

### 2.2 Vocabulary Size and Reading Comprehension

The number of words learners know at a particular level of language acquisition is also known as the breadth of vocabulary knowledge. Turning again to [21]'s question 'how many words do L2 learners actually need to know to achieve successful reading comprehension?'; he claims that educated native English speakers know approximately 20,000 word-families (i.e. root words, inflected

forms, and repeated derivations). Further, [21] asserts that this number rises by 1000 word families for each year of life, and thus, this begs the question: Do L2 learners also need this sort of vocabulary size to attain success in reading in their L2? In answer, [22] claim that L2 learners only require knowledge of approximately 3000 high-frequency words as this amount provides them with understanding at least 95% of most texts.

This figure of 3000 word-families is lower than the number of words cited by most other research into L2 vocabulary size requirements for effective reading comprehension, which tends to agree that knowledge of 5000 word-families is sufficient to understand authentic reading texts. However, even at this level of vocabulary knowledge, compared to a native speaker, an L2 learner with knowledge of 5000 word-families will inevitably come across unfamiliar words, although they should be able to deduce the meanings of such words from the context provided by the surrounding words, sentences, and paragraphs. This means that although their working knowledge of an L2 may only encompass a limited number of words, these words are likely to be high-frequency words and so these will help the reader to understand the meanings of the unfamiliar words they encounter.

### 2.3 Previous Studies on Vocabulary Knowledge and Reading Comprehension

In both L1 and L2 contexts, it has long been established that vocabulary learning is perhaps the most crucial factor in language acquisition [7,23]. Specifically, a reader's ability to effectively extract meaning from written text based on the reader's lexicon is undeniably linked to their success in reading comprehension [24-25]. Indeed, as [26] point out, effective reading comprehension is impossible if a reader does not have a working knowledge of the vocabulary used in a written text because they are simply unable to process the meanings contained within it. In light of this, the previous literature on vocabulary knowledge and its impact on reading comprehension suggests that providing both L1 and L2 readers with explicit instructions to enhance and build their working vocabulary via improving word-recognition and lexical-access skills is strongly linked to improving reading comprehension ability [27]. Turning to an explicit focus on L2 learners, this group tend to be keenly aware of their deficiencies in vocabulary knowledge and how this limits their reading comprehension ability [28]. Indeed, the previous literature on the role of vocabulary knowledge on reading comprehension in both L1 and L2 contexts suggests that the best predictor of reading ability (i.e. reading comprehension) is the extent of the reader's vocabulary knowledge [12,29,19,30]. Past studies by [31-32] assert that we can measure the difficulty level of a particular reading passage for a given reader by assessing the amount of familiar and unfamiliar vocabulary it contains. In summary, the literature is clear that a strong correlation exists between vocabulary knowledge and reading comprehension ability in both L1 and L2 learners for text processing.

## Research Questions

The present study addresses the following research questions:

1. What is the approximate size of Saudi secondary school EFL learners' L2 English lexicon?
2. What are the linkages between vocabulary size and reading comprehension among Saudi Secondary school EFL learners?

## Materials and Methods

### 4.1 Research Design

The present study seeks to investigate how vocabulary size affects reading comprehension in Saudi EFL learners. This study's [www.psychologyandeducation](http://www.psychologyandeducation).

independent variable is vocabulary size while the dependent variable is reading comprehension. To investigate this relationship, this study adopted a correlational research approach to assess the linkages, consistency of any correlation(s), and predictive capability among the variables [33]. A correlation coefficient allows researchers to assess the degree to which a correlation can be proposed to exist between two variables. The degree of association between two variables (or sets of data) can be measured and described using a correlational research design [34]. This ensures that no manipulation of the data can occur as correlation statistics based on two or more scores is used as a crosschecking measure.

### 4.2 Participants

The present study samples Saudi Arabian public secondary school EFL students (n=108) who follow Saudi Arabia's Education Ministry's curriculum and testing procedures. Specifically, these participants do not use English as their regular L2 in daily life; rather, they are native L1 Arabic speakers study English as a compulsory academic subject they are required to pass to progress on to higher education at college or university.

