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A Coh-Metrix Analysis of the English Editorials of Korean, American, and British University Students

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ABSTRACT

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This study aims to identify differences between newspaper editorials of Korean, American, and British university students in order to shed light on more 'native-like' writing, and give pedagogical implications for L2 writing. The comparison between two native English groups could suggest which different results of linguistic aspects result from non-nativeness of Korean-English. The corpora consist of 209 English editorials of Korean, American, and British university students from student English newspapers, and then the editorials are analyzed. Coh-Metrix 3.0, which is a computational textual assessment tool, is used to measure the basic count of texts, lexical characteristics, syntactic complexity, discourse features, and readability level. As for the basic count, the sentence and paragraph length indices clearly show the remarkable difference between Korean-English and English-English editorials. Korean university students tend to write more sentences per paragraph. As for the lexical characteristics, the Korean EFL learners use the easiest words among the three groups. As for the syntactic complexity, the Korean students used significantly less complex syntactic patterns. As for the discourse features, the Korean students utilized connectives as cohesive devices the most. As for the readability level, the English editorials of the Korean students are less difficult than native English speakers.

I. INTRODUCTION

English writing is getting more important in South Korea with the advent of globalization. Writing ability could be one of the most important language skills for success in various contexts such as academic and professional fields (Jenkins, Johnson, & Hileman, 2004). However, writing is considered as the most difficult task for L2 learners among four language skills (Reid, 1992) in that learning L2 writing means to know how to apply specific linguistic aspects which native writers use to their writing (Brown, 2007; Hinkel, 2002). In other words, L2 learners need to write more native like texts. The problem is that L1 transfer occurs when Korean EFL writers write English texts (G. Y. Goh & S. W. Lee, 2008; K. Kim, 1997). In order to identify appropriate conventions of English language, comparative research between native English and L2 writers has been actively conducted (S. Ahn, 2018; J. Choi, 2015; Crossley & McNamara, 2009; G. Y. Goh & S. W. Lee, 2008; M. K. Jeong & N. Kim, 2014; C. K. Kim, 2009).

A lot of research defines one specific group as native English writers among native English speaking groups including American and British English for comparative analysis. This is because American-English or British-English corpora may represent the model of English writing to assess the authenticity of the English use. However, the two major English varieties have considerable linguistic differences (Crossley & Louwerse, 2007; Hall, McCarthy, Lewis, Lee, & McNamara, 2007). Between the two major English varieties, Korean EFL students tend to prefer American English to British English (W. Jung, 2005; H.

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Lee, 2009; M. Park, 2009). The comparison among one L2 group and two native writer groups could identify which English variety is closer to the model of native English writing in that comparative studies reveal each group's general linguistic information as well as differences among groups. Especially, British-English editorials were analyzed in more studies (S. Ahn, 2018; J. Back, 2016; M. K. Jeong & N. Kim, 2014; C. K. Kim, 2009; J. Lee, 2018) although previous studies found that Korean EFL students had strong preference to American English compared to British English. Thus, there is a need to compare linguistic aspects between native English writers and L2 learners, and to identify whether the target language corpora function as the standard in specific linguistic aspects at the same time.

There are a few comparative studies on English texts written by Korean, American, and British university students in second language writing studies. This kind of study could suggest not only significant linguistic differences between Korean-English texts and the native-English texts, but also significant linguistic differences between the two native English varieties. If we know multiple dimensions of linguistic aspects written by L2 writers including lexical sophistication, syntactic complexity, and cohesive devices, we may deeply understand the unique characteristics of L2 writing (Cumming, 2001). Especially, editorials in student newspapers are rarely adopted as research materials for comparative analyses while editorials written by L2 learners can be the source of comparative analysis (J. Back, 2016; J. Choi, 2015). Thus, it is necessary to compare linguistic aspects of Korean-English, American-English, and British-English editorials in student newspapers comprehensively.

The current study analyzes English editorials in university student newspapers. The automated tool, Coh-Metrix (Graesser, McNamara, Louwerse, & Cai, 2004) is used with 22 selected indices including the basic count, lexical characteristics, syntactic complexity, discourse features, and readability level. The five categories of Coh-Metrix indices could specify the distinct linguistic characteristics of Korean-English, American-English, and British-English editorials in a comprehensive way.

The purpose of this study is to shed light on the degree to which Korean-English argumentative texts are different from the two native English counterparts. The analysis of such differences is for lexical, syntactic, and discourse information that can facilitate non-native English writers' writing to become closer to the models of native English writers. The comparison between the two major English varieties could identify whether the source of different results between Korean English and native English English is from the non-nativeness in specific linguistic aspects. Furthermore, the analysis could examine which English variety is closer to model of the native English writing for Korean students. To accomplish this purpose, three corpora of texts consist of editorials written by Korean, American, and British university students, and then they are analyzed.

The five research questions are suggested as follows:

1) Are there any differences in a basic count in the English editorials of Korean, American and British university students?
2) Are there any differences in lexical characteristics in the English editorials of Korean, American and British university students?
3) Are there any differences in syntactic complexity in the English editorials of Korean, American and British university students?
4) Are there any differences in discourse features in the English editorials of Korean, American and British university students?
5) Are there any differences in the readability level in the English editorials of Korean, American and British university students?

II. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

1. Research on Newspaper Editorials

News articles and editorials are distinct text categories while newspapers contain both of them. Apparent differences between news articles and editorials exist. Editorials express the specific stance or subjective opinion of newspapers or individual journalists, whereas news articles deliver objective facts. Editorials are considered as an argumentative genre (J. Back, 2016; J. Choi, 2015). Newspaper editorials contain writers' persuasive argument to affect readers' thought on controversial issues (Connor, 1996). In this regard, C. K. Kim (2009) compared editorials of the British newspaper, *The Guardian*, and argumentative essays of L2 Korean university students since he regarded newspaper editorials as a model of argumentative texts.

