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Does Reading Fluency Predict Reading Comprehension of Korean Middle School EFL Learners?

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ABSTRACT

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In recent years, the research interest in the effect of reading fluency on reading comprehension has been on the rise. However, empirical research evidence regarding the significance of word reading fluency and oral reading fluency on EFL learners' reading ability is scarce. This study examines the relation of word reading fluency, pseudo word reading fluency and oral reading fluency to Korean middle school EFL students' reading comprehension and whether those relationships differentiate between two types of comprehension abilities, namely literal and inferential comprehension. Forty-six 16-year-old middle school English learners participated in this study. Their performance of word reading fluency, pseudo word reading fluency, oral reading fluency and reading comprehension abilities were measured. Surprisingly, the findings revealed that pseudo word reading fluency and oral reading fluency had a significant relationship with general reading abilities. Moreover, word reading fluency and pseudo word reading fluency were significant predictors of literal comprehension abilities, while pseudo word reading fluency was the only important predictor of inferential comprehension abilities. Therefore, the results suggest that instructors should focus on word-level and text-level oral reading to improve reading comprehension abilities of Korean EFL learners.

I. INTRODUCTION

A wide range of studies have investigated reading fluency is related to reading comprehension in the first language (L1) (Jenkins, Fuchs, Van Den Broek, Espin, & Deno, 2003; Y. S. Kim, C. H. Park, & Wagner, 2014; Y. S. Kim & Wagner, 2015; Saiegh-Haddad, 2003; Salvador, Schoeneberger, Tingle, & Algozzine, 2012; Shinn, Good, Knutson, Tilly, & Collins, 1992; Wise et al., 2010). According to Grabe (2009), oral reading fluency was defined as "the ability to read rapidly with ease and accuracy, and to read with appropriate expression and phrasing" (p. 291), and Fuchs, Fuchs, Hosp and Jenkins (2001) described oral reading fluency (ORF) as "the speed with which text is reproduced into spoken language" (p. 241). Fuchs et al. (2001) noted the significant correlation between oral passage reading and reading comprehension. However, little research on reading fluency has been conducted in the second language (L2) context (Baker, Y. Park, & Baker, 2012; Crosson & Lesaux, 2010; Geva & Famia, 2012; E. H. Jeon, 2012; Jiang, Sawaki, & Sabatini, 2012; Zadeh, Farnia, & Geva, 2012).

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Furthermore, most past research on reading fluency concentrated on the comparison between oral reading fluency and word reading fluency of L1 learners (Crosson & Lesaux, 2010; Geva & Famia, 2012; Jenkins et al., 2003; Jiang et al., 2012; Y. S. Kim et al., 2014; Y. S. Kim & Wagner, 2015; Lems, 2005; Saiegh-Haddad, 2003; Shinn et al., 1992; Wise et al, 2010). In these studies, word reading fluency (WRF) referred to "observable speed, fluidity, and accuracy of performance" (as cited in Grabe, 2009, p. 302). Word reading fluency consisted of real word reading fluency and pseudo or nonsense word reading fluency. Wise et al. (2010), for example, demonstrated that real word reading fluency was the most powerful predictor of reading comprehension abilities beyond pseudo word reading fluency and oral reading fluency. Yet, the research which focuses on oral reading fluency, word reading fluency, and pseudo word reading fluency simultaneously in an L2 context is scarce.

Different reading comprehension levels also exist in reading research, such as literal and inferential comprehension, in L1 context as well as L2 context. In Smith and Smith's study, literal comprehension is defined as "tasks requiring matching, imitation and direct recognition of appeared information in the text" (as cited in Miller & Smith, 1985, p. 4) and inferential comprehension as "tasks requiring insightful recognition of information and making responses based on what is implied in meaning" (as cited in Miller & Smith, 1985, pp. 4-5). Schisler, Joseph, Konrad and Alber-Morgan's (2010) research regarding L1 contexts revealed that oral retelling strategies made English-speaking third graders have better L1 reading comprehension for both literal and inferential comprehension. Compared to its research on L1, little attention was given to the role of reading fluency in L2 settings in terms of these two kinds of reading comprehension. To conduct much needed L2 reading research on reading comprehension level, this study attempts to investigate the association between reading fluency and reading comprehension levels, that is, literal and inferential comprehension. The specific research questions examined are as follows:

1) Are oral reading fluency (ORF) and word reading fluency (WRF) related to Korean EFL learners' reading comprehension in English?
2) Are the relationships the same or different for literal and inferential comprehension?

