



## Relationship Between Vocabulary Size and TOEIC Reading Achievement Among Undergraduate Students

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### Abstract

**Background and Aim:** This study investigated the potential correlation between vocabulary knowledge, as measured by the updated Vocabulary Levels Test (Webb, Sasao & Ballance, 2017), and performance across three distinct sections of the TOEIC reading part—namely, incomplete sentence, text completion, and reading comprehension.

**Materials and Methods:** A total of 88 undergraduate students participated in the study, and their scores underwent analysis through Pearson Correlation and Standard Multiple Regression tests.

**Results:** The findings indicated a significant correlation between performance in two TOEIC test components (incomplete sentence and reading comprehension) and overall proficiency as measured by the updated Vocabulary Levels Test.

**Conclusion:** Based on the findings, the vocabulary knowledge assessed by the updated Vocabulary Levels Test serves as a robust and meaningful predictor for incomplete sentence and reading comprehension types in the TOEIC test.

**Keywords:** Vocabulary Size; TOEIC Reading Item Types; Reading Achievement

### Introduction

In the era of globalization, the English language plays a pivotal role in global society, serving as a lingua franca for communication among individuals with diverse first languages. Notably, English holds the official status of a working language within the Association of Southeast Asian Nations (ASEAN). In response to this, English is mandated as a compulsory subject in schools, colleges, and universities in Thailand and neighboring countries. Recognizing its global significance, in 2016 Thailand's Office of the Higher Education Commission adopted the CEFR framework and introduced new educational policies to the Thai education system (Council of Europe, 2001). Among these policies is the prerequisite for students to undergo an English proficiency test, either through university-prepared tests or established standardized exams like the Test of English for International Communication (TOEIC), before completing their academic journey. In essence, students must attain a specified English proficiency level—typically at least the B1 level of the CEFR — before graduating from university. However, achieving this requirement poses a considerable challenge, particularly for learners with lower proficiency levels in English as a foreign language.

Vocabulary assumes a pivotal role in language proficiency assessments, particularly in the domains of reading comprehension and assessment. Nation and Maera (2002) underscored a close correlation between one's vocabulary knowledge, gauged through standard vocabulary tests, and performance in reading, listening, and other formal assessments of English proficiency. About reading, previous studies indicate a critical threshold of vocabulary, typically ranging from 95-98% of running words in a text, essential for adequate comprehension in both listening and reading (Laufer, 1997; Nation, 1990). In simpler terms, a reader would need to comprehend at least 19 out of every 20 words to achieve a minimal understanding of the text. Qian (2002) and Laufer (1992a) claim that vocabulary size, as assessed by the Vocabulary Levels Test, serves as a significant predictor not only for academic success in general but also for effective reading. Estimates suggest minimal vocabulary sizes ranging from 5000 words for reading authentic texts (Laufer, 1997) to potentially up to 10,000 words for reading university textbooks (Hazenbergh & Hulstijn, 1996).

### Objectives of Research

- 1) To study the relationship between the vocabulary size of undergraduate students and the reading performance on various TOEIC reading item types.
- 2) To determine the extent to which vocabulary size can predict undergraduate students' reading performance on various TOEIC reading item types.

## Literature review

### Vocabulary size and reading comprehension

Numerous studies have explored the relationship between vocabulary knowledge and performance on English proficiency tests. Drawing from three criterion vocabulary lists—the British National Corpus High-Frequency Word List, the Standard Vocabulary List 12000, and Nations' 14K—Chujo and Oghigian (2009) asserted that a TOEIC test-taker should possess a minimum vocabulary size of 4,000 and 4,500 words to comprehend and excel in a TOEFL test. Hu and Nation (2000) proposed that, for unassisted text comprehension, the reader must know at least 98% of the words within the text; thus, in a sentence of 50 words, the reader must recognize at least 49 words to understand the text independently. Furthermore, Webb and Paribakht (2015) discovered that the requisite lexical coverage for certain English proficiency tests is based on texts with significantly diverse lexical profiles, encompassing proper nouns. They highlighted that distinct tests assessing proficiency in similar ways may exhibit differing lexical profiles. While previous findings regarding the correlation between vocabulary size and English proficiency have practical implications, these studies offer insights into specific mechanisms through which vocabulary size influences proficiency and raise considerations necessitating further research.

