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Korean EFL Learners' Productive Collocation Knowledge and Its Relationship to Their Writing Proficiency

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The primary purpose of the current study was to investigate Korean university students' productive collocation knowledge and examine its relationship to the students' writing proficiency. Seventy four Korean university students, who were mostly freshmen majoring in English at a university located in Seoul, participated in the study. The productive collocation test (PCT) was administered to the students to assess the collocation knowledge and it was found that the verb-noun collocations were harder to retrieve and use than the adjective-noun collocations in general. Besides, the unpredictability from L1 and the existence of various synonyms were identified as the source of difficulties in retrieving and using the collocations. In an attempt to investigate the relationship between the students' productive collocation knowledge and their writing proficiency, a one-way ANOVA was conducted and it was found that the students with more productive collocation knowledge tended to have high writing proficiency overall. In addition, the result of a hierarchical multiple regression analysis revealed that the students' productive collocation knowledge could account for their writing proficiency significantly when controlling for their grammatical knowledge and productive vocabulary size. The knowledge of verb-noun collocations, in particular, was found to be significantly related to the students' writing proficiency.

[productive collocation knowledge/L2 writing proficiency]

I. INTRODUCTION

The role of collocation knowledge in L2 learning has long been identified and emphasized in a large number of L2 studies (Lewis, 1993, 2000; McCarthy, 1984; Nation, 2013; Schmitt & Carter, 2004). The results of the studies indicated that the knowledge of

multiword units plays a key role in language comprehension and production in that word chunks as a unit of storing and retrieving rather than a single word can accelerate language processing significantly. Particularly relevant to L2 learning, it has been argued that learning collocation can improve the learners' language fluency, allowing them to understand more quickly and speak more fluently (Nation, 2013; Pawley & Syder, 1983; Skehan, 1998), enhance the native-like selection of language use (Bahns & Eldaw, 1993; Marton, 1977; Pawley & Syder, 1983; Verstraten, 1992), and expand the learners' vocabulary retention (Bogaards, 2002; Ellis, 2001).

As the importance of multiword units (collocation in particular) for L2 learners has been increasingly highlighted, a number of studies on L2 collocation with Korean EFL learners have been conducted investigating teaching collocation and its effect on collocation and vocabulary knowledge (Kim & Yoon, 2010; Song, 2009) and exploring the relationship between collocation knowledge and reading and writing proficiency (Kim, 2005; Kim, 2007; Kim & Cho, 2010; Kim & Ma, 2011; Park & Lee, 2011). However, they mostly investigated learners' receptive collocation knowledge in assessing collocation competence, and besides, little research was conducted on how much of L2 writing proficiency could be accounted for by productive collocation knowledge when other variables, which were perceived to be important predictors of L2 writing proficiency, were held. A few studies attempted to explore the relationship between collocation knowledge and writing proficiency (Kim, 2005; Lee & Kim, 2008; Park & Lee, 2011), but they did not delve into investigating how much collocation knowledge could explain L2 proficiency.

Thus, the primary purpose of the current study was to explore the Korean university student's productive collocation knowledge and how it is related to their L2 writing proficiency. Furthermore, it was to investigate how much of the students' writing proficiency could be explained by their productive collocation knowledge, controlling for their productive vocabulary size and grammatical knowledge.

II. THEORETICAL BACKGROUNDS AND LITERATURE REVIEW

1. Language and Collocation Knowledge

With the advent of the pattern-based model of language acquisition, which postulates that the human facility for language learning is based on the ability to extract pattern from input rather than being guided by innate knowledge, a number of researchers have tried to define language use and knowledge in terms of lexical patterning. Pawley and Syder (1983) claimed that language users store a number of lexicalized sentence stems that range from the completely fixed expressions through collocations so that they can

choose a large range of pre-constructed clauses and produce the language appropriately. Similarly, Ellis (2001) argued that language knowledge and use can be explained by storing and retrieving formulaic sequences in long-term memory. According to Nattinger and DeCarrico (1992), these kinds of formulaic sequences are ubiquitous in language use and they make up a large proportion of written and spoken discourse. Erman and Warren (2000) found that formulaic sequences made up 58.6% of the spoken discourse and 52.3% of the written discourse that they analyzed. Foster (2001) reported that 32.3% of the unplanned native speech analyzed was comprised of formulaic language. Along the same lines, Pawley and Syder (1983) suggested that the number of "sentence-length expressions familiar to the ordinary, mature English speakers probably amounts, at least, to several hundreds of thousands" (p. 213).

While it has been taken for granted that such formulaic sequences (e.g., collocations) comprise a large proportion of discourse, its significance in language processing has been widely recognized (Nation, 2013; Pawley & Syder, 1983; Skehan, 1998). It has been maintained that lexical patterning can expedite language comprehension and production significantly since it "allows chunking, freeing up memory and processing resources" (Schmitt & Carter, 2004, p.12). For example, learners can comprehend texts more quickly when they can process word chunks as a unit in retrieving the meaning of formulaic sequences. Similarly, if a large number of multiword units are readily available in L2 writing, less cognitive resource would be spent.

Provided that the knowledge of formulaic sequences plays a crucial role in the efficiency of language processing, L2 researchers (Lewis, 1993, 2000; McCarthy, 1984; Nation, 2013) have begun to voice the importance of the collocation knowledge in second language learning. Lewis (2000) argued that learning word chunks such as collocations would contribute to developing L2 learners' communicative competence by facilitating native-like word selection. Nation (2013) claimed that knowing a word should involve knowing what words it typically occurs with and this type of knowledge can help language use and contribute to language fluency ultimately. Given the importance of collocation knowledge in L2 development, Ellis (2001) contended that it is necessary to teach collocations explicitly in L2 classrooms.

