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Diagnosis of Korean EFL High School Students' Reading Fluency Using Informal Reading Inventory

Jiseon Ryu
Seoul National University

Byungmin Lee
Seoul National University

The study attempts to examine and diagnose Korean EFL high school students' English reading fluency using an informal reading inventory (IRI). In performing IRI reading tasks, 68 eleventh grade high school students were asked to read aloud the graded texts across 14 levels and answer the reading comprehension questions. As a result of the IRI administration, the data of the 68 students' oral reading fluency levels, word reading accuracy, decoding errors, and oral reading rate were collected. The results revealed that the students' ORF levels are widely dispersed. Notably, about 40 percent of the students seemed to be able to read the text of Levels 2 and 3 independently, while approximately 50 percent of the students showed a frustration level in reading at Levels 3 through 5. Besides, less variability was demonstrated in word reading accuracy except for the lower fluency group. The reading rates were found to increase as the participants' reading levels were higher despite the fact that there exists a significant difference in reading rate within and across the three reading fluency groups. These findings shed light on different aspects of L2 learners' reading development and allow us to draw pedagogical implications in the Korean EFL context.

Keywords: oral reading fluency, oral reading rate, word reading accuracy, informal reading inventory

Introduction

Reading, either in L1 or L2, is a complex process in which the synchronization and coordination of multifaceted components are involved (Alderson, 2000; Grabe, 2009). The reading process involves recognizing words, parsing syntactic structures, and forming semantic propositions. As well as going through these lower-level processes, readers bring their prior knowledge to build a coherent mental representation, which is called the 'situation model' (Van Dijk & Kintsch, 1983). When readers successfully form this mental representation of the text, it is said that they comprehend the text on a deeper level.

While L2 readers go through these multiple processes to comprehend a text, it has been by multiple-choice questions that students' L2 reading ability has often been assessed, especially in the Korean context. Rather than directly observing and diagnosing reading behaviors and comprehension during reading, these standardized, multiple-choice questions are designed to assess after-reading outcomes mediated by deviating factors such as multiple choices and test-taking strategies (Ozuru et al., 2007). This assessment procedure, thus, has raised concerns and questions in that the reading process involved in

answering multiple-choice questions is not likely to be equivalent to the online processing of the text in the non-testing situation (Weir & Khalifa, 2008). In addition, this testing format has been questioned because the meaning of the test score could not provide adequate information on how fluently students can read, what level of reading competency they have, and what strengths and weaknesses they have in comprehending L2 reading texts (McCoubrie, 2004).

While the classroom L2 reading assessment typically makes use of multiple-choice questions in Korean secondary schools, many L2 researchers have proposed to use alternative assessments to enhance the validity of the classroom assessment (Grabe, 2009; Grabe & Jiang, 2014; Leslie & Caldwell, 2009). Grabe (2009), for example, suggests several types of informal reading assessment options that are available to teachers in the classroom. Among these informal assessment choices, the usefulness of the oral reading fluency (Hereafter, ORF) measure has been discussed (Grabe & Jiang, 2014; Fuchs et al., 2001; Shinn et al., 1992; Valencia et al., 2010). Grabe and Jiang (2014), for instance, state that by simply having students read a text aloud, teachers can obtain a variety of information on students' ORF: rate, accuracy, prosody, and comprehension. Furthermore, they emphasize that if these aspects of reading performance are incorporated in reading assessment, teachers can gain "a fine-grained understanding of students' reading ability" (p. 192).

Considering that alternative assessments could provide more information on L2 learners' reading development and complement the drawbacks of the standardized multiple-choice assessments, it seems necessary to assess students' actual reading ability using a variety of assessment tools. Amid this circumstance, the present study sets out to assess and diagnose Korean EFL high school students' reading abilities in a microscopic way by employing ORF measures. This attempt is essential in that it will broaden our insight into how fluently EFL high school readers can read, and, fundamentally, what phases they go through to become skilled readers in L2.

Literature Review

Oral Reading Fluency

L2 Readers cannot develop multifaceted components of reading simultaneously, which are necessarily involved in the reading comprehension process. Each reader progresses to develop each sub-skill to become a skilled and fluent reader (Paris, 2005; Wolf & Kazir-Cohen, 2001). Due to this complex character of the reading process, attaining fluent L2 reading skills is regarded as a challenging feat. A century ago, Huey (1908) described students' progress from the beginner stage where readers' close attention is needed for word recognition, to the fluent reading stage where words can be recognized automatically with speed and accuracy. That is, the more skilled readers are, the more speedily and accurately they recognize words in reading.

This importance of automatic lower-level processes is evident in the automaticity theory (LaBerge & Samuels, 1974). The theory premises the constrained capacity of working memory in human information processing. Within this limited capacity, all the components cannot be processed simultaneously and efficiently when readers should pay attention to every component of reading with consciousness. Successful reading is only possible and guaranteed when enough components are executed automatically within tolerable limits of working memory. Specifically, if the lower-level process is efficient and automatic, it frees up the capacity for higher-level, resource-demanding comprehension processing of the text.

