Reading Fluency and Listening Comprehension Abilities as Predictors of Reading Comprehension

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This study aimed to examine whether overall English proficiency influences the relative predictive power of reading fluency and listening comprehension abilities in explaining the reading comprehension of Korean EFL learners within the simple view of reading framework, when the age factor is controlled for. One hundred sixteen eleventh-grade Korean high school students consisting of two highly distinct groups in general English proficiency—55 Most Highly Capable Students (MHCS) and 61 Capable Students (CS)—were tested on measures of reading fluency, vocabulary knowledge, listening comprehension, and reading comprehension. The findings indicated that reading fluency and listening comprehension abilities were significantly related to the reading comprehension of both MHCS and CS groups. However, the results from a series of hierarchical regression analyses revealed that while listening comprehension was a stronger predictor of reading comprehension of the MHCS group, it was reading fluency that explained more variance in comprehension of the CS group. Implications for reading instructions are discussed.

Key words: the simple view of reading, reading fluency, reading comprehension, listening comprehension

1. INTRODUCTION

It has been well documented by now that reading is a complex cognitive process which

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involves a number of component skills and knowledge at different levels of processing (Grabe, 2009; Kintsch & Rawson, 2005). At the lower-level, readers use their orthographic, phonological, morphological, lexical, semantic and syntactic knowledge for successful “word recognition, syntactic parsing, and semantic-encoding propositions” (Grabe, 2009, p. 21). At the higher level, information gained from the lower level processing is integrated for deeper understanding of a text with readers’ relevant background knowledge, inferencing and strategic processing (Kintsch & Rawson, 2005). In general, when children begin to learn to read, it is the lower-level processes that play a major role in reading comprehension, but as they gradually become fluent readers with automatized lower-level skills, higher-level skills exert more influence on successful reading (Perfetti, Landi, & Oakhill, 2005).

Among different models which have tried to explain what comprise reading comprehension, the simple view of reading (Gough & Tunmer, 1986) has received extensive research attention, for it accentuates lower-level skills such as decoding abilities, as well as general language comprehension ability that requires successful application of higher-level skills, including the retrieval of adequate prior knowledge, inferencing, and employing appropriate strategies. The simple view of reading posits that reading comprehension can be explained by the combined effects of two main variables: decoding abilities with which sounds are retrieved from their corresponding letters and general oral language proficiency, which is usually measured by listening comprehension abilities (Hoover & Gough, 1990).

While much empirical evidence supports the simple view of reading in both first language (L1) contexts (Adlof, Catts, & Little, 2006; Carver 1997; Cutting & Scarborough, 2006; Johnston & Kirby, 2006; Joshi & Aaron, 2000; Ouellette & Beers, 2010) and second language (L2) contexts (Gottardo & Mueller, 2009; Y. Kang, 2013; Y. Kang, Choi, Lee, & Nam, 2011; Proctor, Carlo, August, & Snow, 2005; Verhoeven & van Leeuwe, 2012), some studies have pointed out the inappropriateness of decoding abilities as a key variable to measure older and more proficient readers’ print-related, lower-level skills due to the potential ceiling effects which leave little variance to be analyzed, as most participants might end up scoring near the top (Dreyer & Katz, 1992; Y. Kang, 2013). Meanwhile, reading fluency has been identified having a strong correlation with reading comprehension (Fuchs, Fuchs, Hosp, & Jenkins, 2001; Hudson, Pullen, Lane, & Torgesen, 2009; Y. Kang, 2011), as fast and automatic process at the text-level allows limited cognitive resources to be allocated for higher-level processes (Adlof et al., 2006). Yet not only have there been relatively fewer studies investigating the role of reading fluency in the reading comprehension of L2 readers in foreign language contexts, but also little is known about the relative role of lower-level and higher-level processing skills for such readers with varying English proficiency. Thus, this study aims to assess the validity of the
modified simple view of reading model by examining the relations among reading fluency, listening comprehension abilities, and reading comprehension abilities of Korean high school EFL learners, and further explore the impact of students’ general English proficiency on the relative contribution of the two main predictors in explaining their reading comprehension abilities.

2. LITERATURE REVIEW

2.1. The Simple View of Reading

The simple view of reading (SVR), first proposed by Gough and Tunmer (1986), asserts that reading comprehension (R) can be predicted by two main reading sub-skills: decoding skills (D) and language comprehension (C)\(^1\). The term decoding refers to the ability to read and sound out real and pseudo-words quickly and accurately by matching letters to their corresponding sounds. The term language comprehension signifies the general language capacity with which spoken language is processed and understood. Within the SVR framework (\(R = D \times C\)), both decoding skills and language comprehension play essential roles in reading comprehension, since lacking either component will invariably cause failure in reading comprehension; (if \(D = 0\) or \(C = 0\), then \(R = 0\)). Thus, SVR highlights the importance of accurate word-level processing skills as well as a variety of language sub-skills comprising general language comprehension such as vocabulary and syntactic knowledge, semantic processing abilities, and inferencing skills, as integral components of reading comprehension (Y. Kang, 2011).