However, a number of the studies with EFL learners reported that most EFL learners' collocation knowledge was fairly limited (Kim, 2012; Nesselhauf, 2003; Shei & Pain, 2000). For example, Nesselhauf (2003) investigated the use of verb-noun collocations in the essays of German learners of English, and found that even the advanced learners made a number of errors in using English collocations and a large proportion of errors appeared to be influenced by their L1. Similarly, Laufer and Waldman (2011) examined the verb-noun collocations used in the writings of Hebrew EFL learners and it was revealed that the number of collocations produced by the learners was much fewer than

that of the native speakers, and that the collocation errors persisted even at the advanced level.

As such, although the significance of collocation knowledge has been increasingly stressed in L2 learning in that it promotes L2 fluency and facilitates a native-like selection of words, the findings of the studies on L2 collocation with EFL learners insistently suggested that most EFL learners still lack collocation knowledge of English, and learning collocations still presents challenge to them.

2. L2 Collocation Knowledge and Proficiency of Korean EFL Learners

A plethora of studies researched the relationship between collocation knowledge and L2 proficiency (Chon & Lee, 2015; Kim, 2005; Kim & Cho, 2010) or the effect of collocation-based instruction on L2 proficiency (Kim & Ma, 2011; Lee & Kim, 2008; Park & Lee, 2011) in Korean context. The results of the majority of the studies indicated that Korean EFL learners' collocation knowledge is related to their vocabulary knowledge, reading proficiency, and writing proficiency, and that the collocation-based instruction could enhance the students' L2 proficiency in general.

With 203 Korean university students, Kim (2005) investigated the relationship between the students' general language proficiency measured by TOEIC and essay writings and their collocation knowledge assessed by a self-designed collocation test. The results showed that as the students' level of proficiency increased, they had higher scores on the collocation test, and that there was a correlation between the scores on the students' essay writing and their collocation knowledge. The result of the study indicated that there was a close relationship between the students' collocation knowledge and their English proficiency in general.

Similarly, Kim and Cho (2010) examined the relationship between Korean high school students' receptive collocation knowledge and their general English proficiency measured by a national academic ability test, which primarily focused on reading and listening skills. The results revealed that there was a significant difference in learners' collocation knowledge according to their general English proficiency. As the students received the higher scores on the proficiency test, they gained the higher scores on the collocation test. They further probed the relationship between the collocation knowledge and the vocabulary proficiency. The results showed that there was no significant difference in the collocation knowledge according to the level of vocabulary proficiency.

To explore the effect of a collocation-based vocabulary instruction on collocation knowledge and writing proficiency, Park and Lee (2011) administered the collocation and the writing test before and after a 7-week-experiment session to 80 high school students and compared the pre- and post-test scores. They found that the group given the

collocation-based vocabulary instruction displayed a significant enhancement in their collocation knowledge and writing proficiency. On the basis of the findings, it was suggested that there was a significant relationship between the learners' collocation knowledge and their writing proficiency.

In a similar vein, with 80 6th graders at an elementary school in Korea, Lee and Kim (2008) investigated the effect of a collocation-based instruction on the students' English writing proficiency. It was found that the collocation-based instruction had a positive effect on the students' writing proficiency both in the high-proficiency and low-proficiency group, and it appeared to have a long-term effect as well. In addition, the results of the questionnaire indicated that the low-proficiency group, in particular, benefited most from the collocation-based instruction in their interest and self-confidence in learning English.

With 51 high school students, Kim and Ma (2011) examined the effect of a collocation-based instruction on L2 vocabulary learning. The results exhibited that the students' vocabulary knowledge was significantly enhanced through the collocation-based instruction, and that the students who received the collocation-based vocabulary instruction showed a greater level of interest in vocabulary learning and English learning in general than those who did not. They suggested that teachers should be well aware of the collocation-based vocabulary learning strategies and teach them to their students explicitly.

Adopting a corpus-based approach, Chon and Shin (2009) analyzed the collocations used in the essays of 30 university students. The results of the study showed that the students who used a large number of appropriate collocations received higher scores on their essays than those who used a small number of appropriate collocations. They suggested that the ability to use collocation appropriately should be part of measurement in assessing vocabulary proficiency.

Most relevant to the current study, with 68 university students in Korea, Chon and Lee (2015) investigated the relationship between receptive collocation knowledge and L2 writing proficiency. They utilized a regression analysis to find out how much collocation knowledge could explain L2 writing proficiency, and it was found that the receptive collocation knowledge was the strongest predictor among the three variables (receptive vocabulary size, productive vocabulary size, and receptive collocation knowledge) in predicting their English writing proficiency.

To sum, the results of a large number of studies on L2 collocation and proficiency indicated that the collocation-based instruction had a positive effect on vocabulary learning and L2 proficiency, and there was a strong relationship between collocation knowledge and L2 proficiency. However, learners' receptive collocation knowledge was largely measured in most of the studies, and their productive collocation knowledge was

rarely explored. Besides, even though they insistently showed that there was a relationship between the learners' collocation knowledge and their language proficiency in general, but they seldom probed into how much of writing proficiency could be explained by productive collocation knowledge when controlling for such predictors as productive vocabulary size and grammatical knowledge, seemingly believed to be important predictors of L2 writing. Thus, the current study attempted to fill this research gap and such research would shed light on understanding unique contribution of productive collocation knowledge to L2 writing proficiency. The following research questions guided the current study.

1) Which type of collocation (verb-noun or adjective-noun collocations) is more difficult for Korean EFL learners to retrieve and use?
2) What are the sources of difficulty in retrieving and using collocations for Korean EFL learners?
3) What is the relationship between Korean EFL learners' productive collocation knowledge and their writing proficiency?
4) How much of Korean EFL learners' writing proficiency can be accounted for by productive collocation knowledge when holding their productive vocabulary size and grammatical knowledge?
5) Which type of productive collocation knowledge (verb-noun or adjective-noun) can account for L2 writing proficiency better?