The automatic lower-level process is salient in learners' word recognition and syntactic parsing, which can be represented in the rate of reading speed (Fuchs et al., 2001; Rasinski et al., 2011). On the basis of this assumption, it has been emphasized that ORF serves as an index of overall reading competence (Adams, 1990; Fuchs et al., 2001). While reading a text aloud, a reader changes the letters into sound representation, utilizes this phonological information to access oral vocabulary in lexical memory, and

integrates lexical and syntactic information at the intra- and inter-sentence levels (Rasinki et al., 2012). In other words, when readers read aloud a text fluently, they quickly orchestrate these components in a seemingly effortless and unconscious way.

There has been a general consensus in L1 reading development that ORF is part of a developmental process of building oral language and decoding skills that form a bridge to reading comprehension (Kuhn & Stahl, 2003; Pikulski, 2006). This view of ORF focuses on the reciprocal relationship between ORF and comprehension and considers four dimensions of ORF: oral reading rate, oral reading (decoding) accuracy, quality of oral reading (prosody), and reading comprehension. Aligned with this perspective on the developmental nature of reading fluency, different kinds of reading models have been proposed (Kuhn & Stahl, 2003; Paris, 2005; Pikulski, 2006; Schwanenflugel & Ruston, 2008; Wolf & Kazir-Cohen, 2001).

Wolf and Kazir-Cohen (2001), for instance, who attend to influential components of reading differing over time, posed a developmental, component-based perspective on ORF. Paris (2005) proposed the constrained skill theory by providing an illuminating account of the developmental duration and trajectory of reading sub-skills. According to his theory, reading skills can be categorized into three different skills: constrained, less-constrained, and unconstrained skills. Word reading accuracy, which is a constrained skill with a narrow scope, is learned and mastered quickly during reading development. Oral reading rate is considered as the less constrained skill in that it requires automatic word recognition, phonemic awareness, and syntactic parsing. Unconstrained skills, on the other hand, like reading comprehension and vocabulary knowledge, continued to develop throughout the lifespan.

Recognizing the importance of ORF as an overall reading competence, researchers and educators in the L1 setting view it as an essential goal of reading instruction, especially at lower grades (Rasinski et al. 2012). Considerable attempts have been made to examine how L1 readers develop ORF (Fuchs et al., 1988; Kuhn & Stahl, 2003), incorporate ORF instruction in reading classes, and assess ORF in the L1 context (Hansbrouck & Tindal, 2006; Morris et al., 2013).

In L2 reading research and pedagogy, however, ORF has been relatively less examined as a prominent feature until very recently, and can even be considered a neglected part of the reading instruction and assessment (Grabe, 2010). Taguchi and his colleagues (Gorsuch & Taguchi, 2010; Taguchi et al., 2004) investigate the training effects of fluency instruction on the reading rate and comprehension development in a series of L2 studies. Other researchers, on the other hand, examined the relationship between different aspects of ORF among adult L2 readers (Jeon, 2012; Jiang et al., 2012; Kim, 2012). Studies investigating ORF of English Language Learners (Hereafter, ELL) have focused on how L1 (e.g., Spanish) is related to L2 ORF scores (De Ramirez & Shapiro, 2007; Baker et al., 2011), whether L2 ORF can be a proxy for L2 reading comprehension (Baker et al., 2012; Jiang, 2016; Jimmerson et al., 2013), and how their growth patterns in L2 ORF vary over time (Keller-Margulis et al., 2012). While these studies on L2 readers and ELL have revealed a variety of points with regard to ORF, more studies are warranted in order to give valuable insight into L2 literacy development and thus provide positive feedback to teaching and learning.

Informal Reading Inventory

In the L1 context, students' ORF has been measured using the standardized Curriculum-Based Measurement (Hereafter, CBM). CBM-based reading ability has been investigated extensively and has displayed meaningful implications (Deno, 2003; Deno et al., 2001; Hasbrouck & Tindal, 2006, 2017). In fact, the measurement of ORF has a number of strengths to assess readers' reading comprehension ability in the classroom (Fuchs et al., 1988; Grabe & Jiang, 2014). First, oral passage reading can be performed using any reading material and does not require extensive tester training for administering it (Rubin, 2002). Second, scoring can be done promptly and with higher inter-rater reliability (Jeon, 2012; Jiang et al., 2012; Lems, 2006; Taguchi et al., 2004). Third, unlike silent reading in which test-takers' reading performance is invisible, oral reading can provide a transparent observation of their reading

comprehension processes (Jeon, 2012).

A commonly used method for measuring ORF is to employ informal reading inventories (Hereafter, IRI). The IRI, which is an informal, criterion-referenced assessment, has had a prominent place in the field of L1 reading education for more than 60 years (Morris et al., 2011). It is the individually administered diagnostic testing tool designed to evaluate various aspects of students' reading performances such as word recognition, reading rate, and comprehension. Other than a diagnostic assessment tool, one of the other essential functions of the IRI is to help teachers determine students' independent, instructional, and frustration levels of reading (Rubin, 2002), which allows students to find the proper levels of books. In addition to its practical benefit, research using IRI can provide an insight into how ORF varies according to the different levels of texts (i.e., independent, instructional, and frustration level). As Fuchs et al. (2001) put it, this issue is important since the nature of the text is one of the critical factors which affect students' ORF.