In L1 contexts, various studies have provided abundant supporting evidence of SVR for both English monolinguals (Adlof et al., 2006; Carver 1997; Catts, Adlof, & Weismer, 2006; Catts, Fey, Zhang, & Tomblin, 1999; Chen & Vellutino, 1997; Conners, 2009; Cutting & Scarborough, 2006; Johnston & Kirby, 2006; Joshi & Aaron, 2000; Juel, Griffith, & Gough, 1986; Kendeou, Savage, & van den Broek, 2009; Ouellette & Beers, 2010) and speakers of other languages (Hagtvet, 2003; Joshi, Ji, Breznitz, Amiel, & Yulia, 2015; Lee & Wheldall, 2009; Tobia & Bonifaci, 2015; Verhoeven & van Leeuwe, 2012), commonly reporting that approximately 40-80% of the variance in reading comprehension was

\(^1\) Although the term originally used by Gough and Tunmer (1986) was ‘linguistic comprehension,’ other terms such as ‘listening comprehension’ and ‘language comprehension’ have been used interchangeably to refer to the general ability to interpret spoken language. In this study, the term ‘language comprehension’ was used to reflect a more recent research trend in the field which posits that linguistic comprehension comprises, and thus should be measured by, a mixture of various language skills such as vocabulary knowledge, syntactic knowledge, inferencing skills and listening comprehension skills (Adlof et al., 2006; Conners, 2009; Verhoeven & van Leeuwe, 2011).
explained by the joint effects of decoding skills and language comprehension. In L2 contexts, relatively less, but still much, empirical evidence supports SVR, reporting that about 30-90% of variance in reading comprehension was predicted by the joint effects of the two components of SVR (Ghaedsharafi & Yamini, 2011; Gottardo & Mueller, 2009; Hoover & Gough, 1990; Y. Kang, 2013; Y. Kang et al., 2011; Mancilla-Martinez, Kieffer, Biancarosa, Christodoulou, & Snow, 2011; Proctor et al., 2005; Verhoeven & van Leeuwe, 2012).

2.2. Modified Simple View of Reading

Although the adequacy of SVR has been widely supported by the aforementioned research, which investigated the role of decoding skills and oral language comprehension in young (mostly elementary school level) L1 and L2 readers’ reading comprehension, some modification seems necessary when it comes to applying SVR to older, more proficient readers in consideration of potential ceiling effects. That is, “for older L2 learners in high school, for example, decoding skills measured by decoding accuracy at the word level may not yield sufficient variation to allow it to be one of the predictor variables, assuming that by high school they have gained sufficient and well-developed phonics skills to read discrete words independently” (Y. Kang, 2011, p. 87). Indeed, in their studies with L1 and L2 learners respectively, Dreyer and Katz (1992) and Y. Kang (2013) showed the inappropriateness of word-level decoding measures due to ceiling effects, and thus suggested that other code-related measures be considered to replace the decoding component in the SVR framework.

In that sense, reading fluency seems to be a suitable replacement for decoding skills. Reading fluency is defined as the ability to read with speed, accuracy, and proper expression or prosody (Grabe, 2010; National Reading Panel (National Reading Panel, 2000)). This definition accentuates simultaneous comprehension as a key character of a fluent reader, since only when the text is understood can readers orally read the text with appropriate expressions and prosody. Importantly, reading fluency has been identified as having a strong concurrent and predictive relationship with reading comprehension in both L1 and L2 (Daane, Campbell, Grigg, Goodman, & Oranje, 2005; Dreyer & Katz, 1992; Fuchs et al., 2001; Hudson et al., 2009; Y. Kang, 2011; Y. Kang, Huh, Moon & Park, 2014; H. Kim, 2012; Y. Kim et al., 2014; Y. Kim, Petscher, Foorman, & Zhou, 2010;

2 Some researchers have defined reading fluency as the ability to read rapidly and accurately (Jenkins, Fuchs, van den Broek, Espin, & Deno, 2003; Y. Kim, Park, & Wagner, 2014). However, since students who sound out texts accurately with speed but without comprehension are not really fluent “readers,” but simply “word-callers” (Hamilton & Shinn, 2003), the definition of reading fluency which includes “simultaneous comprehension” component is used in this study.
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Kuhn & Stahl, 2003; NRP, 2010; Saiegh-Haddad, 2003). For instance, Daane et al. (2005) reported a positive relationship between fourth-grade students’ oral reading fluency and their reading comprehension in their study of 1,779 English monolinguals. Hence, reading fluency as a possible replacement for decoding skills within the SVR framework stands on solid theoretical support.

Moreover, much empirical evidence supports the inclusion of reading fluency in the SVR framework by showing its significant contributive power above and beyond decoding skills and language comprehension in both L1 (Cutting & Scarborough, 2006; Jenkins et al., 2003; Joshi & Aaron, 2000; Kershaw & Schatschneider, 2012; Shinn, Good, Knutson, Tilly, & Collins, 1992; Spear-Swerling, 2006; Tilstra, McMaster, Broek, Kendeou, & Rapp, 2009) and L2 (Y. Kang, 2011; H. Kim, 2012). In L1 context, for example, Tilstra et al. (2009) examined the contribution of verbal proficiency and reading fluency to reading comprehension of 277 fourth-, seventh-, and ninth-grade English monolingual students and showed that a significant proportion of variance in reading comprehension was explained by reading fluency. Specifically, when entered last in the hierarchical regression analysis, reading fluency explained an additional 8%, 5%, and 10% of variance in reading comprehension in each grade, respectively. Similarly, Kershaw and Schatschneider (2012) reported that passage fluency significantly predicted reading comprehension even after controlling for decoding skills and language comprehension for seventh- and tenth-grade English monolingual students, but not for third-grade students. Both studies suggest the increasing importance of reading fluency in the upper grades.