III. METHODS

1. Participants and Settings

The participants of the current study were 74 English majors at a university located in Seoul who were enrolled in "Practice in English Grammar" in the spring semester, 2015. Two classes were opened for the course and most of the students (94.6%) were freshmen, taking the course as a requirement. The age of participants ranged from 19 through 25, but about 91% of the students were in their late teens or early twenties. The two classes were taught by the same instructor and the primary objective of the course was to help the students understand the core components of English grammar. Most of the participants received at least nine years of formal English education. There were three Chinese students in each class, but they were not included in the data analysis since they did not represent Korean EFL learners.

2. Research Tools

1) Productive Collocation Test (PCT)

In order to measure the participants' productive collocation knowledge, a productive collocation test (PCT, hereafter) was developed on the basis of the collocation tests utilized in previous studies (i.e., Chon & Lee, 2015; Jung, Park, & Kim, 2010; Jung, Sur, & Kim, 2007; Kim, 2012) and the collocations listed in such reference books as *English Collocation in Use* by McCarthy and O'Dell (2005) and *Teaching Collocation* by Lewis (2000). Only two types of structures (i.e., verb-noun and adjective-noun collocations) were included for the test items, and they were cross-checked with *Macmillan Collocations Dictionary for Learners of English* (2010) and *Oxford Collocations Dictionary for Students of English* (2009) to see whether they were listed in the dictionaries. Consequently, 80 collocations were chosen and 80 test items were created accordingly. It was pilot-tested on 25 university students for modification of the test and the 11 test items (e.g., *high position*, *tall trees*, *big fight*, *small business*, and *near future*) were removed from the test since the percentage of correct answers of those items was higher than 90% and they were assumed to be too familiar to Korean EFL learners. As a result, 30 adjective-noun collocations and 39 verb-noun collocations were included in the test, totaling 69 test items. In presenting the prompt of the PCT, the researcher tried to control the level of the vocabulary to be within the most frequent 1,000 words and keep the structure of the prompts as simple as possible in order to minimize the influence of the prompt. Additionally, the meaning of the target collocation was provided in boldface to enhance readability. The followings are the sample test items of the PCT.

A [ ] **decision** could take months.
(**마지막 결정**은 수개월이 걸릴 수 있다)

Farmers [ ] **crops**.
(농부들은 **농작물을 키운다**)

2) Productive Vocabulary Size Test (PVST)

To measure the participants' productive vocabulary size, the productive vocabulary size test (PVST, hereafter) was utilized. It was developed by Shin, Chon, and Kim (2011) and their tool adopted the format of Laufer and Nation's (1999) vocabulary size test of controlled test, which was designed to measure English learners' productive vocabulary size. It was used in a few studies to measure Korean EFL learners' productive

vocabulary size and found to be related to the score of English section of College Scholastic Aptitude Test (Shin, et al., 2011) and writing proficiency (Lee, 2014). The followings are the sample test items of the PVST.

그는 **친절한** 선생님이다.
He is a **k_ _ _** teacher.

저 **배**를 봐라.
Look at the **b_ _ _**?

L1 translation was given to each test item so that test takers can recall a written form from meaning (i.e., L1 translation), otherwise test takers would have to guess the meaning of the target word from context, which is not intended part of assessment. The PVST adopted a C-test format as used in Laufer and Nation's test and there are ten test items in each word band from the 1st through the 10th 1,000 word levels in the test, totaling 100 test items. One or two letters were given according to the number of syllable of the word to prevent test-takers from producing alternative words. The vocabulary level of the prompt of the test was also controlled to be within the most frequent 1,000 word level.

3) Grammar Test

A grammar test was developed by the researcher to measure the participants' knowledge of English grammar, which was also used as the final exam of the course. The test items were largely adapted and modified from the workbook of *Grammar in Use Intermediate* (Smalzer & Murphy, 2009) and *Understanding and Using English Grammar* (Azar & Hagen, 2009). The test included 100 questions and adopted two different types of format: fill in the blank and multiple choice. It covered tense, modals, articles, conditionals, adjectives, nouns, and relative clauses of English. The followings are the sample test items of the test.

**Complete the sentence with the present continuous or present simple form of the verb*.
If you (look) _____ for excellent food and a pleasant dining experience, do not eat at County Line. The food (taste) _____ terrible.

**Choose the best answer*.
John drove all night to get here for his mom's birthday. He _____ exhausted by the time he arrived.

1) ought to be 2) must have been
2) could be 4) wouldn't have been

4) ESL Composition Profile (ECP)

The ESL Composition Profile (Jacobs, Zinkgraf, Wormouth, Hartfiel, & Hughey, 1981), one of most commonly used rubrics for ESL writing assessment, was utilized in the current study in assessing the participants' writing proficiency. It is composed of five major components: content, organization, vocabulary, language use, and mechanics, and each category has four different range of scores from 'very poor' to 'excellent to very good.'

TABLE 1

ESL Composition Profile (Jacobs et al., 1981)

	Range of scores	Criteria descriptors
Content	30-27 (excellent to very good) 26-22 (good to average) 21-17 (fair to poor) 16-13 (very poor)	knowledgeable, substantive, thorough development of thesis, relevant to assigned topic
Organization	20-18 (excellent to very good) 17-14 (good to average) 13-10 (fair to poor) 9-7 (very poor)	fluent expression, ideas clearly stated/supported, well-organized, logical sequencing, cohesive
Vocabulary	20-18 (excellent to very good) 17-14 (good to average) 13-10 (fair to poor) 9-7 (very poor)	sophisticated range, effective word/idiom choice and usage, word form mastery, appropriate register
Language Use	25-22 (excellent to very good) 21-18 (good to average) 17-11 (fair to poor) 10-5 (very poor)	effective complex construction, agreement, tense, number, word order/function, articles, pronouns, prepositions
Mechanics	5 (excellent to very good) 4 (good to average) 3 (fair to poor) 2 (very poor)	spelling, punctuation, capitalization, paragraphing, handwriting

5) Interview

A semi-structured interview was conducted with 20 voluntary students and it was primarily to investigate what were the major sources of difficulty in retrieving and using collocations on the test. The interview was conducted individually at the researcher's

office for about 15 to 20 minutes and the students were mostly asked about what made them difficult to retrieve and use the collocations on the test.

