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Syntactic Complexity of Korean EFL Learners' Argumentative Writing*

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This study aimed to examine the level of syntactic complexity of Korean EFL college learners. A total of 319 writing samples were gathered and rated by the e-rater® engine, and were then divided into four L2 writing proficiency groups. Through the L2 syntactic complexity analyzer 2.4 program, ten sub-measures of syntactic complexity were analyzed. This study found significant correlations between writing scores and syntactic complexity. In addition, all syntactic complexity measures indicated significant positive increasing linear trends as L2 writing proficiency increases, and showed significant group differences across four writing proficiency groups. The present study also suggests that mean length of T-units (MLT), clauses per sentence (C/S), and complex nominals per clause (CN/T) are the most reliable indicators to examine L2 syntactic complexity because they show clear delineation in L2 developmental stages among the different levels of L2 writing proficiency. The findings of this study provide some useful pedagogical implications for teaching and assessing ESL/EFL writings of different language proficiency levels. It is hoped that the findings of this study add to the body of research on L2 writing, while also directing further research.

[syntactic complexity/argumentative writing/통사적 복잡성/논증적 글쓰기]

I. INTRODUCTION

Many researchers (Bardovi-Harlig, 1992; Casanave, 1994; Ellis, 1987; Ishikawa, 1995; Larsen-Freeman, 1978, 2006; Ortega, 2003; Perkins, 1980; Robinson, 2001; Skehan, 2009; Yasuda, 2011) have attempted to account for language development in connection with

* The present study is based in part upon a doctoral dissertation, E. Hwang (2013), completed at Sookmyung Women's University.

language learners' second language (L2) proficiency in second language acquisition (SLA) studies. That is, researchers are convinced that "the constructs of L2 performance and L2 proficiency are multi-componential in nature, and that their principal dimensions can be adequately, and comprehensively, captured by the notions of complexity, accuracy, and fluency" (Ellis, 2003, 2008; Ellis & Barkhuizen, 2005; Skehan, 1998, as cited by Housen & Kuiken, 2009, p. 461). Thus, complexity, accuracy, and fluency have been chosen as major research variables in many L2 studies (Bardovi-Harlig, 1992; Barron, 2007; Casanave, 1994; Ellis & Yuan, 2004; Hirano, 1991; Housen & Kuiken, 2009; Ishikawa, 2006; Larsen-Freeman, 2006; Norris & Ortega, 2009; Ortega, 1999; Skehan, 2009; Yasuda, 2011). In particular, syntactic complexity became an important measure used to trace learners' language developmental patterns, to examine distinctive linguistic features shown in certain developmental stages, to compare language patterns across different groups, and to measure the effects of pedagogical interventions on language learners' performances.

However, previous studies that examined the relationships between L2 development and language proficiency have yielded mixed results (Bosher, 1998; Cumming, 1989; Roca, Murphy & Manchón, 1999; Sasaki, 2000; Schoonen, Gelderen, Stoel, Hulstijn, & Glopper, 2011). Most of studies have found the relationship between L2 proficiency and the quality of writing; others have stated that language learners' L2 proficiency may not be crucial to affect L2 writing performance. Instead, Bosher and Roca et al. viewed L2 writing proficiency as a scale to evaluate writing production.

Previous studies have made significant contributions to the field by providing insights into L2 learners' linguistic features based on L2 learners' proficiency with various linguistic measures (Bardovi-Harlig, 1992; Casanave, 1994; Ellis, 1987; Ishikawa, 2006; Larsen-Freeman, 1983; Ortega, 1999; Perkins, 1980; Skehan, 2009), but with several limitations. First, a limited number of studies have investigated EFL learners' linguistic features in comparison with the large number of studies conducted in ESL settings (Bardovi-Harlig & Bofman, 1989; Engber, 1995; Homburg, 1984; Larsen-Freeman, 1978, 1983). In the case of Korea, there are few studies (e.g., E. Hwang, 2012; Y. S. Kim, 2011; H. Lee, M. Oh & Y. Shin, 2007) that have observed Korean EFL learners' linguistic features based on given tasks or language development patterns. Moreover, there are few studies that included a statistically meaningful number of EFL participants with different proficiency levels. Most previous studies used a number of participants in the range of 40 to 90 (Cooper, 1976; E. Hwang, 2012; Ishikawa, 1995; Yau, 1991); others included less than 20 participants (Fischer, 1984; Sasaki, 2000), even though these studies were regarded as cross-sectional. Moreover, most of those studies did not involve participants from various L2 proficiency levels. For this reason, many of those studies failed to generalize their results. This study seeks to answer the following research questions:

1. To what extent is there a relationship between writing scores and syntactic complexity in argumentative writing?
2. Is there a significant progressive tendency in syntactic complexity across L2 writing proficiency levels?
3. What are the linguistic features of argumentative writing by Korean EFL college learners at different writing proficiency levels in terms of syntactic complexity?

