

Are Different Types of Vocabulary Needed for Comprehending General and Academic Texts?

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This study examined the relationship between reading and vocabulary within general and academic context. Forty-seven Korean EFL university students who participated in this research were given a reading comprehension test of general and academic topics. Also, vocabulary tests were conducted to measure the students' size of vocabulary and their knowledge of general and academic words. The results revealed different findings for each type of vocabulary and reading. First, learners' size of vocabulary significantly predicted reading comprehension, but the predictive power of academic vocabulary was stronger than vocabulary size. Second, general reading comprehension showed a similar result with the overall reading comprehension score in that academic vocabulary made a stronger contribution than vocabulary size. Finally, a different result was found for academic reading comprehension, and students' size of vocabulary rather than academic vocabulary was the only significant predictor. The results indicate the different characteristics of general and academic reading, which implicates that each type of reading should be taught in a different manner.

Key words: reading comprehension, general and academic texts, academic reading, general and academic vocabulary, Korean EFL learner

1. INTRODUCTION

Among the many components that consist reading, vocabulary plays a crucial role in reading comprehension. Numerous studies have dealt with various aspects of both reading and vocabulary in an attempt to unearth the intimate relationship between the two skills (Hsueh-Chao & Nation, 2000; Laufer, 1992a; Verhoeven, 2000). An explanation for the strong relation is that if the learner's lexical coverage for the reading passage is high, it is more likely for the reader to understand the text adequately (Stæhr, 2008). Particularly for L2 learners, lexical knowledge was found to have a bigger role in

reading than L1 learners (Verhoeven, 2000). Hunt and Beglar (2005) also mentioned the importance of vocabulary for EFL students' reading comprehension and raised awareness to the frequent cases of EFL students not gaining a sufficient amount of vocabulary even after long periods of studying English. Unlike L1 learners, it is hard for learners in EFL environment to receive an adequate amount of input which is crucial for learning vocabulary and developing English proficiency. Considering the great importance of vocabulary knowledge for second language learners, a plethora of researchers have investigated the relationship between reading and vocabulary in ESL or EFL context (Grabe & Stoller, 1997; Ji & Shin, 2017; Min, 2008; Stæhr, 2008).

Due to the complicated construct of vocabulary knowledge, studies have focused on certain aspects of vocabulary to explore the relationship between reading and vocabulary in a more precise manner. For example, frequently focused types of knowledge are breadth and depth, and receptive and productive vocabulary (Li & Kirby, 2015; Shen, 2009; Waring, 1999). Another classification of vocabulary is by the frequency of words. Nation (2001) divided vocabulary into high, mid, and low frequency and specialized vocabulary. Because academic texts have a distinct usage of vocabulary, Nation (2001) categorized words that are frequently found in academic texts as a different type of vocabulary. Regarding specialized vocabulary, these words have a high coverage rate for academic texts and are therefore useful for EFL students who are studying English for academic purposes. Recognizing the distinct characteristic of academic vocabulary, several scholars have made lists for academic words for the convenience of learners (Browne, Culligan, & Phillips, 2014; Coxhead, 2000; Xue & Nation, 1984).

Not only vocabulary, but reading can also be narrowed down to general and academic reading. In Qian's (2002) study, the role of both size and depth of vocabulary for academic reading comprehension was investigated. The research concentrates on reading done in university level academic courses and found that both breadth and depth are closely associated with academic reading. In addition, Sutarsyah, Nation, and Kennedy (1994) conducted a study based on corpus linguistics to compile a vocabulary corpus for English in general academic texts and area specific academic texts. Although the fact that academic reading has a distinct characteristic from general reading has been accepted, there are not many studies that directly compare the differences between general and academic reading. In addition, there are many Korean EFL university students who are studying English for academic purposes, but the aspect of academic reading within Korean context has not been focused on.

Therefore, this study aims to investigate the relationship between reading and vocabulary, particularly in the aspects of general and academic purposed English learning within Korean EFL context. By examining the relation between reading and vocabulary, this study will be able to add a valuable finding to the body of studies

emphasizing the importance of vocabulary in reading comprehension. In addition, general and academic types of both reading and vocabulary were taken into consideration to disclose another important aspect that should be further studied in the relationship between reading and vocabulary. Through the results, further implications will be provided for EFL students, especially for those who study English for academic purposes.