A lot of related studies focus on editorials written by professional L1 writers in the press for discourse analysis (Bolgun & Mangla, 2017; J. Choi, 2015; E. Y. Jang, 2014; Ljung, 1997). Among this kind of research, some compare editorials to other genres in newspapers to examine distinct genre-specific features. To compare newspaper editorials to newspaper articles, Ljung (1997) examined the complexity of texts taken from American and British dailies. Similarly, E. Y. Jang (2014) only compared American editorials and news articles.

In addition to the comparison between the different genres in newspapers, some studies compared editorials of major English newspapers to texts of other sources. G. Y. Goh and S. W. Lee (2008) identified the non-nativeness of the Korean-English newspaper editorials by comparing the corpus from *The Korea Herald*, *The Korea Times*, and *JoongAng Daily* and news English of Frown corpus (The Freiburg-Brown corpus of American English). The results revealed that Korean-English editorials reflected the linguistic features of Korean language. It indicated that L1

transfer occurred although the texts were revised by native English proofreaders. For example, Korean English editorials overused specific pronouns 'it' and 'its'. The system of pronouns is well developed in American English to avoid the repetition of the use for the same pronoun. Korean does not have the well-developed system. Korean -English editorials overused modal auxiliaries 'should' and 'must' just as Korean texts contained them for the argument structure of editorials. To investigate distinct discourse features of professional writers and L2 learners, C. K. Kim (2009) compared the use of English metadiscourse in British editorials and Korean university students' argumentative essays. Regarding the frequency of metadiscourse, the Korean students used more textual metadiscourse and writer-reader's interpersonal metadiscourse than the British columnists. However, based on qualitative analysis, British columnists utilized more writer-reader's interpersonal metadiscourse such as hedges whereas the Korean students used more textual metadiscourse including connectives, frame markers, and code glosses.

Among studies on newspaper editorials written by professional journalists, some studies investigated cross-cultural and cross-linguistic differences between different L1 groups for contrastive rhetoric analysis. Editorials written in English and Korean language were compared by J. Choi (2015) to examine text organization patterns, underlying rhetorical structures, and the placement of the main claim in texts. As a result, Korean-Korean editorials had clearly distinct discourse features from American-English counterparts. Most of the Korean editorials had the unique Korean rhetoric pattern, which is the four-unit discourse style, and diverse patterns in the placement of the main claim, whereas English editorials had the rhetoric style of 'introduction-body-conclusion' and the main claim at the beginning of the argument. Similarly, English and Hindi editorials were compared by Bolgun and Mangla (2017) to identify different discourse styles.

While Connor (1996) indicated that most L2 learners do not have any chance to write newspaper editorials in English, English editorials of student newspapers can be adopted as research materials (J. Back, 2016; K. Kim, 1997). For, example, K. Kim (1997) compared the rhetorical style of Korean-English, American-English, and Korean-Korean editorials of student newspapers. The study revealed that Korean students applied their L1 rhetorical pattern into English writing. It indicated that L1 transfer occurred. On the other hand, J. Back (2016) examined differences of the use of questions of Korean and British university students to investigate dialogic features in student newspaper editorials. The study suggested that there were both of the similarities and differences of discourse features in Korean English and British English. In terms of genre-specific features, most of the questions were utilized in the title to draw attention and in the position of 'presenting the case' to introduce the topic. In terms of corpus-specific features, Korean-English editorials utilized questions explicitly for the 'concluding remark' and 'recommending action' functions, whereas English-English counterparts used a few.

As seen above, the majority of previous studies mainly focus on only discourse features using simple statistic analysis. Especially, analysis of editorials in student newspapers does not indicate statistical significance with only showing frequency. In order to identify the characteristics of L2 learners, editorials of student newspapers need to be analyzed with Coh-Metrix in order to assess texts of this genre more comprehensively with multi-levels of linguistic aspects. Many previous studies adopt editorials written by professional writers in major newspapers. There is still a need to adopt editorials of student newspaper as research materials.

2. Coh-Metrix Analysis of English Texts

Coh-Metrix is a computational tool that analyzes and assesses the characteristics of texts with various indices (Graesser et al., 2004; McNamara, Graesser, McCarthy, & Cai, 2014). Coh-Metrix has been widely applied by many researchers in the field of English education and applied linguistics (S. Ahn, 2018; Crossley & McNamara, 2009, 2014; M. K. Jeong & N. Kim, 2014; H. Lee, 2019; J. Lee, 2018). The computational tool can analyze the explicit and implicit aspects of corpora with a variety of linguistic and psycholinguistic measures. Thus, the analysis could be more comprehensive and reliable.

The related studies generally compare two groups: one native-writer group and one nonnative-writer group in that the comparison between L1 and L2 writing has a long history in second language writing studies. In this kind of research, argumentative essays written by two groups have been usually compared. Crossley and McNamara (2009) investigated lexical aspects in L1 and L2 argumentative essays. L2 writers tended to use easier vocabulary items than L1 writers with higher values in word frequency, and lower values in age of acquisition. Argumentative essays could be extracted from existing corpora provided on the Internet. M. K. Jeong and N. Kim (2014) compared lexical and syntactic features between Yonsei English Learner Corpus and Louvain Corpus of Native English Essays using 22 Coh-Metrix indices. The argumentative essays written by native writers were significantly longer with more diverse vocabulary items and more complex syntactic patterns. Especially, the Korean students with lower English proficiency used easier words in that the measured scores were higher in the word frequency index and lower in the age of acquisition index.

Two text types including argumentative essays could be used in order to compare linguistic features between native and nonnative writers. S. Ahn (2018) analyzed expository and argumentative essays written by British and Korean university students to examine the lexical, syntactic, and cohesive differences between two groups. In expository texts, the Korean students used significantly less difficult words, less complex syntactic patterns, and less cohesive devices than the British students. On the other hand, in argumentative texts, there was no significant difference of

syntactic complexity. Moreover, the Korean students used significantly more cohesive devices such as causal and logical connectives than the British students.

