Is it Vocabulary Breadth or Depth that Better Predict Korean EFL Learners’ Reading Comprehension?*

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This study examined whether vocabulary knowledge has meaningful effects on reading comprehension of Korean high school EFL learners and investigated which specific type of vocabulary knowledge, between vocabulary breadth and depth, plays a bigger role in reading comprehension when the learners’ English language proficiency is taken into account. The participants of this study were ninety eight high school EFL learners in Seoul, Korea, and they were tested on a series of measures tapping on their reading comprehension abilities and vocabulary knowledge in two different dimensions (vocabulary breadth and depth). Their listening comprehension abilities were also measured in order to control for the effects of general oral language comprehension abilities known to be the foremost contributor to reading comprehension and thus to enable focused analysis of the role of vocabulary knowledge. The study findings revealed that 1) vocabulary knowledge itself played a critical role in predicting reading comprehension abilities even after controlling for their listening comprehension abilities and that 2) compared to vocabulary breadth, vocabulary depth played a relatively more important role in predicting reading comprehension, regardless of the learners’ language proficiency. The findings provide important implications for vocabulary and reading comprehension instructions for Korean EFL students.

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I. INTRODUCTION

The complexities of reading process has been long established by now, and numerous subcomponents of reading comprehension, such as decoding skill, vocabulary knowledge, syntactic knowledge, and inferencing skills have been identified. Among these various components, however, vocabulary knowledge is especially crucial even from the beginning, as without it one cannot process and discern meanings of even simple sentences or clauses. In this sense, one’s vocabulary knowledge can be either a great help or impediment in reading. The National Reading Panel (2000) confirmed that the development of children’s reading comprehension was dependent on their vocabulary knowledge without which successful text comprehension was impeded. In fact, numerous researchers have agreed that one of the reasons for the fourth-grade slump, a well-known phenomenon that successful readers start struggling in reading comprehension when they become fourth-graders, was increasing demands of vocabulary in upper primary years (Freebody & Anderson, 1983; Kieffer & Lesaux, 2007; RAND Reading Study Group, 2002).

Vocabulary knowledge, however, with its imperative role in reading comprehension, is not a simple construct in and of itself, and researchers have focused on the two main foci of vocabulary knowledge: Vocabulary breadth and depth. Vocabulary breadth refers to the number of words one knows at the minimum level of meaning, while vocabulary depth refers to one’s knowledge about the word in various aspects (Qian, 1998). Both dimensions of vocabulary knowledge are critical in properly comprehending a text, since limited vocabulary size impedes proficient reading, while broad but superficial knowledge of word does not exactly take readers very far (Qian, 1999). Then, second/foreign language (L2) learners are at a tremendous disadvantage, considering that they usually have not developed much vocabulary knowledge before literacy instruction begins, unlike children beginning to learn to read in their native language (L1). That is, while L1 readers usually know 2500-5000 words at the onset of reading instructions through 5-6 years of exposure to the language prior to reading instruction (Nagy & Anderson, 1984), L2 learners usually have very little vocabulary knowledge to facilitate reading comprehension in L2, as vocabulary acquisition begins not long before literacy instruction, if not at the same time. Yet, studies exploring which specific type of vocabulary knowledge, between vocabulary breadth and depth, plays a bigger role in L2 learners’ reading comprehension have been rare. Such research will not only demonstrate how the two different aspects of vocabulary knowledge contribute to reading comprehension of L2 learners in similar or different ways compared to L1 readers, but also yield important teaching implications regarding what specific aspects of words teachers should focus on in enhancing L2 learners’ successful reading comprehension.
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Although Korean secondary school teachers have long acknowledged the important role of vocabulary knowledge in reading comprehension, vocabulary instruction has not been conducted sufficiently in actual classroom settings while more emphasis has been put on analyzing sentence structures and teaching grammatical knowledge in English reading classes (Kim, 2011). Despite much research attention to the role of vocabulary knowledge, in combination with other variables such as grammar (Jung, 2012) and syntactic knowledge (Shin & Kim, 2012), in explaining reading comprehension of Korean EFL learners, little has been done to investigate the potential differences in the effects of each specific vocabulary dimension or the independent role of general vocabulary knowledge in reading comprehension aside from the effects of other language or literacy skills. Thus, this study is designed to investigate the relative role different dimensions of vocabulary knowledge—breadth and depth—play in the reading comprehension of Korean EFL learners with various English proficiency levels. Findings from this study will provide valuable implications for both L2 reading and vocabulary instruction.