2. REVIEW OF THE LITERATURE

2.1. Reading Comprehension and Vocabulary Knowledge

The intricate relation between reading and vocabulary has been well established by numerous studies (Hirsh & Nation, 1992; Laufer & Ravenhorst-Kalovski, 2010; Nation, 2006; Nation & Waring, 1997; Qian, 1999). Vocabulary has been repeatedly shown as a meaningful predictor for reading comprehension. According to Laufer and Ravenhorst-Kalovski (2010), vocabulary accounted for more than half of reading comprehension which once again confirms that vocabulary is a major factor for reading. The study also shows that as the students' vocabulary knowledge increased, their reading comprehension also improved even though the text coverage hardly changed. Qian (1999) also established a high correlation between both breadth and depth of vocabulary and reading comprehension in a study conducted on young adult ESL learners. To take this perspective on vocabulary one step further, without sufficient knowledge of vocabulary, the reading process of learners is severely limited. Hu and Nation (2000) points out that when learner's vocabulary knowledge is lower than 95% coverage, learners rarely gained adequate comprehension. Most learners who read accurately had at least 98% coverage of vocabulary.

Based on the fact that reading comprehension and vocabulary knowledge have a close relationship, many studies have focused on certain aspects of vocabulary due to the complicated structure and types of knowledge. For example, a plethora of studies has focused on the breadth or depth of vocabulary knowledge and its contributions to reading comprehension (Li & Kirby, 2015; Nassaji, 2006; Ouellette, 2006; Proctor, Silverman, Harring, & Montecillo, 2012; Shen, 2009). Among numerous studies, Ouellette (2006) focused on the narrow entities of vocabulary to reveal the complex relationship between different types of vocabulary with decoding, word recognition, and reading comprehension. Results indicated that each type of receptive and excessive vocabulary size and depth contributed differently to reading.

Unlike the size of vocabulary, the depth of vocabulary has a relatively complex

construct and can not be observed easily. As an attempt to accurately test vocabulary depth, Proctor et al. (2012) measured depth of vocabulary using three different tests of morphology, semantics, and syntactical properties of vocabulary. In addition, many studies have been conducted in Korean EFL context to examine the vocabulary construct of Korean students (Choi, 2013; Lee, 2015; Kang, Kang, & Park, 2012). In the study by Kang et al. (2012), vocabulary depth made a greater contribution to reading than the size of vocabulary regardless of the proficiency of the EFL learners. Choi (2013) also found that both variables were found to be significant predictors of reading, but depth of vocabulary showed a stronger relation with reading than vocabulary size. Several studies have been conducted regarding the size and depth of vocabulary, and have reached a consensus that regardless of size or depth, the increase of vocabulary knowledge positively facilitates reading comprehension (Harkio & Pietilä, 2016; Kang et al., 2012; Nassaji, 2006).

Another construct of vocabulary knowledge that has been frequently dealt with is receptive and productive vocabulary. Studies have shown distinct differences between receptive and productive vocabulary knowledge (Laufer, 1998; Mondria & Wiersma, 2004; Waring, 1999; Webb, 2008). Laufer (1998) further distinguished productive vocabulary into controlled active and free active vocabulary and found that free active vocabulary did not correlate with the other two types of vocabulary. On the other hand, in Webb's (2008) study, receptive and productive vocabulary knowledge was measured as full knowledge and partial knowledge. The result that learner's receptive knowledge is bigger than productive knowledge corresponded to previously conducted studies. For partial knowledge of students, the discrepancy between receptive and productive knowledge decreased as they were tested for lower frequency words. However, when full knowledge was tested, Webb (2008) found that the difference between receptive and productive vocabulary increased as the frequency of the words decreased. Further research on receptive and productive vocabulary in academic texts was conducted and showed consistent results to other studies that receptive academic knowledge surpasses productive academic knowledge (Zhou, 2010). In Korean EFL context, various studies have also been carried out to investigate the receptive and productive knowledge of vocabulary of Korean students (Makarchuk, 2013; Ryoo, 2009; Shin, Chon, & Kim, 2011; Won, 2005).

Most studies on vocabulary have investigated the characteristics of size and depth as well as the differences between receptive and productive vocabulary. Researchers have reached a consensus on these areas of vocabulary, and many studies have also been conducted in Korean context. However, only a few have examined different types of vocabulary in terms of the context in which the vocabulary is used. According to previous research reviewed above, different types of vocabulary each demonstrate a

discrete level of proficiency, as the amount of vocabulary knowledge of a particular vocabulary type varied within one subject. It is plausible that vocabulary within particular text types will also portray a different proficiency level. Therefore in the current study, the type of vocabulary according to the text in which the word is used was examined as well as the size of receptive vocabulary.

