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What Vocabulary Size Is Needed to Comprehend *Harry Potter* Series?: Implications for Incidental Vocabulary Learning

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The current study aimed to assess the vocabulary size necessary for understanding the *Harry Potter* book and movie series and to measure the number of potential words that could be learned incidentally through reading the book and watching the movie series. The findings showed that 4,000 (95% text coverage) or preferably 7,000 (98% text coverage) word families are necessary to understand *Harry Potter* book series, and learners should know 3,000 (96% text coverage) or preferably 5,000 (98% text coverage) word families to comprehend the *Harry Potter* movie series. It was also revealed that the learners with the vocabulary size of 4,000 and 7,000 word families might incidentally learn 996 and 475 word families respectively through reading the book series. In addition, the learners with the vocabulary size of 3,000 and 5,000 word families could incidentally learn 30 and 15 word families respectively through watching the movie series. The findings indicated that reading the *Harry Potter* book series provides substantial opportunities for incidental vocabulary learning, whereas watching the movie series does not seem to provide similar gains in vocabulary learning. However, the results implied that regular viewing of movies over an extended period time would give ample opportunities for vocabulary learning.

[incidental vocabulary learning/text coverage/number of encounters/movie/ reading/*Harry Potter*]

I. INTRODUCTION

A growing body of research has indicated that extensive reading can promote incidental vocabulary learning (Mason & Krashen, 1997; Nagy, Herman, & Anderson, 1985; Saragi, Nation, & Meister, 1978) and would lead to overall language development

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(e.g., Cho & Krashen, 1994; Elley, 1991) and even increased motivation (e.g., Brown, 2000; Mason & Krashen, 1997). Particularly relevant to incidental vocabulary learning through reading, it was found that there was a strong connection between the number of encounters of unknown words and the amount of learning, indicating that the more words are repeated in text, the more they can be learned (Brown, Waring, & Donkaewbua, 2008; Pigada & Schmitt, 2006; Waring & Takaki, 2003).

In addition, a series of studies (d'Ydewalle & Van de Poel, 1999; Koolstra & Beentjes, 1999; Neuman & Koskinen, 1992; Pavakanun & d'Ydewalle, 1992) investigated the effect of watching TV or movies on vocabulary learning and consistently showed that watching movies and TV could be a valuable source for incidental vocabulary learning. Listening to diverse passages (Zeeland & Schmitt, 2013) and academic lectures (Vidal, 2011) were also examined whether they could facilitate incidental vocabulary learning. It was found that they could promote vocabulary learning, but more exposures of unknown words were needed for incidental vocabulary learning through listening than reading, and it was suggested that a similar approach to the one taken in extensive reading should be adopted for vocabulary learning through listening.

Indeed, many studies investigated the effect of reading or watching movies or TV on vocabulary learning in experimental settings. However, there has been little corpus-driven research that examined the number of encounters with words used in the novels and movies, which would determine the degree of incidental vocabulary learning through reading and watching them. In this vein, the aim of the current study was to assess the vocabulary size necessary for comprehending the *Harry Potter* book and movie series and to measure the number of potential words that could be learned incidentally through reading and watching them, drawing on a corpus-driven approach.

II. LITERATURE REVIEW

1. Vocabulary Size and Text Coverage for Comprehension

A number of researchers (e.g., Bonk, 2000; Hu & Nation, 2000; Laufer, 1989) attempted to find out a text coverage necessary for comprehending written and spoken texts in English, and they also tried to appraise the vocabulary size that lead to the text coverage for comprehension (e.g., Adolphs & Schmitt, 2003; Nation, 2006; Webb & Rodgers, 2009a, 2009b). It is primarily because with the text coverage found, the vocabulary size for the text coverage can be determined and for comprehension accordingly, and then the determined vocabulary size could inform L2 learners of how much vocabulary they have to learn in order to comprehend L2 texts.