Texts written by only one group of L2 learners can be analyzed using Coh-Metrix without comparing them to native English writers. The improvement of English writing within one L2 group can be identified using Coh-Metrix. Crossley and McNamara (2014) identified the improvement of syntactic features of L2 English writers including syntactic complexity and syntactic density with Coh-Metrix. The researchers used the first drafts and the third drafts of essays. The result revealed that the essays of L2 writers became significantly more complex in terms of the use of nouns and phrases. In addition to the growths within one text genre, the two different genres within the L2 writer group could be analyzed with Coh-Metrix. M. Jeon and Y. Choe (2019) examined how different Korean university students' argumentative and expository summary writings in English were using Coh-Metrix indices of lexical, syntactic, textual features and readability level. The results showed statistically significant differences between the two different text types. In particular, the Korean students used more words, less high-frequency and more concrete words, more adjectives, and longer sentences in their summary writings of argumentative texts. In their expository summary, the students used more nouns and verbs. As for syntactic and textual features, there were more connectives, more complex patterns and more co-referential cohesion in their argumentative summary.

Within one L2 writer group, Coh-Metrix compares different proficiency-level groups of L2 learners. H. Lee (2019) used Coh-Metrix indices to predict writing proficiency and to distinguish infit and overfit learners from misfit learners with essays written by undergraduate and graduate students. The researcher investigated textual, syntactic, and lexical features of the essays. The result presented that sentence length, syntactic similarity in adjacent sentences, and argument overlap distinguished the proficient group from less proficient one. Essays of misfit learners showed lower values in the Flesch Reading Ease score than essays of infit and overfit learners. In addition, S. Kim and M. Jeon (2016) analyzed Korean 6 graders' essays, and compare them according to three proficiency levels. The advanced level group showed significantly longer texts compared to two groups. Their texts were also significantly more difficult to understand than the least proficient group. However, there was no difference in lexical diversity and syntactic complexity.

Aside from analyzing one L2 group, Coh-Metrix compares linguistic characteristics among different L2 groups in accordance with their L1. Crossley and McNamara (2011) focused on the similarities of texts written by Czech, Finnish, German, and Spanish L2 learners in terms of lexical sophistication, syntactic complexity, and cohesion. The study revealed that the L2 learner groups had similar values in lexical information such as hypernymy, polysemy and lexical diversity, and cohesion such as stem overlap. In general, texts written by L2 writers showed less sophisticated lexical features and less referential cohesion. However, L2 writers wrote texts that had a higher lexical diversity values.

By contrast, the difference between national English language varieties could be examined by Coh-Metrix. Among many varieties of English, the two 'standard' varieties, American and British English, were compared by Hall et al. (2007) to identify the similarities and differences in legal texts. The significant differences existed even in the two native groups. The British-English legal texts were more cohesive than the American-English counterparts. The two varieties could be clearly distinguished with 85 percent accuracy.

There are a few studies that identify differences among English varieties including English speaking countries and non-English speaking countries. McCarthy, Lehenbauer, Hall, Fujiwara and McNamara (2007) analyzed scientific journal abstracts of Japanese, American, and British researchers with Coh-Metrix. As a result of the analysis, the Japanese scientists used significantly more high frequency words and familiar words than the two native English writer groups. Additionally, the Japanese writers showed the significantly greater level of syntactic conformity and cohesiveness.

As presented above, texts from newspapers have been rarely analyzed using Coh-Metrix. J. Park, Lawrence, and H. Cho (2015) examined news reports from the major American newspapers and the Nieman Foundation for Journalism, which offers news archives at Harvard University for the training of the new journalism. They investigated lexico-phrasal diversity and syntactic patterns without dividing corpora and comparing them. News articles of the student newspapers were selected as Coh-Metrix research material by J. Lee (2018) to compare cohesive devices, syntactic complexity, and lexical information between L1 and L2 writers. The result suggested that Korean-English news articles were more cohesive in that content words and given information were more overlapped. They showed more complex sentence patterns. Furthermore, they had lack of diversity in vocabulary use, but more use of difficult words in news articles.

Previous studies mainly focus on argumentative essays to compare one group of native writers and one group of L2 learners. There are few studies that compare the linguistic features of L2 writers, American, and British writers at the same time. Especially, editorials in student newspapers are rarely adopted as research materials. Thus, it is necessary to compare linguistic features of Korean-English, American-English, and British-English comprehensively in editorials of student newspapers. This study focuses on English editorials of student newspapers written by Korean, American, and British university students.

III. METHOD

1. Corpus Design

Three corpora were selected: a corpus of English texts in the editorial section or the opinion section written in English by native Korean speakers and matching L1 corpora written by native English speakers who are American and British. The Korean-English (KE) corpus (n = 77) was taken from *The Hyowon Herald* (http://herald.pusan.ac.kr/), which is the campus newspaper of Pusan National University, and *Aranuri* (http://www.kmoumedia.com/), which is the student newspaper of Korea Maritime and Ocean University. The American-English (AE) corpus (n = 75) was chosen from *The Cornell Daily Sun* (https://cornellsun.com/), which is Cornell University's student-run newspaper. The British-English (BE) corpus (n = 57) was collected from on *The Student* (https://studentnewspaper.org/), which is the independent student newspaper of the University of Edinburgh. The Korean-English editorials were published from 2015 to 2019. The American-English editorials were published from 2016 to 2020. The British-English editorials were published from 2015 to 2020.

TABLE 1
Information of Corpora

Variable	Number of articles	Number of words
The Korean-English corpus	77	30,044
The American-English corpus	75	38,855
The British-English corpus	57	39,377
Total	209	108,276

Unlike news articles, editorials tend to be written by editors-in-chief or the member of their editorial board since editorials representatively deliver their specific stance of newspapers. Table 1 displays brief information of the three corpora.

2. Coh-Metrix

The on-line version of Coh-Metrix 3.0 (http://141.225.41.245/CohMetrix2017/) is available for free. The computational program can analyze texts of various dimensions including a basic count, cohesive features, readability, syntactic complexity, and lexical characteristics based on 106 indices (Crossley & McNamara, 2009; McNamara et al., 2014). Among 106 indices, 22 Coh-Metrix indices are selected in accordance with the five research questions as presented in Table 2. Table 2 presents linguistic characteristics, measured variables, and Coh-Metrix indices.