II. LITERATURE REVIEW

1. Relationships between L2 Development and L2 Proficiency

Wolfe-Quintero, Inagaki, and H. Y. Kim (1998) have explained that language development refers to "characteristics of a learner's output that reveal some point of stage along a developmental continuum" (p. 2), and could be gauged in terms of some linguistic measures (e.g., mean length of T-units, the number of clauses per T-unit, etc.). This includes developmental index studies that began in the late 1970s, and have focused on finding "an index of development that could determine second language developmental level by means of an 'objective' measure" (p. 3). As part of this research, linguistic measures on syntactic complexity are used when researchers examine relationships between second language development and other independent variables, such as learners' language proficiency, task types, or pedagogical interventions (Bardovi-Harlig, 1992; Barron, 2007; Casanave, 1994; Ellis, 1987; Engber, 1995; Hirano, 1991; Ishikawa, 2006; Larsen-Freeman, 1983, 2006; Ortega, 1999; Skehan, 2009).

Language proficiency, a primary notion used to explain L2 development, is defined as a "broader concept that is related to separating language users into cross-sectional groups based on a normal distribution of their language ability" (Wolfe-Quintero et al., 1998, p. 2), which is considered to be the central factor accounting for L2 learners' writing products. However, previous studies reporting the relationships between language development and language proficiency have shown contrary results. Some studies have reported that L2 proficiency is a crucial factor in deciding the quality of L2 writing products (Cumming, 1989; Sasaki, 2000; Schoonen et al., 2011), but others have indicated that L2 proficiency is not a major factor to determine the quality of L2 learners' written productions (Bosher, 1998; Roca et al., 1999). In other words, L2 proficiency did not effectively predict developmental stage in L2 writing. For these reasons, several researchers (Bosher, 1998; Roca et al., 1999) have investigated L2 development based on writing proficiency, which is a part of language proficiency. Schoonen et al. (2011) claim that "proficiency in writing requires knowledge of the language sufficient to formulate the propositional content of the

intended message in appropriate linguistic forms and to perform the correct writing act" (p. 32). Furthermore, they assert that the degree of strength of the relationship between writing proficiency and L2 linguistic features could be shown according to L2 writers' age and proficiency level in various writing contexts.

2. Syntactic Complexity

Syntactic complexity refers to properties of the L2 system or L2 features (Housen & Kuiken, 2009), and refers to "the range of forms that surface in language production and the degree of sophistication of such forms" (Ortega, 2003, p. 492). That is to say, it does not matter how many production units[1] are present in the writing, but how varied or sophisticated the production units are. For this reason, the degree of syntactic complexity is considered an integral part of a second language learner's overall development in the target language (Wolfe-Quintero et al., 1998). A large number of different measures have been proposed to assess syntactic complexity in second language writing in terms of frequencies and ratios. In general, frequency measures of syntactic complexity are no longer used because of the low validity of the results. However, the ratio measures of syntactic complexity have been considered systematically sophisticated in terms of the index of syntactic complexity developmental stages, and are divided into five main indices: length of production, sentence complexity ratio, coordination clause ratio, subordination clause ratio, and particular structure (Lu, 2011; Norrby & Håkansson, 2007; Ortega, 2003).

First, length of production regarding fluency is "a person's general language proficiency, particularly characterized by perceptions of ease, eloquence, and 'smoothness' of speech or writing" (Housen & Kuiken, 2009, p. 463), but this measure also indicates "the level of complexity within clauses, as opposed to longer text segments like T-units or sentences" (Beers & Nagy, 2009, p. 188). Length of production is measured by counting the number of production units in a text, and calculating length or rate of production units, such as the mean length of T-units (MLT) and the mean length of clauses (MLC). Second, the sentence complexity ratio (C/S) is a sentence-level complexity measure, investigating the ratio of clauses to sentences, and is considered more indicative of developmental growth in L2 learners' ability to combine clauses within single sentences, coordination clauses, and subordination clauses (Ishikawa, 1995). Third, the sentence coordination ratio (T/S), which was introduced by Hunt (1965), measures the degree of coordination clauses, and is considered a reliable measure for L2 beginners in that T/S shows a decreasing pattern as language learners become more proficient (Wolfe-Quintero et al., 1998). In addition, subordination clause ratios could be measures by T-unit complexity ratio (C/T), dependent

[1] Production units: sentences, clauses, and T-units

clauses per clause (DC/C), and dependent clauses per T-unit (DC/T). C/T measures grammatical complexity in the writing of a learner. The more clauses that exist per T-unit, the more complex the writing is (Wolfe-Quintero et al., 1998). Other subordination ratios such as DC/C and DC/T measure the degree of embedding clauses, such as adverbial, adjective, and nominal clauses in a text. The final component, the particular structure, consists of complex nominals and verb phrases. The frequency of these measures increases with the L2 proficiency of the writer. Complex nominals are defined as two types: headed nominals (nouns plus adjectives or relative clauses) and non-headed nominals (noun clauses, gerunds, and infinitives). The verb phrases measure (VT/T) considers all types of non-independent clauses including finite and non-finite verb phrases (finite: independent, adverbial, adjectival, nominal; non-finite: gerundive, infinitival, participial). These measures gauge L2 writers' linguistic ability to pack sentences into clauses as a process of reduction (Cooper, 1976; Monroe, 1975; Wolfe-Quintero et al., 1998).