II. LITERATURE REVIEW

Numerous studies disclosed that one of the important indicators of reading competence was reading fluency (Anderson et al., 1988; Gough & Tunmer, 1986; Hoover & Gough, 1990; Saiegh-Haddad, 2003). Across the various definitions, Grabe (2009) said the four components of reading fluency are as follows: automaticity, accuracy, reading rate and prosodic structuring. In fact, past studies of reading fluency worked on word reading fluency in both L1 and L2 settings (Berninger, 1994; Feldman, 1995; Foorman, Herrera, Petscher, Mitchell, & Truckenmiller, 2015; Fukkink, Hulstijn, & Simis, 2005; Goswami & Bryant, 1990; E. H. Jeon, 2012; Jiang et al., 2012; Perfetti, Landi, & Oakhill, 2005; Stanovich, 2000). For example, Perfetti et al. (2005) and Stanovich (2000) identified the influence of word recognition speed and accuracy on reading comprehension. On the other hand, Fukkink et al. (2005) found that the word fluency training did not directly give an impact on reading comprehension. However, compared to word reading fluency, relatively little attention was paid on oral reading fluency, or both on oral reading fluency and word reading fluency in the literature so far. (Jenkins et al., 2003; Y. S. Kim et al., 2014; Y. S. Kim & Wagner, 2015; Saiegh-Haddad, 2003; Salvador et al., 2012; Shinn et al., 1992; Wise et al., 2010).

1. L1 Research on Oral Reading Fluency

After the report of National Reading Panel (2000) examined the impact of oral reading fluency on improving reading comprehension, the studies investigating the relationship between oral reading fluency and reading comprehension increased. Most researchers presented supporting evidence that oral reading fluency was a strong predictor of reading comprehension in the first language (L1) contexts (Jenkins et al., 2003; Y. S. Kim et al., 2014; Y. S. Kim & Wagner, 2015; Saiegh-Haddad, 2003; Salvador et al., 2012; Shinn et al., 1992; Wise et al., 2010). Salvador et al. (2012), for example, figured out that there was a statistically significant positive relationship between oral reading fluency and reading abilities of elementary school English-speaking students. Additionally, oral reading fluency was the strongest predictor of reading achievement beyond other factors such as ethnicity.

Moreover, studies of the sole influence of oral reading fluency on reading abilities can be used to explain the effect of two skills, oral reading fluency and word level reading fluency, on reading comprehension abilities. More specifically, many researchers compared the contribution of oral reading fluency and word decoding fluency to reading comprehension with various results. (Geva & Famia, 2012; Jenkins et al., 2003; Y. S. Kim et al., 2014; Y. S. Kim & Wagner, 2015; Saiegh-Haddad, 2003; Shinn et al., 1992; Wise et al., 2010). One group of researchers suggested that oral reading fluency has a relatively stronger relationship with reading comprehension than word decoding ability (Jenkins et al., 2003; Y. S. Kim et al., 2014; Shinn et al., 1992). Y. S. Kim et al. (2014), for example, found out it was oral reading fluency, not word reading fluency, which was involved in reading comprehension for Korean kindergartners, while neither were used in the reading abilities of first grade students. Furthermore, reading proficiency level and the nature of reading fluency were encompassed in the aforementioned studies, in that not only higher-proficiency readers failed to prove their effectiveness of word reading skills as they developed reading abilities, but also word-level reading skills became

more automatized, and oral reading fluency became more closely related with language skills (Geva & Famia, 2012; Saiegh-Haddad, 2003).

On the other hand, the other researchers including Wise et al. (2010), reached a different set of conclusions; the strongest predictor of reading comprehension performance of Canadian second grade students was real-word oral fluency over other two variables, pseudo word oral fluency and oral reading fluency. Furthermore, Y. S. Kim and Wagner's (2015) study verified the mediated relationship among text reading fluency, word reading fluency and reading comprehension. It also was an extension of Wise et al.'s (2010) results in that even though text oral reading fluency was not related to reading comprehension for first grade English-speaking students in U.S., oral reading fluency was a noteworthy bridge between reading comprehension and word reading fluency, as they were developing reading abilities in second to fourth grades. Overall, aforesaid studies in L1 contexts examined how reading fluency, which encompasses oral reading fluency and word reading fluency, reflected reading competence.

