

A Continuity and Difficulty Analysis of the Reading Texts in Korean High School English Textbooks with the 2015 Revised National Curriculum

Kyungmo Yang and Jiyoung Bae*

Yang, Kyungmo, & Bae, Jiyoung. (2022). A continuity and difficulty analysis of the reading texts in Korean high school English textbooks with the 2015 Revised National Curriculum. *English Teaching*, 77(s1), 43-62.

The purpose of this study was to investigate the continuity of reading passages of Korean high school English textbooks with the 2015 Revised National Curriculum using Coh-Metrix, a software that analyzes English texts in a range of linguistic features. Twenty-one English textbooks were analyzed: 11 High School English, five High School English I, and five High School English II. Only reading passages in textbooks were analyzed. Coh-Metrix indices related to basic counts, lexical features, syntactic features, cohesion, and readability were analyzed. Results revealed significant differences between High School English and High School English I and II, but no such differences exist between High School English I and II. This study implies that continuity of reading difficulty in terms of lexical, syntactic, and readability characteristics among High School English, English I, and English II textbooks should be considered.

Key words: English textbooks, 2015 Revised National Curriculum, continuity analysis, Coh-Metrix

*First Author: Kyungmo Yang, Teacher, Sejong Girls' High School

Corresponding Author: Jiyoung Bae, Professor, Department of English Education, Kongju National University; 56 Kongjudaehakro, Gongjusi, Chungnam 32588, Korea; Email: jybae423@kongju.ac.kr

Received 31 May 2022; Reviewed 15 July 2022; Accepted 12 August 2022



© 2022 The Korea Association of Teachers of English (KATE)

This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0, which permits anyone to copy, redistribute, remix, transmit and adapt the work, provided the original work and source is appropriately cited.

1. INTRODUCTION

Frequent exposure to appropriate English input or texts is directly linked to success in language learning (Krashen, 1993). For this reason, the significance of English textbooks in language teaching and learning has been widely stressed, especially in EFL settings where the textbook is the main source of language input for students (Bae, 2019a; Charalambous, 2011; Jeon & Lim 2009; Ryu & Jeon, 2020). The importance of the development and selection of textbooks has also been acknowledged (Cunningsworth, 1995; McGrath, 2002; Shannon, 2010). For this reason, much attention has been given to analyzing such an important asset in Korea recently (Bae 2019a; Jeon 2014; Kim & Yang, 2012; Park & Jung, 2020). Coh-Metrix is a tool particularly useful in textbook analysis as it provides various linguistic measures ranging from surface level measurements like several sentences in a text to measures requiring deep-level analysis such as imageability of a word and readability indices FRE (Flesch Reading Ease) and F-KGL (Flesch-Kincaid Grade Level) (Graesser, McNamara, Louwerse, & Cai, 2004).

Such an in-depth analysis of English textbooks with the 2015 Revised National Curriculum is required. It can provide helpful insights as to how English textbooks with the 2022 Revised National Curriculum should be written. Problems found from the results of Coh-Metrix can act as a general guideline. Many previous types of research indeed indicate that many problems exist especially with the continuity of English textbooks; the problems include no changes in the readability and complexity in different grade-level textbooks, some indices decreasing in the level of complexity in the higher grade level textbooks, or complexity and readability increasing dramatically, with the FRE measure increasing by the amount greater than the difference which exists between textbooks designed to instruct native English students (Bae, 2019a; Jeon, 2014; Lee, 2020; Park & Jung, 2020).

Using Coh-Metrix, this study analyzed 23 indices related to basic counts, lexical features, syntactic features, cohesion, and readability measures of the text passages in 11 High School English, five High School English I, and five High School English II textbooks. The results were then further analyzed to see if continuity exists among all three grade-level textbooks.

1. What is the difference in the amount of reading texts in high school English textbooks that reflect the 2015 revised curriculum?
2. What are the differences by grade level in the linguistic characteristics (vocabulary, syntax, cohesion) of high school English textbook reading passages that reflect the 2015 revised curriculum?
3. How does the readability index of high school English textbooks that reflect the 2015 revised curriculum differ by grade level?

2. LITERATURE REVIEW

2.1. English Textbooks in the Republic of Korea

To teach and lead Korean students to become global leaders, communicative competence is emphasized in the 2015 Revised National Curriculum (Ministry of Education, 2015). The environment setting, however, is EFL in Korea in which exposure to language input needed to harness such competence is difficult to find outside the classroom (Al-Jamal & Al-Jamal, 2014; Kim, 2009). English textbooks are primary and almost an exclusive linguistic input to many students (Charalambous, 2011; Jeon & Lim 2009; Ryu & Jeon, 2020). For this reason, much effort has been continuously put into developing new textbooks that can achieve the goals and objectives mentioned in National Curriculum. As the outline of the 2022 Revised National Curriculum is to be released within a year and implemented starting from 2025, careful attention must be given to developing new English textbooks that have appropriate readability levels, lexical and syntactic complexity, and general continuity across grade levels.

The current English textbooks used in school settings have been developed under the 2015 Revised National Curriculum. Starting with elementary school 1st and 2nd grade students in 2017, it has been extended to all students in the year 2020. A notable difference between the 2015 Revised National Curriculum and the 2009 National Revised Curriculum with English subjects, in general, is that the prior contains more learning elements in the listening and speaking domain in elementary school English and that it gives more emphasis on reading and writing skills in high school English courses (Ministry of Education, 2009, 2015).