Syntactic complexity measures show different features according to levels of L2 development (Azizollah, Reza & Mohsen, 2012; Norris & Ortega, 2009). For example, coordination shows complexity at beginning levels of L2 development, while subordination reveals strong complexity at intermediate and upper-intermediate levels. Furthermore, particular structures with phrasal elaboration show strong predictive power when measuring syntactic complexity at advanced levels. Based on previous studies, mean length of clauses (MLC), mean length of T-units (MLT), T-unit complexity ratio (C/T), dependent clause ratio (DC/C), dependent clauses per T-unit (DC/T), and verb phrases per T-unit (VP/T) are the best predicators to examine syntactic complexity (Lu, 2011; Ortega, 2003; Wolfe-Quintero et al., 1998). This is because these measures consistently increased in a linear relationship to L2 proficiency levels.

3. Previous Research on Syntactic Complexity

A large number of previous studies have chosen syntactic complexity as a predominant dependent variable, in particular to measure L2 task performance in various language learning contexts (Albert & Kormos, 2004; Casanave, 1994; Ellis & Yuan, 2004; E. Hwang, 2012; Ishikawa, 1995; Kormos, 2011; Larsen-Freeman, 1978; Ong & Zhang, 2010; Sasaki, 2000; Sasaki & Hirose, 1996). This is because this variable is considered a "performance descriptor for the oral and written assessment of language learners, as well as [an] indicator of learners' proficiency underlying their performance" (Housen & Kuiken, 2009, p. 461). According to Norris and Ortega (2009), the main reason for measuring L2 linguistic featuresin terms of syntactic complexity is to explain why and how language competencies develop for particular learners and target languages under certain conditions (e.g., particular tasks, pedagogical interventions) in connection with developmental rate, route,

and outcomes. With this assumption, L2 writing studies have been conducted to examine linguistic features of L2 learners.

For instance, Larsen-Freeman (1978) reported the linguistic analysis of argumentative writings produced by 212 ESL college learners. Larsen-Freeman stated significant differences among five L2 proficiency groups concerning linguistic measures (i.e., MLT, W/EFT[2]), and concluded that L2 learners tended to write longer compositions as L2 proficiency levels increased. This occurred for many reasons, such as improved fluency, expressiveness, and increased self-confidence. To examine EFL learners' writing processes, Sasaki (2000) compared L2 features of argumentative writing produced by three paired groups of Japanese EFL writers (i.e., experts, novices, more and less-skilled student writers, and novices before and after six months of instruction). Sasaki found that in particular, the expert and more-skilled students wrote longer productions than the novice and less-skilled students, and then concluded that L2 proficiency was an important factor in writing process. Ong and Zhang (2010) also examined the effects of task complexity on EFL writers' argumentative writing. They found that different task types and the complexity of tasks influence written output produced by L2 learners.

Wolfe-Quintero et al. (1998) recognized several measures (e.g., MLT, C/T, DC/C, etc.) as the most reliable indicators of developmental stages of writing, which increased as the quality of writing did, and reported second language developmental patterns in terms of syntactic complexity. They claim that there are some 'stages' that overlap in any actual L2 writing sample. Simply put, L2 developmental patterns were associated linearly and consistently with holistic rating levels across the study reports. For example, length of production measures (e.g., MLC, MLT) consistently increase in a linear relationship as L2 proficiency level increases. However, in the advanced stages, L2 writers' mean ratios (MLC, MLT) seem to slightly decrease when writers produce reduction phrases instead of clauses.

In addition, Wolfe-Quintero et al. (1998) summarized L2 developmental patterns in terms of syntactic complexity, from sentence fragments to reduced structure forms, based on previous studies (Cooper, 1976; Hunt, 1965; Ishikawa, 1995; Monroe, 1975; Sharma, 1980) that presented pieces of syntactic developmental stages. As seen in the beginning stages of adult L2 learning, fragments are dominantly produced at first, and clauses are produced later in accordance with progress from coordination to subordination. Finally, advanced L2 learners produce more reduced forms (e.g., phrases) instead of complex sentences. Less proficient learners more heavily rely on coordination to combine sentences than do advanced learners (Bardovi-Harlig, 1992). That is to say, as L2 proficiency increases, L2 learners tend to write longer, more complex sentences and clauses, and tend

[2] W/EFT: the number of words per error-free T-unit

to use coordination less (Casanave, 1994). Norris and Ortega (2009) supported this claim. The coordination index is a more effective predictor when measuring syntactic complexity at beginning levels of L2 development; on the other hand, subordination measure is the better predictor for intermediate and upper-intermediate L2 proficiency levels.