2. L2 Research on Oral Reading Fluency

Despite the growing studies on the relationship between reading fluency and reading comprehension in L1 contexts, far little attention has been paid to the L2 contexts. Since L2 learners have more difficulty satisfying the four components of reading fluency: automaticity, accuracy, rate, and prosodic requirements, relatively little research on reading fluency has been conducted. Fortunately, such research interest in reading fluency in the second language (L2) contexts begin to increase in recent years (Baker et al., 2012; Crosson & Lesaux, 2010; Geva & Famia, 2012; E. H. Jeon, 2012; Jiang et al., 2012; Zadeh, et al., 2012). However, studies containing both oral and word reading fluency in L2 reading were still limited. To be specific, research investigating Spanish-speaking ESL fifth grade students (Crosson & Lesaux, 2010), and with adult Chinese EFL learners (Jiang et al., 2012) indicated that the relationship between oral reading fluency and L2 reading was stronger than that between word reading fluency and L2 reading. Also, Lems (2005) stated that there was a statistically significant relationship between oral reading fluency and reading comprehension of adult EFL learners. On the other hand, some researchers showed that both reading fluency skills, such as oral reading fluency and word reading skill, were strong indicators for EFL and Spanish-speaking ESL learners' reading comprehension (Baker et al., 2012; Geva & Farnia, 2012). Additionally, Zadeh, et al. (2012) disclosed the contribution of word reading fluency in explaining that oral reading fluency and reading comprehension of ESL learners with diverse linguistic backgrounds improved word reading fluency, which then allowed them to comprehend the reading text better.

Therefore, most researchers among limited number of studies in L2 settings investigated oral reading fluency as a powerful indicator of reading abilities rather than word reading fluency. However, such studies in L2 contexts have been limited to a sole predictor, such as oral reading fluency, or word-level fluency. Thus, little is known about the combination of two predictors. Moreover, some studies measured word-level fluency, relying on only real words not including pseudo words (Crosson & Lesaux, 2010; Geva & Famia, 2012), which was defined as "the ability to quickly and accurately decode L2 graphemes into their corresponding phonemes" (E. H. Jeon, 2012, p. 190). Therefore, one limitation of these studies can be the failure to negate L1 influence. Despite the aforementioned limitations, most research have extrapolated on the role of reading fluency played in L2 reading comprehension. Further studies on oral reading fluency and word reading fluency, expanded to including pseudo word reading fluency, are needed regarding the L2 learners.

The consensus from the previous studies confirms that L1 and L2 general reading comprehension benefits from reading fluency, that is oral reading fluency and word reading fluency. Yet, among these mentioned studies, most of them were limited in that the student's oral reading fluency and reading comprehension were measured with time gaps because of the young learners' low proficiency (Salvador, et al., 2012; Wise, et al., 2010; Zadeh, et al., 2012). Despite such limitations, most studies have suggested the predictive role of oral reading fluency and word-level reading fluency in reading comprehension abilities., Thus, further research utilizing more accurate measures for reading fluency and reading ability in the same timeframe, is necessary to provide valuable indicators of developing reading abilities.

3. Oral Reading Fluency and Comprehension Level

One under-contemplated distinction in the research of the relationship of reading fluency and reading comprehension is the different contribution of reading fluency on distinct levels of reading comprehension such as literal and inferential comprehension. That is, very little research with the contribution of oral reading fluency and word reading fluency to two different types of comprehension, literal and inferential understanding, has been conducted (McCallum, Sharp, Bell, & George, 2004; Miller & Smith, 1985; Schisler et al., 2010). Instead, previous research which examined the relationship between sub-types of reading comprehension and reading fluency mainly focused on the different roles of oral and silent reading, showing different results (Gläser & Laudel, 2013; McCallum et al., 2004; Miller & Schwanenflugel, 2006; Miller & Smith, 1985; Yeh, McTigue, & Joshi, 2012). Among such limited studies, Miller and Smith (1985), for instance, found that the effect of silent reading of American elementary school students were more pronounced than oral reading in both types of comprehension, while McCallum et al. (2004) resulted in no significant difference between silent and oral reading among younger readers of U.S. Thus, future studies are required to explore the role of oral reading fluency and word reading fluency in different

types of reading comprehension, literal and inferential understanding.