To recapitulate, accumulated research evidence has suggested that for L1 readers, ORF can be an index of overall reading competence and its assessment using several different ways (e.g., IRI) can provide valuable information on students' weaknesses and strengths in reading ability development. Nevertheless, research on ORF assessment has scarcely been carried out in L2 reading contexts (Grabe & Jiang, 2014). Particularly, Korean EFL readers' ORF has been neglected as a research topic (Chae, 2016), and an attempt to examine whether ORF measurement can be a valid tool to reveal L2 learners' reading development and ability has rarely been made. Hence, the present study aims to examine and diagnose the English oral reading abilities of Korean high school students by employing IRI, which is one of the representative ORF measurement tools. Furthermore, it attempts to reveal features that these L2 readers display while orally reading an L2 text, which is within or beyond their reading levels. The following research questions are drawn to guide this study:

1. How are Korean EFL high school students distributed on L2 oral reading fluency levels by an informal reading inventory?
2. How are the features of oral reading fluency components, such as word reading accuracy, decoding errors, and oral reading rate different across the students' oral reading fluency levels?

Methodology

Participants

A total of 68 students from four high schools in Gyeonggi province, South Korea, participated in this study. Among the participants, 26 students were from School A in Yeoju-city, and the other students were from the three schools in Seongnam-city: 26 students from School B, 10 students from School C, and 6 students from School D. When the study was conducted, they were 16 years old and were attending their second year of high school (i.e., equivalent to eleventh grade in the U.S.). They had studied English as a foreign language for approximately nine years, mostly by formal schooling at schools, including private shadow education outside school. Only two students had extensive experience of living and studying in English-speaking countries: One student had lived in an English-speaking country for four years, attending elementary and middle schools. The other student had attended an elementary school for a year in an English-speaking country. Despite their extensive overseas experiences in an English-speaking country, they were not excluded from the data analysis.

The students' overall English proficiency was classified based on a Mock College Scholastic Ability Test (Hereafter, MCSAT)[1]. The detailed English proficiency levels are presented in Table 1. Although the

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[1] This mock-CSAT was hosted by Busan Metropolitan City Office of Education and administered in June 2017. According to Korea Institute for Curriculum and Evaluation (2010), the grade in the MCSAT is assigned as a range

participating students were not controlled in terms of English proficiency, their proficiency levels were widely distributed from lower to higher levels, although the lowest levels of 7, 8, and 9 were relatively fewer than the other six levels.

TABLE 1
The Participants' Distribution of English Proficiency Levels Based on MCSAT

Levels	1	2	3	4	5	6	7	8	9	Total
N	14	7	9	9	16	6	3	1	3	68

Note. Level 1 is the highest, and Level 9 is classified as the lowest level.

Instruments

In order to investigate and diagnose the participants' ORF, the present study employed the Informal Reading Inventory developed by Burns and Roe (2011) among various informal reading inventories. This IRI contains a series of carefully graded test forms for all 14 reading levels from Pre-Primer (PP) through Level 12. These test forms are provided with four sets of reading passages at each reading level. According to the publisher's manual, the reading passages in the IRI are selected primarily from graded materials in basic readers and literature books used in schools at each grade level. Pictures were not included in the texts of this IRI.

For the selection of this IRI, the following criteria were taken into consideration: interchangeability of test sets, the range of grade levels, and the length of the passages. Since informal reading inventories are produced for L1 readers and have not been validated for measuring L2 reading (Grabe & Jiang, 2014), some of the reading tasks and passages needed to be excluded because the content of some passages required culture-specific knowledge. Moreover, since reading comprehension was to be measured based on recall without students' referring back to the passage, the number of words in each passage should be controlled. For these reasons, this IRI was selected among various published IRIs.

Spache Readability and Fry Readability Formulas were used to assess the readability of each passage. Furthermore, the readability of texts was verified again using Flesch-Kincaid Grade Level (Hereafter, FKGL) and Lexile. The detailed information on the reading passages used for ORF measurement is presented in Table 2. As shown in Table 2, there were slight inconsistencies in the readability indices among the readability formulas. The passage of Level 1 had a slightly higher Lexile measure than the passages of Levels 2 and 3, and the passage of Level 5 had slightly lower readability indices than that of Level 4. However, it is said in the publisher's manual that after measuring the readability of reading passages, the passages were readjusted and assured for increasing difficulty in word recognition and comprehension through the field testing.

from 1 to 9 by a percentage of a total number of questions answered correctly. For example, the scores of 90 points or higher fall into Level 1. Scores between 80 and 89 points belong to Level 2 and so on.