II. LITERATURE REVIEW

1. Vocabulary Knowledge and Reading Comprehension

Vocabulary knowledge has been identified as one of the major contributors to reading comprehension (Bauer & Arazi, 2011; Braze, Tabor, Shankweiler, & Mencl, 2007; Freebody & Anderson, 1983; Pae, Greenberg, & Williams, 2011; Proctor, August, Carlo, & Snow, 2005; Tannenbaum, Torgesen, & Wagner, 2006; Thorndike, 1917a/1971). For instance, in a six-year-longitudinal study of Dutch L1 learners, Verhoeven, van Leeuwe, and Vermeer (2011) found that the knowledge of basic vocabulary predicted reading comprehension among first and second graders, and for third graders and above, advanced vocabulary knowledge accounted for their reading comprehension. They also found that vocabulary knowledge was not only a predictor of reading comprehension, but had a reciprocal relationship with reading comprehension. To be specific, second graders’ basic vocabulary knowledge explained the reading comprehension of the same year, which, in turn, was identified as a predictor of advanced vocabulary knowledge of the following year. Moreover, the independent contribution of vocabulary knowledge to reading comprehension among different variables has been found in recent L1 studies (Braze et al., 2007; Cutting & Scarborough, 2006). Braze et al. (2007) demonstrated that receptive vocabulary knowledge of adolescents and young adults explained a unique variance in reading comprehension beyond the effects of two well-known predictors, oral language comprehension and decoding ability. On the other hand, there were others who have
suggested that vocabulary knowledge is not a distinctive component of reading comprehension (Sabatini, Sawaki, Shore, & Scarborough, 2010). Sabatini et al. (2010) reported that vocabulary knowledge was subsumed under the influence of decoding ability and listening comprehension ability in predicting reading comprehension of both native and non-native English-speaking adults with low literacy levels. However, they speculated that the discrepant finding may be due to the homogeneity of the participants’ reading comprehension ability, which warrants further studies with readers of diverse backgrounds and abilities for a firm conclusion regarding the role of vocabulary knowledge in reading comprehension.

As vocabulary knowledge plays a critical role in reading for L1 readers, it is also one of the biggest impediments for L2 readers who may not have sufficient vocabulary knowledge to aid their reading comprehension. Yet studies on L2 learners’ reading comprehension have shown that L2 vocabulary knowledge is correlated with L2 reading comprehension far more than L1 reading ability is (Carrell, 1991; Lee & Schallert, 1997; Schoonen, Hulstijn, & Boskers, 1998; Van Gelderen, Schoonen, & De Glopper, 2004). For example, Van Gelderen et al. (2004) revealed that among different variables including processing speed, vocabulary, grammar, and metacognitive knowledge in L1 (Dutch) and L2 (English), only L2 vocabulary knowledge accounted for significant unique variance in English reading ability beyond the effects of L1 reading abilities of Dutch secondary students. Considering that the role of L2 vocabulary knowledge was significant in L2 reading when L1 was linguistically close to L2, it is worth investigating whether the same pattern will be observed when L1 does not share such linguistic similarities with L2.

2. Vocabulary Breadth

In general, in investigating the relationship between vocabulary knowledge and reading comprehension, vocabulary knowledge has been usually estimated by vocabulary breadth, which is determined by the size of one’s receptive vocabulary knowledge. A large body of studies has demonstrated that one’s vocabulary breadth is a powerful predictor of reading comprehension ability (Beck & McKeown, 1991; Freebody & Anderson, 1983; Nation, 2001; Pasquarella, Gottardo, & Grant, 2012; Torgesen, Wagner, Rashotte, Burgess, & Hecht, 1997; Verhoeven & van Leeuwe, 2008). On the other hand, small vocabulary size may cause difficulties in reading comprehension (Beck, Perfetti, & McKeown, 1982; Perfetti, Landi, & Oakhill, 2005). Pasquarella et al. (2012), for example, investigated predictors of reading comprehension while comparing English native speakers with English language learners and revealed that vocabulary breadth was the only significant predictor of reading comprehension and decoding skill among English L1 learners.

Similar findings have been observed with L2 readers (Baleghizadeh & Golbin, 2010;
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Blachowicz & Fisher, 2006; Llach & Gallego, 2009; Pasquarella et al., 2012; Qian 1999; Staehr, 2008; Zhang & Anual, 2008). For example, Baleghizadeh and Golbin (2010) showed in their research with Iranian EFL university students that their vocabulary size measured by 3000 level words of Vocabulary Levels Test (Nation, 1990) was significantly correlated with their reading comprehension abilities. Similarly, a recent study by Staehr (2008) showed that students’ English vocabulary breadth not only had a strong correlation with English reading abilities of Danish EFL ninth graders, but it also predicted as much as 72% of the variation in reading comprehension of students who had obtained average or above average scores on the reading test. In the earlier mentioned research, Pasquarella et al. (2012) showed that both decoding skill and vocabulary breadth and the interaction between them were all strong predictors of reading comprehension of ESL learners from various language backgrounds. However, since their study included only beginning-level ESL learners, they were able to provide only a partial picture regarding the role of vocabulary breadth in reading comprehension of L2 learners, which explains the significant role decoding skill played in such adult readers. Thus, further studies with L2 learners with diverse language proficiency levels are called for.