TABLE 2
Coh-Metrix Analysis Items

	Measured variable	Coh-Metrix index
Basic count	Descriptive statistics	Word count
		Sentence count
		Paragraph count
		Sentence length
		Paragraph length
Lexical characteristics	Lexical diversity	Type-token ratio
	Word frequency	CELEX word frequency for content words
	Word information	Age of acquisition
		Imagability
		Concreteness
Syntactic complexity	Syntactic complexity	Words before the main verb
		Modifiers for NP
Discourse features	Connectives	Causal connectives
		Logical connectives
		Temporal connectives
	Referential cohesion	Argument overlap in adjacent sentences
		Argument overlap in the whole text
		Content word overlap in the whole text
	Semantic coreferentiality	LSA overlap in adjacent sentences
		LSA for all sentence pairs
Readability level	Readability level	Flesch Reading Ease score
		Flesch-Kincaid Grade level

This study aims at linguistic aspects of English editorials in the student newspapers including the basic count, lexical characteristics, syntactic complexity, discourse features, and readability level. For measuring a basic count, the five Coh-Metrix indices are chosen including the word count, sentence count, paragraph count, sentence length, and paragraph length. A basic count is the essential category to identify basic descriptive information of texts. Coh-Metrix has the descriptive statistics indices for a basic count. These indices give information about traditional textual measures such as the number of words, sentences, and paragraphs that occur in a text. It also calculated sentence length and paragraph length by using the average number of words per sentence, and the average number of sentences per paragraph. The basic count helps the user to analyze the patterns of data (McNamara et al., 2014).

For measuring lexical characteristics including lexical diversity, word frequency, and word information are considered as measured variables. The Coh-Metrix index of lexical diversity means CELEX word frequency for content words. It is measured with type-token ratio (TTR). The term 'type' means the variety of different words, and the term 'token' means the total number of words in a corpus regardless of repetition (Kennedy, 2014; McNamara et al., 2014). Overall, the lexical diversity index is considered as the diversity of different vocabulary items in a corpus related to the total number of every single word. The lower measured values are, the more repetitive and redundant tokens are.

The index of word frequency measures how frequently words in a corpus are used in English language (McNamara et al., 2014). Coh-Metrix uses the CELEX corpus (Baayen, Piepenbrock, & Gulikers, 1995) to calculate the measured values. High values in the word frequency index imply familiar and easier words (M. K. Jeong, 2015; M. Jeon & I. Lim, 2009).

Word information includes three Coh-Metrix indices such as age of acquisition, imagability, and concreteness in this study to specify the lexical difficulty in the selected corpora. Coh-Metrix uses MRC Psycholinguistics Database (Coltheart, 1981) to analyze the level of age of acquisition, word imagability, concreteness, and familiarity. These are important to identify L2 lexical networks (Crossley & McNamara, 2009). Age of acquisition refers to how early particular words appear in Children's language (McNamara et al., 2014). The higher measured values in age of acquisition mean vocabulary items that people acquire later. The word imagability index is related to how easy a word is to construct the mental image. The high measured values in the word imagability index mean that the words in a corpus are easy to associate. The word concreteness index is related to how nonabstract the word is (Crossley & McNamara, 2011).

For measuring syntactic complexity, two Coh-Metrix indices such as the number of words before the main verb, and modifiers for NP (Noun Phrase) are considered as measured variables in that the two indices are popular and direct ways to measure syntactic complexity of given corpora. The index of words before the main verb measures the average number of words on the left of the main verb. The index of modifiers of NP measures the average number of modifiers per noun phrase (McNamara et al., 2014). The high measured value of syntactic complexity means the more difficult text (M. Jeon & I. Lim, 2009; M. K. Jeong, 2015).

For measuring discourse features, connectives, referential cohesion and semantic coreferentiality are considered as measured variables. Connectives include causal, logical, and temporal connectives in this study. Connectives play a leading role of linking ideas, sentences, and clauses with improving cohesion of a text (McCarthy et al., 2007; McNamara et al., 2014). Coh-Metrix provides indices based on the subcategories of connectives classified by Halliday and Hasan (1976) and Louwerse (2001). Those include causal (e.g., 'because,' 'so'), logical (e.g., 'and,' 'or'), adversative or contrastive (e.g., 'although,' 'whereas'), temporal (e.g., 'first,' 'until'), and additive (e.g., 'and,' 'moreover').

Referential cohesion can be measured with three Coh-Metrix indices such as argument overlap in adjacent sentences, and argument overlap in all sentence pairs, and content word overlap in all sentence pairs in this study. Referential cohesion indices measure the conceptual redundancy between adjacent sentences or in all sentence pairs (McCarthy et al., 2007; McNamara et al., 2014). The former one is a local index, but the latter one shows a more global index (McNamara, Graesser, & Louwerse, 2012). Argument overlap is considered as the overlap of arguments including nouns, pronouns or noun phrases. The content word overlap index measures how overlapped content words are in a corpus (McNamara et al., 2014).

Semantic coreferentiality is measured by Latent Semantic Analysis (LSA) in adjacent sentences and in the whole text. Semantic cohesion includes two indices such as LSA overlap in adjacent sentences and in the whole text in this study. Coh-Metrix utilizes Latent Sematic Analysis (Landauer, Foltz, & Laham, 1998), a mathematical formula, in order to computerize the semantic cohesion (M. Jeon, 2014). That is, LSA is a statistical technique which measures the semantic coreferentiality. The technique uses a large corpus of texts to represent world knowledge (McNamara et al., 2014). Meanwhile, it has been controversial because LSA measures not text coherence but cohesion in that LSA examines how similar sentences are to adjacent sentences or to all possible pairs of sentences in a text.

For measuring the readability level, the Flesch-Kincaid Grade level (Flesch, 1948; Klare, 1974-1975), and the Flesch Reading Ease score (Kincaid, Fishburne, Rogers, & Chissom, 1975) are selected in that these two are popular readability metrics. These two indices reflect the word length and sentence length in a text to measure the readability level. The Flesch Reading Ease score ranges from 0 to 100. The obtained score 0 means the most difficult text, whereas the obtained score 100 means the easiest one. The Flesch-Kincaid Grade Level ranges from 1 to 12. The higher the level is, the more difficult the text is (McNamara et al., 2014).