Overall, although the aforementioned studies in the L1 contexts examined oral reading fluency and word reading fluency as indicators of reading competence, much more attention is needed in the L2 contexts. Since many of these studies are most likely limited to identifying the overall reading comprehension abilities of learners, further studies related to the role of oral reading fluency and word reading fluency on the sub-types of reading comprehension are called for. In other words, to supplement the previous research limitations, studies on the oral reading fluency and word reading fluency effects in relation to general L2 reading comprehension, as well as differentiation of two reading skills are in need. Therefore, this study aims to investigate the contribution of oral reading fluency and word reading fluency on reading comprehension abilities of Korean EFL learners, including the differentiated role in relation to sub-types of reading comprehension, namely literal and inferential comprehension.

III. METHODOLOGY

1. Participants

Forty-six Korean middle school EFL third graders participated in this study. All participants were 16-year-old and comprised of 27 male and 19 female students. They attend a local public school in Seoul, Korea, and had low-intermediate level of English proficiency and reading abilities according to the results of a national diagnostic test. None of the participants had lived abroad for more than three months. One English teacher measured participants' word reading fluency, oral reading fluency, and reading comprehension with a diagnostic test before beginning the new semester. Nearly all the students in the class were selected. Only those who specialized in sports were excluded.

2. Measure

1) Word Reading Fluency

English real word reading was measured with twenty words from Wang and Koda (2007), including high frequency regular words such as *best*, low frequency regular words such as *broke*, high frequency exception words such as *are*, and low frequency exception words such as *swamp*. Participants' responses were scored either correct (1 point) or incorrect (0 points). This test was utilized "to measure real word reading fluency, which was defined as the ability to quickly and accurately read aloud real words" (E. H. Jeon, 2012, p. 191).

English pseudo word reading was measured with twelve English nonsense words from Wang and Koda (2007). This test measures phonemic decoding fluency, defined as "the ability to quickly and accurately decode L2 graphemes into their corresponding phonemes" (E. H. Jeon, 2012, p. 190). The raters scored each pseudo words either correct (1 point) or incorrect (0 points), allowing acceptable pronunciation; for instance, *mive* could be said both /mɪv/ and /maiv/ (Glushko, 1979). The interrater reliability (Cronbach's Alpha) of the test was 0.853. Lists of real words and pseudo words are provided in Appendix 1.

2) Oral Reading Fluency

Participants were measured oral reading fluency, defined as "the ability to orally read a connected text fast and accurately" (E. H. Jeon, 2012, p. 191). This test utilizes a 199 word-long passage from *The Dynamic Indicators of Basic Early Literacy Skills 6th Edition* (DIBELS) for the first grade, as shown in Appendix 2. The passage was 2.2 level of Flesch-Kincaid grade and was comparable to reading passages in English textbooks which participants used in the school. Participants read the passage aloud for one minute. Words that were omitted, substituted and hesitation of more than three seconds were scored as error, while self-correction within three seconds was scored as correct. The number of correct words per minute was the oral reading fluency score. The inter-rater reliability of the test was 0.846.

3) Reading Comprehension

The subset of national diagnostic test for 3rd grade middle school students developed by Korea Institute for Curriculum and Evaluation (KICE) was administered to measure students' reading comprehension abilities. The test included 17 reading passages, and each passage was followed by one item principle. Each item was followed by multiple-choice comprehension questions with five possible options, which measured both literal and inferential understanding of the reading. Specifically, eight literal questions contained details that participants were able to find within a reading passage, while nine inferential questions were not directly in the passage. To successfully answer questions, participants must combine what they acquired from reading the text. The raters scored responses either as correct (1 points) or incorrect (0 points). Since each item had one passage, the total score was 17 points. The reliability (Cronbach's Alpha) of the test was 0.858.