3. Vocabulary Depth

Knowing a word involves much more than being able to notice it in context. When trying to comprehend a text, especially, one might need more than superficial knowledge of words. Such word knowledge distinct from vocabulary breadth is referred to as vocabulary depth. Vocabulary depth denotes knowledge about words that includes various features of words such as their spelling systems, pronunciations, syntactic and morphological features, and semantic relations (Hudson, 2007; Ordóñez, Carlo, Snow, & McLaughlin, 2002; Qian, 1999). Thus, vocabulary depth reflects accurate knowledge of words, and it has been identified as an important predictor of reading comprehension abilities (Muter, Hulme, Snowling, & Stevenson, 2004; Nation & Snowling, 1998, 2004; Ouellette & Beers, 2010; Roth, Speece, & Cooper, 2002; Tannenbaum et al., 2006).

Recent studies on the role of vocabulary depth focused on its two representative aspects: syntagmatic and paradigmatic sense relations. (Ordóñez, Carlo, Snow, & McLaughlin, 2002; Schewartz & Katiz, 2002). The syntagmatic sense relations involve the horizontal and descriptive aspects of word meanings within contexts. In other words, it refers to the way of defining words with associative and metaphoric information about them (e.g., “a desk is used for studying and reading”, or “I read a book on the desk”) (Ordóñez et al., 2002). On the contrary, the paradigmatic sense relations are highly interconnected with cognitive skills such as categorization and classification with super— or sub-ordinate terms (e.g., “a desk is furniture”) (Ordóñez et al., 2002). Hence, synonyms and antonyms of
words are part of the paradigmatic sense relations (Schewartz & Katiz, 2011). Studies have demonstrated that paradigmatic word knowledge relates to higher level of cognitive skills such as reading comprehension abilities more than syntagmatic sense relations do (Ordóñez et al., 2002; Schewartz & Katzir, 2011; Verhallen & Schoonen, 1998). Schwartz and Katzir (2012), for example, claimed that when children’s linguistic abilities develop, the dependence on syntagmatic sense relations in vocabulary knowledge shifts to paradigmatic sense relations. It can be also speculated that since paradigmatic sense relations develop in relatively later ages compared to syntagmatic sense relations, ongoing school instruction and accumulative academic word knowledge could be related to the increasing role of paradigmatic sense relations.

Researchers have shown the distinctive role of depth of vocabulary knowledge in reading comprehension. Overall, vocabulary depth is a strong predictor of reading comprehension (Kieffer & Lesaux, 2008; Nation & Snowling, 2004; Ouellette, 2006; Proctor, Silverman, Harring, & Montecillo, 2012; Proctor, Uccelli, Dalton, & Snow, 2009; Roth et al., 2002). Nation and Snowling (2004), for example, conducted research on the predictive role of vocabulary depth measured by a semantic task on the development of reading comprehension and showed that it made a statistically significant contribution to reading comprehension beyond nonverbal activity, non-word reading and phonological skills. Roth et al. (2002) similarly reported that first grade children’s reading comprehension was explained significantly by vocabulary depth measured by oral definition and word retrieval test in kindergarten. Furthermore, Ouellette (2006) demonstrated that fourth graders’ reading comprehension ability was predicted well by vocabulary depth even when the influence of receptive and expressive vocabulary breadth was controlled for.

On the contrary, there has been a relatively limited number of research attentions paid to the effects of vocabulary depth on the reading development with L2 learners (Kieffer & Lesaux, 2008; Proctor et al., 2009, 2012). For instance, Proctor et al. (2012) showed that vocabulary depth measured in three different aspects, including morphological awareness, syntactic knowledge and semantic knowledge was a prominent predictor of reading comprehension of Spanish-English bilingual children. Furthermore, the effects of vocabulary depth were stronger for bilingual students whose English language proficiency was relatively poorer, compared to English monolingual children. Important to note is that most previous studies with L2 learners involve those whose two languages are typologically close and thus share many cognates (i.e., Spanish English learners), for whom L1 vocabulary depth may have facilitated the same language skills in L2. Thus, in order to arrive at a full understanding regarding the role of vocabulary depth in reading comprehension, future studies with L2 learners dealing with two distant languages, such as Korean English learners, are in need.
4. Vocabulary Breadth vs. Depth

Not all the studies have concurred on the relative role of vocabulary breadth and depth in explaining reading comprehension. Kieffer and Lesaux (2008), for example, confirmed that vocabulary depth assessed by morphological awareness test was a much stronger contributor than vocabulary breadth and phonological awareness in predicting reading comprehension of fourth and fifth grade Spanish-speaking English language learners. The study by Tannenbaum et al. (2006) with third grade English-speaking monolingual children, on the other hand, examined the effects of vocabulary breadth and depth in relation to reading comprehension and found that vocabulary breadth was a stronger predictor than vocabulary depth or word reading fluency. Their measures of each dimension of vocabulary, however, were not without limitations in that much overlap was detected across the two measures. Similarly, Ouellette and Beers (2010) reported that when the relative role of vocabulary breadth and depth was compared, it was vocabulary breadth that explained reading ability beyond the effects of vocabulary depth among sixth graders, whereas neither vocabulary breadth nor depth was a significant predictor of reading comprehension abilities of the first graders after controlling for word reading and other literacy skills. It is worth noting that for both groups, word reading skills were significant predictor of their reading comprehension abilities. Considering that word reading skills usually play a significant role in reading comprehension of young children or language learners with relatively low language proficiency (Chaney, 1992, 1994; Goswami, 2001; Kang, 2012), it could be speculated that the reading and/or language abilities of the participants in Ouellette and Beers’ (2010) study might be lower than students in the same age group. Although no firm conclusion could be drawn, since they did not provide any information about the participants’ language or reading proficiency, the study findings certainly shed light on the need to consider language proficiency of the participants in discerning the potential relationship between vocabulary knowledge and reading comprehension abilities of L2 learners.