TABLE 2
The Readability Indices of the IRI Reading Passages

Grade Level	The Number of Words	Spache/Fry	FKGL	Lexile
Pre Primer	60	1.2	N/A	100L-200L
Primer	94	1.4	N/A	100L-200L
Level 1	108	1.8	N/A	400L-500L
Level 2	120	2.1	N/A	300L-400L
Level 3	133	2	N/A	300L-400L
Level 4	142	5.5	4.0	800L-900L
Level 5	131	4.5	4.0	700L-800L
Level 6	143	6.0	6.3	900L-1000L
Level 7	155	7.0	7.7	1000L-1100L
Level 8	159	8.0	6.3	800L-900L
Level 9	170	7.0	8.1	1100L-1200L
Level 10	184	8.0	6.1	900L-1000L
Level 11	190	9.0	8.9	1000L-1100L
Level 12	195	10.0	10.9	1100L-1200L

Note. FKGL=Flesch-Kincaid Grade Level

Each reading passage from Level PP through Level 3 contains eight comprehension questions, while passages from the other levels include ten comprehension questions. The comprehension questions are open-ended questions and designed to elicit readers' comprehension of main ideas, specific details, inferences, sequence, cause-and-effect, and vocabulary. Even though this study used the original version of questions for the comprehension check, the vocabulary questions of the IRI were excluded according to the previous study, reporting that vocabulary questions of the IRI are not suitable for L2 readers because there are possible differences in vocabulary repertoire between L1 and L2 readers (Taguchi et al., 2004). The reading comprehension for the passages was assessed only to ensure that the participants read the passages for meaning and to determine their L2 reading fluency levels, which is different from more ordinary ORF CBM-based measures focusing on wcpm (Deno et al., 2001).

In order to compare the participants' reading performances on ORF with MCSAT, the reading passages of the MCSAT were also assessed using FKGL and Lexile. There were 25 reading passages in the MCSAT, among which the genre of two reading passages was a leaflet style, having short or fragmented sentences. Those reading passages were excluded since the number of words in each passage was below the threshold required for the readability analysis. The readability indices of the twenty-three passages of the MCSAT are provided in Table 3. The twenty-three passages were widely dispersed from 1.5 to 14.9 in FKGL and 400-500 to 1400-1500 in Lexile with a median of 8.4 in FKGL and 936-1036 in Lexile, which indicates about 50 percent of reading passages are equal to or higher than 8.4 FKGL (1000-1100 Lexile).

TABLE 3
The Readability Indices of the MCSAT Reading Passages

	N	Median	Means	S.D.	Minimum	Maximum
FKGL	23	8.4	8.5	2.86	1.5	14.90
Lexile	23	1000-1100	936-1036	244.74	400-500	1400-1500

Note. FKGL=Flesch-Kincaid Grade Level

Through the IRI measurement, three reading levels (i.e., independent, instructional, and frustration levels), word reading accuracy (Hereafter, WRA) scores, oral reading rate (Hereafter, ORR), and decoding errors were collected. Firstly, WRA scores, the percentage of words read correctly, were calculated. According to the manual, decoding errors were supposed to be categorized into five types: substitution, omission, insertions, self-correction, and examiner-help. However, the present research excluded self-correction, according to McKenna and Stahl (2009), and included mispronunciation in the decoding error types. Mispronunciation was included since the participants were L2 readers, some of

whom might not yet have developed the phonological awareness necessary for word recognition. In order to verify and categorize errors, the participants were asked again whether they knew the meaning and the pronunciation of words after the assessment was completed.

Three different reading levels (i.e., independent, instructional, and frustration) were identified by WRA and reading comprehension scores (Betts, 1946). According to the guidelines provided, the highest level with higher than 98% of WRA and at least 85% of comprehension was the independent level (Hereafter, ORF-IL)[2]. The level with 95% of WRA and 75% of comprehension was classified as the instructional level. If a participant could read either below 90% of WRA or 50% of reading comprehension at a level, that level was categorized as the frustration level (Hereafter, ORF-FL). The criteria for WRA and reading comprehension are presented in Table 4. Since it was not possible to pick one specific level for the students' instructional levels, the instructional levels were excluded from the data analyses (Rubin, 2002)[3]. ORR was computed for each passage read orally. The formula for computing the reading rate (WPM) was 60 multiplied by the number of words in a passage, which is divided by the number of seconds[4].

TABLE 4
Criteria for Three Performance Levels: Independent, Instructional & Frustration

	WRA		Reading Comprehension
Independent Level	98%-100%	and	85%-100%
Instructional level	95%-97%	and	75%-89%
Frustration Level	Below 90%	or	Below 50%

Procedure

The measurement of L2 reading fluency using IRI was administered on a one-on-one basis, and the whole process of the measurement was recorded by one of the researchers. Before each participant began to read the first reading passage, the researcher instructed her/him to read at their normal speed to ensure reading comprehension and told them that they would be given comprehension questions after finishing reading the passage. Next, the researcher provided a brief one-sentence introduction to the passage in Korean (e.g., "Read this to find out what two youngsters decide to do."). As each participant started reading a passage aloud, the researcher checked the recorder to mark the starting time. To mark the decoding errors, the researcher followed along with each participant reading orally. When the last word in the passage was read, the time was marked again, and the researcher proceeded to ask comprehension questions. The participants had to answer the comprehension questions without referring to the passages. They continued to read additional passages until they reached their frustration level. It took approximately 30 minutes to measure each student's reading level.