2.2. Vocabulary According to Text Type

Even though there is a clear distinction of vocabulary according to the text type in which the word is used, not many studies have explored the differences. Although not directly related to reading or vocabulary, Cummins' (1999, 2008) distinction of BICS and CALP for English proficiency points out the discrepancy between basic and academic English. As for vocabulary, Nation (2001) divided the entities of vocabulary according to frequency as well as the area of vocabulary such as specialized vocabulary frequently found in academic texts. According to frequency, vocabulary can be divided into high, mid, and low-frequency vocabulary. High-frequency vocabulary is used frequently regardless of text type which makes it the foundation of language use (Richards, 1974). Beginning level students are highly advised to learn these high-frequency vocabularies first as their coverage of vocabulary will increase greatly (Nation, 2001). Therefore, for the convenience of language learners, the most frequently used vocabularies in general text has been made into lists by several scholars (Brezina & Gablasova, 2015; Browne, 2014; West & West, 1953). The most widely used list is West and West's (1953) General Service List of English Words (GSL). But several studies have criticized that GSL has been outdated and raised the need for a new list of high-frequency words in general text (Gilner, 2011; Richards, 1974). In this study, Browne's (2014) New General Service List (NGSL) was utilized instead of the original GSL due to the fact that the NGSL is based on a more up-to-date corpus, and the coverage of NGSL for modern corpus surpasses that of West and West's (1953) GSL. By testing students with these lists of high-frequency words, teachers are able to decide whether students need to study these words further or move on to learning mid-frequency words (Shin'ichi, Yan, Jie, & Haiyan, 2015).

Nation (2001) mentions that especially for academic passages, certain types of texts contain words that are more frequent in that specific context than in general texts. Acknowledging this distinct characteristic of words used in academic texts, Xue and Nation (1984) developed the University Word List, followed by Coxhead's (2000) Academic Word List (AWL). Also, along with the NGSL, Browne et al. (2014) created a list of academic words based on a more contemporary corpus of academic texts named the New Academic Word List (NAWL). Based on these word lists derived from academic texts, several studies

have dealt with academic vocabulary in terms of the knowledge of academic vocabulary of students (El-Dakhs, 2015; Shin'ichi et al., 2015; Vongpumivitch, Huang, & Chang, 2009; Zhou, 2010). Vongpumivitch et al. (2009) investigated the coverage rate of Coxhead's (2000) AWL for journal articles of applied linguistics and reported that over 10% of the text was within the Academic Word List. This result supports the fact that words used in academic texts follow a different word usage pattern. In addition, Zhou (2010) compared receptive and productive knowledge of academic vocabulary in Chinese context, acknowledging the importance of academic words for college level studying. Another study by Shin'ichi et al. (2015) measured the vocabulary knowledge of Japanese university students with NGSL and NAWL. The research perceives the importance of assessing different types of vocabulary as it can provide diagnostic information to teachers. However, studies focusing on academic vocabulary have not been conducted yet in Korean EFL context, lacking the opportunity to demonstrate the pedagogical value of teaching academic English to Korean EFL students.

2.3. The Present Study

As reviewed above, there are many studies speculating the relationship between the depth and breadth, receptive and productive types of vocabulary and reading comprehension. But compared to these areas, there is a dearth of research on the different vocabulary types according to context. Especially in Korean EFL context, there is a lack of studies on measuring and investigating the differences between general and academic vocabulary knowledge. Moreover, there is a need to examine reading comprehension according to general and academic text type as well. This is due to the fact that the characteristic of reading for each text type should also be assumed to have discrepancies under the notion that vocabularies used in certain types of texts are different. Previous research on reading have dealt with particular genres such as fiction, non-fiction, narrative, and expository texts separately and have found that the different entities of reading do not necessarily show a consistent proficiency within one individual (Dole, Valencia, Greer, & Wardrop, 1991; Fitzgerald & Spiegel, 1983; Kidd & Castano, 2013; Rost, 1993; Wray & Lewis, 1997). It is predictable that reading comprehension for general and academic reading will show differences as well and therefore should be examined.

In the same manner, reading comprehension for general topic and academic topic texts should also be investigated independently. A few studies have looked into reading comprehension for academic texts but most of the studies focused on reading strategies (Hermida, 2009; Hijikata, Nakatani, & Shimizu, 2013). Aukerman (2007) conducted a study related to the need of schema for academic reading. However, there was no study that focused on students' knowledge of the vocabulary used in academic texts and its contribution to reading. Therefore, this study aimed to look into the relationship of

reading and vocabulary through the size of receptive vocabulary, as well as academic vocabulary knowledge and reading text types for students in Korean EFL environment by investigating the following research questions.

- 1) To what extent does the vocabulary size predict the overall reading comprehension of Korean EFL university students?
- 2) Between academic vocabulary knowledge and the overall size of vocabulary, which better predicts students' reading comprehension?
- 3) Does the role of vocabulary knowledge for reading comprehension differ according to text types?