3. Procedures

The productive vocabulary size test (PVST) and the productive collocation test (PCT) were administered to 74 participants at the near end of spring semester, 2015. The students were given about 75 minutes to answer the questions and were free to ask questions about the test items when deemed necessary. Also, a semi-structured interview was conducted with 10 students in each class as soon as the test scoring was completed. They were allowed to look at their test sheet and result during the interview and it was to help them recollect their experiences on the test.

In scoring the PVST, one point was given to each item when a target word was spelled correctly and a half point was given if a target word was partially misspelled but recognizable (e.g., *calender*). Then, each score at each word band (i.e., the 1st through the 10th 1,000 word levels) was multiplied by 100 and added altogether to represent the students' productive vocabulary size. Meanwhile, in scoring the PCT, the five native instructors who had been teaching English at the university evaluated the answers the students produced. In the coding scheme utilized, there were four different options; largely acceptable, acceptable, questionable, and largely unacceptable. When all of the five raters considered a collocation acceptable or largely acceptable, it was reasoned to be an appropriate answer. It was also double-checked with the Corpus of Contemporary American English (COCA) to see whether it was actually used with a certain level of frequency (i.e., at least more than 20 occurrences in COCA). An individual score of the test was calculated for each student to represent his/her productive collocation knowledge. One point was assigned to each test item, totaling 69 points, and a half point was given if there was a mistake in tense or agreement (e.g., *The blood <u>provide</u> oxygen to the brain*.).

In the following week, the students were instructed to write an essay of 400 words in 60 minutes. They were informed in advance that the feedback on the five major components of the ECP would be provided by which they could learn the strength and weakness of their writings. The writing prompt used is as following.

> *What do you think are important characteristics that a good leader can have? Use specific reasons and examples to explain your answer.*

Once the students' essays were collected, they were evaluated by the two native teachers at the universities who held a master's degree in the field of language and language teaching. They were pre-trained to use the ESL Composition Profile in evaluating the

students' essays by the researcher. The two raters showed a relatively high interrater reliability (r=.90) in scoring the students' essays.

A grammar test was conducted in the last class of the semester as the final exam of the course. The test was scored by the researcher and one point was given to each item, totaling 100 points, and the test score was used to represent the students' grammar knowledge.

4. Analysis

The data collected from the study were primarily analyzed using SPSS 21.0. In addressing the first research question, a paired t-test was conducted to compare the mean of adjective-noun collocation (ANC, hereafter) items and verb-noun collocation (VNC, hereafter) items. To compare the mean score of ANC and VNC items while controlling for the degree of exposure, the frequency per million (FPM, hereafter) of each item was obtained in COCA and paired each other in a way that they had the similar FPM. It was to minimize the influence of the nuisance factor on the test score. Obtaining the FPM of each test item was not possible until the participants actually took the PCT, and it was because although there was one intended answer to each question when the test was developed, in many cases, there were more than two viable answers that the students produced (e.g., big/huge win). Therefore, once the participants took the PCT, the FPMs of all the answers that were judged to be appropriate were averaged to represent the frequency of each test item.

Taking the FPMs of the test items into account, 23 ANC items were selected out of 30 ANC test items and 23 VNC items out of 39 VNC test items. The average FPM of 23 ANC and VNC test items were 0.83 and 0.82 respectively. Meanwhile, the same number of incongruent/unpredictable collocations (i.e., 5 unpredictable collocations and 18 predictable collocations in each group) were included in each group. It was to control the L1 influence on the PCT scores and thus it was critical to have the same number of unpredictable collocations in each group (Chon & Lee, 2015). Consequently, controlling for the degree of exposure and predictability from L1, the scores of 23 items in each type were entered in the paired t-test, the one-way ANOVA, and the regression analysis.

In order to identify the major sources of difficulty in retrieving and using the collocations on the test, all the interviews were audiotaped and partially transcribed for the analysis. In the analysis, the researcher tried to group similar happenings and experiences while they were taking the PCT, focusing on the difficulties they experienced in answering the questions.

In an attempt to investigate the relationship between the productive collocation knowledge and the writing proficiency of the participants, a one-way ANOVA was

conducted. The participants were divided into three groups according to their scores on the PCT and the mean writing scores of the three groups were compared to see if there were significant differences among them. Then, a hierarchical multiple regression analysis was conducted to identify the variance of the students' writing proficiency that can be accounted for by their productive collocation knowledge when the variance that can be explained by productive vocabulary size and grammatical knowledge was partialled out. Another multiple regression analysis was conducted to see which type of collocation (verb-noun or adjective-noun collocation) better explained the students' writing proficiency.

IV. FINDINGS AND DISCUSSION

1. Productive Collocation Knowledge of Korean EFL Learners

Table 2 below shows a list of collocations that were judged to be appropriate or inappropriate and both of them were sequenced according to the number of occurrences. For example, *heavy meal* was the most frequent appropriate answer whereas *full meal* was the most frequent inappropriate answer that the students produced. In addition, the percentage of correct answer was calculated and the frequency per million (FPM) was obtained for each test item to roughly show the item difficulty and the degree of exposure.