In sum, past studies have demonstrated that the two distinctive measures of vocabulary knowledge—vocabulary depth and breadth—facilitate reading comprehension, although there is not yet an agreement on the relative importance of the two types of vocabulary knowledge. The discrepancies regarding the relative weight each vocabulary dimension plays in reading comprehension seem to be dependent on the subjects’ language proficiency and/or reading abilities. Yet, there has not been much consideration for L2 learners’ language or reading abilities in investigating predictors of their reading comprehension abilities. Thus, further studies that take L2 learners’ language proficiency into account in examining the role of vocabulary knowledge in reading comprehension are called for. In addition, many previous studies tended to depend on similar tasks, such as
definition tasks, morphological awareness tests, and semantic judgment tasks, in assessing vocabulary depth. Limitations, however, have been noted for using such measures in assessing the role of vocabulary knowledge in reading comprehension. For example, defining words is done within one’s knowledge of given words, which means that it does not reflect receptive word knowledge as opposed to productive word knowledge. Moreover, since grammatical aspects of English have been steadily taught and emphasized in English education in Korea (Kim, 2011), morphological awareness test may not provide accurate information about one’s vocabulary depth. Thus, probing other aspects of vocabulary depth within the paradigmatic sense relations, such as synonyms, antonyms and analogies, seem more appropriate and necessary, especially for readers in upper grades whose cognitive abilities and L1 language and literacy skills have already matured and developed. Furthermore, as noted previously, since most past studies on the role of vocabulary knowledge in reading comprehension have focused on L2 learners whose L1 and L2 share similar orthographic systems and lexical features, such as Spanish-English and Dutch-Norwegian bilinguals, a paucity of study has examined L2 learners whose L1 and L2 are typologically distant, such as Korean-English learners.

Therefore, the current study aims to investigate the relative importance vocabulary breadth and depth play in Korean high school EFL learners’ reading comprehension while accounting for their language proficiency and focusing more on the paradigmatic sense relations within vocabulary depth to be more sensitive to their cognitive and linguistic abilities. More specifically, the present study attempts to answer the following questions:

1. Does vocabulary knowledge predict reading comprehension abilities of Korean high school EFL learners?

2. Between vocabulary breadth and depth, which is a better predictor of reading comprehension of Korean high school EFL learners? Does such relative role differ as a function of the learners’ English proficiency?

III. METHOD

1. Participants

A total of ninety eight students\(^1\) (63 1\(^{st}\) graders and 35 2\(^{nd}\) graders) from a girls’ high

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\(^1\) Not all participants took part in all tests. All ninety eight students participated in listening comprehension and vocabulary depth test, while ninety six students completed reading
school in Seoul participated in this study. Participants were recruited from three randomly selected classrooms, and every student in each classroom served as a participant in order to include students from diverse language proficiency levels. They had received 7.9 years of formal English education. For a more detailed analysis, the students were further grouped into three different groups based on their English language proficiency measured by their standardized scores on the PKSAT (Preliminary Korea Scholastic Aptitude Test). One-way ANOVA confirmed that there were significant differences in English proficiency across these three groups (see Table 1). The advanced students were within the top 26th percentile of the national mean, while the intermediate students were placed between 27th to 52nd percentile, and the beginning level students were within the bottom 53rd percentile of the national mean.

<table>
<thead>
<tr>
<th>TABLE 1</th>
</tr>
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<tbody>
<tr>
<td>Means and Standard Deviations of the Converted PKSAT Scores of Three Groups</td>
</tr>
<tr>
<td>Converted score of PKSAT</td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>Advanced</td>
</tr>
<tr>
<td>Intermediate</td>
</tr>
<tr>
<td>Beginning</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

2. Materials

1) English Reading Comprehension

As a measure of reading comprehension, the standardized Passage Comprehension subtest of the Woodcock Reading Mastery Test-Revised (WRMT-R: Woodcock, 1998) was administered. It is in the form of cloze test in which students are required to read passages and complete each blank with answers that best fit the meaning in context. For example, for a short passage, ...when this snow in your Nipigon country melts, the water flows to that river. The river ________ into the Great Lakes, the biggest lakes in the world, students were expected to fill in the blank with an appropriate word choice, such as flows and goes. There were sixty-eight test items in total, and each correct answer received one point. The passages were presented in the order of increasing difficulties, and the test was stopped when students produced six consecutive incorrect answers.
2) English Vocabulary Knowledge