3. METHOD

3.1. Participants

Forty-seven Korean EFL university students participated in the present study. Students were all English Language Education majors from three classes and the grade of the students varied from freshmen to seniors. The overall English proficiency of the participants ranged from intermediate to advance as all of the students' are majoring English Education. Among the forty-five students who reported their College Scholastic Aptitude Test (CSAT) English score, thirty-five students were within the 4% percentile. Except for the two students who did not report their CSAT results, the remaining ten students were within the 11% percentile. Also, the participants are expected to receive a fair amount of English input from their courses of English Education since more than half of their major courses are conducted in English. In addition, fourteen students had an experience of studying in an English speaking country or English mediated school. The majority of students had studied for an official English exam such as TOEFL, TOEIC or TEPS before, but only one participant had an experience of studying IELTS.

3.2. Procedure

Students first took a reading comprehension test of 20 items within a 25 minute time restriction. After the participants completed the reading comprehension test, they were given three online vocabulary tests. There was no time limit for the vocabulary tests since the test was intended to measure the size of vocabulary, not the fluency of vocabulary knowledge. The vocabulary test had a total of 200 items which were each scored as 1 point. The test was consisted of the Vocabulary Size Test (120 items), the

New General Service List of English Words Test (50 items), and the New Academic Word List Test (30 items). The vocabulary tests aimed to measure the participant's total vocabulary size as well as their knowledge for both general and academic vocabulary.

3.3. Measures

3.3.1. Reading comprehension test

A self-designed 20 item reading comprehension test was used to measure students' reading proficiency. The test consisted of two passages from IELTS which has two test types; General Training and Academic. The two different text types were utilized to measure students' reading comprehension for different text types separately. The reading passages were taken from IELTS to minimize familiarity effects since Korean university students tend to have previous experience of studying other official English tests such as TOEFL or TOEIC. The two texts were modified to shorten its length and reach an equivalent readability level. The average of the Flesch Kincaid Reading Ease, the Flesch Kincaid Grade Level, the Gunning FOG score, the SMOG index, the Coleman Liau index, and the Automated Readability index was used as the readability level of the text. The maximum score was 20 as a total of 20 items were scored equally as 1 point. There were 10 questions for each reading passage, including various question types such as factual, inferential, and main idea questions to assess the overall reading comprehension ability of the participant. For example, a factual question asked, '*According to the passage, all of the following are true EXCEPT*' or '*All of the following are true about "plants" in the third paragraph (fourth line) EXCEPT*', whereas an inferential question asked, '*All of the following can be inferred from the passage EXCEPT*' or '*According to the passage, which of the following can be inferred about uniforms?*'

Within IELTS reading, General Training measures the student's English proficiency in an everyday and practical context. The passage from General Training used in this study was about the role of uniforms. The length of the passage was shortened to 542 words due to a time restriction and was followed by 10 reading comprehension questions. The average readability grade level was 12, indicating that the passage would be appropriate for a native speaker of 17 to 18 years old. The modified passage was analyzed with AntWordProfiler (Anthony, 2017) to find out the construct and composition of the words within the passage. The New General Service List of English words (NGSL) and the New Academic Word List (NAWL) was utilized as a standard for analyzing the texts. Results showed that the NGSL coverage rate for the General passage was 90.8% which is a considerably high

percentage and 2.0% for NAWL. Because the passage was from a General Training test, the coverage rate of NAWL was relatively small compared to NGSL. The two lists of words covered 92.8% of the whole passage.

On the other hand, the Academic IELTS test measures English proficiency for academic texts. The second passage taken from the Academic test type was about the circadian rhythm and its importance. The modified text was 554 words long, followed by 10 reading comprehension questions. The average readability grade was 12, which is equivalent with the passage from General Training. However, the coverage rates of NGSL and NAWL for the two texts showed a difference. The NAWL coverage rate for the second passage was 7.4% which is more than three times the amount of the coverage rate for the General Training passage. However, the total coverage rate of NGSL and NAWL (91.4%) was similar to the previous passage. The higher rate of NAWL words showed the academic characteristic of the second text.

The original IELTS test recommends students to spend approximately 20 minutes for a 750-800 word passage with 14 questions. Considering that the length of both passages was shortened to about 550 words with only 10 questions, the participants were given a 25 minute time restriction to complete both reading passages. The reliability of the reading test was examined using the SPSS 22.0 and was found to be $\alpha = .67$. The relatively low reliability of the reading test may be due to the small number of items within the test.