TABLE 2

Adjective-Noun Collocations (ANCs) by Percentage of Correct Answers

	Collocation		Percentage of Correct Answers (PCA)	FPM in COCA
	Adjective	Noun		
1	big, huge/*large	win	0.85	0.28
2	tall, big/*high, *loft	building	0.84	0.54
3	nice, good, great/*fine	apartment	0.84	0.03
4	good, great/*fine	condition	0.80	0.63
5	strong/*high, *huge, *big, *great	preference	0.80	0.27
6	good/*nice	guess	0.77	0.28
7	large, huge, great/*big, *much	amount	0.76	2.67
8	final/*last	decision	0.74	2.11
9	good, great/*nice, *fine, *fair	relation	0.74	0.91
10	last/*final	resort	0.73	3.06
11	big, serious/*huge *large	accident	0.70	0.15
12	final/*last	approval	0.69	0.56
13	heavy, big, large, huge/*full, *much	meal	0.68	0.13
14	heavy, chain/*real	smoker	0.64	0.11
15	final/*last	outcome	0.61	0.42

16	quick/*fast, *swift	look	0.59	1.99
17	quick/*fast, *immediate, *short, *brief, *speedy	comment	0.57	0.26
18	heavy, big/*hard ,*real	drinker	0.53	0.2
19	heavy/*big, *strong, *huge, *large	rain	0.53	2.12
20	heavy, thick, dense/*deep, *dark	fog	0.53	0.19
21	fast/*quick, *speedy	lane	0.49	0.64
22	little/*small, *shallow, *short	knowledge	0.46	0.49
23	true, genuine/*real *sincere *faithful	believer	0.43	0.69
24	powerful/*strong *useful	tool	0.43	1.06
25	strong, black/*deep, *dark, *thick	coffee	0.43	0.24
26	strong/*deep, *thick	tea	0.36	0.05
27	quick, short, hot/*bad, *high, *fast, *impatient	temper	0.35	0.11
28	real / *practical, *realistic, *actual, *virtual, *substantial	possibility	0.26	1.11
29	large/*big, *huge	egg	0.19	3.49
30	thick, strong/*deep, *dense	soup	0.28	0.07
	Mean		0.59	0.83

* refers to an inappropriate answer that occurred at least more than twice.

TABLE 3

Verb-Noun Collocations (VNCs) by Percentage of Correct Answers

	Collocation		Percentage of Correct Answers (PCA)	FM in COCA
	Verb	Noun		
1	make /*take, *do, *have	mistake	0.88	17.27
2	make /*take, *choose	choice	0.88	8.22
3	have, throw, hold/*open, *make	party	0.88	1.31
4	finish, get, complete/*end, *master, *achieve	degree	0.86	1.04
5	make, cook, prepare/*do	breakfast	0.83	0.37
6	provide, offer, give/*supply, *produce	protection	0.82	1.15
7	get, see, understand/*know, *catch	point	0.82	1.62
8	make/*give, *get	profit	0.81	2.83
9	have/*do, *take, *make	debate	0.77	2.8
10	supply, provide /*offer, *give, *produce	gas	0.76	0.09
11	gain/*get	weight	0.76	2.29
12	make/*give, *get, *improve, *have	improvement	0.69	1.31
13	supply, provide/*give, *offer	oxygen	0.65	0.11
14	achieve, make, bring, attain/*keep, *accomplish, *reach, *have, *obtain	peace	0.64	1.26
15	raise/*grow, *feed, *breed, *nurture, *foster	children	0.61	5.95
16	make/*have, *do, *put, *give	effort	0.61	6.58
17	provide, offer/*take, *give	care	0.59	1.9
18	end, stop, overcome /*finish, *cease	crisis	0.60	0.09
19	achieve/*make, *accomplish, *get, *gain, *win, *reach	success	0.55	1.37

20	gain/*get, *earn	popularity	0.55	0.8
21	make/*give *have *take	contribution	0.55	3.85
22	keep/*take, *get, *have	change	0.54	0.71
23	start/*turn, *get, *put, *operate	engine	0.47	1.12
24	raise/*grow, *feed, *breed, *keep, *have	cattle	0.47	0.32
25	expand, broaden, enlarge/*widen, *enlarge, *spread	market	0.45	0.18
26	end/*finish, *stop, *break, *cut, *quit	relationship	0.42	0.51
27	apply/*put, *take, *use	ointment	0.39	0.05
28	do, cause/*give, *have, *make, *bring, *take, *affect	harm	0.36	2.58
29	grow, have/*raise, *keep, *take	beard	0.40	0.35
30	extend, prolong/*long, *lengthen, *delay, *continue	lives	0.35	0.93
31	keep, fulfill/*implement, *practice, *perform, *make, *execute	promises	0.34	1.15
32	expand, increase/*expend, *enlarge, *raise, *widen, *magnify, *amplify	production	0.32	0.73
33	extend, lengthen/*prolong, *postpone, *delay	period	0.31	0.09
34	have/*give, *affect, *make, *cause	effect	0.31	14.06
35	get/*have, *do, *take, *make	perm	0.18	0.05
36	cause, do/*give, *make, *take, *put, *affect, *have, *bring	damage	0.16	2.93
37	break/*throw, *abandon, *discard, *dispose, *stop, *renounce, *destroy	habit	0.12	0.26
38	pay/*make, *have, *take, *give	visit	0.07	1.11
39	fulfill/*do, *implement, *perform, *follow, *practice, *take, *keep, *conduct, *make	obligation	0.01	0.32
	Mean		0.53	2.30

* refers to an inappropriate answer that occurred at least more than twice.

The percentage of correct answers (PCA) on average for the ANCs was slightly higher than that of the VNCs (ANCs: 0.59, VNCs: 0.53) and the frequency per million (FPM) on average for the VNCs was much higher than that of ANCs (VNCs: 2.30, ANCs 0.83). This roughly indicated that the VNCs used on the test were harder to retrieve than ANCs even though the VNCs' degree of exposure is higher than that of ANCs. For a finer analysis, the 23 test items in each type of collocations (i.e., ANC and VNC), whose mean FPMs were 0.83 and 0.82 respectively, were included in the statistical analysis. In addition, the same number of the collocations that are unpredictable from L1 was included in each group. As aforementioned, it was to minimize the influence of the degree of exposure of the collocations and the influence of L1. A paired t-test was conducted and it was found that the mean test score of the ANCs was significantly higher than that of the VNC (see Table 4 below). The result indicated that it was more difficult for the students to retrieve and produce the VNCs than the ANCs in general.