All the IRI scores were assessed by one of the researchers and an English teacher who has twelve years of teaching experience in high schools. In order to ensure inter-rater reliability, 50 percent of the randomly chosen data were scored independently by them, and then they met to compare scores and discuss discrepancies between their results. After having discussions, the rest of the data were assessed by the researcher. The inter-rater reliability was measured by Cohen's Kappa within a 95% confidence interval. The Cohens' Kappa value was 0.781 for determining reading levels, 0.829 for the WRA scores, 0.755 for categorizing word decoding errors, and 0.885 for the ORR, which indicates a moderate or good agreement, respectively.

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[2] According to the publishers' manual, the independent level is where a student can read the text with at least 99% of accurate pronunciation and answer at least 90% of comprehension questions. However, we adjusted the scores of WRA and reading comprehension at the independent level in order to ensure the minimum score because the number of words in pre-primer and primer levels was less than 100 words and there were eight comprehension questions from pre-primer level to level 3.

[3] Rubin (2002) mentioned the instructional level can span one to three levels depending on the content area of the text or students' interests, background information, and experience.

[4] WPM=(60×the number of words in a passage)/seconds

Results and Discussion

Participants' ORF Levels

As a result of the oral reading measurement using the IRI, each participant's ORF/Independent Level (ORF-IL) and ORF/Frustration Level (ORF-FL) were identified. The participants' ORF-IL ranged from Levels Below-PP to 7. Although Level PP was the lowest level among the scale, seven participants could not even satisfy the criteria of the independent level in reading the passages of Level PP. Meanwhile, there was no participant whose ORF-IL was above Level 7. In general, the most substantial proportion of the participants' ORF-IL was concentrated at Level 2 (17.64%) and Level 3 (22.05%). Those who were at Levels Below-PP to 1 amounted to 24, occupying 35.2% in total. The number of participants ranging from ORF-ILs 2 to 4 was 32, occupying 47% of the whole participants. The smallest number of participants was above ORF-IL 5, accounting for only 17.8%.

With respect to ORF-FL, the participants were distributed from Levels PP to 9. About half of the participants were concentrated at Levels 3 through 5. Levels 4 and 5 accounted for the highest proportion of ORF-FL, occupying 17.65 % and 19.11%, respectively. Overall, slightly less than 90 percent of the students (i.e., 86.7%) in the study reached their frustration level at Level 6 or below. Table 5 displays the participants' ORF-IL and ORF-FL.

Next, on the basis of the participants' ORF level, the Spearman rank-order correlation analysis was conducted to identify the relationship between the ORF-IL and the English proficiency level drawn from the MCSAT. The results indicated that the two tests were significantly correlated ($r = -0.709$, $p < .000$). The moderate correlation between the ORF level and the English proficiency level of the MCSAT displays the validity and usefulness of this ORF measurement by means of the IRI. Specifically, the students whose MCSAT levels were Levels 1 and 2 were mostly concentrated in the ORF Level 5 through 7. Also, the students who received Levels 3 to 5 in the MCSAT were distributed at ORF Levels 2 to 4. Among the students whose MCSAT levels belonged to 6 to 9, only one student could read the passages of higher than ORF Level 1 independently. This result is consistent with the previous research conducted by Paris et al. (2002), which reports acceptable concurrent validity in the correlations ($r = .48$, $-.90$) between a reading comprehension test and IRIs. From this finding, it is possible to say that the data derived from IRI can be used to assess L2 readers' individual growth and document reading ability with high practicality.

TABLE 5
The Participants' ORF Levels

Level	ORF-IL	ORF-FL
	N (%)	N (%)
Below PP	7 (10.29)	N/A
PP	6 (8.82)	7 (10.29)
P	5 (7.35)	5 (7.35)
1	6 (8.82)	1 (1.47)
2	12 (17.64)	8 (11.76)
3	15 (22.05)	9 (13.23)
4	5 (7.35)	12 (17.64)
5	5 (7.35)	13 (19.11)
6	5 (7.35)	4 (5.88)
7	2 (2.94)	5 (7.35)
8	N/A	3 (4.41)
9	N/A	1 (1.47)
Total	68 (99.96)	68 (99.96)

One meaningful finding from the IRI assessment results is that the participants' ORF levels were widely dispersed, although they were in the same 11th grade in high schools. Their independent reading levels ranged from Levels Below-PP to 7, and their frustration levels were from Levels PP to 9. For

instance, 7 students (i.e., accounting for 10.29%) reached the frustration level when they read Level PP texts. Approximately 37.69% of the participants seemed to be able to read texts of Levels 2 and 3 on their own, while only about 25% of the participants seemed to be able to read texts independently, which are equivalent to and higher than Level 4. Concerning the frustration level, the results reveal that there is a higher probability that about 50% of the participants would experience difficulty in comprehending texts ranging from Levels 3 to 5.