3. Statistical Analysis

The stored results from Coh-Metrix are analyzed with Jamovi 1.1.9, which is open source software after the results from Coh-Metrix are coded. Welch's ANOVA (analysis of variance) was conducted since Levene's test, which assesses equality of variances, showed significance ($p < .05$). The selected 22 Coh-Metrix indices are the dependent variables, and the Korean, American and British editorials are the independent variables. For the post hoc test, Games-Howell Test was used for unequal variances.

IV. RESULTS AND DISCUSSION

1. Differences in a Basic Count

Research question 1 considers whether differences in a basic count exist among Korean-English (KE), American-English (AE), and British-English (BE) editorials written by university students. In order to investigate differences in the basic count among three groups, Welch's ANOVA is conducted. Table 3 shows the result of Welch's ANOVA for the basic count of 209 editorials of Korean, American and British university students.

TABLE 3
Welch's ANOVA for the Basic Count

Variable	KE (n = 77) M (SD)	AE (n = 75) M (SD)	BE (n = 57) M (SD)	*df*	*F*	*p*
Number of words	390.18 (166.79)	518.67 (172.02)	690.82 (125.49)	137	72.17	.000***
Number of sentences	26.92 (12.47)	29.40 (10.91)	36.32 (8.18)	137	16.31	.000***
Number of paragraphs	4.39 (1.91)	7.52 (2.86)	10.36 (3.69)	116	77.25	.000***
Number of words per sentence	15.03 (3.20)	18.48 (4.43)	19.38 (3.00)	133	35.64	.000***
Number of sentences per paragraph	6.53 (2.48)	4.29 (1.87)	3.87 (1.42)	137	31.64	.000***

***p <. 001

As indicated in Table 3, all the indices of the basic count show statistically significant differences among three groups. KE has the least number of words, sentences and paragraphs, and the shortest sentence length, but the longest paragraph length. BE has the greatest number of words and sentences, and the longest sentence length, but the shortest paragraph length among three corpora. Table 4 presents the result of the post hoc tests for the descriptive statistics in order to specify which groups have differences. To examine where the exactly significant difference lay, Games-Howell Post-Hoc pairwise comparisons were made between individual groups in Table 4.

TABLE 4
Post-Hoc Tests for the Basic Count

Variable	Group I	Group J	Mean difference	*p*
Number of words	KE	AE	-128.00	.000***
		BE	-301.00	.000***
	AE	BE	-173.00	.000***
Number of sentences	KE	AE	-2.48	.379
		BE	-9.39	.000***
	AE	BE	-6.92	.000***
Number of paragraphs	KE	AE	-3.13	.000***
		BE	-5.98	.000***
	AE	BE	-2.85	.000***
Number of words per sentence	KE	AE	-3.46	.000***
		BE	-4.35	.000***
	AE	BE	-.89	.354
Number of sentences per paragraph	KE	AE	2.24	.000***
		BE	2.66	.000***
	AE	BE	.42	.302

***p <. 001

As indicated in Table 4, the sentence length and the paragraph length show significant differences between the Korean group and the two native groups. The difference shows statistical significances between KE and AE, between KE and BE, and even between AE and BE in the number of words and paragraphs. The number of sentences is significantly different between KE and BE, and even between two native groups.

The results indicate that text length of the Korean students and the two native writer groups are different. Especially, the texts written by Korean students are the shortest with the least number of words, sentences, and paragraphs. However, the two native student groups also show differences. The texts of the British students have more words, sentences, and paragraphs than those of the American students have. As indicated by former research (M. Jeon & I. Lim, 2009; M. K. Jeong & N. Kim, 2014), the length of a text can affect the difficulty of the text. It suggests that it is more difficult to understand texts written by the native writers, especially the British students.

The results are similar to other studies (S. Ahn, 2018; J. Lee, 2018) in that the sentences of the Korean students were fewer and shorter than those of the British students. However, the results are contradictory to the result from other research (M. K. Jeong & N. Kim, 2014) in that the British and Korean university students did not show any significant differences in the sentence length in their study.

2. Differences in Lexical Characteristics

Research question 2 considers whether differences in lexical characteristics exist in English editorials of Korean, American and British university students. In order to examine differences in the lexical characteristics among the three groups, Welch's ANOVA and Games-Howell Post-Hoc test are conducted. Table 5 presents the result of Welch's ANOVA for the lexical characteristics of the Korean, American and British editorials.

TABLE 5
Welch's ANOVA for Lexical Characteristics of Korean, American, and British Texts

Variable	KE (n = 77) M (SD)	AE (n = 75) M (SD)	BE (n = 57) M (SD)	*df*	*F*	*p*
Lexical diversity	.53 (.07)	.52 (.05)	.49 (.04)	136	9.43	.000***
Word frequency	2.33 (.18)	2.13 (.12)	2.20 (.11)	133	33.77	.000***
Age of acquisition	361.67 (34.76)	405.83 (25.56)	386.30 (30.68)	129	40.08	.000***
Word imagability	396.40 (23.30)	405.35 (11.66)	400.58 (14.77)	125	5.32	.006**
Word concreteness	360.55 (24.51)	372.07 (12.08)	363.00 (14.11)	125	10.87	.000***

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

As demonstrated in Table 5, there are significant differences among the three groups in all the indices of lexical characteristics. The lexical diversity index shows that Korean university students utilize the most various vocabulary items among the three groups. Moreover, in the word frequency index, Korean university students use the greatest number of high frequency words, but they get the lowest scores of the age of acquisition index. It suggests that Korean-English editorials include the least difficult words among the three groups. To examine where the exactly significant differences exist, Games-Howell Post-Hoc pairwise comparisons are made between individual groups in Table 6.