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In relation to text coverage for comprehension, Laufer (1989) found that 95% text coverage was necessary for comprehending L2 academic texts, whereas Hirsh and Nation (1992) and Nation (2001) suggested that 98% text coverage was essential for comprehension of L2 texts in general. As for listening comprehension, Bonk (2000) investigated the relationship between lexical coverage and listening comprehension, and found a significant correlation between them. He suggested that L2 learners could have adequate comprehension with 90% to 95% text coverage if listening comprehension strategies were appropriately employed. Hu and Nation (2000) examined the relationship between text coverage and the degree of reading comprehension with 66 English learners. They were assigned randomly to one of four conditions: 100%, 95%, 90%, and 80% text coverage and their reading comprehension were measured by a multiple-choice test and a written cued recall of the text. With 80% text coverage, none of the learners gained adequate comprehension of the text, and with 90% and 95% text coverage, only a small number of them gained adequate comprehension. Then, based on the result of the comprehension test and a regression analysis, it was suggested 98% text coverage should be necessary for adequate comprehension of fiction texts.

Adolphs and Schmitt (2003) investigated the coverage of word types and word families (WFs, hereafter) in Cambridge and Nottingham Corpus of Discourse in English (CANCODE) and spoken sections of British National Corpus (BNC) and found that the most frequent 3,000 WFs accounted for 96% of the running words of the corpora. Scrutinizing a number of different written and spoken texts (five novels, newspapers from five different corpora, graded readers, a children's movie, and two parts of the Wellington Corpus of spoken English), Nation (2001) attempted to find out how much vocabulary was necessary for reading and listening comprehension in English in general. He found that about 8,000 to 9,000 WFs were needed for 98% coverage of the written texts (novels and newspapers) and for the comprehension of the texts accordingly, whereas about 6,000 to 7,000 WFs were necessary for 98% coverage of the spoken texts (*Shrek* and Wellington Spoken Corpus). He suggested that 98% coverage was necessary for adequate reading and listening comprehension.

Drawing on the RANGE program, Webb and Rodgers (2009a) analyzed 318 British and American movies to determine the vocabulary size necessary for 95% and 98% coverage of the running words of the movies. The results showed that 3,000 WFs plus proper nouns and exclamations accounted for about 95% of the running words of the American and British movies. Meanwhile, for 98% text coverage, 6,000 WFs were necessary for the American movies whereas 7,000 WFs were needed for the British movies. Along the same lines, Webb and Rodgers (2009b) examined 88 British and American TV programs in order to find out how much vocabulary was necessary to

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understand them. It was found that 3,000 WFs plus pronouns and exclamations would provide about 95% text coverage and 7,000 WFs plus pronouns and marginal words would yield 98% text coverage of the TV programs. They suggested that 95% text coverage would be adequate for understanding movies and TV programs since they provided not only aural input but also visual information which could facilitate overall comprehension processes.

Taken together, the research findings seem to indicate that at least 95% or 98% text coverage is needed for adequate comprehension of written and spoken texts. Therefore, in the current study, 95% and 98% text coverage were set as the lower and higher boundaries for the comprehension of written and spoken texts and the vocabulary sizes which corresponded to 95% and 98% text coverage were interpreted as the vocabulary sizes needed for understanding the texts.

2. Vocabulary Learning through Reading

Much research has explored the potential of reading for vocabulary learning and investigated how many exposures were necessary for incidental vocabulary learning. Horst, Cobb, and Meara (1998) investigated the number of encounters that were needed to learn unknown words through reading a graded reader. The participants were asked to read the book and were tested on their knowledge of the target words' meaning by answering multiple-choice questions. The correlation between the number of encounters and gains in vocabulary knowledge was 0.49, and it was suggested large learning gains were likely to occur when words were repeated eight or more times.

In a study of 95 learners of German as a foreign language, Rott (1999) examined the effect of exposure frequency on the incidental vocabulary acquisition and retention. The learners were exposed to unknown words two, four, and six times during reading, and gains in vocabulary knowledge were measured immediately after reading (acquisition), after one week (retention one), and after four weeks (retention two). It was found that even two and four encounters with unfamiliar words significantly affected the learners' vocabulary growth, but six exposures resulted in more significant gains in both receptive and productive vocabulary knowledge. With regards to retention of word knowledge, it was revealed that all of the learners (two, four, and six exposure groups) retained a significant amount of receptive vocabulary knowledge over a period of one week and four weeks. However, as to productive word knowledge, there was a significant decrease over a period of four weeks. Overall, the findings indicated that reading for meaning could be a significant source of intermediate L2 learners' vocabulary growth.