### Related Studies

In recent studies, the focus on vocabulary size underscores its crucial role in enhancing reading comprehension. Over a span of more than two decades, researchers have consistently demonstrated that assessments gauging the breadth of vocabulary knowledge can effectively forecast success in various areas, including reading, writing, overall proficiency, and academic accomplishment (Nation & Meara, 2002). According to Laufer (1992b), learners with vocabulary sizes of approximately 3,000 words are expected to exhibit strong reading abilities. Qian (1999) delved into the relationship between vocabulary size, depth of vocabulary knowledge, and reading comprehension among 74 Chinese and Korean learners of English, revealing significant inter-correlations among these variables. Similarly, Akbarian (2010) explored the connection between vocabulary size and depth for Iranian learners of English in specific academic contexts, finding a notably robust positive correlation coefficient between vocabulary size and depth. This implies that as learners expand their vocabulary size, their depth of vocabulary knowledge tends to increase. Furthermore, Laufer (1992a) scrutinized the link between vocabulary size and reading scores, uncovering significant correlations across all levels (less than 2000, 3000, 4000, and 5000 words) between vocabulary scores and comprehension scores.

Zhang and Anual (2008) investigated the influence of vocabulary knowledge on reading comprehension among secondary students in Singapore. Their study employed the Vocabulary Levels Test (VLT) to assess students' vocabulary knowledge, reading comprehension, and summary abilities. The results indicate a correlation between students' vocabulary knowledge at the 2000- and 3000-word levels and their performance in reading comprehension (short-answer questions), while no such correlation was observed in the summary test items. This aligns with the findings of Alavi and Akbarian (2012), who explored the relationship between vocabulary size, as measured by the Vocabulary Level Test (VLT), and performance across five types of reading comprehension items in the TOEFL exam (e.g., guessing vocabulary, main idea, inference, reference, and stated detail). Their results revealed that performance in only three TOEFL test items (guessing vocabulary, stated detail, and main idea) correlated with performance in the VLT. Notably, no correlation was identified for the low-level and middle-level groups. The study implies that the type of test items employed is influenced by vocabulary knowledge and proficiency levels. Building on these findings, it becomes evident that different task formats may yield varying effects on students' overall test outcomes, prompting the need for further exploration in future studies.

Schmitt et al. (2011) assert through empirical evidence that "there is a fairly straightforward linear relationship between growth in vocabulary knowledge for a text and comprehension of that text" (p.39). Laufer (1992a) examined the correlation between vocabulary scores (using VLT) and reading comprehension scores (assessed through multiple-choice questions), revealing correlations across all levels (2000, 3000, 4000, and 5000 words) of vocabulary knowledge. However, it appears that different reading comprehension test items tap into varying levels of vocabulary knowledge. A question arises from Zhang and Anual's (2008) study, which attributes low correlations or non-significant ones to task types, involving two specific task or item types. Additionally, Alavi and Akbarian (2012) found that performance in only three TOEFL test items (guessing vocabulary, stated detail, and guessing vocabulary) correlated with performance in VLT, with no correlation found with the other two types. Limited research has delved into the contribution of vocabulary size to specific reading comprehension item types, especially about tests like TOEIC that assess workplace English proficiency. Very little is known about how vocabulary size relates to micro levels of reading, sub-skills, and different aspects of

reading. Scholars in the field advocate for additional research incorporating diverse text types and coverage (Schmitt et al., 2011) to establish a more solid foundation for any conclusions. A fresh study, encompassing various reading tasks or item types, is particularly needed. Notably, no research has investigated the correlation between vocabulary size and different reading item types of the TOEIC test, which holds significance as a measure of workplace English proficiency often used by companies to assess real-world English skills. Higher scores on the TOEIC test frequently translate to increased employment opportunities and higher salaries for test takers (ETS, 2015).