(1) English Vocabulary Breadth

A standardized The Peabody Picture Vocabulary Test-Revised (PPVT-R: Dunn & Dunn, 1981) was used to assess participants’ English receptive vocabulary knowledge. On this test, participants were asked to indicate which of the four pictures best described a word they heard. For example, among four pictures of different shapes, they were expected to point to an “oval,” one of the target words spoken to them. There were 204 test items in total, and students received one point when they provided a correct answer. The test was terminated after five consecutive incorrect answers.

(2) English Vocabulary Depth

In assessing students’ vocabulary depth, the Word Comprehension subset of the Woodcock Reading Mastery Test-Revised (WRMT-R: Woodcock, 1998) was administered. This subtest consists of three different sections, assessing test takers’ knowledge of antonyms, synonyms, and analogies in English. The antonyms and synonyms subtests (34 and 33 test items in total, respectively) required the students to read a word and provide a word opposite and similar in meaning, respectively, while the analogies subtest (79 test items in total) required them to read a pair of words, ascertain the relationship between the words, and supply a word to complete the analogy appropriate for the first word of a second pair provided. For example, students were expected to come up with close for a synonym of a given word near in the synonyms subtest, night for day in the antonyms subtest, and fly for dog-walk, bird-__ in the analogies subtest. Each subtest was terminated when six consecutive incorrect answers were provided, and each correct answer received one point. Vocabulary depth score was computed by combining the participants’ scores on the three sub-sections of the test.

3) English Listening Comprehension

Although this study includes a measure of the participants’ English proficiency (PKSAT), there was a need to include another measure of their general language comprehension abilities to control for their effects in assessing the predictive role vocabulary breadth and depth play in reading comprehension. It was especially more so, because there has been a consensus on the facilitative role of oral language comprehension ability in reading comprehension (Carver, 1998; Florit & Cain, 2011; Gough & Tunmer, 1986; Hoover & Gough, 1990; Johnston & Kirby, 2006; Joshi & Aaron, 2000; Kershaw & Schatschneider, 2012), regardless of the readers’ age and language proficiency. Thus, the participants’ performance on a listening comprehension test was used in this study as a
proxy to control for the potential significant effects of their oral language comprehension abilities in explaining reading comprehension.

To measure English listening comprehension abilities, the Oral Comprehension subtest of Woodcock-Johnson III Diagnostic Reading Battery (WJ III: Woodcock, Mather, & Schrank, 2004) was administered. This was a cloze-type test, where students were told to finish the incomplete oral passage they heard. For example, when students heard A bird flies, a fish _____, they were expected to provide “swims” as an answer. There were 34 test items in total, and each correct item was scored one point. The test was terminated when students gave six consecutive incorrect responses. Due to the increasing length and complexity of the recorded oral passages, not all students were able to complete the test.

3. Data Analysis

Descriptive statistics were first examined to understand the participants’ performance on each of the measures. Then, in answering the first research question, a correlation analysis exploring the potential relationships among vocabulary knowledge, reading comprehension and listening comprehension abilities, and a hierarchical regression analysis assessing the predictive role of vocabulary knowledge in explaining reading comprehension after controlling for the effects of listening comprehension abilities were conducted for the whole sample of participants. In answering the second research question, the participants were further divided into three different groups according to their English language abilities based on their PKSAT scores, and the two different types of vocabulary knowledge (vocabulary depth and breadth) were treated as separate constructs. Then, after a correlation analysis examining the relationships between reading comprehension abilities and the two types of vocabulary knowledge for the three different language proficiency groups was conducted, a series of hierarchical regression analyses testing the relative role vocabulary depth and breadth played in predicting reading comprehension were conducted separately for each of the three language proficiency groups.

IV. RESULT

Table 2 presents the means, standard deviations, and the ranges of the test results for each task. On average, students answered 19.46 questions correctly on the reading comprehension task, while they answered 68.96, 30.24, and 8.26, items correctly on average on the test of vocabulary breadth, depth, and listening comprehension, respectively. Important to note is that there were wide variations across the participants for all of the tasks. For example, there were students who provided correct answers for only 2 test items
of the maximum possible score of 146 on the test of vocabulary depth, while the best-performing student scored as much as 60. Such wide variations will further ensure investigation of the relationship between vocabulary knowledge and reading comprehension abilities as a function of language proficiency.