In line with the research findings reporting significant explanatory power of reading fluency in older students’ L1 reading comprehension, in L2 context, Saiegh-Haddad (2003) demonstrated a significant correlation between oral reading fluency and reading comprehension among 22 adult Arabic and 28 adult Hebrew native speakers learning English as a foreign language (EFL). In Korean EFL context, H. Kim (2012) investigated the predictive power of language comprehension, decoding skills, and reading fluency on the reading comprehension of tenth-grade Korean high school students. The findings indicated oral reading fluency as the most powerful predictor of the subjects’ reading comprehension, with decoding skills being the most insignificant factor, thus supporting the modified SVR. Likewise, Y. Kang (2011) explored the role of reading fluency and language comprehension abilities in reading comprehension of 101 Korean EFL tenth grade students and argued for the acceptability of the modified version of SVR by showing that reading comprehension is significantly explained by the joint effect of reading fluency and language comprehension. All of these findings uniformly lend support to the modified simple view of reading as a viable theory of reading comprehension. Therefore, in this study, reading fluency is used as a main component of SVR to represent the print-related skills in predicting reading comprehension of Korean high school EFL readers who have
presumably mastered English decoding skills.

2.3. Print-Related Skills vs. Language Comprehension Abilities

Despite the fact that both print-related skills (decoding and reading fluency) and language comprehension abilities are deemed to be important prerequisites for successful reading comprehension within the SVR framework, the relative importance of the two still remains controversial due to mixed findings. While some studies claim print-related skills to be a more prominent predictor of reading comprehension, others show that language comprehension has more predictive power in explaining reading comprehension. The discrepancies seem to pertain to the readers’ age. In many previous studies on SVR, younger learners have shown more dependence on print-related skills in contrast to older learners, who rely more on their language comprehension abilities (Adlof et al., 2006; Chen & Vellutino, 1997; Conners, 2009; Dreyer & Katz, 1992; Joshi & Aaron, 2000; Kershaw & Schatschneider, 2012; Tilstra et al., 2009). For example, Conners (2009) investigated 67 eight-year-old English native speakers’ reading comprehension and reported that a greater amount of variance was explained by decoding skills than language comprehension, showing that the proportion of variance accounted for by decoding skills was three times as large as that accounted for by language comprehension. In similar research, but with older learners, Tilstra et al. (2009) examined 89 fourth grade, 89 seventh grade, and 93 ninth grade children and showed that the variance explained by decoding skills decreased from fourth grade, while the variance explained by listening comprehension increased from fourth to seventh grade. In addition, a longitudinal study conducted by Adlof et al. (2006), where 604 English monolingual students were tested longitudinally from second through eighth grade, also supports the shift in the relative predictive power of print-related skills and language comprehension, highlighting “the importance of word recognition skills for early reading comprehension and listening comprehension skills for later reading comprehension” (p. 950). This pattern may reflect the speculation that reading comprehension abilities mostly entail similar sub-skills as listening comprehension abilities, once one’s print-related skills reach a level of automaticity (Hoffman, 2009).

However, there are mixed findings across studies regarding the incremental role of language comprehension in reading comprehension with increasing age for L2 readers. Some research findings support the heavier role of print-related skills and relatively less important role of language comprehension abilities in explaining younger L2 readers’ reading comprehension (Gottardo & Mueller, 2009; Y. Kang, 2011; H. Kim, 2012; Proctor et al., 2005). For instance, to explore the adequacy of SVR in explaining young English as a second language (ESL) learners’ reading comprehension, Gottardo and Mueller (2009)
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investigated 131 native Spanish ESL students who were tested in first grade and again in second grade, and showed a more dominant predictive role of decoding abilities than language comprehension in their reading comprehension. In similar research with older ESL learners, Proctor et al. (2005) examined reading comprehension abilities of 135 Spanish-speaking English language learners in fourth grade and demonstrated that the effect of English language comprehension was the strongest. In an EFL context, both Y. Kang (2011) and H. Kim (2012) highlighted the predictive power of oral language comprehension to be stronger than reading fluency in explaining the reading comprehension of tenth grade Korean high school EFL students.

Some longitudinal studies demonstrate an even clearer shift in L2 readers’ dependence on print-related skills to oral language skills in reading comprehension (Hoover & Gough, 1990; Verhoeven & van Leeuwe, 2012). In a longitudinal study of Spanish ESL children in first through fourth grades, Hoover and Gough (1990) identified a developmental change: in earlier grades, younger children’s decoding skills explained most of the variance in their reading comprehension, but as they become more proficient decoders, language comprehension predicted a greater proportion of the variance in reading comprehension. Likewise, Verhoeven and van Leeuwe (2011) tested 394 children who speak Dutch as their second language in first through sixth grade and argued that “starting from the intermediate grades, the predictive power of word decoding tends to diminish at favor of a greater impact of listening comprehension” (p. 1814). All the aforementioned research findings seem to support the hypothesis “that at the upper-elementary level, decoding variables will exert a lesser effect on reading comprehension, whereas oral language proficiency skills will exhibit much stronger associations with reading comprehension outcomes” (Proctor et al., 2005, p. 253) as equally applicable to L2 readers.