Similarly, Ortega (2003) reported, in her synthesis oftwenty-five L2 writing studies at the college level to examine the use of syntactic complexity measures as indices of L2 proficiency in various instructional settings, that syntactic complexity measures could distinguish between English as a second language (ESL) and English as a foreign language (EFL) writers, and ESL writers outperformed EFL writers. Ortega explained this phenomenon by comparing the different natures of EFL writing and ESL writing. In general, language learners in EFL contexts start at lower levels of L2 proficiency, and do not study as much target language as language learners in ESL contexts do. For this reason, language learners in EFL contexts tend to undergo a generally slower pace of L2 development (Hirose & Sasaki, 1994; Ishikawa, 1995; Kubota, 1998).

Compared to previous related studies, this study was designed to investigate linguistic features and patterns of L2 syntactic complexity in Korean EFL learners' argumentative writing with ten sub-variables.

III. METHODOLOGY

1. Setting and Participants

This study was conducted in a women's university in Seoul, Korea, in the spring semester of 2012. A total of 319 female participants from 18 classes took part in the study, and were required to take a writing test as a course requirement. Among them, 104 students from four English major courses, and 215 students from 14 General English Courses, *English Reading and Writing,* participated in the study. The participants majored in a variety of subjects, including English, Korean, French, German, History, Education, Chemistry, Biological Science, Computer Science, Physical Education, Dance, Child Welfare, Food and Nutrition, Law, Public Administration, Business, Economics, Composition, and Painting. The participants consisted of 194 (60.82%) freshmen, 28 (8.78%) sophomores, 48 (15.05%) juniors, and 49 (15.36%) seniors, and their average age was 21.3 years.

Based on the results of a survey[3], 158 (50.97%) participants had formal experiences taking English writing courses in schools or institutes, and 130 (41.94%) participants had

[3] 310 of 319 participants responded to a survey, which asked for their personal backgrounds.

official English test scores such as TOEFL, TOEIC, or TEPS. 149 (48.06%) participants responded that they had experiences abroad, in English-speaking countries. Among these 149 participants, 71 (47.65%) participants had such experiences for travel purposes, 40 (26.85%) participants did so for study purposes, 25 (16.87%) participants did so for family business purposes, and 13 (11.40%) participants did so for other purposes.

2. Data Collection and Procedures

The writing test took place in a computer laboratory between May and June of 2012. Participants accessed the test website and listened to test procedures from their instructors in a period of 5 minutes. They then answered a questionnaire[4] in Korean, designed to survey their backgrounds (e.g., year in school, major, English education background, task difficulty, etc.), which took approximately another 5 minutes. Afterwards, they produced argumentative writings on the given writing prompt[5] for a period of 40 minutes. While taking the test, they were allowed neither to look up words in English dictionaries, nor to use scratch paper.

Submitted essays within the set time were rated on a scale of one to six by the *e*-rater® engine on the Criterion online writing evaluation service, and participants received their test scores[6] based on the ETS score description and diagnostic feedback in five categories (i.e., grammar, usage, mechanics, style, organization and development) concerning their writing. However, 6 out of 319 writings were scored as N/A (not applicable) because some of them were off-topic essays, written in merely one long paragraph, or were full of repeated sentence fragments. To rate the 6 N/A scored essays, three native English speakers, instructors of the General English Program, evaluated these essays based on the standardized rubric used by *e*-rater® after being trained to use the rubric with 10 sample essays. Interrater reliability was quite high ($r = .86$, $p < .05$) for this scoring of the essays. Finally, all submitted essays were rated.

While all of the examined results and scores were analyzed using SPSS 18.0, they were divided into four writing proficiency levels based on writing scores (i.e., writing scores 1 and 2 as beginner, writing score 3 as intermediate, writing score 4 as high-intermediate, and writing scores 5 and 6 as advanced levels) to compare L2 linguistic features in terms of syntactic complexity among different proficiency groups. The number of those participants

[4] The questionnaire is linked directly to the main page of the test website. Thus, participan ts simply clicked their mouse buttons to answer the survey.

[5] Writing prompt: Do you agree or disagree with the following statement? People always l earn from their mistakes. Use specific reasons and details to support your answer.