In a similar vein, Waring and Takaki (2003) explored the effect of the number of encounters on vocabulary learning. Twenty five words that appeared with different

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occurrence frequencies were selected from a graded reader and were changed into substitute words to make sure they were unknown to the students. Then, the students read the books and three different types of the tests (word form recognition, meaning recognition, and meaning recall) were administered immediately after reading, after one week, and after three months to measure gains in knowledge of those words. The data from the three tests showed that more exposure of the words would lead to more learning and while word form could be learned with a small number of exposures, learning word meaning necessitated much more exposure than learning word form. Overall, the vocabulary knowledge in general seemed to be lost over time. The authors suggested that more than 20 encounters may be necessary to gain full knowledge of new words through reading.

Focusing on four aspects of vocabulary knowledge (spelling, part of speech, meaning recognition, and meaning recall), Pellicer-Sanches and Schmitt (2010) investigated the effect of the number of word exposure in an authentic novel (*Things Fall Apart*) on vocabulary learning. It was found that with 5-8 exposures of words, meaning and spelling were recognized for 37% and 45% of the words respectively while meaning and part of speech were recalled for 11% and 20%. With 10-17 exposures, the meaning and spelling were recognized for 80% and 85% of the words respectively, while meaning and part of speech were recalled for 80% and 54%. The data showed that increase in learning began with 5–8 occurrences, and accelerated with 10-17 exposures, and based on the findings, the authors suggested that 8-10 exposures were the point at which incidental learning began to accelerate.

With 121 EFL university students in Japan, Webb (2007) investigated the effects of repetition (one, three, seven, and ten encounters) on vocabulary knowledge: knowledge of orthography, association, syntax, grammatical function, meaning and form. It was found that repetition affected the degree of incidental vocabulary learning from reading significantly. Webb suggested that if learners encountered unknown words ten times, large gains in vocabulary knowledge could occur, and in order to develop full knowledge of vocabulary more than ten exposures of unknown words were necessary.

In sum, several studies attempted to determine the number of encounters of unknown words for incidental vocabulary learning to occur, and recognized the importance of multiple exposures of words in reading. Even though the results of the studies were somewhat inconclusive, most of the studies suggested that more than ten exposures of unknown words could lead to substantial gains in vocabulary knowledge in many aspects. Thus, in the current study, the point at which incidental vocabulary learning could occur through reading was set at more than ten encounters.

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3. Vocabulary Learning through Watching TV and Movies

A series of studies were conducted in relation to vocabulary learning through watching movies or TV programs and they consistently showed that vocabulary could be learned through watching movies and TV. With seventh and eighth grade students, Pavakanun and d'Ydewalle (1992) investigated the effect of the use of L2 subtitles in cartoons on vocabulary learning, ensuring that the target words were repeated at least five times in the cartoons. They found that children who watched the cartoons with the subtitles had higher scores than those who watched cartoons without the subtitles on a meaning recognition test. Based on the findings, they suggested that watching movies could provide sufficient opportunities for vocabulary learning when multiple exposures of unknown words were ensured. In this line of research, d'Ydewalle and Van de Poel (1999) examined the effect of watching movies on incidental vocabulary learning with Dutch children aged from eight through ten, with the target words being repeated at least four times in the movies. They found that presenting the L2 in the sound track could yield larger gains than presenting it in the subtitles for children.

With seventh and eighth grade students, Neuman and Koskinen (1992) attempted to measure L2 vocabulary learning through reading, watching TV, and watching TV with subtitles. They found that the students who watched TV programs with subtitles had significantly higher scores on three different types of vocabulary tests than the students who watched the movies without the subtitles and who just read the transcripts of the programs. Overall, the students who watched the TV programs outperformed those who just read the transcripts of the programs.

Koolstra and Beentjes (1999) examined the effects of watching a documentary on L2 vocabulary learning with 246 Dutch children in grade four and six learning English. They found that the children who watched the documentary with L1 subtitles had higher scores on a vocabulary test than the children who did not watch the program (control group). The children who watched the program without L1 subtitles also outperformed those who did not watch the program.

Most relevant to the current study, Webb (2010), adopting a corpus-based approach, analyzed 143 movie scripts that were composed of 1,267,236 running words (tokens). He found that 23% of the WFs from 4th 1,000 through 14th 1,000 word levels were encountered more than ten times in a set of 70 movies. The results showed that as the number of movies analyzed increased, the percentage of the number of words that were encountered more than ten times increased. He suggested that it was critical to watch a large number of movies for incidental vocabulary learning to occur.