However, some, albeit comparatively fewer, empirical studies have observed decoding skill remaining a stronger and more dominant predictor of reading comprehension for older L2 readers, implying that the increasing role of language comprehension in reading comprehension does not simply correspond to increasing age in L2 contexts (Y. Kang, 2011; Mancilla-Martinez et al., 2011; Nakamoto, Lindsey, & Manis, 2008). In an ESL context, for example, both Mancilla-Martinez et al. (2011) and Nakamoto et al. (2008) investigated the relative predictive role of decoding skills and language comprehension in Spanish ESL learners’ reading comprehension, and decoding skills were found to have a stronger influence on upper-elementary to middle school ESL learners’ reading comprehension. A similar result was found in the study of Kang et al. (2011), where the validity of SVR among upper-grade elementary Korean EFL students was explored; 99 Korean EFL students in fifth grade were tested, and although both decoding skills and language comprehension abilities were reported as significant predictors of reading comprehension, decoding skills explained larger amount of variance in reading
comprehension. These contradictory results warrant the needs of further examination.

Considering that L2 learners, especially those who are in foreign language learning contexts, have significantly less exposure to the target language, it might be the case that L2 learners’ overall target language proficiency, rather than age itself, is what moderates the changing role of print-related skills and language comprehension abilities in predicting reading comprehension. Thus, while most monolinguals become progressively more proficient language users as they age, age may not be an adequate indicator of L2 learners’ target language proficiency, due to differing starting points of language learning and varying amount of target language exposure in meaningful contexts. Therefore, unlike L1 readers, older L2 readers might not possess sufficiently developed language comprehension ability to rely on for their reading comprehension. In this perspective, we can conjecture that L2 learners with low language proficiency will show more dependence on decoding skills for their reading comprehension than L2 learners with advanced language proficiency, regardless of age.

Similarly, the contradictory results found by Nakamoto et al. (2008) and Proctor et al. (2005), although they both examined Spanish-speaking ESL learners in upper elementary school grades, could be attributed to differences in the participants’ general language proficiency. Indeed, the participants in Nakamoto et al. (2008), whose variance in reading comprehension was explained more by decoding skills than language comprehension, were reported to be well below average in English oral language skill. Hence, as Y. Kang (2011) pointed out, “in order to arrive at a firm conclusion regarding the effects of age and L2 proficiency on the explanatory power of language abilities and decoding skills for reading comprehension, further studies with L2 learners of diverse L2 proficiency and reading abilities are in need” (p. 98). To demonstrate whether L2 proficiency, but not age, affects the changing role of the two key components of SVR, two same-age groups with different L2 proficiency need to be compared.

Thus, despite the number of studies reporting the adequacy of SVR for both L1 and L2 readers, little attention has been paid to whether the modified SVR framework, which includes reading fluency in lieu of decoding skills, is equally applicable for older L2 learners in foreign language contexts. In addition, researchers have not reached a consensus on the relative predictive power of the two major components of SVR in EFL reading comprehension. In particular, little systematic investigation has considered EFL learner’s language proficiency as a moderator variable when controlling for age in a single study. Hence, this study aims to extend prior findings on SVR by examining the reading comprehension of two groups of eleventh-grade Korean high school EFL learners with differing English proficiency levels. Specifically, the research questions of this study are:

1. Is the modified simple view of reading, which considers reading fluency as a key
variables, supported among Korean high school EFL learners?

2. Between reading fluency and listening comprehension abilities, which has a greater influence on Korean high school EFL learners’ reading comprehension?

3. Is there any difference in the relative predictive power of reading fluency and listening comprehension depending on learners’ general English proficiency?

3. METHOD

3.1. Participants

Participants of this study were 116 Korean high school eleventh graders, who comprised two groups labeled Most Highly Capable Students (MHCS) and Capable Students (CS). The 55 MHCS participants, as their label suggests, were students who perform at a significantly advanced English proficiency compared to others of their age, enrolled at a foreign language high school in Seoul, Korea. Their performance on the English subject of the Preliminary Korean Scholastic Aptitude Test (PKSAT) was within the top 99th percentile of the national mean, and many of them held iBT TOEFL scores of 110 or higher. Most of the MHCS also reported prior experience of living in English-speaking countries, and the mean length of stay abroad was 31 months. The 61 CS participants, on the other hand, were students recruited from self-contained, all-inclusive classrooms at a regular public high school in Seoul, Korea, and thus there was a wide range of English proficiency represented. In order to eliminate floor effects in the forthcoming analyses, however, only students whose standardized English scores on the PSAT were within the top sixtieth percentile of the national mean were selected as participants in this study. None of the CS had prior experience of living abroad in English-speaking countries.