TABLE 6
Post-Hoc Tests for Lexical Characteristics of Korean, American, and British Texts

Variable	Group		Mean difference	*p*
	I	J		
Lexical diversity	KE	AE	.00	.993
		BE	.03	.002**
	AE	BE	.03	.000***
Word frequency	KE	AE	.20	.000***
		BE	.13	.000***
	AE	BE	-.07	.000***
Age of acquisition	KE	AE	-44.20	.000***
		BE	-24.60	.000***
	AE	BE	19.5	.000***
Word imagability	KE	AE	-8.96	.009**
		BE	-4.18	.416
	AE	BE	4.78	.115
Word concreteness	KE	AE	-11.50	.000***
		BE	-2.44	.758
	AE	BE	9.08	.000***

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

As indicated in Table 6, the lexical diversity index shows that the Korean students utilize significantly more unique words compared to the British students. The results are contradictory to the results of existing research (S. Ahn, 2018; M. K. Jeong & N. Kim, 2014; McCarthy et al., 2007) in that British-English argumentative texts included significantly more unique vocabulary items. This is because the texts were extracted from English editorials of student newspapers in this study. Unlike writing under exam conditions, the Korean university students could write a variety of vocabulary items with sources, which they had covered, and feedback from professors and peers gave.

In spite of the use of various words in Korean-English editorials, the indices related to lexical difficulty indicate that Korean-English editorials include easier words. Specifically, the word frequency index shows that the Korean students use significantly more high frequency words than the two native groups. Moreover, the age of acquisition index demonstrates significant differences between the Korean EFL group and the two native English writer groups. In other words, the Korean students use easier words than the American and British students. The results are similar to previous Coh-Metrix analyses on argumentative essays (S. Ahn, 2018; M. K. Jeong & N. Kim, 2014) in that the Korean university students utilized more high frequency words in English argumentative essays.

In the word imagability and concreteness indices, Korean-English editorials are clearly distinguished from American-English ones, but not from British-English ones. The results indicate that Korean-English editorials do not include many vocabulary items easy to associate unlike American-English counterparts. This aspect of Korean English is closer to British English. The results are similar to the studies conducted by M. K. Jeong and N. Kim (2014), and J. Lee (2018). The former study suggested that the Korean students and the British students did not have significantly different values in the word imagability and concreteness indices in the argumentative essays. The later study indicated that Korean-English and British-English newspaper articles did not have any significant difference in the word concreteness index.

When considering which English variety is closer to the model of native English writing for Korean students, lexical diversity of Korean-English editorials is more similar to that of American-English editorials. It is consistent with the fact that Korean EFL students generally consider American English as the target language (W. Jung, 2005; H. Lee, 2009; M. Park, 2009). However, lexical abstractness of Korean-English editorials is more similar to that of British-English editorials. Vocabulary in American-English editorials is significantly more tangible.

In addition, the comparison between the two native groups is noteworthy. The result indicates that the significance could be limited in that even the two native groups show significant differences in the four indices of lexical characteristics such as lexical diversity, word frequency, age of acquisition, and word concreteness. It suggests that the differences of lexical characteristics result from not only language-specific aspects but also national English varieties.

3. Differences in Syntactic Complexity

Research question 3 investigates whether differences in syntactic complexity exist in the English editorials of Korean, American and British university students. In order to investigate differences in syntactic complexity among the three groups, Welch's ANOVA and Games-Howell Post-Hoc test are conducted. Table 7 demonstrates the results of Welch's ANOVA for syntactic complexity of Korean, American and British texts.

TABLE 7
Welch's ANOVA for Syntactic Complexity of Korean, American, and British Texts

Variable	KE (n = 77) M (SD)	AE (n = 75) M (SD)	BE (n = 57) M (SD)	*df*	*F*	*p*
Modifiers for NP	.78 (.18)	1.01 (.13)	.85 (.13)	134	44.80	.000***
Words before the main verb	3.99 (1.38)	4.76 (1.35)	4.12 (1.22)	134	6.96	.001**

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

As shown in Table 7, the two measures of syntactic complexity show statistically significant differences among the three groups. Korean-English editorials are the least complex, whereas American-English editorials are the most complex in terms of syntactic complexity. For more information of the statistics, Games-Howell Post-Hoc pairwise comparisons are made between individual groups in Table 8.

TABLE 8
Post-Hoc Tests for Syntactic Complexity of Korean, American, and British Texts

Variable	Group		Mean difference	*p*
	I	J		
Modifiers for NP	KE	AE	-.23	.000***
		BE	-.07	.027*
	AE	BE	.16	.000***
Words before the main verb	KE	AE	-.78	.000***
		BE	-.13	.827
	AE	BE	.64	.014

**$p < .05$, ***$p < .001$

As shown in Table 8, all pairs show significant differences in the index for measuring the number of modifiers for NP. On the other hand, in the index for measuring the number of words before the main verb, there is a statistically significant difference only between Korean-English editorials and American-English editorials.

The results reveal that the sentence structures of the Korean students are the least complex among the three groups. However, the results do not clearly distinguish the Korean EFL learner group from the two native English writer groups. The index for measuring the number of modifiers for NP reveals the difference even between the two native English groups, and the index for measuring the number of words before the main verb shows the difference only between the Korean students and the American students.

When considering which English variety is closer to the model of native English writing for Korean students, syntactic complexity of Korean-English editorials is more similar to that of British-English editorials. It is inconsistent with the fact that Korean EFL students generally consider American English as the target language. Sentence structures in American-English editorials are significantly complex (W. Jung, 2005; H. Lee, 2009; M. Park, 2009).

The results partially correspond to the research of S. Ahn (2018) in that the two indices did not distinguish Korean-English and British-English argumentative texts. In addition, the results are partially similar to the research of J. Lee (2018) in that the two indices showed the distinctive differences between Korean-English and British-English newspaper articles. The partial difference of the results may come from the different text genre because editorials have characteristics of argumentative texts and newspaper texts at the same time.

4. Differences in Discourse Features

Research question 4 asks whether differences in discourse features exist in English editorials of Korean, American, and British university students. In order to examine differences in discourse features among the three groups, Welch's ANOVA and Games-Howell Post-Hoc test are conducted. Table 9 shows the results of Welch's ANOVA for discourse features in Korean, American, and British editorials.