Another distinctive feature of the 2015 Revised National Curriculum regarding English is the number of English-related subjects and the variety of English subjects with different contents. The 2015 Revised National Curriculum offers students various English courses which suit their needs. After completing the first year of high school in which all students take the same general subjects, students are given choices as to what subjects they wish to take. These subjects are called elective subjects, and there are two types of elective subjects: general elective and career-related elective subjects. The general elective English subjects include English I, English II, English Reading and Writing, and English Conversation. Likewise, career-related elective subjects contain Practical English, Career English, Culture of English Speaking Countries, and English Literature. The total number of English subjects under the 2015 Revised National Curriculum is nine which can be summarized in Table 1 below.

TABLE 1
English Subjects under the 2015 Revised National Curriculum

Area	Domain	Subjects	
		Common	English
Basic	English	General Elective	English I, English II, English Reading and Writing, English Conversation
		Career-related Elective	Practical English, Career English, Culture of English Speaking Countries, and English Literature

The purpose of general elective English subjects is to enhance students' general capacity for four language skills, listening, speaking, reading, and writing. The aim of career-related elective subjects, as announced by the Ministry of Education (2015), is to promote the skills and capacities that students would need when pursuing their fields of studies or completing tasks in a workplace. As aforementioned, many studies have been conducted to examine the continuity of English textbooks under both the 2009 and the 2015 Revised National Curriculum. Though not all reading measures were not statistically significant, higher scores in the text complexity and readability indices of high school English textbooks under the 2015 Revised National Curriculum proved that the intended guideline is being adhered to (Park & Jung, 2020). However, the question of whether the continuity in terms of text complexity and readability among High School English, I, and II of the 2015 National Revised Curriculum exist has not been answered yet. If each subsequent grade textbook has an appropriate increase in the Coh-Metrix measures, it may be said that the continuity among them is secured.

2.2. Previous Studies on the Continuity of English Textbooks

Recently, much research has been conducted on the text complexity, readability, and continuity of English textbooks using Coh-Metrix (Bae, 2019a; Jeon, 2014; Lee, 2020; Park & Jung, 2020). Coh-Metrix is a web-based tool devised by the Institute for Intelligence Systems at the University of Memphis. It is useful in that it allows deep-level analysis as well as surface-level analysis. From plain linguistic features of English text such as pronoun incidence and a number of modifiers per noun to psycholinguistic features of English like age of acquisition and familiarity of a concrete word, Coh-Metrix can analyze 106 different indices of any given text under 15,000 characters at once. Researchers in the field of linguistics and language pedagogy effectively exploit Coh-Metrix due to its easiness and practicality.

The study of continuity in English textbooks within grade levels and across grade levels has been conducted by many teachers and experts in the field of TESOL. For instance, Kim and Yang (2012) analyzed continuity between elementary school 6th grade English textbooks

and middle school 1st grade English textbooks with the 2007 Revised National Curriculum. The study showed that there were significant differences in the two textbooks in terms of basic counts, the word before the main verb, and F-KGL (Flesch-Kincaid Grade Level). They noted that the significant differences existed mostly in the written language and not in the spoken language; there was found to be no significant difference in most surface linguistic features in the spoken language between the two-grade level textbooks. There were, however, significant differences in both spoken and written language with indices related to deep linguistic features. As the written language did not show significant differences in other indices than the ones mentioned above, it was concluded that there was a need for more careful selection and modification of English textbooks.

Likewise, Jeon (2011, 2014, 2015) conducted several studies on the continuity of English textbooks across grade levels. His study in 2011 on the continuity of Middle School English 1 and 2 revealed that the continuity is well established on some Coh-Metrix measures like basic count, standard readability, and cohesion, but not well constructed for other measures such as word frequency, co-reference cohesion, and semantic cohesion. A similar result was shown in his study on the continuity of High School English, I, and II with the 2009 Revised National Curriculum; measures related to a number of words and sentences, F-KGL, words before main verbs, lexical diversity, co-reference cohesion, and semantic cohesion did not show continuity.

There have been many studies focused on analyzing the continuity of the English reading passages in the textbooks, all under the 2015 Revised National Curriculum. Some of the studies include an examination of continuity of English textbooks between Elementary 6th grade and Middle School 1st grade (Bae, 2019a), Middle School 1st and 2nd grades (Bae, 2019b), and Elementary 5th and 6th grades. There are also studies in which more than two grades have been considered: Hwang (2019) analyzed the continuity of English textbooks of four different grade levels, from Elementary 5th grade to Middle School 2nd grade and Ryu and Jeon (2020) analyzed Middle School English textbooks from grade 1 to 3. Despite the previous research on the continuity of English textbooks under the 2009 Revised National Curriculum disclaiming the need for level adjustment in the level difficulty and other Coh-Metrix indices, the majority of these studies have found that the problem has not been fixed; the problem of the dramatic increase in the text difficulty as shown by both surface and deep level measurement has not been corrected. Moreover, it was found that the problem with the continuity in the text difficulty between grades and school levels has not been improved in terms of the number of sentences and readability indices due to no specification of the amount of learning and readability values in the textbook development guidelines (Ahn & Bae, 2021; Park & Jung, 2020; Ryu & Jeon, 2020).