3.3.2. Vocabulary Size Test (VST)

The Vocabulary Size Test developed by Nation and Beglar (2007) was utilized to measure the participants' breadth of vocabulary knowledge. VST provides an accurate and reliable measure of English L2 learners' written receptive vocabulary (Beglar, 2010). The Korean version of VST in which the answer choices are in Korean was used in the current study (Nation, 2017). The participants were given the target word with an example sentence and were to choose the correct meaning of the word among the four Korean answer choices. The original test items range from the first to fourteenth 1000 tier of English word families with 10 items from each tier to prevent frequency bias within the test. Considering that the level of the participants is intermediate to advance, the test was modified to start from the third tier of the word list. Therefore, among the 140 questions of the original VST, 120 questions starting from the third tier were used in this study. The VST was reported to show an adequate reliability (Beglar, 2010).

3.3.3. New General Service List (NGSL) of English Words test

The New General Service List of English Words was used to develop a test to measure

the participants' knowledge of general English words. NGSL consists of the most frequent and generally used English words. Instead of using West and West's (1953) General Service List of English words which have been criticized for its outdated and inaccurate coverage rate of the second 1000 word families (Read, 2009), the more recent and up-to-date word list, NGSL was used. NGSL is composed of 2800 lemmas and has an 87-94% coverage rate for general English. The NGSL test was developed in the same manner as the Vocabulary Size Test. Every n^{th} word of the NGSL was chosen for the test and an example sentence with answer choices was made for each word. Word selection began from the 1000th word in the list to take the participants' proficiency level into account. 50 questions consisting of the target word and example sentence with four Korean answer choices were given after the students finished the VST. The reliability of the NGSL test was above .90.

3.3.4. New Academic Word List (NAWL) test

To measure the participants' knowledge of academic vocabulary, the New Academic Word List was used. The NAWL is a list of words that are commonly used in academic texts. The 963 lemmas included in the NAWL are words that are not in the NGSL but are frequent within the academic corpus. In this manner, NGSL and NAWL are to work in conjunction as Coxhead's (2000) Academic Word List complements the General Service List. The NAWL test was developed in the same manner as the NGSLT by selecting every n^{th} word in the list and making answer choices in Korean. A total of 30 items were included in the NAWL test. The reliability of the NAWL test was above .90.

3.3.5. Questionnaire

After the participants completed the reading and vocabulary tests, they were asked to answer a short survey. The questionnaire included 14 questions related to the content of this study and their experience of learning English as a foreign language. Participants reported their experience of living abroad, studying for English exams, how much they read English or study vocabulary, and whether they encountered GSL or AWL before. The studying abroad variable was further used as a control variable.

4. RESULTS

In order to investigate the fundamental characteristics of the test results, the descriptive statistics of each variable was examined and are given in Table 1. To

begin with, the mean scores for the overall reading comprehension skills, general reading comprehension, and academic reading comprehension were 16.00 ($SD = 2.14$), 8.09 ($SD = 1.42$), and 7.91 ($SD = 1.26$) respectively and all of the three reading variables showed enough variance. As for the vocabulary tests, the mean scores for the vocabulary size test, NGSLT test, and the NAWL test were 104.32 ($SD = 6.47$), 48.55 ($SD = 1.11$), and 25.49 (2.50) respectively. The total score for each test varied as the VST had a total score of 120 whereas the total score of NGSLT and NAWLT were 50 and 30 each. Among the three vocabulary variables, VST and NAWLT demonstrated a sufficient variance whereas the NGSLT showed a relatively narrow variation. Also, the mean score of NGSLT (48.55) was very close to the total score of 50 for the test which indicates that the high proficiency among test takers might have resulted in a potential ceiling effect for the NGLST scores. This could be due to the fact that the majority of the subjects for this study had a high English proficiency. Because this variable was a likely candidate to be excluded from further analysis, preliminary analyses were conducted. The NGSLT variable turned out to be insignificant, and a ceiling effect was identified. Therefore, for further analyses, this variable was excluded. Contrary to the NGSLT, students did show a difference in knowledge for academic vocabulary even though most of the students were high proficiency English learners of an English Education major.