TABLE 9
Welch's ANOVA for Discourse Features of Korean, American, and British Texts

Variable	KE ($n = 77$) *M* (*SD*)	AE ($n = 75$) *M* (*SD*)	BE ($n = 57$) *M* (*SD*)	*df*	*F*	*p*
Causal connectives	32.29 (11.95)	24.99 (8.24)	25.36 (7.20)	135	10.95	.000***
Logical connectives	46.40 (14.78)	38.13 (10.69)	38.19 (9.99)	134	9.26	.000***
Temporal connectives	19.76 (9.58)	17.69 (6.13)	16.65 (5.53)	134	2.78	.066
Argument overlap in adjacent sentences	.48 (.18)	.41 (.15)	.39 (.11)	137	6.36	.002**
Argument overlap in the whole text	.36 (.15)	.35 (.13)	.32 (.10)	137	2.12	.124
Content word overlap	.07 (.04)	.05 (.02)	.05 (.02)	131	8.68	.000***
LSA overlap in adjacent sentences	.16 (.06)	.15 (.05)	.14 (.05)	135	3.70	.019*
LSA overlap in the whole text	.14 (.05)	.14 (.05)	.12 (.04)	133	1.38	.079

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

As shown in Table 9, two connective measures, two referential cohesion measures, and one semantic coreferentiality measure distinguish discourse features among the three groups. In the connective measures such as causal and logical connectives, Korean-English editorials include the greatest number. In the referential cohesion measures, the arguments and content words of Korean-English editorials are overlapped the most. The semantic coreferentiality measures indicate that Korean-English editorials are highly semantically co-referenced in adjacent sentences.

Table 10 presents the results of the post hoc tests for the five variables of the discourse features that show the significant results in Welch's ANOVA in order to identify where the exactly significant difference lay. Games-Howell Post-Hoc pairwise comparisons are made between individual groups for the two variables in Table 10.

TABLE 10
Post-Hoc Tests for Discourse Features of Korean, American, and British Texts

Variable	Group		Mean difference	*p*
	I	J		
Causal connectives	KE	AE	7.30	.000***
		BE	6.93	.000***
	AE	BE	-.37	.959
Logical connectives	KE	AE	8.27	.000***
		BE	8.21	.000***
	AE	BE	-.64	.999
Argument overlap in adjacent sentences	KE	AE	.07	.022*
		BE	.09	.002**
	AE	BE	.02	.739
Content word overlap	KE	AE	.02	.000***
		BE	.02	.000***
	AE	BE	-.00	.920
LSA overlap in adjacent sentences	KE	AE	.00	.867
		BE	.02	.027*
	AE	BE	.02	.061

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

As presented in Table 10, regarding the use of connectives, the differences show statistical significances between the L2 group and the two native English groups in both causal and logical connectives. The results indicate that the Korean students utilize the causal and logical connectives the most as cohesive devices. The results exactly correspond to the research of S. Ahn (2018) in that the Korean students used significantly more causal and logical connectives than the British students. In addition, the results are similar to the research of C. K. Kim (2009) in that the Korean students used more connectives as textual metadiscourse than native English writers.

In terms of the referential cohesion measures, the differences show a statistical significance between the Korean EFL group and the two native writer groups in the argument overlap in adjacent sentences, and in the content word overlap. It means that the Korean students more repetitively use same words. The results of the argument overlap are similar to the research of G. Y. Goh and S. W. Lee (2008), and M. K. Jeong and N. Kim (2014) in that Korean writers repeatedly used same pronouns unlike American writers. The results of the content word overlap are consistent with the study conducted by S. Ahn (2018) in that the Korean students had significant higher values in the content word overlap index. G. Y. Goh and S. W. Lee (2008) mentioned that the system of pronouns is well-developed in American English to avoid the repetition of the use for the same nouns and pronouns, but Korean does not have the well-developed system. This cohesive aspect could affect the result.

In terms of semantic coreferentiality measures, the differences show a statistical significance only between Korean-English editorials and British-English editorials. Namely, the editorials of the Korean students are semantically co-referenced within adjacent sentences the most. It means that there are more numbers of related vocabulary items in Korean-English editorials.

Overall, the Korean-English editorials are the most cohesive among the three groups in terms of the connective use, referential cohesion, and semantic coreferentiality although the significance is limited in the argument overlap and LSA overlap indices.

5. Differences in Readability Level

Research question 5 is whether differences in readability level of English editorials exist among Korean, American, and British university students. In order to examine differences in readability level among the three groups, Welch's ANOVA and Games-Howell Post-Hoc test are conducted. Table 11 demonstrates the results of Welch's ANOVA for the readability level in Korean, American, and British editorials.

TABLE 11
One-Way ANOVA for Readability Level of Korean, American, and British Texts

Variable	KE (n = 77) M (SD)	AE (n = 75) M (SD)	BE (n = 57) M (SD)	*df*	*F*	*p*
Flesch Reading Ease	60.22 (12.86)	47.16 (9.89)	51.02 (9.31)	134	24.85	.000***
Flesch-Kincaid Grade level	8.59 (2.26)	11.27 (2.27)	10.96 (1.72)	147	32.78	.000***

***p <. 001

As presented in Table 11, there are statistically significant differences among the three groups in the Flesch Reading Ease score, and the Flesch-Kincaid Grade level. Korean-English editorials are the easiest in that the higher score of the Flesch Reading Ease index and the lower level of the Flesch-Kincaid Grade level refer to the easier texts. Table 12 presents the result of the post hoc tests for the two variables of the readability level in order to identify where the exactly significant difference lay. Games-Howell Post-Hoc pairwise comparisons are made between individual groups for the two variables in Table 12.

TABLE 12
Post-Hoc Tests for Readability Level of Korean, American, and British Texts

Variable	Group I	Group J	Mean difference	*p*
Flesch Reading Ease	KE	AE	13.10	.000***
		BE	9.20	.000***
	AE	BE	-3.86	.060
Flesch-Kincaid Grade level	KE	AE	-2.68	.000***
		BE	-2.36	.000***
	AE	BE	-.32	.634

***p < .001

As demonstrated in Table 12, there are statistically significant differences between Korean-English editorials written by Korean students and English-English editorials written by American and British students. Namely, the readability level clearly distinguishes the L2 group from the native groups. The English editorials of the Korean students are easier to comprehend than native English speakers.