It is surprising to note, given the high level of social pressure and attention that is put on Korean high schools, that there was no study conducted on examining the continuity of high school English textbooks from grades 1 to 3. Similar to the study conducted by Ryu and Jeon (2020) that analyzed all three grade levels of middle school English textbooks, there is a need for a study focusing on and analyzing all three textbooks of high school English textbooks as well. As such this study used the Coh-Metrix program as well as the indices used in the previous studies to examine a total of 21 high school English textbooks, with the number of textbooks for English, English 1, and English 2 being 11, five, and five, respectively. The study focused on surface-level measurement and analysis as well as deep-level measurement and analysis.

3. METHOD

3.1. Research Subjects

The present study selected a total of 21 Korean high school English textbooks to analyze. All of the textbooks are written under the guideline of the 2015 Revised National Curriculum. 11 High School English, designed for grade 1, five High School English I, targeting grade 2, and five High School English II, intended for grade 3, were selected for analysis. The list of textbooks used in the study is presented in Table 2. The number of chapters contained, which directly corresponds to the number of text passages, in High School English 1 and 2 were all exactly 6 each while that of High School English varied slightly, the number being either 8 or 10.

TABLE 2
High School English Textbooks Used in This Study

Textbook	Author	Publisher	Year
High School English	Lee et al.	Chunjae Education Inc.	2015
High School English	Kim et al.	Chunjae Education Inc.	2015
High School English	Choi et al.	Kumsung Publishing Co.	2015
High School English	Kim et al.	Neungyule Education Co.	2015
High School English	Yang et al.	Neungyule Education Co.	2015
High School English	Kim et al.	Darakwon Inc.	2015
High School English	Lee et al.	Doosan Dong-A Co.	2015
High School English	Hong et al.	Visang Education Co.	2015
High School English	Park et al.	YBM Sisa Co.	2015
High School English	Han et al.	YBM Sisa Co.	2015
High School English	Min et al.	Jihaksa Publishing Co.	2015

High School English I	Lee et al.	Chunjae Education Inc.	2015
High School English I	Choi et al.	Kumsung Publishing Co.	2015
High School English I	Kwon et al.	Doosan Dong-A Co.	2015
High School English I	Park et al.	YBM Sisa Co.	2015
High School English I	Han et al.	YBM Sisa Co.	2015
High School English II	Lee et al.	Chunjae Education Inc.	2015
High School English II	Choi et al.	Kumsung Publishing Co.	2015
High School English II	Kwon et al.	Doosan Dong-A Co.	2015
High School English II	Park et al.	YBM Sisa Co.	2015
High School English II	Min et al.	Jihaksa Publishing Co.	2015

3.2. Research Procedure and Research Tool

The present study selected and analyzed textbooks High School English, I, and II with the 2015 Revised National Curriculum. The main reading texts of the textbooks were extracted and each reading passage was analyzed then the results were converted to text files with various Coh-Metrix measures. The number of the corpus of reading text passages of High School English, I, and II, were 92, 30, and 30, respectively.

Coh-Metrix web version Coh-Metrix 3.0 was used in the analysis. Coh-Metrix 3.0 provides 106 different indices which are categorized together under 11 labels of descriptive, text easability principle component scores, referential cohesion, LSA, lexical diversity, connectives, situation model, syntactic complexity, syntactic pattern density, word information, and readability. Only 23 measures representing the amount of reading passages, lexical features, syntactic features, cohesiveness, and readability were selected in the present study. Following the line of precedent research on the analysis of English textbooks (Ahn, 2018; Bae, 2019a, 2019b; Jeon, 2011, 2015), the study categorized the 23 measures into five categories: basic counts, lexical features, syntactic features, cohesion, and readability as shown in Table 3.

TABLE 3
Coh-Metrix Indices Used in This Study

Category	Index	Index
Basic counts	DESSC	Number of sentences
	DESWC	Number of words
	DESSL	Sentence length, number of words, mean
	DESPL	Paragraph length, number of sentences in a paragraph, mean
Lexical features	LDTRC	Lexical diversity, type-token ratio
	WRDFRQc	CELEX word frequency for content words, mean
	WRDAOAc	Age of acquisition for content words, mean
	WRDFAMc	Familiarity for content words, mean
	WRDCNCc	Concreteness for content words, mean
	WRDIMGc	Imagability for content words, mean
	WRDPOLc	Polysemy for content words, mean
Syntactic features	SYNLE	Left embeddedness, words before main verb, mean
	SYNNP	Number of modifiers per noun phrase, mean
	DRNP	Noun phrase density, incidence
	DRVP	Verb phrase density, incidence
	DRAP	Adverbial phrase density, incidence
	DRPP	Preposition phrase density, incidence
	DRPVAL	Agentless passive voice density, incidence
Cohesion	CRFAO1	Argument overlap, adjacent sentences, binary, mean
	LSASS1	LSA overlap, adjacent sentences, mean
	CNCA11	All connectives incidence
Readability	RDFRE	Flesch Reading Ease
	RDFKGL	Flesch-Kincaid Grade level

3.3. Data Collection and Data Analysis

The period of this study is from October 2021 to March 2022, and the study proceeded with the procedures of the research plan and data collection, study design, corpus construction, and result analysis. First, the research topic and purpose, research tools, and methods were designed based on the need to verify whether there is an excessive difficulty gap among the three different grade English textbooks under the 2015 Revised National Curriculum. Second, to build the corpus, English textbooks to which the 2015 Revised National Curriculum was applied were classified by the publisher, and PDF files for teachers were downloaded and used to build the corpus. The total of 60 reading passages of 21 English textbooks to be analyzed was separated by unit and grade by the publisher and saved as text files (.txt). Third, after constructing a corpus with a total of 528 files, Coh-Metrix measurements were checked for each textbook unit, and 23 of the indicators corresponding

to the amount of language learning, linguistic characteristics (vocabulary and syntactic features), cohesion, and readability were selected. Fourth, descriptive statistics were obtained by converting the collected data into SPSS, and ANOVA verification was used to examine the differences between adjacent grades. All analysis items were judged for statistical significance at a significance level of .05. As a post-test, Bonferonni's test was performed.