This finding seemed to reveal a significant and controversial point with regard to high school students' L2 reading ability in the Korean educational contexts. According to Kim and Choi (2015), who analyzed the readability indices of the passages in the high school English textbooks, the mean FKGL of the texts in these textbooks was 7.5, which seems to be equal to Level 7 by ORF. Considering the participants' distribution along with their reading fluency levels, only two students among the 68 students (2.94%) seemed to be able to read the similar level of the textbooks independently, and most of them are highly likely to grapple with understanding the passages with less than 50% of comprehension. Given the fact that the textbooks are written for instructional purposes in Korean high schools, the readability level of the textbooks is deemed to be too challenging for many students to read with instructional assistance.

Another issue is the assessment of L2 reading ability. As presented in Table 3, the median FKGL of the reading passages of the MCSAT is 8.4. It could be inferred that many students participating in this study could not understand the texts in MCSAT without assistance since most of these texts are presumably beyond their independent reading levels and even close to or beyond their frustration levels. Furthermore, previous studies (e.g., Koh & Shin, 2017; Kim & Choi, 2015) reported that the average readability of passages in the College Scholastic Ability Test (Hereafter, CSAT) is even higher than MCSAT (i.e., mean 9.75 in FKGL). Given that more than 60% of the participants could not comprehend the texts of Level 4 and above, it is questionable whether texts of CSAT could measure high school graduates' reading comprehension ability with appropriate validity, although the participants are not representing the entire Korean high school graduates.

Analyses of ORF Components

The second goal of the study was to examine how the components of ORF (i.e., WRA, ORR, and decoding errors) would be featured across the participants. The following three groups were formed to capture the students' oral reading features in more detail: higher fluency (Hereafter, HF), intermediate fluency (Hereafter, IF), and lower fluency (Hereafter, LF) groups. The HF group included the readers whose ORF-IL was for upwards of Level 5, the IF readers' ORF-IL ranged from Levels 2 to 4, and that of the LF group was below Level 1. The summary for the distribution of the participants is provided in Table 6.

The ORF components were analyzed in terms of whether the scores of the three components differed according to the students' reading fluency levels. The WRA data and decoding errors were analyzed only at ORF-FL because the participants' WRA scores were all over 99% at ORF-IL. On the contrary, ORR data were calculated only at their own ORF-IL according to the previous research (Morris et al., 2013).

TABLE 6
Reading Fluency Group by ORF-IL & MCSAT Level

Group	ORF Level	MCSAT Level									Total
		1	2	3	4	5	6	7	8	9	
Low Fluency	Level 1 and below	1	1	0	4	6	6	2	1	3	24
Intermediate Fluency	Levels 2 - 4	3	4	9	5	10	0	1	0	0	32
High Fluency	Levels 5 and above	10	2	0	0	0	0	0	0	0	12

Word reading accuracy

WRA was analyzed in terms of whether the scores differ according to the students' reading fluency levels. Since the participants' WRA scores were all over 99% at ORF-IL, the data were analyzed only at ORF-FL. Interestingly, variance in WRA scores was rarely observed even at ORF-FL. Table 7 illustrates the means, the range, and standard deviations of the WRA scores across the reading fluency groups at ORF-FLs. As shown in Table 7, most of the participants could read the passages almost without committing errors. Only LF readers made errors in reading texts with their frustration levels, whereas IF and HF groups could read words accurately with an average of higher than 99% accuracy.

TABLE 7
The WRA Scores Across the Fluency Groups at ORF-FL (%)

Group	N	*Mean* (%)	*SD*	Min	Max
LF	24	97.29	3.49	90	100
IF	32	99.21	1.26	95	100
HF	12	99.75	0.45	99	100

In order to examine what types of decoding errors were committed, the errors were collected at the frustration level. Most decoding errors were found in the LF group, particularly from those whose ORF-IL was Level Below-PP. The total number of decoding errors found was 86. Among them, the proportion of mispronunciation (79.06%) marked remarkably the highest among the five types of errors, followed by examiner-help (17.44%), substitution (2.32%), and omission (1.16%). Insertion errors were not found in this group of readers.