IV. RESULTS

Table 1 presents the descriptive statistics for each variable, (i.e., (real) word reading fluency, pseudo word reading fluency, oral reading fluency, and reading comprehension, dividing into literal and inferential comprehension), including the mean, standard deviation, minimum, and maximum scores and the proportion of correct responses. (Real) Word reading fluency attained the highest average score of 14.54, followed by pseudo word reading

fluency, receiving 8.76 on average, out of the maximum possible score 20 and 12, respectively. The two variables (word reading fluency and pseudo word reading fluency) had differences between minimum score 8 and maximum score 18, and between 5 and 12, respectively. Oral reading fluency obtained the lowest average score of 0.919 out of maximum possible score 1, making difference between the minimum and maximum scores as 0.273. In addition, participants received 5.43 and 4.57 on average on the measures of literal and inferential comprehension, out of maximum possible score 8 and 9, respectively. The standard deviations ranged from 0.069 to 4.061, showing acceptable range of variations. Among three variables, which are (real) word reading fluency, pseudo word reading fluency, and oral reading fluency, participants were excellent at oral reading fluency, followed by reading pseudo words. Furthermore, between literal and inferential reading comprehension, they are better in literal comprehension, because it requires them to understand the information which appears directly, rather than intended meaning.

TABLE 1
Descriptive Statistics of Variables (n = 46)

	Minimum	Maximum	Mean	Standard Deviation	Total Score	Pc
(Real) Word reading fluency	8.000	18.000	14.540	2.419	20	0.727
Pseudo word reading fluency	5.000	12.000	8.760	1.968	12	0.730
Oral reading fluency	0.718	0.991	0.919	0.069	1	0.919
Reading comprehension	2.000	16.000	10.000	4.061	17	0.588
Literal comprehension	1.000	8.000	5.430	1.734	8	0.678
Inferential comprehension	0.000	9.000	4.570	2.722	9	0.507

Note. Pc = Proportion of correct responses

Table 2 indicates the relationship among all six variables. The correlation coefficients were all statistically significant at the 0.01 significant level, ranging from .533 (p < .001) to .945 (p < .001), implying that all six variables had statistically significant relationships with each other. To be specific, general reading comprehension was most significantly associated with the inferential comprehension (r = 0.945, p < .001), and literal comprehension (r = 0.858, p < .001), indicating that the participants' inferential and literal understanding seemed to have a significant influence on their general reading comprehension.

Among the variables of (real) word reading fluency, pseudo word reading fluency and oral reading fluency, pseudo word reading fluency showed the co-relationship with reading comprehension (r = 0.742, p < .001), oral reading fluency (r = 0.675, p < .001) and word reading fluency (r = 0.597, p < .001), indicating that three variables are significantly and positively correlated to overall reading comprehension. As for literal and inferential comprehension, they had a relatively stronger relationship with pseudo word reading fluency (r = 0.699, p < .001, r = 0.681, p < .001, respectively), oral reading fluency (r = 0.643, p < .001, r = 0.590, p < .001, respectively), and word reading fluency (r = 0.61, p < .001, r = 0.533, p < .001, respectively). Overall, the three variables had significant correlations not only with general reading comprehension, but also with the two specific types of reading comprehension, namely literal and inferential understanding. In other words, regardless of the sub-types of comprehension levels, improving students' reading fluency of individual words and texts are closely related to enhancing their reading comprehension.

TABLE 2
Correlation Analyses of the Examined Variables

	1	2	3	4	5	6
1. (Real) Word reading fluency	1.000	.597***	.752***	.618***	.610***	.533***
2. Pseudo word reading fluency		1.000	.675***	.742***	.699***	.681***
3. Oral reading fluency			1.000	.670***	.643***	.590***
4. Reading comprehension				1.000	.858***	.945***
5. Literal comprehension					1.000	.644***
6. Inferential comprehension						1.000

***p < .001

Stepwise multiple regression analysis was utilized to estimate not only the prediction equation between three variables (word reading fluency, pseudo word reading fluency and oral reading fluency) and general reading comprehension ability, but also the predictive power between three variables and two-types of reading comprehension; that is literal and inferential comprehension. The results of stepwise multiple regression model are presented in Table 3 and Table 4.