4. RESULTS

4.1. Comparison of the Amount of Reading Passages

To analyze the inter-grade relevance of reading passages in high school English textbooks reflecting the 2015 revised English curriculum reading passages from a total of 21 textbooks, including 11 high school English textbooks, 5 English I textbooks, and 5 English II textbooks were analyzed using Coh-Metrix in this study. First, in order to analyze how the amount of learning that is directly related to students' English learning burden changes as the grade goes up, average values for each grade were analyzed for the number of words and sentences, average sentence length, and average paragraph length in the reading passage among the indicators corresponding to the basic calculation of the Coh-Metrix. Moreover, based on this, one-way ANOVA was used to examine whether there was a statistically significant difference between grades. Specific results are shown in Table 4 below.

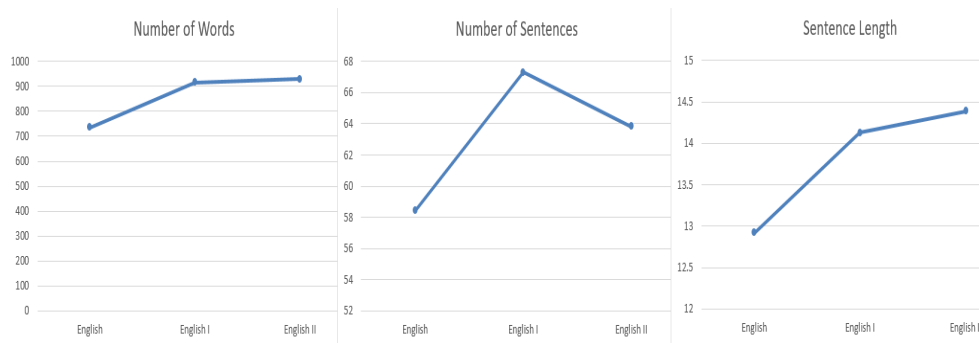
The result of analyzing the average number of words included in a single reading passage showed that there was a statistically significant difference between High School English and English I and English II. In such a situation where there is a statistically significant difference among all grades, it is appropriate to look at the continuity by looking at the increase by each grade. As a result of Bonferonni's test, specifically, it was found that High School English was statistically significantly lower than the average number of words in English I and English II textbooks. However, there was no difference in the average number of words in the reading passages of English I and English II textbooks. High School English and English I differed in the average number of words per reading passage by 179. It is natural that the amount of learning increases as the grade goes up, and even compared with the study result of Bae and Kim (2021) which showed that the average number of words per reading passage in English textbooks increased from middle school 3rd grade to high school 1st grade by 315 words, it does not appear to be a significant increase in learning. However, the fact that there is no difference in the average number of words between English I and English II seems problematic.

TABLE 4
Results of Basic Counts Measures

Indicators	High School English	High School English I	High School English II	<i>F</i>	<i>p</i>
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>		
Number of words	736.12(121.66)	915.23(162.98)	928.47(188.01)	29.763	.000** HE<HE1, HE2
Number of sentences	58.43(14.12)	67.3(20.35)	63.83(16.18)	4.803	.010** HE<HE1
Sentence length	12.92 (2.01)	14.13 (2.50)	14.39 (2.13)	7.291	.001** HE<HE1, HE2
Paragraph length	4.02 (1.32)	4.26 (1.21)	4.40 (1.58)	1.055	.351

* $p < .05$, ** $p < .01$

FIGURE 1
Comparison of the Reading Amount in High School English Textbooks



Looking at the average number of sentences included in English reading passages, there was a statistically significant increase between reading texts in high school English and English I textbooks. Since there was a statistically significant difference in the average number of words between the reading passages of High School English textbooks and English I and English II textbooks, the average number of sentences was also expected to differ. However, since the length of a single sentence in the English II textbooks was slightly longer than that of the English I textbooks, it seems that the English II textbooks had lower scores than the English I textbook in the average number of sentences in reading passages. Similar to the result of word count, it can be inferred that the number of sentences included in a single reading passage also increased between High School English and English I textbooks, suggesting that students' learning burden increased (see Figure 1).

4.2. Linguistic Features: Lexical, Syntactic Characteristics, and Cohesion

Table 5 below shows the results of ANOVA analysis on the lexical characteristics among reading passages in High School English, English I, and English II textbooks. To analyze the lexical characteristics of the reading texts for this study, age of acquisition, familiarity, concreteness, imageability, polysemy indicators for interpreting the semantic information of vocabulary, and the word frequency and type-token ratio indicators for assessing the diversity of vocabulary use were used. First of all, among the indicators of the semantic information of vocabulary, it was found that there were statistically significant differences between the high school English, English I, and English II passages in terms of age of acquisition, familiarity, and polysemy. First, there was a statistically significant difference in the age of acquisition index between the reading passages of High School English and English II textbooks. The age of acquisition index refers to the average time at which a native speaker acquires a certain vocabulary; the higher the vocabulary acquisition age measure, the higher the vocabulary acquisition age. Therefore, the higher the number of this index means the higher the difficulty of reading texts (McNamara & Graesser, 2012). Therefore, it can be seen that the vocabulary in the reading passages of English I and English II textbooks, which showed a high age of acquisition, has higher difficulty compared to the vocabulary in the reading passages of High School English textbooks.