TABLE 1
Descriptive Statistics of VST, NCSL Test, and NAWL Test

Tests	<i>M</i>	<i>SD</i>	Min.	Max.
RC (Total)	16.00	2.14	10	19
RC (General)	8.09	1.42	3	10
RC (Academic)	7.91	1.26	5	10
VST	104.32	6.47	88	119
NGSLT	48.55	1.11	46	50
NAWLT	25.49	2.50	16	29

Note. RC = Reading comprehension

To find out the overall relationship among the variables in this study, correlations among five variables were run (Table 2). The correlation analyses showed that the total score for reading comprehension demonstrated relatively high correlations with other variables. The results indicate that the total score for reading comprehension demonstrated a significant relation with the overall vocabulary size ($r = .616, p < .01$) and academic vocabulary ($r = .599, p < .01$) of the subject. This means that students who possess a bigger vocabulary size or have more knowledge of academic vocabulary are likely to have better reading comprehension skills. As for general and

academic reading comprehension, both variables also portrayed a significant correlation with the two vocabulary variables. To be specific, general reading comprehension was significantly correlated to both vocabulary size and academic vocabulary knowledge ($r = .505, p < .01$; $r = .640, p < .01$ respectively). On the other hand, academic reading comprehension was also found to have a significant relationship with VST and NAWLT ($r = .476, p < .01$; $r = .295, p < .05$ respectively). Interestingly, the NAWL scores demonstrated a higher correlation with general reading than with academic reading. Also, students' overall size of vocabulary seems to have a significant relation with both general and academic reading scores. But results showed that the student's vocabulary size had the strongest relationship with their overall reading comprehension score rather than a particular type of reading. As for the correlations among the variables of reading and the variables of vocabulary, the relationship between general reading and academic reading was marginally significant ($r = .269, p < .10$), whereas the correlation between vocabulary size and academic vocabulary knowledge showed a significant relationship ($r = .339, p < .05$).

TABLE 2
Correlation Among Variables

Variables	1	2	3	4	5
1. RC (Total)	-				
2. RC (General)	.823**	-			
3. RC (Academic)	.768**	.269~	-		
4. VST	.616**	.505**	.476**	-	
5. NAWLT	.599**	.640**	.295*	.339*	-

Note. * $p < .05$ ** $p < .01$

As given in Table 3, the relationships between vocabulary knowledge and reading comprehension were further investigated by conducting hierarchical regression analyses in two stages where the sequence of the vocabulary variables alternated.

TABLE 3
Hierarchical Regression Analyses Predicting Total Reading Comprehension

Steps	Variables	R^2	ΔR^2	ΔF	sig.
1	Study Abroad	.173	.173	9.429	.004
2	VST	.457	.284	23.032	.000
3	NAWLT	.625	.168	19.266	.000
2	NAWLT	.489	.315	27.132	.000
3	VST	.625	.137	15.677	.000

The experience of studying abroad variable was entered in step 1 in order to control for the effects of studying in English speaking countries. This variable was found to significantly predict 17.3% of the variance in total reading comprehension ($\Delta F = 9.429, p < .01$). In step 2, vocabulary size was entered to see whether it is a significant predictor after a control variable. The size of vocabulary predicted an additional significant contribution of 28.4% for the variance in reading comprehension ($\Delta F = 23.032, p < .01$). Academic vocabulary knowledge was added in step 3 in order to investigate the predictive power of the variable after the studying abroad and vocabulary size factors were controlled for. The academic vocabulary test scores demonstrated a unique contribution of 16.8% ($\Delta F = 19.266, p < .01$) beyond the subject's experience of studying abroad and vocabulary size. Both vocabulary variables significantly explained the variance of students' overall reading comprehension.

To further explore the extent to which vocabulary variables play a predictive role in reading comprehension, a regression analysis was conducted once more. Knowledge of academic vocabulary was entered before size of vocabulary in order to see if vocabulary size is a significant predictor even after academic vocabulary knowledge was controlled for. Academic vocabulary knowledge added 31.5% of the variance in reading beyond students' experience of studying abroad ($\Delta F = 27.132, p < .01$). When vocabulary size was entered last in step 3, it accounted for a significant unique variance of 13.7% ($\Delta F = 15.677, p < .01$). That is, regardless of the sequence of entering, academic vocabulary knowledge and vocabulary size remained as a significantly unique predictor for reading comprehension.

The three variables entered in the analyses explained a total of 62.5% for the variance in total reading comprehension scores, and the vocabulary variables alone significantly contributed an additional 45.2%. The vocabulary size and academic vocabulary demonstrated a significant predictive power at the .001 level for the subjects' variation of overall reading proficiency regardless of sequence above and beyond the studying abroad factor. However, among the two variables, academic vocabulary showed a stronger explanatory power than vocabulary size as the F change of academic vocabulary was bigger when entered last. In addition, when controlling for each other, the two vocabulary variables showed unique contributions.