## Conceptual Framework

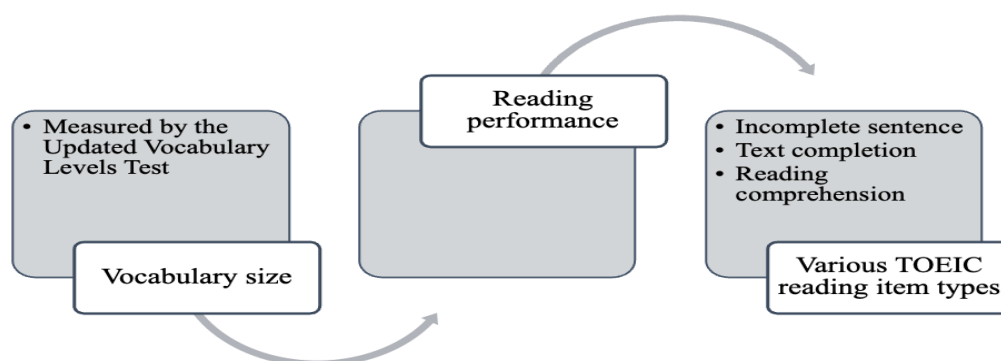


Figure 1 Conceptual framework of vocabulary knowledge

## Research Methodology

### Participants

The participants were 88 second-year undergraduate students majoring in English at one university in the northeast of Thailand during the second semester of the academic year 2022. These participants were selected using a purposive sampling method. The background information of the participants is outlined in Table 1 below.

Table 1 The background information of the participants

Gender	No. of participant	Proportion (%)
Male	10	11.36
Female	78	88.64
Total	88	100

As can be seen from Table 1, a total of 88 participants took part in the study. Of those 88 participants, 10 are male (11.36%) while 78 are female (88.64%).

### Materials

Two tests were administered: the updated Vocabulary Levels Test (VLT), developed by Webb, Sasao, and Ballance (2017), and the reading section in Barron's TOEIC Practice Exams.

### The updated Vocabulary Levels Test

The updated Vocabulary Levels Test, developed by Webb, Sasao, and Ballance in 2017, was selected for its practicality, ease of administration, and straightforward interpretation. It boasts a KR-20 reliability coefficient of 0.8, indicating high internal consistency. This revised version of the Vocabulary Levels Test assesses knowledge across five levels: 1000, 2000, 3000, 4000, and 5000 Word Level. At each level, there are 10 three-item clusters with three definitions on the left side and six words on the right side in the table (See Figure 1) and measure knowledge of proportions of nouns, verbs, and

adjectives (15, 9, and 6 items per level, respectively) (Webb, Sasao & Ballance, 2017). Therefore, several 30 words were tested at each level.

To master each level of the updated Vocabulary Levels Test, test takers need to obtain scores depending on some degree of the word level; at the 1000, 2000, and 3000 levels, a cutting point of 29/30, while at the 4000 and 5000 levels, the cutting point of 24/30 (Webb, Sasao & Ballance, 2017). Therefore, getting 29/30 words correct indicates a mastery at 1000, 2000, and 3000 levels, and getting 24/30 words correct indicates a mastery at 4000 and 5000 levels.

Participants must put a check (✓) under the word that goes with each meaning. Here is an example						
	game	island	mouth	movie	song	yard
land with water all around it						
part of your body used for eating and talking						
piece of music						

Webb, Sasao, Ballance (2017)

Figure 2 A sample of the updated Vocabulary Levels Test

### Barron's TOEIC Practice Exams

The TOEIC is a paper-and-pencil test designed to estimate the reading, listening, speaking, and writing skills needed in a workplace. When the TOEIC speaking and writing portions are taken together with the TOEIC listening and reading portions, the test can achieve an accurate measure of proficiency in all four English language skills. However, this study focused on reading part of the TOEIC. Three reading comprehension item types from Barron's TOEIC Practice Exams were selected for investigation, including: 1) incomplete sentence, 2) text completion, and 3) reading comprehension (e.g., single and double passages).