TABLE 4
Results of the PCT

	Mean	SD	t	Sig
Verb-Noun Collocations (23 items)	9.45	3.74	7.16**	.00
Adjective-Noun Collocations (23 items)	12.15	3.38		

**p<.01

The finding echoes the result of Chon and Lee's (2015) study in which the VNCs were found to be harder to retrieve than the ANCs even when controlling for the influence of L1. The results may be related to the fact that the students retrieved a large number of the potential collocates of the VNCs, and thus more competition occurred among the potential collocates of the VNCs than those of the ANCs. In fact, the average number of collocates of the VNCs retrieved by the students was 9.8 per each question and it was 6.9 in the case of ANCs. This may imply that the competition among the potential collocates of the VNCs was more intense than among those of ANC, resulting in a relatively low PCA. It may be partially because many delexical verbs were retrieved as potential but inappropriate collocates by the students. For example, a node word "harm" triggered them to retrieve 11 inappropriate collocates, and the five collocates among them were delexical verbs (i.e., *make*, *have*, *give*, *take*, and *get*), and overall, delexical verbs make up about 30% of the total number of collocates retrieved by the students. The reason may be that the meanings of delexical verbs are often hazy and indistinct, and thus it might be assumed by the students that they could be combined with a wide range of words. The 10 out of 20 students interviewed confirmed this and reported that they often believed a number of delexical verbs would fit in as a collocate (e.g., **give damage*, **put damage*, **have damage*, **get damage*, **take damage*, and **bring damage*). To recap, more competition seemed to occur among the potential collocates of VNCs than among those of ANCs, and it was partially due to a large number of delexical verbs wrongly retrieved by the students, which would influence the PCA ultimately.

With regards to the sources of difficulty in retrieving and using English collocations, as a number of researchers (Kim, 2012; Kim & Yoon, 2008; Nesselhauf, 2003) consistently predicted, the participants' L1 appeared to interfere with their use of English collocations. In the current study, L1 influence was particularly persistent among the unpredictable collocations on the test. For example, the students produced such inappropriate collocations as "thick (*jin-han*) tea," "give (*ju-da*) harm," "do (*ha-da*) effort," "open (*yeol-da*) a party," and "discard (*beo-ri-da*) habits," which directly correspond to their L1 translations. They often made up a relatively large proportion of a total number of

inappropriate collocations (e.g., **do a perm*: 40%, **give harmful effect*: 60%) and influence their PCA in a negative way. For example, the average PCA of such test items as *get a perm*, *break a habit*, *pay a visit*, and *do damage*, which are unpredictable from L1, was lower than 20%. The 13 out of the 20 students interviewed reported that when they were not sure about which collocate would fit in, they often relied on L1-L2 translation. In other words, they tried to find a corresponding English word that matched a L1 word given as a target meaning in each test item. One of the students interviewed stated that "I know *do* means *ha-da* and *effort* stands for *no-reok* in Korean. Then why not *do effort*? I thought it made a perfect sense."

Of note is that even if the collocations are unpredictable from L1, when the degree of exposure is high, the influence of L1 on L2 collocation use seems to lessen. For example, such unpredictable collocations *make mistake*, *make choice*, and *make profit* had a relatively high FPM (9.44 on average) and the PCA of those test items was higher than 80% on average. As Yamashita and Jiang (2010) contended, once the collocation knowledge is firmly grounded in L2 learners' mental lexicon through repeated exposure and use, L2 collocations are processed independently, setting off L1 influence.

Meanwhile, as shown in a few previous studies (Jung, Sur, & Kim, 2007; Jung, Park, & Kim, 2010), the existence of various synonyms was also identified as the source of difficulty in retrieving and using the collocations. A large number of synonymous but inappropriate collocates were retrieved by the students, and among those were **last outcome* (32.43%), **real believer* (24.32%), **strong tool* (36.49%), **finish relationship* (21%), **grow cattle* (18%) and **get popularity* (35%). The 15 students interviewed stated that they were very confused in a number of the test items especially when there existed several synonyms whose L1 translations were largely the same to their knowledge (e.g., *end*, *finish*, *stop*, *quit*, *cease* and *halt*). One of the students stated that "the first word that occurred to me as an appropriate collocate of *relationship* was *finish*. I thought it could co-occur with *relationship*, but soon more words such as *end*, *stop*, and *quit* came to my mind. Then, I wasn't sure about what to choose. I was kind of lost."

It seems the existence of the words that are habitually perceived to be synonyms, and that often have the same L1 translation would cause much confusion in the use of collocations. The findings are in line with a few previous studies (Jung, Sur, & Kim, 2007; Jung, Park, & Kim, 2010) in which the presence of near-synonyms would influence the recognition of L2 collocations. As Lee (2011) argued, these kinds of collocation errors may be related to how English words were explained and introduced in their classroom and EFL reference books in which a number of near-synonyms are often treated as if they could be used interchangeably.

2. L2 Productive Collocation Knowledge and Writing Proficiency

In order to examine the relative strength of the relationship between L2 productive collocation knowledge and writing proficiency, the Pearson's correlations between the participants' writing test scores and the scores on three other variables (i.e., productive vocabulary size, grammatical knowledge, and productive collocation knowledge) were obtained respectively, and they were all found to be statistically significant at. 01 level (see Table 5). The correlation between the students' writing scores and their PCT scores was the highest whereas it was the lowest between their writing scores and the scores on the grammar test.

TABLE 5

Correlations between L2 Writing Proficiency and Three Other Variables

	Productive Vocabulary Size	Grammatical Knowledge	Productive Collocation Knowledge
L2 Writing Proficiency	.61**	.53**	.69**

**p<.01

For a finer analysis, the participants were divided into three groups according to the score on the PCT (high, mid, and low), and the means and standard deviations of writing test scores were calculated (see Table 6). In general, the mean scores of the groups were sequenced according to their productive collocation knowledge. In other words, the more productive collocation knowledge they had, the higher writing test scores they received.