TABLE 2

Means and Standard Deviations of the Key Variables

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading comprehension</td>
<td>19.46</td>
<td>8.22</td>
<td>2</td>
<td>37</td>
<td>95</td>
</tr>
<tr>
<td>Listening comprehension</td>
<td>8.26</td>
<td>3.69</td>
<td>0</td>
<td>15</td>
<td>98</td>
</tr>
<tr>
<td>Vocabulary knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocabulary breadth</td>
<td>68.96</td>
<td>25.88</td>
<td>16</td>
<td>105</td>
<td>95</td>
</tr>
<tr>
<td>Vocabulary depth</td>
<td>30.24</td>
<td>12.32</td>
<td>2</td>
<td>60</td>
<td>98</td>
</tr>
</tbody>
</table>

The correlations among the reading comprehension, listening comprehension, and vocabulary measures were examined next.

TABLE 3

Correlations among Reading Comprehension, Listening Comprehension, and Vocabulary Knowledge

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td>1. Reading comprehension</td>
<td>—</td>
<td>.773**</td>
<td>.798**</td>
</tr>
<tr>
<td>2. Listening comprehension</td>
<td>—</td>
<td>—</td>
<td>.731**</td>
</tr>
<tr>
<td>3. Vocabulary knowledge</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**p < .01

As seen in Table 3, the correlation analyses showed that all three constructs were significantly correlated with one another (p < .01). To be specific, reading comprehension was significantly correlated with both listening comprehension and vocabulary knowledge ($r = .773, p < .01$, and $r = .798, p < .01$, respectively). Listening comprehension and vocabulary knowledge were also significantly correlated with each other ($r = .731, p < .01$).

Next, in order to investigate the role of vocabulary knowledge in reading comprehension, hierarchical regression analyses were conducted. Listening comprehension was entered first, as it was the proxy variable to control for the effects of oral language comprehension abilities, followed by vocabulary knowledge that encompassed both vocabulary breadth and depth.
TABLE 4
Hierarchical Regression Analysis Predicting Reading Comprehension

<table>
<thead>
<tr>
<th>Steps</th>
<th>Variables</th>
<th>R</th>
<th>R²</th>
<th>ΔR²</th>
<th>ΔF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Listening comprehension</td>
<td>.773</td>
<td>.597</td>
<td>.597</td>
<td>137.851***</td>
</tr>
<tr>
<td>2</td>
<td>Vocabulary knowledge</td>
<td>.882</td>
<td>.777</td>
<td>.180</td>
<td>36.884***</td>
</tr>
</tbody>
</table>

***p < .001

As can be seen in Table 4, the results revealed that vocabulary knowledge accounted for an additional 18.0% of the variance in reading comprehension ($F = 36.884, p < .001$) even after the effects of listening comprehension, a well-known prominent predictor of reading comprehension, was controlled for. In other words, vocabulary knowledge turned out to be a significant predictor of reading comprehension beyond the effects of general oral language comprehension abilities.

TABLE 5
Correlations among Listening Comprehension, Vocabulary Breadth and Depth, and Reading Comprehension

<table>
<thead>
<tr>
<th>Reading comprehension</th>
<th>Total</th>
<th>Advanced</th>
<th>Intermediate</th>
<th>Beginning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening comprehension</td>
<td>.773**</td>
<td>.597</td>
<td>.360*</td>
<td>.676***</td>
</tr>
<tr>
<td>Vocabulary breadth</td>
<td>.689**</td>
<td>.390*</td>
<td>.357*</td>
<td>.456**</td>
</tr>
<tr>
<td>Vocabulary depth</td>
<td>.855**</td>
<td>.758***</td>
<td>.463**</td>
<td>.722***</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001

Another set of correlation analyses as shown in Table 5 was conducted in order to explore the relationship between reading comprehension and the two specific types of vocabulary knowledge (vocabulary breadth and depth). The findings indicated that both vocabulary breadth and depth, as well as listening comprehension abilities, had significant correlation with reading comprehension abilities. When separate analyses were conducted according to the students’ English proficiency levels, the same pattern was observed as the correlations remained significant across the three proficiency groups. For the beginning-level students, listening abilities and vocabulary depth showed stronger relationships with reading comprehension ($r = .676, p < .001; r = .722, p < .001$) than vocabulary breadth did ($r = .456, p < .01$), while stronger correlations between vocabulary depth and reading ability compared to the other two variables ($r = .463, p < .01; r = .758, p < .001$, respectively) were observed among the intermediate and advanced level students.

In order to have a closer look at the relative importance of vocabulary breadth and depth as a function of the students’ language proficiency, a series of hierarchical analyses were conducted in predicting reading comprehension according to students’ English proficiency levels.
As seen in Table 6, listening comprehension ability was entered in the first step to control for the effects of general oral language comprehension abilities, as a control variable, and it explained about 16% of the variance ($F = 5.4$, $p < .05$) in reading comprehension ability. Then, vocabulary breadth and depth were entered in step 2 and 3, respectively, and both variables made a significant contribution to reading comprehension. To be specific, vocabulary breadth explained an additional 11% of the variance ($F = 4.3$, $p < .05$) beyond listening comprehension, and vocabulary depth added another 36% of the unique variance in reading comprehension abilities ($F = 26.6$, $p < .001$). That is, vocabulary depth was still a significant contributor of reading comprehension after controlling for the effects of listening comprehension and vocabulary breadth. However, when the order of entry was reversed to examine the relative effects of vocabulary breadth and depth (see the bottom panel of Table 6), vocabulary breadth did not contribute any additional variance beyond vocabulary depth. In short, vocabulary depth was a more significant predictor compared to vocabulary breadth in predicting reading comprehension abilities of the advanced students.