TABLE 4

Hierarchical Regression Analyses Predicting General Reading Comprehension					
Steps	Variables	R^2	ΔR^2	ΔF	sig.
1	Study Abroad	.066	.066	3.192	.081
2	VST	.275	.209	12.706	.001
3	NAWLT	.521	.246	22.038	.000
2	NAWLT	.448	.382	30.426	.000
3	VST	.521	.073	6.553	.014

Hierarchical regression analyses were conducted separately for general reading and academic reading to further investigate the relationship between reading comprehension and vocabulary knowledge. The results for general reading comprehension are given in Table 4. The studying abroad factor was entered as a control variable in step 1, but it was not found to have a significant predictive power for the variance in general reading comprehension ($\Delta F = 3.192$, $p = .081$). Vocabulary size and academic vocabulary knowledge were entered afterward, and both variables showed a significant contribution to the variance of general reading comprehension. To explain further, vocabulary size added a unique contribution of 20.9% when it was entered in step 2 ($\Delta F = 12.706$, $p < .001$), and in step 3, academic vocabulary knowledge accounted for an additional 20.9% ($\Delta F = 12.706$, $p < .001$) beyond the experience of studying abroad and size of vocabulary.

To find out whether vocabulary size demonstrates a significant explanatory power for general reading comprehension when entered after the academic vocabulary knowledge is controlled for, a hierarchical regression analysis was conducted once more. As the result illustrates, both variables consistently showed a unique predictive power for general reading comprehension beyond the control variable. The additional contribution of academic vocabulary was 38.2% when it was entered in step 2 ($\Delta F = 30.426$, $p < .001$). On the other hand, the unique predictive power of vocabulary size was 7.3% when the academic vocabulary variable was controlled ($\Delta F = 6.553$, $p < .05$). It is clear from the results that the knowledge of academic words has a stronger prediction power than the student's overall vocabulary size for the variance in general reading comprehension.

TABLE 5

Hierarchical Regression Analyses Predicting Academic Reading Comprehension

Steps	Variables	R^2	ΔR^2	ΔF	sig.
1	Study Abroad	.173	.173	9.412	.004
2	VST	.324	.151	9.818	.003
3	NAWLT	.342	.019	1.218	.276
2	NAWLT	.239	.066	3.787	.058
3	VST	.342	.104	6.798	.012

In Table 5, results of another set of hierarchical regression analyses for academic reading comprehension are given. Analyses were conducted in the same manner as in Table 4. Once again, the experience of studying abroad was entered first to investigate the unique contributions of the vocabulary variables beyond the effects of studying in an English speaking country. Unlike the results for the general reading comprehension, the control variable showed a significant and relatively strong predictive power for academic reading ($\Delta F = 9.412$, $p < .01$). When vocabulary size was entered after the studying

abroad factor was controlled for, it significantly contributed an additional 15.1% of the variance in academic reading ($\Delta F = 9.818, p < .01$). However, when academic vocabulary was entered in the last step, it failed to demonstrate a unique significant prediction ($\Delta F = 1.218, p = .276$).

A final set of hierarchical regression analysis was conducted to investigate the relative importance of the two vocabulary variables for academic reading comprehension. After the studying abroad factor was controlled for, the knowledge of academic vocabulary showed a marginally significant predictive power, adding 6.6% to the variance in academic reading when it was entered before vocabulary size ($\Delta F = 3.787, p = .058$). On the other hand, the subjects' size of vocabulary continued to account for a significantly unique role in the variance of academic reading comprehension, contributing 10.4% ($\Delta F = 6.798, p < .05$) beyond the control variable and academic vocabulary knowledge. It is interesting to see that the knowledge of academic vocabulary portrayed a bigger significantly unique role in predicting the variation of general reading comprehension than in academic reading comprehension.

5. DISCUSSION

The current study aimed to investigate the intricate relationship between reading and vocabulary knowledge according to the different types of texts and different contexts in which vocabularies are used. Among the various types of texts that have been previously dealt with, this study concentrated particularly on the different constructs and relationships between general and academic reading comprehension along with vocabulary. The results indicated that students' overall size of vocabulary had a significantly strong relationship with reading comprehension and played a significant unique role in predicting reading comprehension after controlling for the students' experience of studying abroad. As for the different variables of vocabulary which were examined, both size of vocabulary and knowledge of academic vocabulary were found to have a significant relationship with reading and demonstrated a strong explanatory power for reading comprehension. However, rather than vocabulary size, academic vocabulary served as a stronger predictor for reading. Also, the contributions of vocabulary differed according to the text type of the reading passage. That is, for general reading comprehension, academic vocabulary was found to have a stronger predictive power than vocabulary size, whereas, for academic reading, only vocabulary size was identified as a significant predictor. In sum, a strong relationship between vocabulary and reading was identified in line with previous research (Harkio & Pietilä, 2016; Li & Kirby, 2015; Sen & Kuleli, 2015), but the role of vocabulary knowledge in reading

showed a clear distinction when it was examined in a more specific distinction of general and academic reading.