In sum, a number of studies recognized watching movies or TV as a valuable source for vocabulary learning and the importance of multiple exposures of target words to be

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learned. In the current study, taking the findings of the research on incidental vocabulary learning into consideration and following Webb's (2010) suggestion, ten encounters were set as the point at which incidental vocabulary learning through watching movies could occur. It was also assumed that presenting visual and aural input together could provide more favorable conditions for incidental vocabulary learning than presenting aural input only.

4. Statement of the Problems

As aforementioned, numerous studies investigated the effect of reading or watching movies or TV programs on vocabulary learning and also attempted to measure the number of encounters of unknown words necessary for incidental vocabulary learning to occur through reading in particular. However, to the author's knowledge, there has been only one corpus-driven study (i.e., Webb, 2010) that examined the number of encounters of the words used in movies in an attempt to determine how much vocabulary can be learned through watching them, and little research adopted a corpus-driven approach in analyzing novels in relation to vocabulary learning. With this research gap in mind, the current study aimed to assess the vocabulary size necessary to understand the *Harry Potter* book and movie series and to measure the number and percentage of potential words that could be learned incidentally through reading and watching them. The following research questions guided the current study.

1) What vocabulary size is necessary to comprehend the *Harry Potter* book and movie series?
2) What is the number and percentage of potential words that could be learned through reading the *Harry Potter* book series and watching the *Harry Potter* movie series?

III. METHODS

1. Materials

The American version of *Harry Potter* book series was scanned and saved as text files for the purpose of analysis. Then, each of text files was compiled to construct the *Harry Potter* corpus. The average number of tokens per episode was about 159,854 and the total number of tokens was 1,118,981 as shown Table 1 below. In addition, the transcripts of the *Harry Potter* movie series were collected from the Internet and all of them were saved as a

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text file for the purpose of analysis. The average number of tokens per episode was about 8,283 and the total number of tokens was 66,265 as shown in Table 2 below. The total running time of the series was 1,199 minutes (about 20 hours) and the average running time per episode was about 150 minutes (2 hours and 30 minutes). The transcripts of seven movies were compared with the actual videos and they were found to be fairly accurate, providing all the details of discourse including hesitations (e.g., *um*, *uhh*) and exclamations (e.g., *aah*, *huh*, *wow*, *oh*).

TABLE 1

***Harry Potter* Book Series**

Series	Number of token
Harry Potter and the Philosopher's Stone	80,305
Harry Potter and the Chamber of Secrets	89,418
Harry Potter and the Prisoner of Azkaban	108,394
Harry Potter and the Goblet of Fire	196,246
Harry Potter and the Order of the Phoenix	266,779
Harry Potter and the Half-Blood Prince	174,742
Harry Potter and the Deathly Hallows	203,097
Average	159,854
Total	1,118,981

TABLE 2

***Harry Potter* Movie Series**

Series	Number of token	Running Time (minutes)
Harry Potter and the Philosopher's Stone	8,824	159
Harry Potter and the Chamber of Secrets	5,630	174
Harry Potter and the Prisoner of Azkaban	9,814	142
Harry Potter and the Goblet of Fire	9,773	157
Harry Potter and the Order of the Phoenix	8,962	138
Harry Potter and the Half-Blood Prince	9,958	153
Harry Potter and the Deathly Hallows part 1	7,719	146
Harry Potter and the Deathly Hallows part 2	5,585	130
Average	8,283	150
Total	66,265	1,199

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One of the key reasons to choose *Harry Potter* book and movie series for analysis was that they have been one of the most popular books and movie series worldwide. As Nation (2001) noted, in order to make incidental vocabulary learning occur while reading and listening, it is essential for learners to do large quantities of reading and listening, and to be involved in a large amount of reading and listening for an extended period of time, it appears critical to use materials that can interest language learners. In addition, as Nation suggested, continuous texts on a similar topic provide favorable conditions for vocabulary learning. This being the case, it seemed worth analyzing the *Harry Potter* book and movie series, which would meet these conditions under which incidental vocabulary learning can be promoted.

2. Tool

The tool used for analyzing the vocabulary of *Harry Potter* book and movie series was the RANGE program, one of the most well-known and comprehensive vocabulary analysis tools developed by Nation and Heatley (2002). It can inform us of the number and the percentage of tokens, types, and word families from the 1st 1,000 through the 14th 1,000 word levels that are used in texts. According to them, the word lists are based on the frequency lists of British National Corpus (BNC) and three factors were taken into consideration when selecting words. First, they checked the range of words by examining whether words were used in various corpora (i.e., LOB, FLOB, Brown, Frown, Kohlapur, Wellington Written, Wellington Spoken, and LUND corpora). Then they consider the total frequency of the words and how evenly the words were dispersed in each corpus.