The same analysis was conducted with the intermediate students next, as presented in Table 7.

As shown in Table 7, listening comprehension ability was entered in the first step as a control variable, and it explained about 13% of the variance ($F = 4.1$, $p < .05$) in reading comprehension ability. Then, vocabulary breadth and depth were entered in step 2 and 3, respectively, and both variables made a significant contribution to reading comprehension. To be specific, vocabulary breadth explained an additional 11% of the variance ($F = 4.3$, $p < .05$) beyond listening comprehension, and vocabulary depth added another 51% of the unique variance in reading comprehension abilities ($F = 5.8$, $p < .05$).
Table 7 shows that listening comprehension ability of the intermediate students did not explain any significant amount of variance in reading comprehension. Moreover, when controlling for its effects, vocabulary breadth also failed to contribute a unique variance in explaining reading comprehension abilities. On the other hand, vocabulary depth contributed a significant unique variance beyond the effects of listening comprehension and vocabulary breadth, adding an additional 18% of the variance in predicting reading comprehension abilities (\(F = 4.3, p < .05\)). When the order of vocabulary breadth and depth was reversed in order to compare their relative importance, vocabulary depth added an extra 16% of the explanatory power (\(F = 5.7, p < .05\)) beyond listening comprehension abilities while vocabulary breadth still remained insignificant in predicting reading comprehension abilities when listening comprehension abilities and vocabulary depth were controlled for.

**TABLE 8**

Hierarchical Regression Analysis Predicting Reading Comprehension (Beginning Students)

<table>
<thead>
<tr>
<th>Steps</th>
<th>Variables</th>
<th>R</th>
<th>(R^2)</th>
<th>(\Delta R^2)</th>
<th>(\Delta F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Listening comp.</td>
<td>.676</td>
<td>.457</td>
<td>.457</td>
<td>25.215***</td>
</tr>
<tr>
<td>2</td>
<td>Vocabulary breadth</td>
<td>.696</td>
<td>.484</td>
<td>.028</td>
<td>1.552</td>
</tr>
<tr>
<td>3</td>
<td>Vocabulary depth</td>
<td>.772</td>
<td>.595</td>
<td>.111</td>
<td>7.683**</td>
</tr>
<tr>
<td>2</td>
<td>Vocabulary depth</td>
<td>.771</td>
<td>.595</td>
<td>.138</td>
<td>9.898***</td>
</tr>
<tr>
<td>3</td>
<td>Vocabulary breadth</td>
<td>.772</td>
<td>.595</td>
<td>.000</td>
<td>.027</td>
</tr>
</tbody>
</table>

* \(p < .05\), ** \(p < .01\), *** \(p < .001\)

Finally, another set of the same analysis was conducted for the beginning level students. Similar to the advanced students, listening comprehension abilities turned out to be a significant predictor, accounting for as much as 45% of the variance in reading comprehension (\(F = 25.2, p < .001\)). Vocabulary breadth did not show a significant effect on reading comprehension beyond the effects of listening comprehension, whereas vocabulary depth made a unique contribution to reading comprehension after controlling for the other two variables, adding around 11% of additional explanatory power in reading comprehension (\(F = 7.6, p < .05\)).

When the order of entry was reversed, vocabulary depth explained around 14% of the variance beyond listening comprehension (\(F = 9.8, p < .01\)). Yet, vocabulary breadth still failed to contribute a significant variance to reading comprehension abilities.
V. DISCUSSION AND CONCLUSION

This study aimed to examine the effects of vocabulary knowledge on reading comprehension of Korean EFL learners. More specifically, the role of different dimensions of vocabulary knowledge, namely breadth and depth, were explored in relation to reading comprehension ability. The study findings indicated that the overall vocabulary knowledge was a significant contributor to reading comprehension of Korean high school EFL learners when controlling for their general oral language comprehension abilities. With respect to the relative effects of vocabulary breadth and depth on reading comprehension, it was found that vocabulary depth was a stronger predictor of reading comprehension abilities compared to vocabulary breadth across all English proficiency levels. Also, vocabulary depth consistently demonstrated strong explanatory power even after the effects of vocabulary breadth was controlled for. Although vocabulary breadth did turn out to be a significant indicator of reading comprehension in case of the advanced students, it played a relatively less significant role in explaining reading comprehension abilities. Thus, in short, the findings from this study demonstrate that vocabulary depth plays a relatively more important role in Korean EFL learners’ reading comprehension compared to vocabulary breadth.

