

Does Reading and Vocabulary Knowledge of Advanced Korean EFL Learners Facilitate Their Writing Performance?

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Although numerous studies have identified the potential relations reading comprehension abilities, vocabulary knowledge, and different language constructs may have with one's writing competence, not much research exists on the specific roles played by these language- and literacy-related constructs in explaining one's writing performance in an integrative manner, especially in the cases of second and foreign language learners. This study therefore aims to investigate the relative predictability of reading comprehension and vocabulary knowledge for advanced Korean EFL learner's writing performance measured both for its form and content qualities, while their English proficiency was taken into consideration. The findings indicate that reading comprehension abilities, vocabulary knowledge, and general English proficiency all had a significant relationship with advanced Korean EFL learners' structural and linguistic aspects of writing performances. Between reading comprehension abilities and vocabulary knowledge, reading comprehension had a relatively stronger predictability for their writing performance, while vocabulary knowledge only demonstrated indirect effects on writing performances through reading comprehension. The findings from this study have pivotal pedagogical implications for language and literacy instruction in Korean EFL contexts.

Keywords: reading-writing, vocabulary-writing relationship, advanced EFL learners

Introduction

Over the past decades, writing has received much research attention and has been studied in coordination with variables related to psychological aspects, such as self-efficacy and personal characteristics, as well as language and literacy-related variables, such as phonological awareness, vocabulary knowledge, and reading comprehension (Chen & Lin, 2009; Dunsmuir & Blatchford, 2004; Lee & Krashen, 2002; Mackenzie & Hemmings, 2014). In addition, much research has attempted to understand writing development in relation to the writers' characteristics or writing processes (Dunsmuir & Blatchford, 2004; Jim, 2017; Lee & Krashen, 2002; Oh & Kang, 2013). All in all, the findings from

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past studies have helped understanding the construct of writing itself and its sub-constructs and relevant factors that influence one's overall writing performance.

Studies looking into the predictors of writing performance, however, have been mostly conducted with psychological, rather than language or literacy elements. In fact, it is largely acknowledged that the large number of research on writing achievements in relation to the role of self-efficacy and motivation has been relatively thoroughly looked upon (Pajares, 2003).

Although relatively small in number, several studies have established the notion that writing is deeply related with other language and literacy constructs, such as reading (Grabe & Zhang, 2016; Shanahan, 1984) and vocabulary knowledge (Allen, Snow, Crossley, Jackson, & McNamara, 2015; Laufer & Nation, 1995). In fact, reading comprehension abilities (Shanahan, 1984) and vocabulary knowledge (Allen et al., 2015; Fitzgerald & Shanahan, 2000) have both been repeatedly identified as significant predictors of writing performance. Yet, not much research has been conducted on the specific roles that these language- and literacy-related constructs play in explaining one's writing performance in an integrative manner. Also, despite the fact that language proficiency of the writer does seem to influence how the relationship between writing abilities and different language and literacy skills shapes (Lee, 2018; Llach, 2010; Shanahan, 1984), there have not been many studies that have dealt with this issue appropriately, especially for second (L2)/foreign language (FL) learners. Considering that L2 or FL learners' receptive and productive language skills usually do not develop simultaneously with other language abilities (Choi, 2008), studies that take writers' language proficiency into account are greatly in need. Thus, this research focuses on the identification of the potential contributions that reading comprehension and vocabulary knowledge might have on advanced Korean EFL learners' writing abilities, while controlling for their English proficiency.

Literature Review

One of the most prominent literacy skills that are closely related to writing proficiency is reading comprehension. Several studies have consistently shown the close connection between reading and writing abilities, for both L1 (Abbott, Berninger, & Fayol, 2010; Fitzgerald & Shanahan, 2000) and L2 writers (Carrell & Connor, 1991), although differences do exist in the nature of the relationship (Carson, Carrell, Silberstein, Kroll, & Kuehn, 1990; Grabe, 2003; Yoshimura, 2009). The longitudinal study of Abbott et al. (2010), following two cohorts of lower level English monolinguals for four years (first to fifth, and third to seventh grade), found a significant longitudinal relationship between reading and writing abilities and also demonstrated how such relationship changed with age. To be specific, a significant relationship among lower text level skills, such as letter writing and spelling, was found for lower graders, whereas higher-level skills, such as text composing and comprehending abilities, were found to have a significant relationship for upper graders. Such close relations between reading and writing was also confirmed for older L1 students (Allen et al., 2014), showing that the two literacy constructs maintain a close relationship regardless of age for L1 writers, which may be related to the simultaneous and reciprocal development of their receptive and productive skills.