3.2. Measures

All the measures used in this study are standardized tests that have been used in most of the previous studies discussed in the literature review. This was particularly important, as it allows direct comparisons with the results obtained from other studies, thus providing important insights regarding the relative role of reading fluency and language comprehension in explaining Korean EFL learners’ reading comprehension.
3.2.1. English reading comprehension

The standardized Passage Comprehension subtest of the Woodcock Reading Mastery Test-Revised (WRMT-R: Woodcock, 1998) was administered in order to measure students’ overall reading comprehension abilities. This subset is in the form of a cloze test which asks students to read passages and complete each blank with word choices that best fit the meaning in context. There were sixty-eight test items in total, presented in the order of increasing difficulty, and each correct answer received one point. Thus, the maximum possible score was 68 for this measure.

3.2.2. English listening comprehension

The Oral Comprehension subtest of the Woodcock-Johnson III Diagnostic Reading Battery (WJ III: Woodcock, Mather, & Schrank, 2004) was administered to measure English listening comprehension abilities. For this cloze-type test, students were required to complete the incomplete oral passage they heard by providing a one-word answer. There were a total of 34 test items presented in order of increasing difficulty, and each correct response received one point. Thus, the maximum possible score for this measure was 34.

3.2.3. English reading fluency

In assessing students’ reading fluency, the Reading Fluency subtest of the standardized Woodcock Johnson Diagnostic Reading Battery (WJIII; Woodcock et al., 2004) was administered. This subtest aims to test students’ ability to decode given sentences rapidly and accurately while comprehending the meanings at the sentence level. It requires them to read a total of 98 discrete sentences and make decisions about the truth value of each statement within three minutes. For example, for a given sentence, “Dogs have five legs”, the students must quickly decode the words in the sentence and decide whether the statement is true or false. Thus, this test measures students’ ability to decode series of words accurately and efficiently, while attending to their meanings at the sentence level. The sentences are presented in the order of increasing sentence complexity and length, and each correct answer received one point. The maximum possible score for this measure was 98.

3.2.4. English vocabulary

Although the participants were grouped according to their PKSAT scores, an additional measure of their general language abilities, namely, vocabulary knowledge, was adopted in
order to further control for their language proficiency in English (Deacon, Commissaire, Chen, & Pasquarella, 2013; J. Y. Kang, 2012; Sparks, Patton, Ganschow, & Humbach, 2012). As a measure of students’ vocabulary knowledge, the Word Comprehension subset of the Woodcock Reading Mastery Test-Revised (WRMT-R: Woodcock, 1998) was used. This subtest consists of three different sub-sections, assessing test takers’ knowledge of antonyms, synonyms, and analogies in English. These measures of English vocabulary depth rather than vocabulary breadth were administered, as previous studies have identified a relatively more significant role that vocabulary depth plays in reading comprehension compared to vocabulary breadth (Y. Kang, H. S. Kang, & Park, 2012; E. J. Kim & Kang, 2014). The antonyms and synonyms subtests (34 and 33 test items, respectively) asked the students to read words and provide appropriate synonyms or antonyms, respectively. The analogies subtest (79 test items in total) required them to read a pair of words, discern the relationship between them, and provide a word to complete the analogy appropriate for the first word of the second pair. Each correct answer received one point for all three sub-tests, and the vocabulary depth score was computed by combining the participants’ scores on the three sub-sections of the test.

3.3. Analyses

After first examining the two groups’ performance on the test measures, the potential relations among the measures are explored, followed by a series of hierarchical regression analyses to determine the relative contribution of reading fluency and language comprehension abilities to reading comprehension for the two groups separately. Although some previous studies included vocabulary knowledge as part of the oral language comprehension construct (Adlof et al., 2006; Y. Kang, 2011), listening comprehension abilities served as a sole measure of oral language comprehension skills in this study, following the initial SVR model proposed by Gough and Tunmer (1986). Vocabulary knowledge, on the other hand, served as a control variable, in order to further control for the differences in the participants’ English proficiency.

4. RESULTS

Table 1 presents the means, standard deviations, and the score ranges for each measure. Also included in the table are the t-test results comparing the performance of the MHCS and CS groups. Not only were there statistically significant differences between the two groups on all tests administered, but MHCS outperformed CS with more than double the scores of CS on all tests, except for the analogies test. The greatest score difference
between the two groups was in the reading comprehension test, as MHCS performance on the reading comprehension test is almost equivalent to that of American English-speaking tenth graders (Woodcock, 1998), while CS, on average, answered only 24 items correctly on the reading comprehension test (equivalent to American English-speaking third graders). Such significant differences in the test scores persist in the listening comprehension and reading fluency tests as well, as on average, MHCS scored 21.71 and 80.84 on listening comprehension tests and reading fluency test, respectively, while CS scored only 8.36 and 38.28, respectively. On the three tests of vocabulary depth, the two groups equally showed a large variation of scores, with statistically significant score differences.