In order to examine the statistical significance among the groups, a one-way ANOVA was conducted and it was found that there was a significant effect of the participants' productive collocation knowledge (PCK, hereafter) on their L2 writing proficiency, $F(2, 71)=14.95$, $p<.01$ (see Table 7). Since the main effect for the participants' PCK involved more than two levels, a follow-up post hoc procedure (Tukey HSD) was conducted to evaluate pairwise differences among the three different groups (high, mid and low PCK groups). The significant mean difference was found between the low PCK and the mid PCK group and the low PCK and the high PCK group, but no significant mean difference was found between the mid PCK and the high PCK group (see Table 8).

TABLE 6

L2 Writing Proficiency by Productive Collocation Knowledge

Productive Collocation Knowledge	N	Mean	SD
Low	26	75.73	10.80
Mid	25	83.52	6.38
High	23	87.52	4.98

TABLE 7

Results of ANOVA for L2 Writing Proficiency

Source	SS	df	MS	F	Sig.
Group	1872.05	2	936.02	14.95**	.00
Error	4445.09	71	62.60		

**p<.01

TABLE 8

Multiple Comparisons for Productive Collocation Knowledge and L2 Writing Proficiency

Dependent Variable	Group	Group	Mean Difference	Std. Error	Sig.
Writing Proficiency	Low PCK	Mid PCK	-8.79**	2.22	.001
		High PCK	-11.79**	2.26	.000
	Mid PCK	Low PCK	8.79**	2.22	.001
		High PCK	-3.00	2.29	.393
	High PCK	Low PCK	11.79**	2.26	.000
		Mid PCK	3.00	2.29	.393

**p<.01

The result of a one-way ANOVA seemed to uphold the findings of the previous studies (Kim, 2005; Park & Lee, 2011; Siyanova & Schmitt, 2008). As revealed in the current and previous studies, an increasing number of studies on L2 collocation have pointed to the fact that there is a positive correlation between collocation knowledge and L2 proficiency. Given that the knowledge of multiword units is crucial in L2 production, it seems essential for teachers to draw students' immediate attention to collocation knowledge in relation to their L2 proficiency. This type of consciousness raising about collocation knowledge seems indispensable in that it can influence their future vocabulary learning strategies or language learning strategies in general. They would shift their focus from a single-word unit to a multi-word unit, which would enhance their L2 proficiency eventually.

3. How Much of L2 Writing Proficiency Can Be Explained by Productive Collocation Knowledge?

In order to investigate how much of L2 writing proficiency can be explained by productive collocation knowledge, holding grammatical knowledge and productive vocabulary size, a hierarchical multiple regression analysis was conducted by entering three predictors sequentially. The multicollinearity among the predictors was also tested to

see whether the correlations among the predictors were too high to the extent that the regression analysis could not be conducted. The tolerance and variance inflation factor (VIF) obtained were all within the accepted level. All the tolerance scores were below 1 and the VIF scores were lower than 5. The results of hierarchical multiple regression analysis are shown in Table 9 below.

TABLE 9

Hierarchical Multiple Regression Analysis for Three Variables

Model	Beta	t	R^2	F	R^2 Change	F Change
Model 1						
Grammatical Knowledge	.55	5.55**	.30	30.74**	.30**	30.74**
Model 2						
Grammatical Knowledge	.22	1.74	.42	25.28**	.12**	14.19**
Productive Vocabulary Size	.47	3.77**				
Model 3						
Grammatical Knowledge	.19	1.64	.55	26.75**	.13**	14.25**
Productive Vocabulary Size	.25	2.23*				
Productive Collocation Knowledge	.41	3.80**				

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

As shown by *F* statistics in Table 9 above, all of the three regression models were statistically meaningful in explaining the students' L2 writing proficiency (model 1: F =30.74, $p < .01$, model 2: F =25.28, $p < .01$, model 3: F=26.75, $p < .01$). In regression model 1, the students' grammatical knowledge was entered first as an independent variable and it was a significant predictor of L2 writing proficiency ($t = 5.55^{**}$) and accounted for 30% of the variance of L2 writing proficiency. In regression model 2, the students' productive vocabulary size was added as the second independent variable, and the two variables explained 42% of L2 writing proficiency and the R^2 change (12%) was significant (F=14.19**). Meanwhile, once productive vocabulary size was entered in regression model 2, grammatical knowledge was no longer a significant predictor of L2 writing proficiency (t = 1.74).

Finally, the participants' productive collocation knowledge was entered in regression model 3. As noted earlier, the reason productive collocation knowledge was entered last was that one of the research interests of the current study was how much of the variance of L2 writing proficiency can be explained by productive collocation knowledge, holding the other two variables. In so doing, the unique contribution of productive collocation knowledge to L2 writing proficiency could be identified.

When the three variables were entered in regression model 3, they could explain 55% of

the variance of L2 writing proficiency and R^2 change (13%) was significant (F=14.25**). In this model, productive vocabulary knowledge and productive collocation knowledge remained as significant predictors (t=2.23*, t=3.80**) whereas grammatical knowledge was not a significant predictor as in model 2 (t=1.64). The result indicated that productive collocation knowledge could explain about 13% of L2 writing proficiency even after the variance that could be accounted for by the other two variables was partialled out.

In addition, as the *Beta* scores in Table 9 indicated, productive collocation knowledge was the strongest predictor of L2 writing proficiency among the three variables. The result of the regression analysis suggested that productive collocation knowledge may be a crucial aspect of L2 writing proficiency to which due consideration should be paid in L2 writing assessment.