This, however, may not be the case for L2 learners, especially FL learners, whose relationship between reading and writing is more difficult to determine. That is, the writing development for L2/FL students, unlike L1 writers, is a cross-linguistic process involving two languages (Koda, 2007), thus involving more language-related factors, including L2 proficiency and L1 transfer (Grabe, 2003), which complicates the picture even more. In fact, Hedgcock and Atkinson's study (1993) revealed that differences do exist between L1 and L2 writers in that extensive reading only showed significant relationships with writing for only L1, but not L2 writers. Also, ESL learners with low and high reading abilities both equally displayed relatively underdeveloped writing skills, although those with higher reading abilities did get better writing scores (Graber-Wilson, 1991).

These results are also broadly in line with the study by Carson et al. (1990), where Chinese and

Japanese English as Second Language (ESL) learners were assessed in both their L1 and L2 and demonstrated that the relationship between reading and writing showed different outcomes for each language group. Although both groups showed significant cross-language correlations between reading and writing, L1 educational background explained such relationship for the Chinese language group, while the relationship for the Japanese group was relatively weaker. Although the scope of this study was limited to adult L2 learners and failed to appropriately assess language proficiency as a separate variable, the results still shed light on the differences between L1 and L2 writers and between L2 writers with different language backgrounds, in terms of their writing development in relation to reading. It is important to note, however, that despite the differences found between L1 and L2 writers, reading and writing still maintain a significant relationship even for L2 learners (Carrell & Connor, 1991).

In terms of writing development, then, FL learners are at even more disadvantages, compared to L1 and L2 writers, as their learning environment is very different. Opportunities for FL learners to practice and improve writing abilities in their language learning contexts are considerably limited compared not only to L1 or L2 writers, but also to such exposure for their development of receptive skills such as reading or listening (Choi, 2008). These circumstances consequently lead FL learners' writing abilities to lag behind their overall target language development, even for high proficiency students (Yoshimura, 2009). Despite these observable differences, however, not many studies have focused on the relationship between reading comprehension and writing performances of FL learners. Most such research attempts have been to show the benefits of integrating reading and writing within the classroom (Tsai, 2006; Zamel, 1992), and thus further studies that determine the exact relationships between reading and writing abilities of FL learners are in need before implementing such interventions.

Overall, there is a consensus that reading and writing abilities are related. Yet, there are still several limitations in the aforementioned studies, such that the participants have been mostly constrained to L1 or L2, and not FL writers, that the writers' language proficiency was not fully considered (Graber-Wilson, 1991), and that most of the studies resorted to simple correlation or regression analysis (Carson et al., 1990; Hedgcock & Atkinson, 1993; Llach, 2010). Also, almost half of the remaining variance in writing performance is yet to be explained in these regression studies (Abbott & Berninger, 1993; Shanahan, 1984; Tierney & Shanahan, 1991), thus pointing to the need to consider other relevant predictors. Further studies that appropriately address these limitations, by utilizing accurate and adequate measures and including additional variables that are likely to explain additional variance in the relationship between reading and writing, such as the writer's language proficiency and vocabulary knowledge, are called for.

Another important language domain greatly intertwined with writing development is vocabulary knowledge. A great number of studies have demonstrated that vocabulary knowledge is a good indicator of writers' overall writing performance for L1 (Duin & Graves, 1987; Olinghouse & Leird, 2009; Roth, 2000) and L2 writers (Babayigit, 2014; Engber, 1995; Harley & King, 1989; Laufer & Nation, 1995; Zhai, 2016) alike. In the study by Askita (1993) with ESL college students, for example, vocabulary proficiency was identified as the most important predictor for their writing scores, which is in line with the findings from a similar study conducted by Olinghouse and Leird (2009) which highlighted vocabulary knowledge as an imperative predictor of English native speakers' writing quality, regardless of grade levels. As a matter of fact, research studies that have taken various dimensions of vocabulary knowledge into consideration in explaining the writing quality of L2 students (Kang, 2011; Nation, 2001) have shown that there are close relationships between their writing performance and vocabulary size, as well as vocabulary depth, the quality of one's vocabulary knowledge that refers to his/her knowledge about each word or semantic network of words (Baba, 2009; Kang, 2011; Read, 1993; Wang, 2014). These research findings commonly highlight the importance of vocabulary knowledge in explaining L2 learners' writing performance.