**TABLE 1**

<table>
<thead>
<tr>
<th>Tests</th>
<th>Group</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>M</th>
<th>SD</th>
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<tbody>
<tr>
<td>Vocabulary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Analogies</td>
<td>CS</td>
<td>61</td>
<td>2</td>
<td>44</td>
<td>25.74</td>
<td>7.30</td>
<td>14.88***</td>
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<tr>
<td></td>
<td>MHCS</td>
<td>55</td>
<td>4</td>
<td>56</td>
<td>46.38</td>
<td>7.63</td>
<td></td>
</tr>
<tr>
<td>Antonyms</td>
<td>CS</td>
<td>61</td>
<td>0</td>
<td>15</td>
<td>8.20</td>
<td>3.34</td>
<td>16.87***</td>
</tr>
<tr>
<td></td>
<td>MHCS</td>
<td>55</td>
<td>0</td>
<td>25</td>
<td>19.11</td>
<td>3.63</td>
<td></td>
</tr>
<tr>
<td>Synonyms</td>
<td>CS</td>
<td>61</td>
<td>0</td>
<td>11</td>
<td>3.98</td>
<td>2.49</td>
<td>17.74***</td>
</tr>
<tr>
<td></td>
<td>MHCS</td>
<td>55</td>
<td>5</td>
<td>20</td>
<td>13.11</td>
<td>3.04</td>
<td></td>
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<tr>
<td>Reading Fluency</td>
<td>CS</td>
<td>61</td>
<td>0</td>
<td>74</td>
<td>38.28</td>
<td>15.97</td>
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<td>24.18</td>
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<td>35</td>
<td>61</td>
<td>50.87</td>
<td>4.79</td>
<td></td>
</tr>
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</table>

*Note. CS: Capable Students; MHCS: Most Highly Capable Students

***p < .001

Table 2 and Table 3 present the correlations among the tested variables for CS and MHCS, respectively. While significant correlations were detected in every pair of measures for CS, some of the vocabulary depth measures did not show significant correlations with reading and listening comprehension measures for MHCS. For example, MHCS performance on the analogies task did not show a significant correlation with reading comprehension or listening comprehension, and their performance on the antonyms task did not show a significant correlation with the reading fluency task. Yet important to note are the statistically significant positive correlations of the two key predictor variables, namely, reading fluency and listening comprehension, with the outcome variable, reading comprehension ($r = .72, p < .001$, $r = .60, p < .001$, respectively for CS; and $r = .48, p < .001$, $r = .55, p < .001$, respectively for MHCS) and among themselves ($r = .64, p < .001$ for CS and $r = .31, p < .05$ for MHCS) for both groups. Interestingly, the correlation coefficients were uniformly greater for CS than for MHCS, thus showing stronger
correlations among the variables in general than for MHCS. For MHCS, the number of years spent in English-speaking countries showed a significant positive correlation only with listening comprehension ($r = .39, p < .01$) and not with any other variables.

**TABLE 2**

<table>
<thead>
<tr>
<th>Tests</th>
<th>Analogies</th>
<th>Antonyms</th>
<th>Synonyms</th>
<th>Reading Fluency</th>
<th>Listening Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antonyms</td>
<td>.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synonyms</td>
<td>.40**</td>
<td>.61***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluency</td>
<td>.66***</td>
<td>.30*</td>
<td>.45***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listening comprehension</td>
<td>.60***</td>
<td>.08</td>
<td>.37**</td>
<td>.64***</td>
<td></td>
</tr>
<tr>
<td>Reading comprehension</td>
<td>.59***</td>
<td>.36**</td>
<td>.44***</td>
<td>.72***</td>
<td>.60***</td>
</tr>
</tbody>
</table>

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

**TABLE 3**

<table>
<thead>
<tr>
<th>Tests</th>
<th>Years Abroad</th>
<th>Analogies</th>
<th>Antonyms</th>
<th>Synonyms</th>
<th>Reading Fluency</th>
<th>Listening Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antonyms</td>
<td>.03</td>
<td>- .01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synonyms</td>
<td>.09</td>
<td>.39**</td>
<td>.24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluency</td>
<td>.05</td>
<td>.27*</td>
<td>.24</td>
<td>.41**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listening comprehension</td>
<td>.39**</td>
<td>.24</td>
<td>.14</td>
<td>.26</td>
<td>.31*</td>
<td></td>
</tr>
<tr>
<td>Reading comprehension</td>
<td>.13</td>
<td>.22</td>
<td>.35**</td>
<td>.30*</td>
<td>.48***</td>
<td>.55***</td>
</tr>
</tbody>
</table>

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

Next, in order to examine the relative predictive power of reading fluency and listening comprehension on reading comprehension abilities, two sets of hierarchical regression analyses were conducted separately for each group. As seen in Table 4, the three measures of vocabulary depth, antonyms, synonyms, and analogies were entered in the first step as a control variable for CS, to control for their oral language proficiency. Then reading fluency and listening comprehension abilities were entered as Step 2 and Step 3, respectively. While reading fluency made a significant contribution to reading comprehension when controlling for their vocabulary knowledge, adding as much as 15% of additional variance in reading comprehension ($\Delta F = 19.31, p < .01$), listening comprehension did not make any significant unique contribution beyond reading fluency and vocabulary knowledge ($\Delta F = 3.54, p = .07$). In order to examine whether reading fluency accounts for significant variance in reading comprehension beyond the effects of listening comprehension, another hierarchical regression analysis was conducted in reverse order (see bottom panel of Table 4). It turned out that reading fluency still made a unique contribution, explaining an additional 9% of the variance in reading comprehension, beyond the effects of vocabulary knowledge and listening comprehension abilities ($\Delta F = 11.46, p < .01$).
comprehension, when the effects of reading fluency were not accounted for, made a significant contribution beyond vocabulary knowledge ($\Delta F = 10.33, p < .01$). In short, reading fluency seems to be a relatively more powerful predictor of reading comprehension abilities for CS than listening comprehension abilities. About 58% of the variance in the CS reading comprehension abilities was explained by their vocabulary knowledge, reading fluency, and listening comprehension abilities.