### 4.3 Instruments

In general, past studies investigating vocabulary size and reading comprehension have relied on quantitative data collection from data from tests given to the participants. Therefore, this study used three main research instruments. First, the researcher assessed the participants' proficiency in English using their official school examination scores. Second, the VST [35] was used to quantify the extent of the participant's vocabulary. Third, a reading comprehension test developed by [2] was used to measure the participants' reading comprehension skills. This reading comprehension test is made up of two reading passages of varying difficulty. In summary, this study set out to measure (i) the participants' current level of English, (ii) the participants' vocabulary size, and (iii) their reading comprehension skills to examine any correlations that may exist among these variables. Both research instruments (the VST and the reading comprehension test) were subject to a pilot test with 10 student participants who did not form part of the main sample. This was to ensure that the researcher could assess the timings and clarity of instructions before performing the main testing and modify either one to ensure the main testing went smoothly. The pilot test proved successful and the researcher moved onto carrying out the main tests, as detailed in the next section.

#### 4.3.1 Vocabulary Size Test

The VST provided a quantitative measure of the participants' vocabulary size so that the scores could be collated and subjected to statistical data analysis. Originally, this test was designed to measure learners' receptive written vocabulary size in English to estimate whether the learner has sufficient vocabulary knowledge to be able to perform a specific task such as reading a newspaper or reading a novel [1].

This test assesses the participants' knowledge of 14 specific word-families including both high-frequency and low-frequency words; specifically, these occur between the 1000-14000 word frequency levels. First, words occurring within the 1000-2000 word-frequency range are considered high-frequency words, those within the 3000-9000 range represent medium-frequency words, and those in the >10000 word-frequency list represent low-frequency words [1].

The word-family vocabulary size test is comprised of 10 questions designed to test the participants' knowledge of these items. In total, the questionnaire includes 14 word-families; this results in 140 questions (10 questions x 14 word-families). The participants were asked to read each question, each of which presents a different word and select the option that provides the closest definition of the word's meaning. For instance, the following example was taken from the 1000-word

frequency level.

- PUB: They went to the pub.
- A). A place where people drink and talk.
- B). A place that looks after money.
- C). A large building with many shops.
- D). A building for swimming.

The vocabulary size test questionnaire included the first four word-families (1000-4000 word frequency level (See Appendix C). This resulted in a total of 40 questions. In line with previous studies in this area [36-37], the present study employed only four word-families from the questionnaire for the reasons discussed next. Specifically, these were the 1000, 2000, 3000, and 4000 word-frequency levels. To explain the rationale for this, only four word-families were used first because of time constraints; the complete questionnaire takes on average 40 minutes and it was felt this was too long for the participants. Second, the previous research on reading comprehension and vocabulary size suggests that Saudi Arabian EFL students are unlikely to possess a vocabulary size of more than the 5000 word-frequency level [36-37]. The modified version of the VST used in the present study was validated by linguistic experts at the University (see Appendix D).

#### 4.3.2 Reading Comprehension Test

The reading comprehension test is comprised of two reading passages and a set of multiple-choice questions. The first passage, The Planet Mars, is 250 words long and the second text, The Mysterious Bermuda Triangle, is 385 words long (see Appendix B). Each passage is followed by six multiple-choice questions based on the reading text – a total of 12 questions in all. One point was given for each correct answer, giving a maximum score of 12 points.

These two reading passages are taken from material provided by [2] and were selected based on their appropriateness for the participants' current reading abilities. This was to ensure that the participants would be able to read and understand the passages to some extent. Also, the two reading passages' linguistic and textual information, as well as the vocabulary content frequency, are similar to the participants' current English EFL textbooks. It is hoped that this approach would enhance the reading test's content validity in terms of accurately measuring the participants' level of reading comprehension. To further ensure that the two reading passages and their associated questions would ensure content validity in terms of measuring the participants' level of reading comprehension, the tests were presented to the University's linguistic experts for approval.

#### 4.4 Data Collection and Analysis

Data collection proceeded in two stages: in stage one, the participants completed the VST; in stage two, the participants completed the two reading comprehension tests.

Stage One: In line with standard research practices when dealing with schools in Saudi Arabia, the school supervisors were contacted by the researcher to arrange a convenient time for the participants to complete the tests. The researcher introduced himself to the class and gave an explanation of the study and what was required of them in terms of completing the VST and reading comprehension test. Specifically, the participants were informed that the VST involved completing the associated questionnaire. Importantly, the participants were also informed that that should simply do their best on the test and that any responses or errors they made on the tests would not be used to assess them academically and that all responses were anonymous and would only be used for research purposes. Next, the participants told that they were to read the two reading comprehension texts and complete the respective multiple-choice questions. The researcher made it clear that if the students had any questions about the tests or reading passages they should ask for help.

Finally, the VSTs were collected and the students thanked for their participation.