Although the close relations both reading and vocabulary have with one's writing performance seem to have been well documented (Askita, 1993; Fitzgerald & Shanahan, 2000; Grabe, 2003; Nation 2001), these two variables have not usually been included in a study together (Choi, Moon, Paek, & Kang, 2018; Kim & Ryoo, 2009; Shanahan, 1984; Shanahan & Lomax, 1986), while they probably should be. This is

because language elements are greatly intertwined with one another and cannot be studied in an isolated manner. Also, considering that reading and vocabulary are also closely related to each other (Anderson & Freebody, 1982; Koda, 1989), the reciprocal influence on each other may lead to a different result for their relations to writing when considered together in a single study.

Of the few available studies that considered both reading and vocabulary in explaining one's writing abilities, Kim and Ryoo (2009), although focusing on the influence of writing topics, examined the relationship between the three variables of Korean EFL learners, and found that word usage within their writing differed according to their reading proficiency, but did not differ for writing topics. However, this study has limitations regarding the limited number of participants and inadequate measurements used for assessing language skills. On the other hand, Choi et al. (2018) did include all three skills as independent variables and indicated that although vocabulary, reading, and writing were all significantly correlated with one another, it was reading comprehension that significantly and directly contributed to writing performance of Korean EFL learners when controlling for vocabulary knowledge. Yet this study used vocabulary knowledge as a measurement for language proficiency, rather than regarding it as an independent construct or adopting a measure that assessed the participants' overall language proficiency as a whole. Thus, a more thorough and systematic research on L2 learners' lexical proficiency in relation to their writing and reading abilities is greatly in need.

In addition, in discerning the relationship among reading comprehension, vocabulary knowledge and writing performance of L2 and FL learners, in particular, language proficiency should be considered since these constructs are closely related to their language development in general (Carson, Carrell, Silberstein, Kroll, & Kuehn, 1990; Grabe, 2003; Grabe & Zhang, 2013; Llach, 2010; Shanahan, 1984). Carson et al. (1990) for example, revealed that correlation between L2 reading and writing tend to increase as L2 proficiency increased, which suggests that literacy development is a complex phenomenon that may rely on language proficiency for L2 learners. Similarly, Llach (2010) demonstrated that there was a significant relationship between reading and writing for low-intermediate proficiency L2 learners while no significant relation existed for low proficiency learners, which further points to the potential role of language proficiency. In short, it seems imperative to consider the writers' target language proficiency when examining the L2 writers' writing abilities in relation to other language and literacy constructs (Carson et al., 1990; Grabe, 2003).

Despite such research findings, not much research that investigated the relation between L2/FL learner's writing abilities and their potential predictors has controlled for their target language proficiency in an appropriate manner. In fact, studies have either assumed the proficiency level of the participants based on the information about the classes that they are enrolled in or their education level, or utilized inadequate measurements for proficiency, such as class placement tests or self-developed cloze tests (Carrell & Connor, 1991; Graber-Wilson, 1991; Laufer & Nation, 1995; Llach, 2010; Zhai, 2016). Without such research effort, however, only a partial or incomplete picture of the contribution of literacy skills to writing performance can be provided.

A commonly overlooked limitation that studies on writing have is their reliance on inaccurate or inadequate writing assessments. Majority of studies on writing skills have relied on holistic evaluations by human raters or computerized scoring programs based on established scoring rubrics of high-stakes tests or self-developed rubrics (Allen et al., 2014; Parodi, 2007). A frequently utilized automatic holistic scoring system, or e-raters, is the Criterion developed by Educational Testing Service (ETS), and has been reported as a reliable scoring method for writing assessments (Burstein, Chodorow, & Leacock, 2004; Chodorow & Burstein, 2004). As an automatic scoring system, the Criterion focuses on the formal or linguistic aspects of writing, such as usage of vocabulary or lexical complexity (Chodorow & Burstein, 2004). Despite the advantage of an automated holistic scoring that enables capturing formal and grammatical aspects of writing, however, it lacks the ability to assess essays for its content or organization (Quinlan, Higgins, & Wolff, 2009), thus needing a complementary measurement to make up for this shortcoming.