The findings regarding decoding errors indicate that some participants belonging to the LF group might not have sufficient phonological knowledge for some words of high frequency. Not only did they mispronounce words in the texts ranging from Levels PP to 1, but the examiner had to help them to pronounce words properly since they did not know how to pronounce some words. In fact, the mispronounced words were highly frequent words in any context (e.g., better, glad, hear, ran, sad, and so on). Given that the readability of the texts was the lowest (i.e., Levels PP through 1 with approximately 60 to 100 words), the amount of mispronunciation errors suggests that these high school students would be limited in recognizing basic phonological patterns of English vocabulary. It implies that the source of the errors found in the LF group was mainly the insufficient phonological knowledge, which seems to serve as a precursor for later reading ability (Ehri, 2005; Koda, 2005; Paris, 2005). With regard to this, previous studies provide insight into the interpretation of the result. The studies that explore EFL students' word recognition pattern (Jeon, 2016; Yin et al., 2007) on the basis of Ehri's (2005) phase theory of word recognition showed that the students of low phonological awareness had difficulty pronouncing words of high frequency. Also, as their proficiency levels are higher, their patterns of word recognition corresponded to those shown at the later stage of the phase model. Even though it is hard to pinpoint at which phase of Ehri's model the readers in this study are located, it can be inferred that they are in the early stages such as the *pre-alphabetic* or *partial alphabetic* phase of Ehri's model (Jeon, 2016; Yin et al., 2007).

Another point to note is that the participants in LF appeared to fail to activate the words' meaning as well as the sound information in reading texts of Levels P through 1. In fact, when they read sentences from the text of Level 1, some learners could not read aloud high-frequency words accurately (e.g., small, change, follow, children, etc.). For example, one student yielded a sentence like "*They are smell and can fit well in my smell room.*" instead of "*They are small and can fit well in my small room.*" When this student was asked questions for comprehension check, he responded to the questions based on the meaning of the substitute, 'smell' rather than 'small'. A sample answer to a comprehension question is presented below[5].

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[5] The question and the answer were all given in Korean.

Question: "*What probably caused him to suggest fish for her pet*?"
Answer: "*I don't know exactly, but he said they are smelly*"

Although the student knew the meaning of the words he pronounced (e.g., smell), he failed to pronounce the words correctly and to retrieve the meaning of the words (e.g., small), when asked to pronounce the original words in the text. Considering the fact that some of these LF students are 11th-grade high school students, it seems problematic that these high school students are grappling with pronouncing some words accurately in the texts of Levels P to 1, despite almost nine years of school-based English learning.

When it comes to the amount of vocabulary that an L2 reader should know for fluent reading, the idealistic goal of L2 vocabulary is above 10,000 words to read any kind of text (Grabe, 2009). Also, given that at least 98 percent of word knowledge of a text is a generally accepted expectation for reading comprehension (Nation, 2001), many high school students in Korean secondary schools might have to encounter highly challenging passages in instructional and assessment contexts, in which many passages are not within the reach of reading comprehension.

Oral reading rate

The ORR of each participant was calculated at their independent reading levels. The data of the reading rate are presented in Table 8. At ORF-IL, the ORR of the HF readers was the highest (130.36 WPM), followed by the IF readers (115.69 WPM) and the LF readers (104.36 WPM).

TABLE 8
The ORR at ORF-IL(WPM)

	N	*Mean* (WPM)	*SD*	Min	Max
LF	17	104.36	16.22	63.1	131.16
IF	32	115.69	20.46	72.54	153.46
HF	12	130.36	21.84	94.69	171.6

Note. Among the participants, seven participants were excluded from LF as they could not read the Level PP passage independently.

The above reading rates for each group were those calculated at the students' independent reading levels, which means that each participant read different levels of texts so that it is not appropriate to compare these reading rates literally. One notable finding is that there exists a significant intra-group variance at each ORF-level. For example, a reader in the HF group read as fluently as 171.7 words per minute, whereas a reader in the same group read as slowly as 94.69 words per minute, which seems to be about as half speed as that of the fastest one. The pattern was found to be similar across the three fluency groups.

Another significant result is that while HF readers read the text mostly from Levels 5 to 7 at about 130 WPM, LF readers read the texts ranging from Levels pp through 1 at the rate of about 104 WPM. The intergroup differences in reading rate reveal that there exists a significant discrepancy among these high school EFL readers in terms of their L2 reading fluency. Given that reading rate can serve as an indicator for reading ability in L1 (Fuchs et al., 2001; Hansbrouk & Tindal, 2006), these differences in reading rate seem to imply different reading abilities among L2 learners. Furthermore, the fact that the reading rate was measured in the reading-while-comprehending condition in the current study supports the potential relationship between reading rate and reading ability in L2, which is contradictory with the previous studies (Jeon, 2012; Lems, 2006). Another to note is that they read the different levels of texts with different reading rates. It reveals that it is highly likely to exist even wider gaps in their L2 reading fluency. However, the overall reading rates of these three groups do not seem to be significantly different than expected despite the 26 WPM difference between HF and LF readers. Some studies (e.g., Chiappe & Siegel, 1999; Chiappe et al., 2002; Lesaux & Siegel, 2003) have reported that L2 readers in an early stage of L2 reading acquisition, tend to develop a rapid naming skill, which seems to be performed well up to

the level of Ll readers even though they are likely to lag behind other areas of reading. Thus, if the lower-level students are provided with an opportunity to read their independent or instructional level of L2 text inside and outside the classroom, they could potentially read a similar amount of L2 texts with the higher groups and could accelerate their L2 reading development.