TABLE 5
Results of Lexical Features

Indicators	High School English	High School English I	High School English II	<i>F</i>	<i>p</i>
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>		
Type-token ratio	.65(0.05)	.64(0.03)	.66(0.05)	1.181	.310
Word frequency	2.31(0.13)	2.24(0.11)	2.23(0.13)	5.790	.004** HE>H1, HE2
Age of acquisition	316.38(24.21)	328.95(29.26)	337.64(29.09)	8.353	.000** HE<HE2
Familiarity	576.36(6.99)	574.22(7.82)	572.41(6.73)	3.805	.024* HE>HE2
Concreteness	387.58(22.77)	388.43(20.61)	385.54(19.08)	.147	.864
Imageability	419.58(20.33)	420.22(16.89)	417.66(17.25)	.155	.857
Polysemy	4.21(0.32)	3.97(0.31)	4.02(0.29)	9.051	.000** HE>H1, HE2

* $p < .05$, ** $p < .01$

Additionally, in the case of familiarity, as a result of Bonferonni's post hoc test, the word familiarity of English I ($M = 574.21$, $SD = 7.81$) and English II texts ($M = 572.41$, $SD = 6.73$) was higher than the familiarity of vocabulary used in High School English texts ($M = 576.36$,

$SD = 6.99$). There was a statistically significant difference in word familiarity between High School English textbooks and English II textbooks ($F = 3.805, p = .024$). Since familiarity refers to how familiar the vocabulary is to learners, it can be inferred that the higher the number, the easier it is to encounter in everyday life and use a vocabulary that is relatively familiar to learners (Ahn, 2018; Ahn & Bae, 2021). It can be interpreted that the vocabulary of the reading passages used in the High School English is more familiar than the vocabulary of the English I and English II textbooks.

Lastly, in the case of polysemy, that is, how many different meanings a specific word has in the text, was examined. The polysemy of vocabulary contained in the texts of High School English textbooks was statistically significantly higher than the average value of the polysemy of words contained in English I ($M = 3.97, SD = 0.30$) and English II ($M = 4.01, SD = 0.28$) textbooks ($F = 9.051, p = 0.000$). In the case of a polysemy index, it is usually said that the difficulty of a reading passage increases when the degree of polysemy is high (Crossley, Salsbury, & McNamara, 2010). However, Johnson and Pearson (1984) stated that relatively easy passages may show high polysemy scores because words with a high frequency of occurrence often contain multiple meanings. It is specified that the polysemy index of easy reading passages can also be increased. To confirm this, it is necessary to compare the word frequency index (Ahn & Bae, 2021), and there was a statistically significant difference among the three passages. In other words, the frequency of words in the High School English textbooks was higher than that of the English I and English II textbooks, which means that the English I and English II reading passages involve words with relatively low frequency more than the High School English textbook reading passages. Therefore, it can be seen that the polysemy index was also statistically significantly higher than that of the English I and English II textbooks because the High School English textbooks used words that appeared more frequently than the texts of the English I and English II textbooks.

As for the results of lexical characteristic analysis, most of the indicators showed that the vocabulary of English I and English II textbook reading passages had relatively more difficult semantic information than that of High School English textbook reading passages, and the frequency of occurrence and repetition of words were also low. This revealed that, in terms of lexical characteristics, the reading passages of English I and English II textbooks were more difficult than in High School English textbooks, but there was little difference in the difficulty of reading passages according to lexical characteristics between the passages of English I and English II textbooks.

In order to analyze the syntactic characteristics of reading passages included in High School English, English I, and English II textbooks, the length of single sentences, the number of words before the main verb, and the density of noun phrases, verb phrases, adverb phrases, prepositional phrases, and passive voices corresponding to the density of the

syntactic structure were analyzed using ANOVA. The results are shown in Table 6 below. First, as a result of analyzing the length of a single sentence, the average sentence length in High School English textbooks ($M = 12.91$, $SD = 2.01$) is shown to be statistically significantly shorter than the sentence length of the English I ($M = 14.13$, $SD = 2.49$) and English II textbooks ($M = 14.39$, $SD = 2.12$). A long single sentence length can be interpreted as high difficulty in reading passages (Ahn, 2018; Bae, 2019; Jeon, 2014), so it can be said that English I and English II textbooks have higher difficulty in reading passages than High School English textbooks.