One scoring approach that can compensate for the flaws of holistic scoring, either automatic or human,

is the adaptation of the Toulmin model (Toulmin, 1958) which has a high validity when used as an assessment for content analyses that focus on logical development and organizations (Connor, 1987; Connor & Lauer, 1988). The Toulmin model of writing is largely divided into fundamental elements, which consists of claims, data, and warrants, and secondary elements which consists of rebuttals, qualifiers, and backing (Toulmin, 1958). The claim refers to the conclusion of the argument of which data provides evidence for, and warrants connect between the claim and data. In addition, qualifiers confine the extent to which an argument can be true, and backing is a further connection made between the claim and data when warrants are not sufficient. Studies that have utilized the Toulmin model for evaluating writing qualities in both L1 and L2 have shown its reliability in content analysis of argumentative writing (Chambliss & Murphy, 2002; Choi et al., 2018; Paek & Kang, 2017). Nonetheless, the Toulmin model, too, if used alone, poses limitations in that it only focuses on the contents of writings without consideration for structural or formal aspects.

Hence, in order to accurately assess both form and content of writing, it seems imperative to rely on both holistic scoring approach, which focuses on formal or linguistic aspects of writing, and thorough content analyses so that the two evaluation approaches can compensate each other for their drawbacks. That is, holistic scoring such as e-rater can provide evaluations on the form, and its lack of content evaluation can be made up for with thorough content analyses by the Toulmin model, and vice versa. Another important point to consider is that, although the use of the Toulmin model has been proven to be reliable, human rating still has a risk of inconsistent rating and judgement bias (Eckes, 2008) which can be traded off by automatic and consistent assessments by the e-rater. Yet, although it seems logical and even unavoidable to use more than one measurement of writing in order to accurately and adequately evaluate one's overall writing skills, very few studies have made the effort to consider both form and content in their writing evaluation (Choi et al., 2018) and only focused on either form (Allen et al., 2014) or content (Carrell & Connor, 1991).

To sum up, despite the general research consensus that reading and writing are closely related skills, previous studies have largely neglected other potentially important variables such as language proficiency and vocabulary knowledge in discerning such relationships. Also, relatively little is known about the relationships among different language and literacy variables in relation to writing performance of L2/FL writers in comparison to L1 writers. Complementing these limitations, Choi et al. (2018) did demonstrate the direct effects of reading comprehension abilities on advanced Korean EFL learners' writing skills assessed for both form and content. However, this study is also not without limitations in that the learners' English proficiency was measured with their vocabulary knowledge, rather than having an independent measure for vocabulary knowledge and language proficiency.

Thus, this study aims to investigate the relationship between reading and writing abilities of advanced Korean EFL learners by considering learner's vocabulary knowledge and proficiency in English, while utilizing adequate and accurate measurements in investigating the following research questions:

- (1) Are advanced Korean EFL learners' reading comprehension abilities, vocabulary knowledge, and their English proficiency related to their writing performances?
- (2) Between reading comprehension abilities and vocabulary knowledge in English, which has relatively stronger predictability for advanced Korean EFL learners' writing performance in English, when their English proficiency is taken into consideration?
- (3) Do advanced Korean EFL learners reading comprehension abilities, vocabulary knowledge, and language proficiency have any direct and/or indirect effects on their writing performance, when controlling for one another's effects?

Method

Participants

Participants were 204 Korean EFL college seniors from six different colleges in Seoul, Korea, consisting of 108 males and 96 females, with a wide range of majors and disciplines represented, including humanities, social science, engineering, and science. They were all preparing for their graduate school admissions in English-speaking countries, and thus had taken *TOEFL iBT* within the past year as part of their preparations. They provided their official score reports issued by ETS, which will serve as a control variable that control for their general English proficiency. Overall, their *TOEFL iBT* scores identified them as advanced English learners, which will be discussed further in the later section. All the participants had begun formal EFL education from third grade, as part of the national curriculum, and thus have taken at least 10 years of formal English education.

Measures

Reading comprehension

As a measure of the participants' reading comprehension abilities, the Reading Comprehension (RC) subtest of the standardized Gates-MacGinitie Reading Test (GMRT; MacGinitie, MacGinitie, Maria, & Dreyer, 2000) was administered. Specifically, Level AR (Adult Reading) GMRT, which asked the participants to read eleven passages and answer 48 multiple-choice comprehension questions within a 55-minute time limit, was employed. Each correct answer was given one point, and thus the scores could range from 0 to 48. The Kuder-Richardson reliability for this test is .89 (MacGinitie, MacGinitie, Maria, & Dreyer, 2002).

Vocabulary knowledge

Two separate measures of English vocabulary knowledge were adopted in this study: The Word Comprehension subset of the Woodcock Reading Mastery Test-Revised (WRMT-R; Woodcock, 1998) and the Vocabulary subtest of the Gates-MacGinitie Reading Test (GMRT; MacGinitie et al., 2000).