A follow-up multiple regression analysis was conducted to address the fifth research question: Which type of collocation (adjective-noun vs. verb-noun) is a better predictor of L2 writing? As displayed in Table 10 below, it was found that when the two variables were entered in the regression model together, they could account for 51% of the variance of L2 writing proficiency, which was statistically significant. However, the ANC score was not a significant predictor (t=1.58) while the VNC score was (t=5.05**) in the model. The *Beta* scores also indicated that the contribution of the VNC (*Beta* = .55) in explaining L2 writing proficiency was much higher than that of the ANC (*Beta* =.17).

TABLE 10

Multiple Regression Analysis for ANCs and VNCs

Model	Beta	t	R^2	F	R^2 Change	F Change
Model 1						
ANCs	.17	1.58	.48	28.60**	.51	28.61**
VNCs	.55	5.05**				

The results imply that teaching verb-noun collocation is essential in improving leaners' L2 writing proficiency and this may be related to the fact that the knowledge of VNCs is crucial in constructing a sentence (Lewis, 2000). However, as revealed in the current study, the students' knowledge of verb-noun collocations was significantly lower than that of adjective-noun collocations. Then, close and immediate attention should be paid to verb-noun collocations in teaching L2 writing. In particular, the verb-noun collocations that are often used but that are difficult for the students to retrieve and use should be identified (e.g., *have an effect*, *do damage*/*harm*, see Table 3) and they should be explicitly taught in the classroom. Meanwhile, as aforementioned, the very first step should be to raise the leaners' awareness of L2 collocations through which they truly understand the value of multiword units in enhancing their L2 writing proficiency.

V. CONCLUSION

The current study primarily aimed to explore the Korean university students' productive collocation knowledge of English and to investigate the unique contribution of the productive collocation knowledge to L2 writing proficiency, controlling for the students' grammatical knowledge and productive vocabulary size. It was found that it was more challenging for the students to retrieve and produce the verb-noun collocations than the adjective-noun collocations when holding the degree of exposure and L1 influence. It was partially because many delexical verbs were often wrongly retrieved as potential but inappropriate collocates by the students.

Regarding the sources of difficulty in using the collocations, as predicted by a number of researchers (Kim, 2012; Kim & Yoon, 2008; Nesselhauf, 2003), the participants' L1 appeared to interfere with their use of L2 collocations. Many inappropriate collocates that directly paralleled their L1 translations were frequently observed. However, when the degree of exposure of the collocations was relatively high, the influence of L1 on the use of L2 collocations seemed to lessen to some extent. Also, it was found that the existence of numerous synonyms that often had the same L1 translation caused much confusion in the use of L2 collocations. A large number of synonymous but inappropriate collocates were retrieved and produced by the students.

Concerning the relationship between the students' productive collocation knowledge and their writing proficiency, the results of a hierarchical multiple regression analysis revealed that the students' productive collocation knowledge was the strongest predictor of their writing proficiency among the three variables (i.e., grammatical knowledge, productive vocabulary size, and productive collocation knowledge) and it could explain the variance of L2 writing proficiency significantly even after the variance explained by their grammatical knowledge and productive vocabulary size was partialled out. The knowledge of verb-noun collocations, in particular, was found to be significantly related to the students' writing proficiency.

On the basis of the findings of the current study, a few pedagogical implications could be drawn. First, in dealing with unpredictable collocations in L2 classrooms, as Laufer and Girsai (2008) suggested, it may be necessary to give the students a cross-linguistic instruction in which L2 collocations and their corresponding L1 forms are contrasted explicitly and the information about the particular difficulties rooted from L1-L2 differences is provided. In so doing, the students' awareness about the unpredictable collocations could be raised, and accordingly they become more salient to the learners, increasing the likelihood of learning them.

Similarly, in coping with the collocations that can cause much confusion to Korean EFL learners because of the existence of various synonyms, the teachers need to

palpably expound to their students that there is no absolute synonym, and that near-synonyms may have similar meanings but they probably have different restrictions on their collocates. Above all, they need to avoid explaining the meanings of new words by providing near-synonyms because the students may mistakenly assume that they can have the same collocates since they share the meaning and L1 translation.

Last but not least, it is crucial for the teachers to help their students appreciate the true value of collocations in relation to their L2 proficiency enhancement. In particular, they should be well aware that the knowledge of verb-noun collocations is closely related to their L2 writing proficiency. In this respect, it may be necessary for the teachers to explicitly teach the most frequently used verb-noun collocations to their students, and provide them with adequate opportunities to use the target collocations through pushed output tasks. For example, the learners can have ample opportunities to retrieve and use the collocations through a guided writing task in which they have to use a particular set of collocations in their writings.

The value of the current study reside in the fact that it attempted to explore the leaners' productive collocation knowledge and identify the source of the difficulty in retrieving and using L2 collocations, and that it investigated the unique contribution of productive collocation knowledge to L2 writing proficiency. However, a number of limitations of the current study should be noted and those should be taken into account when interpreting the results. First, the current study focused only on verb-noun and adjective-noun collocations. In order to gain a comprehensive perspective on collocation knowledge, the research should have been conducted on various lexical and grammatical collocations.

Second, the productive collocation test (PCT) used in the current study seems to assess the partial knowledge of productive collocation since it requires test-takers only to retrieve a possible collocate that can fit with a node word given in a sentence, and does not ask them to retrieve the whole sequence (i.e., a collocate and a node word). The learners in the current study might not have been able to retrieve the whole sequence and use it in their writing. Therefore, the test scores on the PCT should be interpreted with caution.

Also of note is that the FPM of the collocations in COCA may not represent the degree of exposure of the collocations to Korean EFL learners because the degree of exposure can be affected by the linguistic and cultural environment in which they are situated. For example, a majority of Korean EFL learners typically use English textbooks in the middle and high school. Thus, the different degree of exposure for each test item might have been gained when the collocations in the textbooks were analyzed.

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Examples in: English
Applicable Languages: English
Applicable levels: Secondary and tertiary education

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