With regard to the role of general vocabulary knowledge, the finding is in line with a large body of previous studies highlighting the importance of general vocabulary knowledge in both L1 and L2 reading (Bauer & Arazi, 2011; Braze et al., 2007; Cunningham, Stanovich, & Wilson, 1990; Freebody & Anderson, 1983; Verhoeven et al., 2011). That is, similar to previous studies, the critical role of vocabulary knowledge in L2 reading was supported among Korean EFL learners whose exposure to the target language is limited and whose two languages do not share many structural features or cognates. Moreover, the finding that vocabulary knowledge accounted for a substantial portion of unique variance in reading comprehension beyond the effects of listening comprehension is noteworthy. As mentioned earlier, oral language comprehension ability, known as one of the key predictors of reading comprehension (Gough & Tunmer, 1986; Hoover & Gough, 1990), is widely measured by listening comprehension alone or in combination with receptive vocabulary knowledge. However, the finding from this study indicates that vocabulary knowledge should not be subsumed under listening comprehension and that it makes distinctive and independent contribution to reading comprehension of Korean EFL high school learners.

Of importance to note is that vocabulary depth had significant effects on reading comprehension regardless of the Korean EFL learners’ English language proficiency. Moreover, vocabulary depth was a stronger predictor than vocabulary breadth across students with different English language proficiency. These findings are in line with some
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of the previous studies with English language learners (Kieffer & Lesaux, 2008; Nation & Snowling, 2004; Proctor et al., 2009, 2012; Roth et al., 2002), while they are discrepant from those found in other studies (Ouellette & Beers, 2010; Tannenbaum et al., 2006). In those previous studies, vocabulary depth was not identified as a significant predictor of reading comprehension, while vocabulary breadth was. This discrepancy might be due to the differences in the participants’ language proficiency and age. As discussed earlier, the participants in Ouellette and Beers’ (2010) study were not only young but their English proficiency seemed to be relatively lower for their age, which may explain the absence of relationship between vocabulary depth and reading comprehension, considering that vocabulary depth begins to facilitate reading comprehension with increasing age and language development (Schwartz & Katzir, 2012). Although English language proficiency of the Korean EFL high school students in this study may be considerably lower than that of age-matched English L1 students, and although a big proportion of them have limited English proficiency, their developed and matured cognitive abilities and L1 skills may have facilitated the positive role of vocabulary depth in reading comprehension. Additionally, the relatively poor English word knowledge could have been complemented to some extent by relying on their knowledge of synonyms and antonyms, a strategy often used by successful L1 and even L2 readers. However, cautions should be made against generalizing the findings to the Korean EFL learners in general, as the participants in this study were limited to students selected from only one school from one area, despite the diverse English abilities represented among them. Thus, further studies that ensure more diversity among the participants with different educational, regional, and other socio-economic backgrounds are called for.

Nevertheless, the findings from this study yield important implications for vocabulary teaching in relation to reading comprehension. As general vocabulary knowledge plays a crucial role in successful reading comprehension, the need to increase the proportion of effective vocabulary instruction in English classes is highlighted. In fact, the increasing needs of vocabulary instruction was reported in Lee’s (2011) recent survey which identified that more than 80 percent of the teachers and students of Korean secondary schools recognized the importance of vocabulary knowledge in teaching and learning English. Despite these recognized needs, however, more than 60 percent of the teachers reported that they did not and could not deal with vocabulary in class sufficiently due to the pressed need to focus on other areas such as grammar teaching. Since both depth and breadth of vocabulary knowledge have strong influence on reading comprehension of Korean EFL learners, English teachers should introduce and expose learners to a variety of words to increase their vocabulary size, and also help them acquire full and accurate understanding of the target words by building semantic network among words using paradigmatic relations such as synonyms, antonyms, hypernyms, and hyponyms. The
focus on paradigmatic sense of words seems especially pertinent, since most Korean EFL high school learners are already accustomed to memorizing a list of dictionary meanings of words to broaden vocabulary size (Kim, 2011). This suggests that Korean EFL learners need teachers’ explicit guidance and instruction in developing vocabulary depth, as well as breadth, in English.

Overall, the current study reveals that studying about the words in addition to getting to know their superficial meanings is essential in vocabulary instruction, especially in relation to reading comprehension instruction. Thus, focusing on vocabulary depth by touching on the paradigmatic sense relations within contexts should be an important part of reading instruction, along with the efforts to increase the vocabulary size. Moreover, the ability to utilize vocabulary depth with contextual clues can be a strategy to make up for the deficits in English vocabulary knowledge among L2 learners as well and thus should be taught and practiced. Although the present study highlights the great role of vocabulary depth and the importance of the paradigmatic aspects of words in reading comprehension, attention to other relevant factors such as semantic and syntactic knowledge as well as syntagmatic sense relations should be paid in future research in order to obtain a more accurate and complete picture regarding the role of vocabulary knowledge in reading comprehension processes.

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Applicable levels: high school

Key words: vocabulary knowledge, vocabulary breadth, vocabulary depth, reading comprehension, Korean EFL learners

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