The Word Comprehension subtest of WRMT-R comprises three different sub-sections, each evaluating different dimensions of test takers' knowledge of English words, namely, synonyms, antonyms, and analogies. The synonyms and antonyms subtests (33 and 34 total test items, respectively) asked the participants to come up with a word that is similar to or opposite from the each given word in meaning, while the analogies subtest (79 test items) asked them to provide an appropriate word to complete the given analogy after identifying the relationship between the provided first pair of words. Each correct answer scored one point on these three vocabulary depth subsets, and thus the scores could range from 0 to 33, 0 to 34, and 0 to 79 for the synonyms, antonyms, and analogies subtest, respectively. The test-retest reliability reported by the test developers is .91.

The GMRT Vocabulary subtest served as an additional measure of the participants' general vocabulary knowledge in English. This subtest consists of 45 multiple-choice test items which require the test-takers to choose a word that is most similar in meaning to the given words used in phrases, clauses or sentences. Each correct response received one point, and the scores could range from 0 to 45. The reported Kuder-Richardson reliability estimate for this test was 0.88 (MacGinitie et al., 2002).

Writing

The participants were asked to produce a timed argumentative essay on the following prompt: *Do you agree or disagree with the following statement? Technology creates problems and threaten the quality of*

life. They were required to complete the writings within 30 minutes.

In evaluating the writing samples, two separate scoring systems were adopted: The e-rater score as a measure of linguistic accuracy and surface structural features and the Toulmin score based on content analysis.

The scores derived from an e-rater program *Criterion*, developed by ETS, were used as measures of the formal qualities of the argumentative writing. *Criterion* is known to provide evaluations of linguistic accuracy and textual features that are highly correlated with human ratings (Burstein, Chodorow, & Leacock, 2004), providing a holistic score that ranges from 1 to 6, based on its assessments of formal aspects of each writing. The reported weighted Kappa reliability estimate for *Criterion* is 0.72 (Enright & Quinlan, 2010).

For content analysis that evaluates the adequacy of the content features and argument development, Toulmin scoring rubric developed by Connor and Lauer (1988) was employed with slight modifications. Specifically, their rubric was modified and expanded to consider not only the fundamental, but also the secondary Toulmin elements included in each essay. Hence, each argumentative essay produced by the Korean EFL learners in this study was evaluated for the inclusion of Toulmin's secondary elements that consist of rebuttals, backing, and qualifier, as well as their inclusion of fundamental elements that include claim, data, and warrant. For each inclusion of each of the Toulmin's fundamental and secondary elements, a score between 1 and 3 was assigned, based on its degree of specificity and relevance, and an average score was computed for each element. For example, if a writer included a subclaim that was well-developed, explicitly stated, and highly related to the main claim, s/he was given a score 3, whereas a subclaim which slightly diverged from the main claim was assigned score 1. Thus, if a writer, for example, had 3 subclaims in his essay and the score for each of them was 3, 1, and 2, then his score for the inclusion of subclaim was computed to be 2, which is the average of the three scores. Likewise, scores for other fundamental and secondary Toulmin elements were computed in the same manner, and the total of each averaged-element scores served as the overall Toulmin score. Two experienced researchers evaluated the essays independently, and the interrater agreement for the Toulmin analysis was 87.4%.

In addition to the measures of the Korean EFL learners' English vocabulary knowledge, reading comprehension abilities, and writing competence evaluated for both its formal and content qualities, their official *TOEFL iBT* scores were used as a measure of their overall English proficiency, to control for its effects on the inter-relationships among the tested variables, as suggested by previous studies (Baba, 2009; Perkins, Brutton, & Pohlman, 1991).

For data analysis, SPSS 23 was used to examine the descriptive statistics of the variables and to conduct correlation analysis. In addition, confirmatory factor analysis and Structural Equation Modeling (SEM) were conducted, using AMOS 21.0

Results

As can be seen from the descriptive statistics presented in Table 1, the Korean EFL participants in this study were highly proficient in English, scoring 105.29 on average on the *TOEFL iBT*, which rank them at above the 87th percentile among undergraduate level test-takers (ETS, 2018). They also displayed a good grasp of vocabulary knowledge and reading comprehension abilities in English, scoring 13.97 ($SD = 2.23$), 20.28 ($SD = 2.43$), 43.95 ($SD = 3.12$), and 32.98 ($SD = 4.82$) on average, on the measures of synonyms, antonyms, analogies, and overall vocabulary knowledge (GMRT Vocabulary sub-test), respectively, and 38.37 ($SD = 6.07$) on the GMRT Reading Comprehension sub-test. Their performance on the three sub-tests of WRMT-R vocabulary depth and GMRT Vocabulary and Reading Comprehension subtests are grade equivalent for North American 10th graders (Woodcock et al., 1998) and post-high school (MacGinitie, MacGinitie, Maria, Dreyer, & Hughes, 2007), respectively. Their writing abilities measured in terms of both form and content also showed that they had good command of writing skills in English, producing extended argumentative discourse successfully ($M = 4.07$, $SD = .72$;