The readability level is affected by the multi-dimensional linguistic features such as text length in a basic count, word frequency and age of acquisition in lexical information, and syntactic complexity. Concerning a basic count, Korean-English editorials contain the least number of words, sentences and paragraphs. The shortest text length suggests the easiest to process. Korean university students use the greatest number of high frequency words and the least number of words with the lowest age-of-acquisition score. It suggests that Korean-English editorials include relatively easy vocabulary. Korean university students use the least number of words before the main verb, which means the syntactic patterns of Korean-English editorials are less complex.

V. CONCLUSION

The current study aims to examine different linguistic features between native and non-native English writers in order to shed light on more 'native-like' writing, and give pedagogical implications for L2 writing. The comparison between American and British English could suggest which different results of linguistic aspects result from non-nativeness of Korean English. In addition, the analysis could suggest which English variety is closer to the model of native English writing for Korean students.

For this study, English editorials in student newspapers of Korean, American and British university students were analyzed based on 22 selected indices that a textual assessment tool, Coh-Metrix, offers.

The five research questions are adopted to examine differences in the basic count, lexical characteristics, syntactic complexity, discourse features, and readability level of the English editorials written by Korean, American, and British university students. The results of this study are suggested as follows.

As for the basic count, the text length of the Korean students is shorter than the two native English group students in that Korean-English editorials include significantly fewer words and paragraphs. However, the three indices related to the text length present differences between the two native groups. It means that the text length of English editorials varies according to not only linguistic conventions but also stylistic differences. The sentence length index and the paragraph length index clearly show the remarkable difference between Korean-English and native English-English editorials. The Korean university students tend to write fewer words per sentence and more sentences per paragraph. This difference comes from non-nativeness as both two native writer groups write more words per sentence and fewer sentences per paragraph.

As for the lexical characteristics, the Korean students wrote more unique words than the American and British students did. The results contradict the results of previous studies (S. Ahn, 2018; M. K. Jeong & N. Kim, 2014), which analyzed argumentative essays, as British-English argumentative texts included significantly more unique vocabulary items. This is because the Korean students can have chances to cover topics in-depth for newspaper editorials unlike writing under exam conditions. In terms of the lexical difficulty such as word frequency and age of acquisition, the Korean students used easier words. The research of M. K. Jeong and N. Kim (2014), and S. Ahn (2018) partially supports the results. However, the significance could be limited in that even the two native groups show significant differences in the four indices of lexical characteristics such as lexical diversity, word frequency, age of acquisition, and word concreteness. It suggests that the differences of lexical difficulty result from not only language-specific aspects but also national language varieties. It also illustrated that lexical diversity of Korean-English editorials was more similar to American-English editorials than British-English editorials as Korean EFL students generally consider American English as the target language.

As for the syntactic complexity, the Korean students used significantly less complex syntactic patterns. However, the results do not clearly distinguish the Korean EFL learner group from the two native English writer groups in that there were significant differences even between the two native groups in the modifiers for NP index, and no difference between Korean-English and British-English editorials in the words before main verb index. Syntactic complexity of Korean-English editorials is more similar to that of British-English editorials, whereas Korean EFL students generally consider American English as the target language. Sentence structures in American-English editorials are significantly more complex. The results partially correspond to the research of S. Ahn (2018) and J. Lee (2018). The partial difference of the results may come from the different text genre because editorials have characteristics of both argumentative texts and newspaper texts at the same time.

As for the discourse features, the Korean-English editorials are the most cohesive among the three groups in terms of the connective use, referential cohesion, and semantic coreferentiality. It means that the Korean students used more connectives, same words and related vocabulary. Especially, the connective use and referential cohesion show the clear difference between Korean-English editorials and native English-English editorials, whereas the statistical significances are limited in the LSA overlap indices. It is noteworthy that high values of the argument overlap may come from non-nativeness as G. Y. Goh and S. W. Lee (2008) mentioned that the system of pronouns is well-developed in American English to avoid the repetition of the use for the same nouns and pronouns.

As for the readability level, the English editorials of the Korean students are easier to comprehend than native English speakers. As indicated by related research (M. Jeon & I. Lim, 2009; M. K. Jeong & N. Kim, 2014), the text length can affect the difficulty of the text. In addition to the text length, the result comes from the various linguistic characteristics such as lexical difficulty and syntactic complexity. Korean-English editorials are the shortest, contain the greatest number of high frequency words, and use the simplest syntactic patterns. These linguistic aspects make Korean-English editorials have the lowest readability level.

The educational implications are as follows. As the result of lexical diversity indicated, writing editorials could be a helpful activity to utilize various words with the coverage of specific topics to make better argumentative texts in English. Thus, English language teachers should give students chances to understand the topics that they choose and to study related expressions by themselves. To be more native like, Korean EFL learners need to improve their proficiency in both the sentence level and the text level. For the more complex syntactic patterns, language teachers need to help Korean EFL learners to use their own grammatical knowledge in language production. As

for discourse aspects, Korean EFL learners should avoid using same nouns and pronouns repeatedly to be more native-like. For the more difficult text, language teachers need to encourage Korean EFL students to write more words, sentences, and paragraphs. As suggested by other writing research (S. Ahn, 2018; M. K. Jeong, 2015), Korean EFL students are good at writing cohesive texts in English by utilizing connectives.

The limitation of the current study is related to the selection of the corpora. First, each corpus was extracted from one or two student newspapers in accordance of its national group. The results could be different if newspaper editorials are selected from various student newspapers in each group. Second, the topics of the editorials are various. However, C. K. Kim (2009) suggested that linguistic features could be significantly different according to the topics of the texts. Further studies need to select the same topic of editorials.

In conclusion, this study provides implications for research on English education in that this study compared the Korean, American, and British university students with English editorials in student newspapers. This study also tried to give a guidance to be more native-like writers with a comprehensive analysis on various linguistic features.

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