TABLE 6
Results of Syntactic Features

Indicators	High School English	High School English I	High School English II	<i>F</i>	<i>p</i>
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>		
Sentence length	12.92 (2.01)	14.13 (2.50)	14.39 (2.13)	7.291	.001** HE < HE1, HE2
Left embeddedness	3.10 (0.86)	3.54 (1.03)	3.33 (.83)	3.032	.049* HE < HE1
Noun phrase modifier	.79 (0.13)	.83 (0.15)	.83 (.13)	1.529	.220
Noun phrase density	363.81 (27.14)	365.75 (20.43)	368.70 (26.21)	.417	.660
Verb phrase density	224.61 (31.38)	215.86 (30.62)	217.49 (25.27)	1.271	.284
Adverbial phrase density	34.66 (10.69)	32.75 (7.76)	31.82 (8.64)	1.134	.324
Preposition phrase density	100.31 (18.46)	107.99 (19.79)	108.54 (17.33)	3.360	.037* HE < HE2
Passive density	7.01 (4.95)	8.54 (6.08)	9.17 (4.74)	2.445	.090

* $p < .05$, ** $p < .01$

Left embeddedness refers to the number of words before the main verb index, and it is a numerical value that shows the average number of words before the main verb in a sentence. The larger the number of words before the main verb, the more complex the sentence is. The number of words before the main verb in the English I textbook texts ($M = 3.54$, $SD = 1.03$) was statistically significantly higher than the number of words before the main verb in the High School English textbook ($M = 3.10$, $SD = 0.86$). This can be interpreted as the relative complexity of sentences used in the text of the English I textbook.

The numerical value on modifier density provided by Coh-Metrix indicates how many syntactic structures there are per 1,000 words in the text. If the density of a specific syntactic structure is high, the difficulty increases because it is considered syntactically complex and has more information (McNamara et al., 2010). The difference between reading passages in High School English textbooks and English II textbooks was found to be statistically

significant in the results of prepositional glomerular density. As a result of the analysis of the indices on the density of noun phrases, verb phrases, adverb phrases, and passive voices, there was no statistically significant difference among the three different textbook passages.

Overall, it was confirmed that the modifier phrase density of the English I and English II textbooks was higher than that of the High School English textbooks. As a result, it can be inferred that the High School English I and English II textbook reading passages are more difficult than the High School English textbook reading texts because they use syntactically complex sentences.

Coh-Metrix provides a measure of text cohesion to show in-depth characteristics of text and uses it to evaluate text comprehension (McNamara, et al. 2010). The argument overlap rate means the repetition rate value of an argument for an adjacent pair of sentences. LSA (Latent Semantic Analysis) is a computational linguistic method that measures the degree of semantic connection between words, sentences, paragraphs, and entire texts, indicating semantic cohesion (Landauer, 2007). The cohesion of a text can be checked using these measurements, and the results of text cohesion analysis of High School English, English I, and English II textbooks for the present study are shown in Table 7. However, there was no statistical difference among the grades in the cohesion index of texts from three different grade-level textbooks.

TABLE 7
Results of Cohesion

Indicators	High School English	High School English I	High School English II	<i>F</i>	<i>p</i>
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>		
Argument overlap	.47 (0.11)	.49 (0.10)	.47 (0.12)	.385	.681
LSA overlap	.19 (0.06)	.21 (0.06)	.18 (0.06)	2.111	.125
All connectives	84.30 (13.00)	85.65(14.04)	84.30(10.52)	.135	.874

4.3. Readability

In this study, Flesch Reading Ease (FRE) and Flesch-Kinkaid Grade Level (F-KGL) were selected to analyze the readability of reading passages in High School English, English I, and English II textbooks. The results are shown in Table 8 below. First, the FRE scores of the English I ($M = 64.57$, $SD = 10.13$) and English II ($M = 64.59$, $SD = 9.06$) textbooks were statistically significantly lower than the FRE scores of the High School English textbooks ($M = 72.05$, $SD = 8.12$). The FRE score is composed of scores ranging from 0 to 100, and a lower score means lower reading comprehension for students; textbooks with lower FRE scores are considered to be more difficult. Therefore, it can be confirmed that the reading difficulty of the High School English I and English II textbooks is higher than that of the

High School English textbooks.

Looking at the analysis results of the F-KGL index, the F-KGL, the values of the reading passages of English I (M = 7.76, SD = 1.79) and English II (M = 7.82, SD = 1.62) textbooks were statistically significantly higher than the F-KGL value of the reading passages of High School English textbooks (M = 6.42, SD = 1.46). As a result of the F-KGL index test in this study, the reading passages of High School English textbooks were 6.42 grades in the US grade. Additionally, the F-KGL values of English I textbooks and English II textbooks were 7.76 and 7.82, showing a difference of more than one grade from High School English textbooks.

TABLE 8

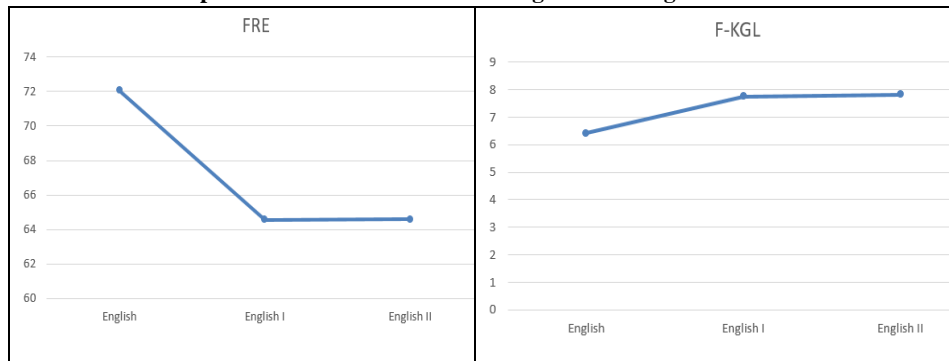
Results of Readability

Indicators	High School English	High School English I	High School English II	F	p
	M(SD)	M(SD)	M(SD)		
FRE	72.05(8.12)	64.57(10.13)	64.60(9.06)	13.290	.000** HE>HE1, HE2
F-KGL	6.42(1.46)	7.76(1.79)	7.83(1.62)	14.120	.000** HE<HE1, HE2

* $p < .05$, ** $p < .01$

FIGURE 2

Comparison of FRE and F-KGL in High School English Textbooks



As can be seen in Figure 2, the readability values of FRE and F-KGL of English I and English II textbooks were almost identical. In addition, the difference in the readability index between High School English textbooks and English I textbooks is also remarkable in that there is a difference of more than one grade. Although the High School English, English I, and English II textbooks were developed as a step-by-step intensive course, the fact that the difficulty of reading passages did not differ in steps seems to be a problem.