In addition, the concept of fluency or reading rate in L2 has rarely been discussed in an EFL assessment context, although it is practically important since various L2 reading assessments set a time limit. For instance, CSAT in Korea sets a time limit[6] when it tests EFL high school graduates' L2 reading ability. The number of words in the reading section is literally over 4,300, which means that within the time constraint, the readers are supposed to read at least at the speed of above 100 words per minute. Since the time constraint is one of the critical factors in determining the test validity (Pitoniak et al., 2009), it seems necessary to consider this factor in designing a standardized L2 reading comprehension test and also to specify an appropriate reading rate as one of the critical criteria for L2 reading assessment.

Conclusion

The present study was conducted to diagnose how fluent Korean EFL high school students are in reading in English and provide alternative information regarding their current reading ability and fluency on the basis of the IRI measurement. One of the significant findings is that the participants' ORF levels were widely dispersed, even though they were at the same grade in high schools. In particular, the text level at which they can read independently with a proper degree of comprehension seemed relatively lower compared to those of their textbooks or standardized high-stakes L2 reading assessments. Furthermore, this study furthers our understanding of L2 students' weaknesses and strengths by analyzing EFL students' word reading accuracy, decoding errors, and reading rate, which vary depending on their reading proficiency. Specifically, some students in the LF group still seem to be limited in phonological knowledge to process sound information of frequent English words after almost 9 years of formal English education at schools.

Based on the major findings aforementioned, the conclusions drawn from the present study propose the following implications for L2 reading education. First of all, the qualities of the fluent reader need to be considered in the L2 educational context if the ultimate goal of the L2 reading instruction is to foster fluent readers in L2. Considering that fluency development involves automatic processes of written information in a text, it is pivotal to provide a large amount of L2 reading practice and exposure to the appropriate level of texts to the readers inside and outside the classroom. In particular, teachers should provide students with opportunities to read a large amount of reading materials on their own. In order to find the appropriate level of book for each student, it is also important that teachers are well aware of their students' reading abilities and developmental levels with an appropriate diagnostic tool. As this study reveals, students' reading abilities and fluency are measured using the IRI, which could be relatively easily implemented in the classroom.

Subsequently, the present study offers valuable research insight into the reading assessment and diagnostics of L2 readers. Explicit in the results of the current study is that the reading passages of MCSAT or CSAT seem to be too difficult for many students to read with a moderate degree of comprehension. Since the text difficulty is one of the critical factors contributing to the difficulty level of the reading comprehension test (Freedle & Kostin, 1993, 1999), the test validity and reliability will be critically compromised as it is implausible to make appropriate inferences to test taker's reading ability based on scores of the test, which is too difficult (Fulcher & Davidson, 2007). Furthermore, with the introduction of the criterion-referenced English test into the CSAT in 2018, more empirical research is called for to investigate the actual reading abilities of L2 readers. Even though the current CSAT proclaims that it is a criterion-based assessment, the test results do not tell specifically what levels of fluency or what level of L2 reading ability students can perform, only displaying their relative position among the test-takers. In this

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[6] According to KICE, students are given 45 minutes for the reading section of the CSAT.

sense, IRI is worthy of notice as a classroom-based reading assessment tool to monitor students' L2 reading development and fluency.

The present study has some limitations that need to be considered concerning the methodology in spite of the fact that each experiment was meticulously designed. This study imported the reading passages directly from IRI without modification. Even though IRI has been probed in terms of reliability and validity (Nilsson, 2008), measuring ORF using a single IRI might not fully demonstrate students' reading skills. For example, the result of the current study showed that some students who had a relatively high score on MCSAT were placed in the LF group. Even though similar discrepancies between ORF and standardized test scores were observed in L1 contexts (Valencia et al., 2010), this issue should be addressed in future studies. It is recommended to include other informal assessments to complement the result of an IRI. Also, the sample size was relatively small due to the test format requiring individualized test administration. Thus, the findings with respect to L2 readers' reading rate and features of word recognition errors cannot be generalized to other groups of students. It might have been better to include more subjects from more diverse regions. Also, the subjects of this study were 11th-grade high school students, which seem to be relatively at the final stage of their formal L2 learning. Thus, a more extensive study, including elementary, middle, and high school students, seems to be necessary to examine stage-based characteristics of L2 reading fluency and developmental trajectory. If a future study is conducted on learners at different grades, a more integrated picture of the reading fluency development of EFL students will be obtainable.

Acknowledgements

The Authors

Jiseon Ryu is a doctoral student at the Department of English Education at Seoul National University. Her research interests include L2 reading and writing development, language testing, and cognitive psychology.

Department of English Language Education
College of Education
Seoul National University
Seoul, 08826, Korea
Tel: +82 028807670
Email: willowy03@snu.ac.kr

Byungmin Lee (corresponding author) is a professor of English Language Education at Seoul National University. He is interested in foreign language learning and education, L2 literacy acquisition and development, English curriculum, and bilingual education policy.

Department of English Language Education
College of Education
Seoul National University
Seoul, 08826, Korea
Tel: +82 028807677
Email: bmlee@snu.ac.kr

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