### TABLE 4
Hierarchical Regression Analyses Predicting Reading Comprehension (CS)

<table>
<thead>
<tr>
<th>Steps</th>
<th>Variables</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
<th>$\Delta F$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vocabulary knowledge</td>
<td>.402</td>
<td>.402</td>
<td>12.752***</td>
<td>.000</td>
</tr>
<tr>
<td>2</td>
<td>Reading fluency</td>
<td>.555</td>
<td>.153</td>
<td>19.308***</td>
<td>.000</td>
</tr>
<tr>
<td>3</td>
<td>Listening comprehension</td>
<td>.582</td>
<td>.027</td>
<td>3.540</td>
<td>.065</td>
</tr>
<tr>
<td>2</td>
<td>Listening comprehension</td>
<td>.495</td>
<td>.093</td>
<td>10.332**</td>
<td>.002</td>
</tr>
<tr>
<td>3</td>
<td>Reading fluency</td>
<td>.582</td>
<td>.087</td>
<td>11.462**</td>
<td>.001</td>
</tr>
</tbody>
</table>

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

### TABLE 5
Hierarchical Regression Analyses Predicting Reading Comprehension (MHCS)

<table>
<thead>
<tr>
<th>Steps</th>
<th>Variables</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
<th>$\Delta F$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of years abroad</td>
<td>.035</td>
<td>.035</td>
<td>1.934</td>
<td>.170</td>
</tr>
<tr>
<td>2</td>
<td>Vocabulary knowledge</td>
<td>.212</td>
<td>.177</td>
<td>3.751*</td>
<td>.017</td>
</tr>
<tr>
<td>3</td>
<td>Reading fluency</td>
<td>.345</td>
<td>.133</td>
<td>9.913**</td>
<td>.003</td>
</tr>
<tr>
<td>4</td>
<td>Listening comprehension</td>
<td>.454</td>
<td>.109</td>
<td>9.592**</td>
<td>.003</td>
</tr>
<tr>
<td>3</td>
<td>Listening comprehension</td>
<td>.393</td>
<td>.180</td>
<td>14.555</td>
<td>.000</td>
</tr>
<tr>
<td>4</td>
<td>Reading fluency</td>
<td>.454</td>
<td>.061</td>
<td>5.385*</td>
<td>.025</td>
</tr>
</tbody>
</table>

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

As seen in Table 5, another similar two sets of hierarchical regression analyses were conducted for MHCS. For MHCS, two control variables were considered in the first two steps, in order to control for their prior experiences of living abroad in English-speaking countries and vocabulary knowledge. The number of years spent in English speaking countries did not make any significant contribution to reading comprehension abilities ($\Delta F = 1.93, p = .17$), while vocabulary knowledge did ($\Delta F = 3.75, p < .05$). In addition, reading fluency made significant contribution to reading comprehension abilities ($\Delta F = 9.59, p < .01$) beyond the effects of living abroad and vocabulary knowledge, and listening comprehension abilities still contributed significant unique variance beyond reading fluency, vocabulary knowledge, and experiences of living abroad ($\Delta F = 9.59, p < .01$). That is, unlike CS, listening comprehension abilities were a significant predictor of reading comprehension abilities for MHCS, even when the effects of reading fluency were controlled for. When another hierarchical regression analysis was conducted in reverse order (see bottom panel of Table 5), reading fluency still turned out to be a significant
Reading Fluency and Listening Comprehension Abilities as Predictors of Reading Comprehension abilities, beyond the effects of listening comprehension abilities, vocabulary knowledge, and the number of years spent in English-speaking countries. Thus, both reading fluency and listening comprehension turned out to be significant predictors of reading comprehension abilities for MHCS, when the effects of each other are accounted for. Compared to reading fluency, however, listening comprehension abilities seem to be a relatively more significant predictor of reading comprehension abilities, as it contributed more variance beyond reading fluency ($\Delta R^2 = .11$, $p < .01$) than reading fluency did beyond listening comprehension abilities ($\Delta R^2 = .06$, $p < .05$). The four variables (the number of years abroad, vocabulary knowledge, reading fluency, and listening comprehension abilities) together explained about 45% of variance in the reading comprehension abilities of MHCS.

5. DISCUSSION AND CONCLUSION

The present study aimed to investigate the validity of the modified simple view of reading and the relative predictive power of reading fluency and listening comprehension in explaining reading comprehension of high school Korean EFL learners. Specifically, reading comprehension of two groups of same-age high school students with significantly different English proficiency levels was compared to examine whether their English proficiency exerts any influences when the age factor was controlled for. The findings from the present study demonstrated that for both Most Highly Capable Students (MHCS) and Capable Students (CS) groups, students’ reading fluency and language comprehension were highly correlated with their reading comprehension, indicating the applicability of the modified SVR for older EFL learners. However, for the second research question, the two groups yielded different results: while it was reading fluency, thus the print-related skill, which was more strongly related to reading comprehension of CS group, listening comprehension abilities turned out to be more strongly associated with reading comprehension for the Most Highly Capable Students (MHCS) group.