5. CONCLUSION AND IMPLICATION

This study was conducted to compare the continuity and difficulty between English textbooks including High School English, English I, and English II textbooks reflecting the 2015 Revised National Curriculum for each grade by analyzing reading passages. For this, reading passages of High School English, English I, and English II textbooks were analyzed, focusing on basic counts, lexical and syntactic characteristics, and readability index using Coh-Metrix. The results of this study are summarized as follows.

First, the number of words and sentences in a single reading passage for judging the learning amount of High School English, English I, and English II textbooks reflecting the 2015 Revised National Curriculum showed a statistically significant increase between High School English and English I. However, there was little difference in the index values indicating the number of words and sentences in the reading passages between English I and English II textbooks. Comparing previous studies, in English textbooks from elementary school to the first year of high school, the amount of reading in English steadily increased (Bae, 2019a, 2019b; Bae & Kim, 2021; Park & Hwang, 2020), but the increase in the amount of reading was not found in the English I and English II (Ahn & Bae, 2021).

Second, lexical, syntactic, and cohesive indicators were used to analyze linguistic characteristics. As a result of analyzing the lexical characteristics, statistical differences were found in terms of age of acquisition, familiarity, polysemy, and word frequency. It was confirmed that the vocabulary of English I and English II textbooks was relatively more difficult than that of High School English textbooks. Next, as a result of analyzing the syntactic characteristics, there was a statistically significant difference in the sentence length and the number of words before the main verb. The sentence length of High School English textbook reading passages was statistically significantly shorter than that of English I and English II textbook passages, and the number of words before the main verb was also statistically significantly smaller. In other words, it can be interpreted that the texts of English I and English II textbooks consist of relatively complex sentences. The density of modifier phrases in English I and English II textbooks was higher than that of High School English textbooks even in the indices of noun phrases, verb phrases, adverb phrases, and passive voice density, which had no statistically significant difference among the three different passages except for the numerical value of the prepositional phrase index. This suggests that English I and English II textbooks are more difficult to read than High School English textbooks because they use syntactically complex sentences. However, there was still no difference in the index values indicating the lexical and syntactic difficulty of reading passages between English I and English II textbooks.

Third, reading passages of High School English, English I and English II textbooks reflecting the 2015 Revised National Curriculum showed a statistically significant difference

in terms of readability index. The FRE score of high school English textbook passages was statistically significantly higher than the FRE scores of passages from English I and English II textbooks, indicating that the English I and English II textbook passages are more difficult than High School English textbook passages. According to the F-KGL index test result, the texts of English I and English II textbooks differ from those of High School English textbooks by 1.3 grades based on the American grade levels. As such, it can be interpreted that the difference in text reading difficulty is quite large. In addition, even though the English II textbook was developed as the subject of the intensive English I, there was little difference in reading difficulty between the two English textbooks. This result suggests that there is a problem in adjusting the reading difficulty and continuity of English textbooks between English I and English II (Ahn & Bae, 2021).

Based on the results of this study, suggestions for educational implications and follow-up studies are as follows. The continuity of reading difficulty in terms of lexical characteristics, syntactic characteristics, and readability between English I and English II textbooks should be considered. Although English II is a subject that deepens the content learned from English I, the difficulty of English reading passages between the English I and English II textbooks was almost identical. This result seems very meaningful. In other words, since it was found that English II did not function properly as an advanced subject, the reading difficulty of the English II subject must be adjusted in comparison with the English I text. This seems to be a matter that must be improved for students to be able to prepare for the SAT English test with the regular school curriculum.

Only quantitative analysis of reading passages was conducted in this study, qualitative analysis for in-depth analysis is necessary. According to the results, there are no differences in reading difficulty between English I and English II, which means that differences between grades need to be investigated more as well. Moreover, only the reading passages of English textbooks were selected for the analysis in this study. Since listening passages are included in all textbooks, integrated difficulty comparison will be possible if the listening passages are also used for Coh-Metrix analysis for future study.

Finally, although this study confirmed the reading difficulty hierarchy among the textbooks of the three grades (High School English, English I, and English II), it was not possible to determine whether the continuity was maintained within each grade. Therefore, a more in-depth analysis of textbooks will be possible if research is conducted to examine the continuity and difficulty within each textbook grade, going beyond the inter-grade difference analysis in the follow-up study.