The critical role of the overall vocabulary size for a university level EFL learner's reading comprehension was found once again, adding another study to the largely accumulated studies (August, Carlo, Dressler, & Snow, 2005; Freebody & Anderson, 1983; Henriksen, Albrechtsen, & Haastrup, 2004; Zhang & Anual, 2008). On the other hand, this study also found a noteworthy result regarding the different roles of vocabulary size and vocabulary knowledge of academic words for reading comprehension which is a relatively understudied area of vocabulary. Although both vocabulary variables were found to have a significantly unique role in reading, results indicated that the predictive power of academic vocabulary was greater than the role of vocabulary size for reading comprehension. One possible explanation for this result is that high proficiency EFL learners who have studied more academic words also have a tendency of studying more, resulting in a reciprocal improvement in reading. Another potential reason is that the size of vocabulary of higher proficiency learners has reached a sufficient level, leaving academic vocabulary knowledge as a more prominent predictor for reading. However, the reason behind this result is obscure due to the lack of information on the participants of this study. Whether academic vocabulary has a direct influence on reading comprehension should be investigated in further research. Yet, the fact that academic vocabulary had a greater contribution to reading comprehension than the overall size of vocabulary for high proficiency EFL learners is a noteworthy finding itself.

Regarding the role of vocabulary for comprehending different types of texts, the results demonstrated interesting results. That is, the knowledge of academic vocabulary showed a stronger predicting power for general reading comprehension than for academic reading. To be specific, academic vocabulary was found as a stronger predictor than vocabulary size for general reading comprehension, whereas academic vocabulary failed to show a significant contribution to academic reading comprehension. A probable reason for this result may be that academic reading requires more than having knowledge of academic vocabulary, while for general reading comprehension, knowing academic vocabulary itself may help students comprehend general topic passages. Given that previous research has shown the more powerful influence of content schema over formal schema on reading comprehension (Li, Wu, & Wang, 2007), it seems that students were unable to adequately comprehend academic passages even with academic vocabulary due to the lack of topic specific knowledge of the passage. In other words, students could not read academic passages with only Cognitive Academic Language Proficiency known as CALP (Cummins, 2008) to aid them, but they also needed schema to help their understanding of an unfamiliar topic. Aukerman (2007) postulates the

importance of helping students become familiar with the context of the reading passage, and emphasizes that there is much more to reading than having decontextualized knowledge of academic vocabulary.

The findings of this study should be understood with caution as most of the participants in this study were university students with a high proficiency. This distinctive characteristic of the participants ultimately resulted in a ceiling effect for the vocabulary test measuring high-frequency words. A deeper understanding could have been possible if there was a larger variation among students' language proficiency to find out the relation of vocabulary knowledge and reading including the knowledge of high-frequency vocabulary as a variable. In addition, the reading comprehension test utilized in this study was self-designed to meet the needs to measure student's comprehension of both general and academic topic texts with matching difficulty levels. Although the texts were controlled for its readability level and coverage rate of the NGSL and NAWL, the level of the vocabulary that was not covered by the word lists was not compared. However, as the readability level for each text was equivalent, the overall level of the texts was thought to be similar. As mentioned earlier, the reliability of the reading test was somewhat low, but this may be due to the small number of items of the test. Further research should be conducted on a wider proficiency range with a more reliable reading test to verify the results of the current study. Also, the results regarding the role of different types of vocabulary for reading were not able to be accurately explained due to the fact that only limited information of the participants was available. Nonetheless, this study succeeded in discovering the underlying difference between general and academic reading comprehension and its relation with vocabulary which used to remain as an understudied gap.

Overall, the current study holds several important implications for EFL learners and teachers who wish to develop their English skills to an academic level. Although most students already know that knowledge of vocabulary is a prerequisite to reach an adequate level of reading comprehension, there are only few who acknowledge the fact that reading general topic passages and academic texts should be dealt in a different manner. Therefore, teachers should inform students of the discrepancy between reading types to help learners develop English for academic purposes. Especially for those who teach EFL students that are studying university level texts in English like those in this study, the results from this study can serve as a guideline for teaching reading skills. That is, the overall size of vocabulary plays a significant role for general reading, but for academic reading, the fact that not only vocabulary but also specific knowledge on the topic area is needed should be kept in mind. To reach a deeper understanding of different types of texts and entities of vocabulary, further studies on various proficiency level learners encompassing various factors should be carried out.

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