$M = 7.50$, $SD = 1.14$ on *Criterion* and Toulmin analysis, respectively). Overall, the Korean EFL participants in this study are highly advanced English learners, demonstrating their mastery of English language and literacy skills on a range of measures.

TABLE 1
Descriptive Statistics of Variables (N = 204)

	Measure	Mean	SD	Min.	Max.
Control Variable	TOEFL Score	105.29	8.10	74	120
Predictor Variables	<i>Vocabulary Knowledge</i>				
	WRMT-R Synonym	13.97	2.23	10	20
	WRMT-R Antonym	20.28	2.43	13	27
	WRMT-R Analogies	43.95	3.12	36	52
	GMRT Vocabulary	32.98	4.82	20	45
	<i>Reading Comprehension</i>				
	GMRT Reading Comprehension	38.37	6.07	19	48
Outcome Variables	<i>Writing Abilities</i>				
	E-Rating (<i>Criterion</i>)	4.07	.72	2	6
	Content (Toulmin) Score	7.50	1.14	4.5	10.92

Next, correlation analysis was conducted to discern the potential relationship among the variables tested (See Table 2). The two measures of writing, the e-rating score and Toulmin score, were significantly correlated ($r = .34$, $p < .001$), thus showing the significant relationship between formal and content aspects of their writing performance. Interestingly, however, while their e-rating score was significantly correlated to all four of the vocabulary measures ($r = .26$, $p < .001$; $r = .29$, $p < .001$; $r = .29$, $p < .001$, $r = .30$, $p < .001$ for synonyms, antonyms, analogies, and GMRT Vocabulary, respectively), reading comprehension ($r = .41$, $p < .001$), and TOEFL score ($r = .49$, $p < .001$), the Toulmin score was not significantly correlated to any of the vocabulary measures and were only significantly correlated to reading comprehension ($r = .20$, $p < .01$) and TOEFL score ($r = .25$, $p < .001$). The four measures of vocabulary knowledge were not only significantly correlated with one another, but with reading comprehension abilities as well, showing that the participants' performance on GMRT Reading Comprehension was significantly correlated to each measure of vocabulary knowledge ($r = .40$, $p < .001$; $r = .53$, $p < .001$; $r = .51$, $p < .001$; $r = .40$, $p < .001$, for synonyms, antonyms, analogies, and GMRT Vocabulary, respectively). The participants' TOEFL score, a measure of their overall English proficiency, was also significantly correlated to all the tested variables, including their writing scores based on e-rating of linguistic and structural features ($r = .49$, $p < .001$) and content analysis ($r = .25$, $p < .001$).

TABLE 2
Correlations Coefficient among Variables (N = 204)

	1	2	3	4	5	6	7
<i>General English Proficiency</i>							
1 TOEFL	--						
<i>Vocabulary Knowledge</i>							
2 Synonym	.39***						
3 Antonym	.46***	.48***					
4 Analogy	.50***	.46***	.54***				
5 GMRT Vocabulary	.46***	.48***	.39***	.53***			
<i>Reading Comprehension</i>							
6 GMRT RC	.58***	.40***	.53***	.51***	.40***		
<i>Writing Abilities</i>							
7 E-rating	.49***	.26***	.29***	.29***	.30***	.41***	
8 Content Score	.25***	.02	.11	.02	.13~	.20**	.34***

~ $p < .10$, ** $p < .01$, *** $p < .001$

Before testing the structural equation model in identifying the interrelationships among the variables, a confirmatory factor analysis was conducted first, to test the adequacy of the measurement model with two latent constructs in this study (See Figure 1). The two latent constructs were vocabulary knowledge which comprised the four vocabulary measures and writing abilities which consisted of e-rater and content scores. The major fit indices were all within acceptable range and indicated that the measurement model fit the data well. More specifically, the root mean square of approximation (RMSEA), for which a value of less than .06 is considered a good fit (Hu & Baker, 1999) was .02, while the comparative fit (CFI), model goodness of fit index (GFI), and the adjusted goodness of fit index (AGFI), for which values higher than .90 are indicative of good fit (Hu & Baker, 1999) were 1.00, .99, and .96, respectively. Although the factor loading of Toulmin score on the writing construct was relatively low ($\beta = .47$), all observed variables loaded significantly on the respective latent variables. Thus, the confirmatory factor analysis demonstrated that the respective observed variables served as adequate indicators of the two proposed latent constructs and that the tested model fit the data well.