Applicable levels: Secondary

REFERENCES

- Ahn, H., & Bae, J. (2021). A study about the analysis of linguistic difficulty among English textbooks with 2015 Revised National Curriculum, EBS-CSAT prep books, and College Scholastic Ability Test. *Secondary English Education*, 11(4), 39-58.
- Ahn, S. (2018). An analysis of Coh-Metrix on the differences in English expository and argumentative writing of Korean and native English university student. *New Korean Journal of English Language and Literature*, 60(3), 177-205.
- Al-Jamal, D. A., & Al-Jamal, G. A. (2014). An Investigation of the difficulties faced by EFL undergraduates in speaking skills. *English Language Teaching*, 7(1), 19-27.
- Alptekin, C. (1993). Target-language culture in EFL materials. *ELT Journal*, 47(2), 136-143.
- Bae, J. (2019a). A study about the analysis of readability of English textbooks with 2015 Revised National Curriculum and the selection of children's English literature. *Journal of the Korea English Education Society*, 18(2), 117-141.
- Bae, J. (2019b). A Continuity Analysis of the reading passages in elementary and middle school English textbooks with 2015 Revised National Curriculum. *Modern Studies in English Language & Literature*, 63(2), 81-107.
- Bae, J., & Kim, G. (2021). A study on the difficulty and continuity analysis of elementary, middle and high school English reading texts: Focusing on the 2015 revised English textbooks. *Journal of the Korea English Education Society*, 20(4), 141-162.
- Charalambous, A. C. (2011). The Role and Use of Course Books in EFL. Retrieved on september 16, 2021, from <http://files.eric.ed.gov/fulltext/ED524247.pdf>
- Crossley, S., Salsbury, T., & McNamara, D. (2010). The development of polysemy and frequency use in English second language speakers. *Language Learning*, 60(3), 573-605.
- Cunningsworth, A. (1995). *Choosing your coursebook*. Oxford: Macmillan Heinemann.
- Graesser, A. C., McNamara, D. S., Louwrese, M. M., & Cai, Z. (2004). Coh-Metrix: Analysis of text on cohesion and language. *Behavior Research Methods, Instruments, & Computers*, 36(2), 193-202.
- Hwang, H. (2019). *A Corpus-based analysis of 5th-8th grade English textbooks used in South Korea*. A master's thesis, Gyeongin National University of Education, Incheon.
- Jeon, M. (2011). A Corpus-based analysis of the continuity of the reading materials in middle school English 1 and 2 textbooks with Coh-Metrix. *The Journal of Linguistic Science*, 56, 201-218.
- Jeon, M. (2014). An Analysis of the continuity of the reading materials in high school English textbooks. *Journal of the Korean Data Analysis Society*, 16(2), 925-938.

- Jeon, M. (2015). A corpus-based analysis of the continuity among middle school English textbooks with an automated language analysis program. *Modern English Education*, 16(1), 195-218.
- Jeon, M., & Lim, I. (2009). A Corpus-based analysis of middle school English 1 textbooks with Coh-Metrix. *English Language Teaching*, 21(4), 265-292.
- Johnson, D., & Pearson, D. (1984). *Teaching reading vocabulary* (2nd ed.). New York: Holt, Rinehart & Winston.
- Kim, J. (2009). *Teaching vocabulary activities of middle school English textbooks*. A master's thesis, Kyung Hee University, Seoul.
- Kim, J., & Yang, J. (2012). An analysis of the continuity of elementary and middle school English textbooks using Coh-Metrix. *English Teaching*, 67(2), 319-341.
- Kim, K. J. (2019). Factors influencing EFL high school students' remotivation: Differences by English proficiency. *Secondary English Education*, 12(4), 27-47.
- Krashen, S. D. (1993). The case for free voluntary reading. *Canadian Modern Language Review*, 50(1), 72-82.
- Landauer, T. K. (2007). LSA as a theory of meaning. In T. K. Landauer, D. S. McNamara, S. Dennis, & W. Kintsch (Eds.), *Handbook of latent semantic analysis* (pp. 3-34). Psychology Press.
- Lee, H. (2020). *An analysis of the difficulty of the reading materials in high school 3rd grader's English textbooks and the CSAT with Coh-Metrix*. A master's thesis, Kongju National University, Chungnam.
- McGrath, I. (2002). *Materials evaluation and design for language teaching*. Edinburgh: Edinburgh University Press.
- McNamara, D. S., & Graesser, A. C. (2012). Coh-Metrix: An automated tool for theoretical and applied natural language processing. In P. M. McCarthy & C. Boonthum (Eds.), *Applied natural language processing: Identification, investigation, and resolution* (pp. 188-205). IGI Global.
- McNamara, D. S., Louwerse, M. M., McCarthy, P. M., & Graesser, A. C. (2010). Coh-Metrix: Capturing linguistic features of cohesion. *Discourse Processes*, 47(4), 292-330.
- Ministry of Education. (2009). *2009 revised national curriculum*. Ministry of Education.
- Ministry of Education. (2015). *2015 revised national curriculum*. Ministry of Education.
- Park, H., & Jung, C. (2020). An analysis of the continuity among reading passages in high school English textbooks in the 2009 and 2015 revised English curriculums. *Studies in Foreign Language Education*, 34(4), 179-202.
- Park, K., & Hwang, E. (2020). A closer look at L2 students' syntactic complexity and teacher's revision: A comparative case study. *Studies in English Education*, 25(1), 73-96.

- Ryu, J., & Jeon, M. (2020). An analysis of the text complexity of listening scripts of high school English textbooks using Coh-Metrix. *Korean Journal of English Language and Linguistics*, 20, 363-383.
- Shannon, P. (2010). Textbook development and selection. In B. McGaw, P. Peterson, & E. Baker (Eds.), *International Encyclopedia of Education* (pp. 397-402). Elsevier Ltd.