Stage Two: The reading comprehension tests were distributed to the participants and they were told that to read each passage and select the correct answers with a tick in the correct box. The researcher reiterated that the tests would only be used for research purposes would be strictly confidential. On average, the participants took 50 minutes to complete both tests.

## Results

The current study investigates Saudi high school EFL learner's vocabulary size and its effect on reading comprehension. Saudi high school EFL learners' vocabulary size was calculated by totalling all the vocabulary size scores based on 40 items (i.e., four sections each with 10 items per section). The results (Table 1) show the minimum vocabulary size score was 1 and the maximum vocabulary size score was 30; the mean vocabulary size was  $M=12.60$  with a standard deviation of  $SD=5.04$ .

Table 1. Descriptive statistics related to vocabulary size

Minimum	Maximum	Mean	Std. Deviation
1	30	12.60	5.04

The vocabulary size scores were categorized into 'low' and 'high' using a cut-off point of 20 (the midpoint between 0-40). The frequency analysis results (Figure 1) show that the majority of participants (90%) had 'low' vocabulary size scores (<20) while only 10% achieved 'high' vocabulary size scores (>20).

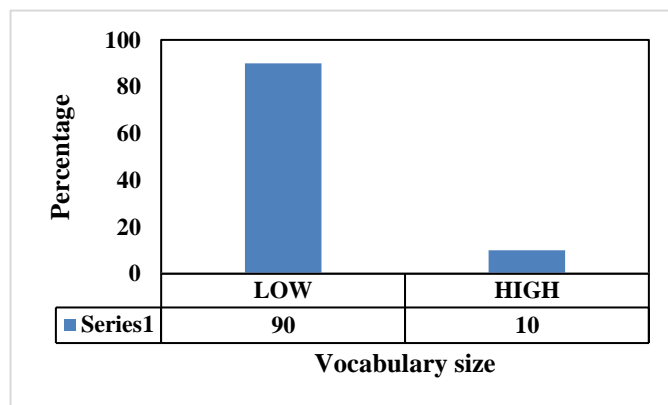


Figure 1. Vocabulary size percentages categorized into 'high' and 'low'.

An independent t-test was performed to compare participants' vocabulary sizes across the proficiency levels examined. The results show significant differences between the 'low' and 'high' vocabulary size proficiency levels ( $t=-5.161$ ,  $p<0.001$ ). Further, the results (Table 2) show the mean scores for vocabulary size at the 'low' proficiency level ( $M=10.315$ ,  $SD=4.365$ ) were significantly lower than vocabulary size at the 'high' proficiency level ( $M=13.913$ ,  $SD=4.952$ ).

Table 1. Comparison of vocabulary sizes across proficiency levels.

Profic. CAT	N	Mean	SD	t value	p-value
LOW	73	10.315	4.365	-5.161**	<0.001
HIGH	127	13.913	4.952		

\*\* Significant at 0.001 level

## Discussion

The present study investigated Saudi high school EFL learner's vocabulary size and its effect on their reading comprehension using a



sample (n=108) of Saudi high-school EFL learners in 2019/2020. The results underline that, on average, the Saudi EFL learners have a vocabulary size of 2025 word families, which was sufficient to allow them to comprehend +/- 90% of their required English texts. The results suggest that a significant relationship exists between vocabulary size and reading comprehension. This finding concurs with other studies in this area [37-38] as the results suggest that a significant correlation exists between vocabulary size and reading comprehension: namely, that vocabulary knowledge is a significant predictor of success in reading comprehension. That said, the results also suggest that vocabulary knowledge is regulated by English proficiency.

In summary, the findings indicate that while vocabulary knowledge significantly predicted effective reading comprehension among the Saudi high-school participants, ultimately, the impact of vocabulary knowledge on this cohort's reading comprehension is regulated by their English proficiency.

## Conclusion

In conclusion, the present study's results suggest that while vocabulary knowledge is a significant predictor of success in reading comprehension, vocabulary knowledge is regulated by English proficiency. It is hoped that these findings will provide useful insights for Saudi Arabian educational stakeholders to improve reading comprehension in L2 contexts. Also, the present study recommends that English-language educators emphasise vocabulary teaching and applying innovative pedagogical strategies so that L2 students can acquire new L2 vocabulary and academic vocabulary in particular, which is relevant to their current or intended studies. Finally, the researcher asserts that it is especially important to promote sustainable language learning to develop more continuous pathways for students to develop their English-language skills by establishing coherent inter-school curricula and providing continued access to qualified and experienced English-language teachers.

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