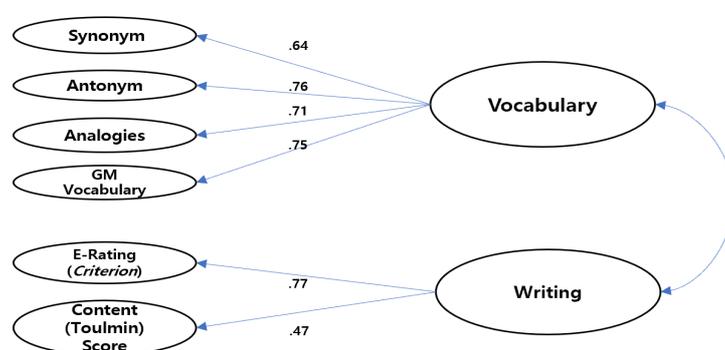


Figure 1. Confirmatory factor analysis for the measurement model.

Next, based on the confirmatory factor analysis that indicated a good measurement model fit, a structural equation model which examined the relationships among the tested predictors of advanced Korean EFL learners' writing abilities was tested. As can be seen in Figure 2, the structural equation model included two latent constructs, namely vocabulary knowledge construct which comprised four observed variables (knowledge of synonyms, antonyms, and analogies measured by WRMT-R and overall vocabulary knowledge measured by GMRT Vocabulary test) and writing construct which comprised e-rating and Toulmin scores that reflect the participants' performance on formal and content aspects, respectively, in their production of extended argumentative writing. Direct paths to English writing abilities were included from English reading comprehension abilities, vocabulary knowledge, and TOEFL scores, while indirect paths were drawn from English vocabulary knowledge and TOEFL scores through reading comprehension abilities and from TOEFL scores through vocabulary knowledge. The goodness-of-fit indices for the proposed model revealed that it fit the data well, as all values were within the acceptable range: $\chi^2_{17} = 24.06$, $p = .12$, RMSEA = .04, CFI = .99, and GFI = .97.

The analyses revealed that for writing abilities, paths from English reading comprehension and general English proficiency measured by TOEFL were positive and significant ($\beta = .23$, $p < .05$; $\beta = .50$, $p < .001$, respectively), while the path from English vocabulary knowledge was not ($\beta = .00$, $p = .98$). In other words, between English reading comprehension abilities and vocabulary knowledge, it was the former that made independent unique contribution to writing abilities, when controlling for general English proficiency and each other's effects. Vocabulary knowledge seemed to have the least unique independent contribution to writing abilities after controlling for general English proficiency and reading comprehension abilities. The participants' general English proficiency, reading comprehension abilities and vocabulary knowledge together explained about 43% of the variance in their writing performance.

Vocabulary knowledge, however, had a significant positive unique contribution to reading comprehension ($\beta = .50$, $p < .001$), thus demonstrating its significant indirect effects on writing abilities

through reading comprehension abilities. Since the participants' overall English proficiency measured by TOEFL showed significant positive indirect effects ($\beta = .26, p < .01$), through reading comprehension abilities, in addition to its direct effects ($\beta = .50, p < .001$), its total effect size was the largest among the three predictors ($\beta = .63, p < .001$).

In sum, reading comprehension abilities were identified as a relatively stronger contributor to Korean advanced EFL learners' writing performance compared to their vocabulary knowledge, when controlling for the direct and indirect effects of their general English proficiency and vocabulary knowledge.

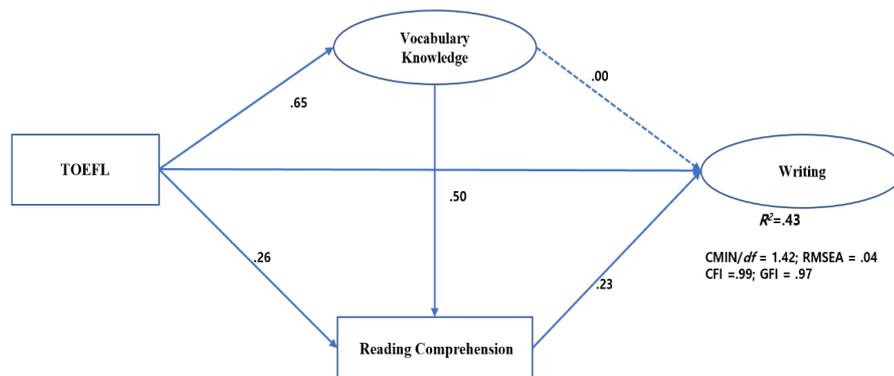


Figure 2. Structural Equation Model of Korean EFL learners' writing abilities (N=204).