As seen in Table 3, two models (Model 1 and Model 2) accounted for significant variation in reading comprehension. The results of stepwise multiple regression analysis identified that among the three variables, ((real) word reading fluency, pseudo word reading fluency and oral reading fluency), only two variables, pseudo word reading fluency and oral reading fluency, showed a significant contribution in explaining reading comprehension (R^2 = .604). In other words, word reading fluency did not significantly affect reading abilities. As for Model 1, pseudo word reading significantly contributed to reading ability, accounting for a 55.1% variation (R^2 = .551, ΔF = 53.995, p = .000). As for Model 2, pseudo word reading fluency and oral reading fluency were a significant predictor of reading comprehension, explaining a 60.4% variation and accounting for additional 5.3% variation (R^2 = .604, ΔF = 5.723, p = .021). Table 3 also shows that reading comprehension was predicted by pseudo word reading (b = .532), and oral reading fluency (b = .311). In other words, pseudo word reading fluency and oral reading fluency significantly accounted for Korean EFL middle school students' reading abilities. Thus, this analysis showed that two variables,

pseudo word reading fluency and oral reading fluency, were significant predictors of reading comprehension of Korean EFL learners.

TABLE 3
Stepwise Multiple Regression Analysis
Predicting Reading Comprehension

Model	Variables	R^2	ΔR^2	ΔF	*b*	*p*
1	Constant	.551	.551	53.995		.000***
	Pseudo word reading fluency				.742	
2	Constant	.604	.053	5.723		.021*
	Pseudo word reading fluency				.532	
	Oral reading fluency				.311	

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

Table 4 reveals the stepwise regression analysis results on literal comprehension. The result of Model 1 indicated that the ability of pseudo word reading fluency accounted for about 44.8% of the variance in literal understanding, making a significant contribution on achieving literal comprehension questions (R^2 = .448, ΔF = 35.677, p < .001). Furthermore, as shown in Model 2, the addition of word reading fluency led to the conclusion that pseudo word reading fluency and word reading fluency were significant predictors of literal comprehension; explaining an additional 6.9% of the variance (R^2 = .516, ΔF = 6.11, p < .05). However, oral reading fluency was excluded in that the variable and did not make a significant contribution in explaining literal comprehension. Thus, pseudo word reading fluency and word reading fluency turned out to be a significant predictor of literal understanding.

Another stepwise multiple regression analysis was conducted to show the inferential comprehension indicators. Model 1 indicated that pseudo word reading fluency was identified as a significant predictor of inferential understanding, accounting for a 46.4% variance (R^2 = .464, ΔF = 38.091, p < .001). Yet, other two variables (word reading fluency and oral reading fluency) did not make a significant contribution in explaining inferential understanding.

TABLE 4
Stepwise Multiple Regression Analyses
Predicting Literal and Inferential Comprehension

Model	Variables	Literal comprehension			Inferential comprehension		
		R^2	ΔR^2	ΔF	R^2	ΔR^2	ΔF
1	Constant	.448	.448	35.677***	0.464	0.464	38.091***
	Pseudo word reading fluency						
2	Constant	.516	.069	6.110*			
	Pseudo word reading fluency						
	Word reading fluency						

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

Overall, pseudo word reading fluency turned out to be a significant predictor of both literal and inferential comprehension, while word reading fluency was a significant variable in solely predicting inferential comprehension. It can be inferred that oral reading fluency is not a stronger predictor for both sub-types of reading comprehension. In fact, pseudo word reading fluency played a significant role in explaining two different types of comprehension, whereas oral reading fluency did not.

V. DISCUSSION AND CONCLUSION

Using Korean middle school EFL learners, this study attempted to examine the predictive power of all three variables in reading abilities: real word reading fluency, pseudo word reading fluency and oral reading fluency, and identify the effects of those variables on two different types of reading comprehension, literal and inferential comprehension. As for the first research question, one noteworthy finding indicated that both oral reading fluency and word reading fluency had significant positive relationships with not only general reading abilities, but also the two types of reading comprehension, namely literal and inferential reading comprehension.

As evidenced by descriptive statistics, students seemed to have nearly identical working (real) word reading fluency and pseudo word reading fluency. However, students were good at oral reading fluency, indicating that they are more fluent in reading text, rather than reading individual words. Moreover, more literal comprehension questions were correct compared to inferential comprehension. It is possible that they had difficulty in recognizing information insightfully or reading between the lines. In contrast, it may have been relatively easy to find out superficial information. In addition, in respect of the results from correlation analysis, the students who were good at inferential comprehension were likely to have a high reading comprehension ability, followed by literal comprehension. It might be caused by the fact that the level of inferential comprehension is higher than that of literal comprehension.