The Barron's TOEIC Practice Exams was chosen because, as a widely used high-stakes test, it has the same test construct as the actual TOEIC test as they are identical in terms of format and contents, it also assesses different item types in reading comprehension and it is easy to administer and score.

### Data collection

Data were collected in one session, during which participants were explicitly informed that all gathered information would be treated with strict confidentiality and utilized exclusively for research purposes before their engagement in the tests. To counterbalance and prevent ordering effects, the participants were divided into two groups as per the methodology suggested by Mackey and Gass (2016). Concurrently, participants in Group One underwent the updated Vocabulary Levels Test and the TOEIC test, while those in Group Two completed the TOEIC test followed by the updated Vocabulary Levels Test. The participants were given 30 minutes for the updated Vocabulary Levels Test and 75 minutes for the TOEIC test, which is the same test time (75 minutes for the reading section) as the actual TOEIC test administration.

### Data analysis

The data was analyzed using mean, standard deviation (SD), correlation analysis, and stepwise multiple regressions. The overall alpha significance level was preset at  $p < 0.05$  for statistical analyses.





## Results

The results are presented by research objectives: firstly, the relationship between the vocabulary size of undergraduate students and the reading performance on various TOEIC reading items t, and secondly, the predictive power of vocabulary size measured by the updated Vocabulary Levels Test (VLT) on students' reading performance on various TOEIC reading item types.

### Relationship between the updated VLT and the TOEIC reading items

After collecting the data, descriptive and interpretive statistics were used to analyze them. The type of correlation used in this study was Pearson product-moment correlation coefficient.

Regarding the overall performance of the participants on the updated VLT, the descriptive statistics provide a general profile of the data (See Table 2).

Table 2 Descriptive statistics for overall performance on the updated VLT and TOEIC reading items (N = 88).

	VLT	Total TOEIC Score	Incomplete sentence	Text completion	Reading comprehension
Mean	49.93	28.13	13.01	3.17	11.94
SD	(16.54)	(5.53)	(3.90)	(1.68)	(2.60)
MPS	150	100	40	12	48

Note: MPS = maximum possible score.

As depicted in Table 2, the participants achieved scores on the updated Vocabulary Levels Test (VLT) and the various sections of the TOEIC exam, including incomplete sentences, text completion, and reading comprehension. Specifically, the scores were 49.93 out of 150 for the updated VLT, 28.13 out of 100 for the total TOEIC score, 13.01 out of 40 for incomplete sentences, 3.17 out of 12 for text completion, and 11.94 out of 48 for reading comprehension.

Table 3 displays the correlation analyses and the effect sizes of the variables under the study. The relationship between the updated VLT and TOEIC reading item types was investigated using the Pearson product-moment correlation coefficient. There was a strong positive correlation between vocabulary size and total scores of TOEIC reading item types, with a correlation of about ( $r = .599$ ), at 0.01 level of significance. This result implies that the students who know a higher number of vocabulary items may do better in reading, or the students who perform better in reading know more vocabulary items.

In terms of each type of TOEIC reading section, the updated VLT, showed strong positive correlations with incomplete sentence type ( $r = .567$ ), at 0.01 level of significance. Furthermore, the updated VLT, also showed moderate positive correlations with reading comprehension type ( $r = .347$ ), at a 0.01 level of significance. However, the result showed the updated VLT showed no relation with text completion type ( $r = .121$ ).

Table 3 Correlations between the updated VLT and the TOEIC reading items.

		Total Score of TOEIC	Incomplete sentence	Text completion	Reading comprehension
Pearson correlation	VLT	.599**	.567**	.121	.347**

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

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

### The predictive power of the updated VLT on students' reading performance

To address the predictive power of the updated VLT, a standard multiple regression analysis was run to find out the predictor.