Conclusion

The current study aimed to investigate the relative predictability of reading comprehension and vocabulary knowledge for advanced Korean EFL learners' writing performance and identify the relationship among the three constructs when their overall English proficiency was controlled for. The findings indicate that reading comprehension skills, vocabulary knowledge, and language proficiency all had a significant relationship with the Korean EFL learners' structural and linguistic aspects of writing performances, while a somewhat different result was found for the content evaluation, in that it was not significantly related to the learners' vocabulary knowledge. Moreover, between reading comprehension abilities and vocabulary knowledge, reading comprehension not only had stronger predictability for learners' writing performance when their overall English proficiency was considered, but also made an independent unique contribution to writing abilities, while vocabulary knowledge only demonstrated indirect effects on writing performances through reading comprehension. On the whole, it was the learners' overall English proficiency that showed the largest effect size among the three constructs, showing both positive direct and indirect effects on writing performance.

Among the research results, the most prominent finding is the relatively more important role reading comprehension abilities play, compared to vocabulary knowledge, in explaining advanced EFL learners' writing competence when controlling for each other's effects. This is meaningful in that it has expanded on previous studies that focused on either reading comprehension (Carrell & Connor, 1991; Carson et al., 1990) or vocabulary knowledge (Kang, 2011; Olinghouse & Leaird, 2009) as a predictor of writing abilities, rather than taking an integrative approach in considering both. In fact, this particular finding may seem discrepant from previous studies which have not included reading comprehension abilities as a potential predictor and have simply shown vocabulary knowledge as a significant predictor for writing performances (Baba, 2009; Kang, 2011; Laufer & Nation, 1995; Olinghouse & Leaird, 2009; Wang, 2014). The identification of reading comprehension abilities as a relatively stronger predictor of Korean EFL learners' writing competence is not only in line with Choi et al.'s (2018) study which found that while reading had a direct effect on writing performance of Korean EFL learners, vocabulary only showed an indirect effect through reading comprehension abilities, but also complements their study in

that the learners' target language proficiency was controlled for in discerning such relationship in this study (Choi et al., 2018). Overall, although several studies have revealed the close relationship between vocabulary knowledge and writing, and between reading and writing, reading comprehension abilities has turned out to have a relatively larger influence, compared to vocabulary knowledge, on writing performance of advanced EFL learners.

Another notable result is that the general English proficiency, included in the study as a control variable, actually had the largest influence on the Korean EFL learners' writing performances, showing both direct and indirect effects when reading comprehension abilities and vocabulary knowledge was controlled for. This result is not surprising, considering that English proficiency has been found to influence the shaping of relationships among different language constructs (Abbott et al., 1993; Carson et al., 1990; Shanahan, 1984). Considering that most previous studies that looked into the influence of the overall language proficiency on the relationships between language skills did not include it as a separate variable but simply relied on the researchers' assumption about it, or did not use an adequate measurement for assessing language proficiency, the finding from this study also holds an upper hand in that the variables included in this study were assessed with adequate and accurate measurements, not only for language proficiency, but also for reading, writing, and vocabulary.

This study is not without limitations however, in that the participants were only consisted of advanced EFL learners, which may limit the generalizability of the results for other learners. The largest effect size of general English proficiency identified in this study suggests that research on low or intermediate learners may show different results, and further calls for studies assessing learners of diverse proficiencies. Also, even though several potential predictors of writing performance were included in this study, still less than half of the variance was explained through the proposed model, which is similar to the amount of variance explained in other previous studies (Choi et al., 2018; Shanahan, 1984). This clearly shows that language learners', especially FL learners', writing is a cognitively complex skill which may require other language and literacy skills, and addresses the need for comprehensive studies with more relevant variables considered. Nonetheless, this study has made a significant contribution to understanding the complex relationship among EFL writers' reading comprehension, vocabulary knowledge, and writing proficiency in an integrative manner, while considering their general English proficiency.

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