[6] Score description: 1 (unsatisfactory), 2 (insufficient), 3 (uneven), 4 (sufficient), 5 (skillful), 6 (excellent)

who received scores 1 and 6 was too small to have statistical significance, so they were combined with adjacent scores, 2 and 5, respectively. As seen in Table 1, 36 (11.29%) of these 319 participants who received scores 1 or 2 based on score descriptions by Educational Testing Services (ETS) in the test were classified as beginner, 75 (23.51%) who received score 3 were listed as intermediate, 94 (29.47%) who received score 4 were categorized as high-intermediate, and 114 (35.74%) who received scores 5 or 6 were classified as advanced.

TABLE 1
Descriptive Statistics of Participants' Proficiency Levels

	No. of Participants (%)			
Level	Beginner	Intermediate	High-intermediate	Advanced
Score	1 and 2	3	4	5 and 6
	36 (11.29)	75 (23.51)	94 (29.47)	114 (35.74)

After completing the test of writing, the researcher downloaded all of the participants' essays and transferred them into text format files (.txt) for computer analysis. To prevent program errors, the researcher examined the text files for missing punctuation or incorrectly converted quotation marks, and corrected them. Participants' essay files were numbered. All of the examined results were analyzed by Word Smith Tools 6.0 to acquire general information concerning the learner corpus among the different writing proficiency groups. As shown in Table 2, the corpus of argumentative writing contained a total of 84,525 words, and the texts ranged from 68 to 691 words in length (M = 264.61, SD = 110.49).

TABLE 2
Summary of the Learner Corpus

Level	No. Texts	Tokens	Types	Mean Length (SD)		
				Word	Sentence	Text
Total	319	84,525	4,878	4.43(2.28)	13.31(7.44)	264.61(110.49)
4	114	43,311	3,383	4.40(2.29)	14.98(7.57)	379.32(92.07)
3	94	22,597	2,230	4.46(2.28)	12.27(5.82)	240.11(40.79)
2	75	13,688	1,691	4.46(2.29)	11.92(6.34)	182.35(32.04)
1	36	4,929	942	4.49(2.24)	10.49(6.42)	136.72(34.15)

Note. level 1 (beginner); level 2 (intermediate); level 3 (high-intermediate), level4 (advanced)

3. Measurement of the Variables

In this study, the independent variable that the researcher believed might affect quality of writing in terms of linguistic development of EFL learners is L2 writing proficiency levels. In addition, based on previous studies (Lu, 2010; Ortega, 2003; Wolfe-Quintero et al., 1998), this study adopts ten syntactic complexity measures as dependent variables, as illustrated in Table 3: length of production (MLT, MLC); sentence complexity (C/S); coordination clause (T/S); subordination clause (C/T, DC/C, DC/T); particular structures (CN/C, CN/T, VP/T). These measures are used as ways of measuring EFL learners' linguistic features and observing their language developmental stages, because global measures such as holistic and analytic ratings may not be sufficient to examine L2 development (Ortega, 2003; Wolfe-Quintero et al., 1998).

TABLE 3

Syntactic Complexity Measures Investigated in the Study

Type	Measure	Code
Length of production	Mean length of T-units	MLT
	Mean length of clauses	MLC
Sentence complexity	Clauses per sentence	C/S
Coordination	T-units per sentence	T/S
Subordination	Clauses per T-unit	C/T
	Dependent clauses per clause	DC/C
	Dependent clauses per T-unit	DC/T
Particular structures	Complex nominals[7] per clause	CN/C
	Complex nominals per T-unit	CN/T
	Verb phrases per T-unit	VP/T

4. Data Analyses

First, all writing samples graded by *e*-rater® were classified into four writing proficiency levels to investigate how the participants in different groups performed on an argumentative writing task. Then, to measure syntactic complexity, the *L2 Syntactical Complexity Analyzer 2.4* (L2SCA) program was used. This is a computational system for the automatic analysis of syntactic complexity in L2 writing, and uses fourteen different measures that have been explored or proposed in previous studies of L2 development (Lu, 2010). With this program, all ten measures of syntactic complexity, which consisted mainly

[7] *Complex nominals* comprise (1) nouns plus adjective, possessive, prepositional phrase, relative clause, participle, or appositive, (2) nominal clauses, and (3) gerunds and infinitives in subject position (Cooper, 1976).

of five areas (length of production, sentence complexity, coordination clause, subordination clause, particular structure), were automatically calculated.

A statistical analysis of the data was performed through SPSS version 18.0. All statistical analyses were conducted at a .05 significance level, and were shown as mean scores (*M*) and standard deviations (*SD*). Three types of statistical analysis were used to answer the research questions: (a) descriptive statistics of various data such as questionnaires, (b) Spearman's correlation to observe relations between the syntactic complexity measures and writing proficiency, and (c) a series of one-way ANOVAs to compare the results of syntactic complexity measures across the four proficiency levels ($p < .05$) and to investigate statistically significant linear trends across groups (p for Trend < .05). Post-hoc Scheffé tests followed, to determine whether the observed differences for the four proficiency groups were significant.