Interestingly, the three variables (oral reading fluency, (real) word reading fluency, and pseudo word reading fluency) were strongly correlated to reading comprehension, indicating that recognition of individual words and connected texts encourage readers to understand the reading content. These results support the findings from other previous studies (Baker et al., 2012; Geva & Farnia, 2012), in that this study revealed that both oral reading fluency and word reading fluency are closely related to reading comprehension. Also, unlike the past studies (Crosson & Lesaux, 2010; Geva & Famia, 2012), this study attempted to measure English word level reading fluency, separating real-word and nonsense-word reading fluency, to block the interference of L1. In addition, the other findings from this study note that overall reading abilities were strong indicators of oral reading fluency and pseudo word reading

fluency for Korean EFL middle school third graders.

As for the second research question, two sets of stepwise multiple regression analyses were conducted, showing the results regarding two sub-types of reading comprehension, literal and inferential comprehension. One result demonstrated that word reading fluency, consisting of real word and pseudo word reading fluency, was a significant contributor for predicting literal understanding. The other result identified that only pseudo word reading fluency was a predictor of inferential understanding. In other words, pseudo word reading fluency played a much stronger predictive role in explaining not only general reading abilities, but also two different types of comprehension, while oral reading fluency had a significant relationship with only overall reading comprehension. It might be assumed that the recognition of surface information, referring to literal understanding, depends on connecting between individual words and their comprehension directly. On the other hand, the deeper understanding of implied meaning, standing for inferential comprehension, seems to be only related to recognizing overall text. Thus, the findings of this study extended the previous research related to the effect of oral reading strategies on both literal and inferential comprehension (McCallum et al., 2004; Miller & Smith,1985; Schisler et al., 2010), revealing that the positive contribution of word reading fluency on Korean middle school EFL learners' reading abilities.

Overall, this research not only identified the significant correlations between reading fluency and reading comprehension abilities of Korean EFL middle school students, but also demonstrated the valuable indicators for both literal and inferential comprehension. Further, it suggests critical pedagogical implications for effective reading instructions and demonstrated the need to improve word reading fluency in practical EFL classrooms to enhance overall reading abilities. For example, an instructor could give students opportunities to read new words from the texts and read new texts as pre-reading activities, and then students can discuss what they read and help each other read the new words and texts fluently. Moreover, they could participate in while-reading activities such as fast-reading games to enhance their reading fluency. This study, however, was limited because vocabulary knowledge was not taken into consideration for word reading fluency. Another limitation was that the small number of participants limits the generalization of the findings. Also, further research could measure suprasegmentals to be more accurate oral reading fluency, such as separating fluency level, because it impacts the perception of fluency (H. Park & S.C. Rhee, 2018). Thus, further studies, accounting for vocabulary knowledge, L1 interference, and having relatively large sample size, are in need. Nevertheless, this research supplemented the lack of empirical studies of the relationship between reading fluency and reading abilities in Korean middle school EFL context, and expanded the research field to certain types of comprehension in relation to reading fluency.

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APPENDIX 1

Lists of Real and Pseudo Words

A List of Real Words

are	break	pint	write	sank
best	class	main	put	swamp
broke	come	ripe	wax	have
stop	bush	worm	flood	beam

A List of Pseudo Words

boose	fush	rone	tross	bant	mive
boad	reat	bool	clow	nouse	stook

APPENDIX 2

A Passage in Oral Reading Fluency Test

My Soccer Team

I am so happy! I just found out I can be on the soccer team. We have our first practice on Saturday. We practice at my school right after lunch.

Our team is called the Blue Bombers. Our colors are blue and white so I get to wear blue shorts and a blue and white shirt. The number on my shirt is seven. I'm seven years old, too. I think seven must be my lucky number.

We play our first game next week on Saturday. I can't wait to play. My dad said if I practice a lot I will do well at the games. My dad is going to practice with me tonight.

Right after dinner my dad is going to take me to the store to buy some soccer shoes and a soccer ball. Then we will play on the grass by my school. My dad will help me to kick the ball and to run fast and kick the ball at the same time.

I am so excited I don't think I will get to sleep tonight. I need to sleep so that I can be rested and strong for my soccer practice.