As shown in Table 4, the results of the regression analysis revealed that among three types of TOEIC reading items (i.e., incomplete sentence, text completion, and reading comprehension), vocabulary knowledge captured in the updated VLT is a good and significant predictor of incomplete

sentence type, with the largest beta value of (.499,  $P < .05$ ) and reading comprehension type, however, with a lesser degree of beta value of (.236,  $P < .05$ ). Therefore, it has been apparently that vocabulary knowledge contributes to the performance on incomplete sentence type and reading comprehension type in the TOEIC reading section. In other words, learners who receive high scores on the updated VLT tend to perform well in the TOEIC reading section in incomplete sentence type and reading comprehension type. However, the text completion type was not predicted significantly by vocabulary size.

Table 4 Standard multiple regression of the updated VLT and the TOEIC reading items.

Model	Unstandardized Coefficient		Standardized Coefficient	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.193	8.019		.273	.785
Incomplete sentence	2.120	.384	.499	5.518	.000
Text completion	.711	.869	.072	.818	.416
Reading comprehension	1.499	.573	.236	2.619	.010

a. Dependent Variable: the updated VLT

Note: \* $p < .05$ , \*\* $p < .001$ .

## Discussion and Conclusion

The study's findings reveal a robust, positive correlation between vocabulary size, as assessed by the updated Vocabulary Levels Test (VLT) and reading performance, aligning with similar outcomes reported in previous literature. Notably, Henriksen, Albrechtsen, and Hassstrup (2004) discovered a strong connection between vocabulary size and L2 reading tests, while emphasizing that success in reading is not solely dependent on students' vocabulary size; external factors such as lexical inferencing skills may also influence reading performance. These results corroborate the findings of other studies, including those by Alavi and Akbarian (2012), Qian (1999), and Zhang and Anual (2008), which identified a correlation between vocabulary knowledge and reading comprehension. Further support for our study's results is evident in Hu and Nation's (2000) examination of the relationship between text coverage and reading comprehension. Staehr (2008) conducted research involving 88 EFL learners, revealing a strong association between learners' receptive vocabulary size and their reading and writing skills. Staehr suggested that achieving a vocabulary level of 2000 words is a crucial goal for low-level EFL learners. Additionally, Li and Kirby's (2014) study suggested that the breadth of vocabulary significantly influences reading performance. Drawing implications from these findings, it is plausible to suggest that EFL teachers should expose students to a diverse range of vocabulary items to enhance their comprehension levels. Laufer (1992a) supports this notion, recommending that classrooms should aim to teach no fewer than 3,000 to 3,600 related vocabulary words, respectively.

This study yielded additional insights, revealing that within the three types of TOEIC reading items—namely, incomplete sentence, text completion, and reading comprehension—the vocabulary size derived from the updated Vocabulary Levels Test (VLT) serves as a robust and meaningful predictor for the incomplete sentence and reading comprehension types. However, it did not exhibit predictive power for the text completion type. This outcome aligns with the findings of Zhang and Anual (2008), who investigated the role of vocabulary knowledge in reading comprehension. Their results indicated a correlation between students' vocabulary knowledge at the 2000-word and 3000-word levels and their reading comprehension, particularly as measured by short-answer questions, but not by summary test items. This suggests that varying task formats can yield different effects on students' overall test outcomes. Similarly, Alavi and Akbarian (2012) discovered that vocabulary size is a strong predictor for reading tests in guessing vocabulary, stated detail, and main idea types, but not for inference and reference types. This implies that certain item types may tap into participants' depth of vocabulary knowledge and, consequently, may not strongly correlate with vocabulary size.



### Limitations of the study

This study confronted several limitations, primarily stemming from its focused scope. The primary goal was to confirm the correlation between vocabulary size and reading performance in TOEIC reading item types. However, for a more comprehensive understanding, future research endeavors should delve into the intricate relationship between vocabulary size and depth. Another constraint of the study is its emphasis on the reading section of TOEIC. Subsequent research should extend its investigation to encompass the relationship between vocabulary size and depth concerning performance across the listening, speaking, and writing sections of the TOEIC. Additionally, it's important to note that the present study did not establish the reliability of the updated Vocabulary Levels Test (VLT) and the TOEIC practice exam, indicating a need for further assessment in this regard.

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