The close relationship between reading fluency, language comprehension and reading comprehension demonstrated in our research parallels previous research findings which reported the adequacy of reading fluency as a replacement of decoding skills in applying the SVR framework to older or advanced students whose decoding skills might not generate enough variation (Kershaw & Schatschneider, 2012; H. Kim, 2012; Tilstra et al., 2009). However, this result contrasts with Adlof et al. (2006), where reading fluency did not make any significant contribution to second-, fourth-, and eighth-grade English monolinguals’ reading comprehension. One possible explanation for this discrepancy seems related to different types of measures used in the studies, as discussed in Tilstra et al.
Specifically, while the reading fluency measure in the present study tested students’ ability to read quickly and accurately with simultaneous comprehension, the fluency measures used in the study of Adlof et al. (2006) tested only reading speed and accuracy. As discussed earlier, to clearly distinguish fluent ‘readers’ from fluent ‘word-callers’ (Hamilton & Shinn, 2003), fluency measure must assess students’ simultaneous comprehension alongside their reading speed and accuracy. Thus, the current study’s finding calls for further research on the role of the comprehensive meaning of reading fluency in reading comprehension.

One interesting observation from this study was that although the modified SVR was supported for both groups, the variance in reading comprehension for CS explained by the combined effects of their reading fluency and language comprehension was larger than for MHCS (CS: 58%, MHCS: 45%). Such a difference in the amount of variance explained by the same reading comprehension model may be related to the difference in the general English proficiency itself, as previously suggested by Tilstra et al. (2009). That is, as students become more advanced readers with automatic word processing skills, other reading-related skills that are not particularly represented in SVR, such as reading strategy and verbal working memory, might exert an influence on reading comprehension. Thus, further investigation of SVR with more candidate variables is also warranted to provide a clearer picture of advanced L2 students’ reading comprehension.

Another intriguing observation from the present study is that the relative contribution of the two predictors depended on the students’ general English proficiency. More specifically, for MHCS, language comprehension abilities played a more significant role in their reading comprehension than print-related skills, while only print-related skills and not language comprehension abilities played a significant role for the CS. The reason why MHCS language comprehension abilities explained more variance in reading comprehension than the print-related skills can be attributed to the fact that the MHCS must have developed a mastery of print-related skills, being highly advanced in English reading as they are. In fact, within the SVR framework, reading comprehension abilities can almost be equated with language comprehension abilities when print-related skills reach an automatic level that yields little variance to serve as a significant predictor. In contrast, print-related skills of less proficient students are effortful, taking up much mental resources for other reading skills to be more fully and actively employed (Verhoeven & van Leeuwe, 2012), which explains why CS print-related skills contributed more than language comprehension skills in explaining variance in their reading comprehension. This result lends strong support to the assumption that for L2 students, their overall L2 proficiency is what moderates the relative predictive power of the two variables, in contrast with age, which was found to be a significant moderator in L1 contexts. Considering how L2 (especially foreign language) learners, receive significantly less exposure to the target
language and how rarely they encounter meaningful language contexts to develop their target language proficiency compared to L1 learners, not to mention that L2 students start to learn the target language at various times of their lives, it is evident that L2 learners’ age cannot guarantee a certain level of target language proficiency. Therefore, taking into consideration the L2 learners’ overall language proficiency seems necessary in investigating the reading sub-skills that contribute to their reading comprehension abilities. But at the same time, further studies with L2 learners with varying ages and language proficiency are in need, in order to investigate the potential interaction between the two.

The discrepancies found between the findings of the present study, specifically the result pertaining to the CS group, and those of Y. Kang (2011) and H. Kim (2012) can thus be explained by the participants’ English proficiency. That is, even though all the participants in the three studies were Korean high school EFL learners, the CS group in this study might have been less proficient in English than the participants in Y. Kang (2011) and H. Kim (2012), thus relying more on their print-related skills than language comprehension abilities when reading in English. In the same manner, the reason why the reading comprehension of the upper-elementary students in Y. Kang et al. (2011) depended more on decoding skills than language comprehension might derive from their less-developed English proficiency. Likewise, similar findings reported by Mancilla-Martinez et al. (2011) that fifth- and seventh-grade language minority ESL students’ word reading exerted larger influences than listening comprehension in predicting their reading comprehension seem to be due to the participants’ relatively underdeveloped English proficiency.

The findings from the present study provide some pedagogical implications. First, the fact that reading fluency still remains influential for even the most highly capable high school Korean students’ reading comprehension suggests that instructional assistance on print-related skills should not be overlooked even in secondary schools. In Korean English classrooms where teacher-directed grammar instruction as well as line-by-line translation still take up much of the class time, activities designed to promote students’ reading fluency, such as repeated reading and providing a model of fluent reading (Kuhn & Stahl, 2003) will help the students to become successful readers. Second, efforts should be made to provide natural and meaningful environment where students can develop their general English proficiency, which will in turn promote successful reading comprehension. On the whole, this study highlights the importance of well-developed print-related skills and general language comprehension abilities for successful reading comprehension of secondary school students in Korean EFL contexts, and provides meaningful insights into the relationships among the key variables of the SVR for L2 readers of different target language proficiency levels.
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Mancilla-Martinez, J., Kieffer, M. J., Biancarosa, G., Christodoulou, J. A., & Snow, C. E.


Applicable levels: Secondary