IV. RESULTS AND DISCUSSION

1. Correlation between Writing Scores and Syntactic Complexity

The correlation[8] analysis reported in Table 4 shows that all ten sub-variables of syntactic complexity showed statistically significant differences with writing scores ($p < .01$). Among them, MLT ($r = .54$) and C/S ($r = .45$) presented a moderate positive correlation with writing scores. There were eight measures that showed a relatively weak positive correlation with writing scores. This finding reveals that all syntactic complexity measures are correlated with writing proficiency levels, although in some cases less strongly, in argumentative writing. It can be inferred that as writing proficiency levels increase, language learners tend to produce more complex sentences.

TABLE 4

Correlation Coefficient between Writing Scores and Syntactic Complexity

MLT	MLC	C/S	T/S	C/T	DC/C	DC/T	CN/C	CN/T	VP/T
.54**	.41**	.45**	.33**	.34**	.35**	.36**	.25**	.37**	.44**

Note. *$p < .05$, **$p < .01$ (2-tailed)

Length of production: mean length of T-unit (MLT), mean length of clause (MLC); *Sentence complexity*: clauses per sentence (C/S); *Coordination clause*: T-units per sentence (T/S); *Subordination clause*: clauses per T-unit (C/T), dependent clauses per clause (DC/C), dependent clauses per T-unit (DC/T); *Particular structure*: complex nominals per clause (CN/C), complex nominals per T-unit (CN/T), verb phrases per T-unit (VP/T)

[8] Following Wolfe-Quintero et al. (1998), correlations are characterized as high ($r \geq .65$), moderate ($.45 \leq r < .65$), and weak ($.25 \leq r < .45$).

2. Tendency across L2 Writing Proficiency on Syntactic Complexity

As seen in Table 5, in order to examine whether there are significant trends in syntactic complexity as L2 writing proficiency levels increase in L2 writing, a one-way ANOVA test was performed. For the purpose of gaining a better understanding of the actual complexity across the writing proficiency levels, parts of participants' original writings were excerpted from each writing proficiency level, and measured through L2 SCA. The results are shown in Appendix.

In general, each mean score tended to increase in a positive direction as writing proficiency levels increased within writing. Significant positive linear trends in all ten measures of syntactic complexity were observed with increasing writing proficiency levels (p for Trend < .05). That is, all ratios of the length of production (MLC, MLT), sentence complexity (C/S), coordination clauses (T/S), subordination clause (C/T, DC/T, DC/C), and particular structures (CN/T, CN/C, VP/T) indicated increasing patterns across all groups as writing proficiency levels increased in argumentative writing (p for Trend < .01).

TABLE 5

Group Means and Standard Deviations on Syntactic Complexity

Type	Measure	Mean (SD)				p for Trend
		Beginner	Intermediate	H-Intermediate	Advanced	
Length of Production	MLT	9.46(1.98)	10.76(2.0)	11.51(2.11)	13.32(2.47)	.0001
	MLC	6.47(0.85)	6.82(0.8)	7.16(0.91)	7.60(0.95)	.0001
Sentence Complexity	C/S	1.53 (0.36)	1.75 (0.40)	1.80 (0.31)	2.02 (0.31)	.0001
Coordination	T/S	1.04 (0.09)	1.10 (0.12)	1.12 (0.11)	1.15 (0.11)	.0001
Subordination	C/T	1.47 (0.29)	1.59 (0.31)	1.62 (0.27)	1.76 (0.28)	.0001
	DC/C	0.31(0.09)	0.34 (0.11)	0.36 (0.08)	0.41 (0.08)	.0001
	DC/T	0.47 (0.24)	0.57 (0.27)	0.60 (0.23)	0.73 (0.26)	.0001
Particular Structures	CN/C	0.59 (0.20)	0.62 (0.17)	0.67 (0.17)	0.72 (0.17)	.0001
	CN/T	0.87 (0.38)	1.00 (0.37)	1.07 (0.30)	1.26 (0.36)	.0001
	VP/T	1.82 (0.39)	1.90 (0.40)	2.01 (0.39)	2.30 (0.45)	.0001

Note. *P*-value was obtained by one-way ANOVA.

Length of production: mean length of T-units (MLT); mean length of clauses (MLC); *Sentence complexity*: clauses per sentence (C/S); *Coordination clause*: T-units per sentence (T/S); *Subordination clause*: clauses per T-unit (C/T), dependent clauses per clause (DC/C), dependent clauses per T-unit (DC/T); *Particular structure*: complex nominals per clause (CN/C), complex nominals per T-unit (CN/T), verb phrases per T-unit (VP/T)

For instance, in the case of length of production (MLT), the advanced level (M = 13.32) was the most fluent group, and the high-intermediate level (M = 11.51) performed more fluently than the intermediate level (M = 10.76). The beginner level (M = 9.46) was the least fluent group among them. That is to say, Korean EFL college writers use more words per T-unit as their writing proficiency increases.

In the case of sentence complexity (C/S), coordination clauses (T/S), and subordination clause (C/T, DC/T, DC/C), higher L2 proficiency writers produced more complex sentences by using more coordination sentences and embedded clauses in argumentative writing. To summarize, all results show a general upward progression from low to advanced L2 writing proficiency levels. This phenomenon shows that L2 learners' written performance presents different language developmental patterns, depending on L2 writing proficiency levels (Wolfe-Quintero et al., 1998), and supports previous studies, particularly in that the frequency of subordination clauses increased with proficiency levels in writing productions (Casanave, 1994; Ishikawa, 1995; Perkins, 1980; Wolfe-Quintero et al., 1998).

However, in the case of particular structures (CN/T, CN/C, VP/T), the results seemed to be in conflict with previous research. In comparison with Cooper's (1976) study, the means of CN/T in Table 5 (0.87, 1.00, 1.07, 1.26) indicated values lower than those of Cooper's study (0.81, 1.55, 1.89, 2.62). Lu's (2011) study also presented means of the highest L2 proficiency group in three particular structure measures (CN/C, M = 1.28, CN/T, M = 1.81, VP/T, M = 2.09), and their ratios were higher than those in the present study. To conclude, usage of complex nominals and verb phrases (CN/C, CN/T, VP/T), considered as indexes of the last L2 developmental stage, indicated statistically significant level differences (p < .05), but these usages of Korean EFL college learners were relatively lower than those in previous studies (Cooper, 1976; Lu, 2011). That is, these results support the notion that the advanced learners in this study had not yet fully reached this last developmental stage.

3. Linguistic Features across L2 Proficiency on Syntactic Complexity

Table 6 shows that all results of ten measures of syntactic complexity had statistically significant differences (p < .01) among four writing proficiency levels, and also reports the actual between-level differences, which were found to be significant (p < .05) in a Scheffé test, a one-way ANOVA post hoc multiple comparison test.

As shown in Table 6, all measures of length of production (MLT, MLC) showed statistically significant differences among the four writing proficiency groups (p < .01), and indicated between-level differences. However, MLT and MLC did not show actual level differences between the intermediate and high-intermediate groups (levels 2 and 3). That is, these groups seem to be adjacent groups that did not show actual group differences.

Sentence complexity measures (C/S) indicated that all group differences among writing proficiency levels were found except in levels 2 and 3. In comparison with the results of other measures in Table 6, sentence complexity (C/S) showed higher significant group differences than others, in writing across writing proficiency levels. For this reason, sentence complexity (C/S) was considered a reliable indicator to show syntactic developmental growth of L2 adult learners (Bardovi-Harlig, 1992; Wolfe-Quintero et al., 1998). However, the results of coordination clause measures (T/S) did not show actual differences between any adjacent groups, even though T/S indicated increasing patterns across all groups in Table 5 (p for Trend < .05).

TABLE 6

Significance Between-Level Differences on Syntactic Complexity

Type	Measure	Level-difference						*Sig.*
		1-2	2-3	3-4	1-3	2-4	1-4	
Length of Production	MLT	1.30		1.81	2.05	2.56	3.86	.0001
	MLC			0.44	0.69	0.78	1.12	.0001
Sentence Complexity	C/S	0.22		0.21	0.27	0.26	0.48	.0001
Coordination Clause	T/S				0.08	0.05	0.11	.0001
Subordination Clause	C/T			0.14		0.17	0.29	.0001
	DC/C			0.05	0.05	0.06	0.10	.0001
	DC/T			0.14		0.16	0.26	.0001
Particular Structures	CN/C					0.09	0.13	.0001
	CN/T			0.19	0.21	0.26	0.39	.0001
	VP/T			0.29		0.40	0.48	.0001

Note. Differences between means were obtained by Scheffé tests, a one-way ANOVA (p < .05).

The next component, subordination clause (C/T, DC/T, DC/C), presented statistically significant group differences (p < .01). For example, In the C/T measure, the advanced group, who showed the highest ratio of T-unit complexity, significantly outperformed the other three groups (beginner, intermediate, and high-intermediate groups). This means that the advanced group used more clauses within one T-unit than other groups. Even though the other three groups produced more clauses within a T-unit as their writing proficiency increased, the ratios of C/T among the groups were not sufficiently significant to show actual group differences. The results of the dependent clause ratio (DC/C, DC/T) also showed very similar group differences in comparison to T-unit complexity ratio (C/T). In

other words, higher L2 proficiency writers used more embedded clauses within one clause or T-unit in argumentative writing. Specifically, significant group differences were shown between the advanced and other three groups (beginner, intermediate, and high-intermediate groups) in writing.

The last component, particular structures (CN/T, CN/C, VP/T), consists of complex nominals (CN/T, CN/C) and verb phrases (VP/T). Through the results of multiple comparison tests in Table 6, CN/T and VP/T presented significant group differences in comparison to CN/C, but these measures did not show actual group differences among the beginner and high-intermediate groups. That is to say, the ratio of complex nominals or verb phrases from beginner to high-intermediate groups did not show significant differences, even though Korean EFL college writers produced more usages in these syntactic structures as their writing proficiency levels increased.

The findings of this study suggest that length of production (MLT), sentence complexity (C/S), subordination clause (DC/C), and complex nominals (CN/T) are the most reliable indicators to examine a wider range of proficiency levels in argumentative writing, because they clearly show delineation in L2 developmental stages among the different levels of L2 writing proficiency.

V. CONCLUSIONS

This study was done to investigate the different linguistic features of written productions by Korean EFL college learners, performed across writing groups of different proficiency. In order to observe how participants across writing proficiency groups performed in argumentative writing, the correlation between writing scores and syntactic complexity was examined, and measures of syntactic complexity were compared to examine significant differences and significant linear trends across four writing proficiency levels.

This study found statistically significant correlations between writing scores and syntactic complexity in argumentative writing. Among ten measures of syntactic complexity, MLT and C/S showed moderate correlations, while the remaining eight measures (MLC, T/S, C/T, DC/C, DC/T, CN/C, CN/T, VP/T) showed weak correlations with writing scores. In addition, all syntactic complexity measures indicated significant positive increasing linear trends (p for Trend $< .05$) and significant group differences ($p < .01$) across four writing proficiency groups. This means that Korean EFL college writers produce more complex structures by using coordination clauses, subordination clauses, complex nominal phrases, and verb phrases, as their writing proficiency increases in argumentative writing, and the means of all measures showed significant differences among groups. This paper also supports previous studies on the L2 development process

showing that as L2 writing proficiency increases, learners' writings seem to become more syntactically complex (E. Hwang, 2012; Lu, 2011; Ortega, 2003; Sharma, 1980; Wolfe-Quintero et al., 1998). Concerning results of the multiple comparison tests, sentence complexity (C/S) showed distinctive features among groups. Moreover, subordination clause (DC/C), rather than coordination clause (T/S), revealed distinctive features among groups. This study also suggests that MLT, C/S and CN/T are the most reliable indicators to examine syntactic complexity, because they show clear delineation in L2 developmental stages among the different levels of L2 writing proficiency.

The findings of this study provide some useful pedagogical implications for teaching and assessing ESL/EFL writings of different language proficiency levels. Specifically, the relationships between L2 proficiency and writing must be taken into account in assessing language learners' performance. Insight and understanding of the task characteristics along with discourse and linguistic features of L2 writing could be instrumental in assisting both language teachers and test-takers when choosing tasks that to draw out target features of writing competence. Moreover, L2 writing instructors and researchers should provide course and research designs for L2 learners, considering all facets of their language development, including type of writing and proficiency levels.

Even though the researcher attempted to minimize the effects of unintended variables in the design and implementation of the study, variations may have remained. As quantitative research conducted with 319 participants, the large sample size might support confidence in the results of the study and seem sufficient to make generalizations based on the findings; however, all participants were female students attending the same university in Seoul, so the results may have unintended gender interference and biased demographic characteristics. Another limitation is that this study did not consider participants' overall L2 proficiency. The strength of the relationship between writing scores and linguistic resources might have depended on overall L2 proficiency level. If the participants' overall proficiency levels were provided along with writing proficiency, the findings might have become more concrete. Based on the findings of the study, subsequent research to expand upon the issues that are related to L2 writing instruction or L2 writing assessment in the future should be conducted.

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APPENDIX

The following are parts of the participants' original writing in argumentative writing. In order to understand Korean EFL learners' detailed language development, part of original writing excerpts from each writing proficiency level in argumentative writing and the writing samples were investigated in terms of syntactic complexity. For sample writing, two adjacent sentences that state one's opinion are chosen. The first sentence starts with the clause "I believe that."

Beginner: I think that mistake is experience and learning. Not mistaking people is impossible. (S: 2, C: 3, T: 2, DC: 1, CN: 2, VP: 3)

Intermediate: I think that mistakes are not important. Best Important thing is you fix or not fix to your mistake. (S: 2, C: 3, T: 2, DC: 1, CN: 1, VP: 4)

High-Intermediate: I think that human has developed and will develop, so human has made many difficult problem, but also has made many solution. Through the problem, we can make new solution, and can care new condition. (S: 2, C: 4, T: 3, DC: 1, CN: 7, VP: 4)

Advanced: I think that people can learn more things from an experience rather than from a theory or lesson which is taught in class or by their parents. All of people can get feelings or ideas from the real experience or events. (S: 2, C: 4, T: 2, DC: 2, CN: 4, VP: 4)

Examples in: English
Applicable Languages: English
Applicable Levels: Tertiary

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