3. Data Analysis and Procedure

Before analyzing the texts of *Harry Potter* book and movies series using the RANGE program, all of the contracted forms (e.g., *it's been* and *wanna*), apostrophes (e.g., *y'know*, *'cause*, and *'ll*) and hyphenated words (e.g., *pale-faced* and *light-hearted*) in the texts were changed to conform to the spelling used in the word lists of the RANGE program. For example, *kinda*, *gonna* and *he's got* were changed into *kind of*, *going to* and *he has got* respectively. In addition, in the movie scripts, the descriptive words of scenes and actors' performances were removed from the texts for a more accurate vocabulary analysis.

Then, a vocabulary analysis was conducted with the revised texts of book and movie scripts. The results of analysis provided the information about the number of tokens, types,

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and word families used in the texts from the 1st 1,000 through the 14th 1,000 word levels. The word band 15 consisted of a list of proper nouns including names of people and places, and the word band 16 included a list of exclamations. In the current study, it was assumed that those words (i.e., proper nouns and exclamations) could be understood by learners with a minimal learning burden.

The words that were not in the fourteen 1,000-word-family lists were manually analyzed and re-categorized. To begin with, they were searched on two online dictionaries (http://www.merriam-webster.com and www.daum.net) to see whether they were actual words or not. If they were found to be actual words, then they were labelled as "not in the list." Those words of "not in the list" were considered to be highly infrequent words since they were not found in the most frequent 14,000 WFs. The rest of words were re-examined to see if they could be potentially subsumed under any of the frequency lists. For example, *giggly* was not found in any of the frequency lists, but it was subsumed under the 4th 1,000 word level which *giggle* belonged to, supposedly assuming that the meaning of *giggly* could be easily inferred once learners knew the meaning of *giggle*. In addition, the words were also searched on Wikipedia, one of the most comprehensive online encyclopedias available to check whether they were proper nouns (i.e., names of people and places). If they were found to be proper nouns, they were re-grouped into proper nouns. The words that were found neither in the online dictionaries nor in the Wikipedia were excluded from the analysis since they made up a very small proportion of the texts so that they were negligible.

Concerning compound words (e.g., *brainwave*, *cartwheel*, and *cupboard*), they were analyzed based on the roots that comprised them. For example, in the case of *cartwheel*, *cart* and *wheel* were searched on the word lists separately and the word level that each word belonged to was identified separately (e.g., *cart*: the 3rd 1,000 word level, *wheel*: the 2nd 1,000 word level) and then the higher word level between the two was chosen subsuming *cartwheel* under the 3rd 1,000 word level.

As a result of the revision of the text and re-grouping of the words, a certain number of words were added to some of the word bands and the tokens of those words were added accordingly when the text coverage of each word band was calculated. In addition, the number of encounters of WFs at each word band was calculated and it was to assess how often WFs were repeated in the *Harry Potter* book and movie series.

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IV. FINDINGS AND DISCUSSION

1. Vocabulary Size for Comprehending *Harry Potter* Series

It was found that 1,122,973 tokens, 22,135 types, and 11,430 WFs were used in the *Harry Potter* book series as shown in Table 3. The words were spread over the fourteen word levels and beyond. The text coverage of tokens sharply dropped as the word level increased, and at the 6th 1,000 word level, the text coverage became lower than 1%, indicating that the text coverage of the word bands beyond the 6th 1,000 word level was minimal. The text coverage of the 1st 1,000 WFs was 77.82%, covering 873,898 tokens and those of the 2nd and the 3rd 1,000 were 5.9% and 4.83%, accounting for 66,291 and 54,186 tokens respectively.

Table 4 displays the cumulative text coverage with and without proper nouns and exclamations. As aforementioned, based on the findings of previous studies, 95% and 98% text coverage were set as the lower and higher boundaries for the comprehension of written and spoken texts in the current study. Assuming that proper nouns and exclamations can be easily understood with a minimal learning burden, 95.33% text coverage can be reached with the most frequent 4,000 WFs and 98.09% with the most frequent 7,000 WFs.

The findings indicated that learners should have the vocabulary size of at least 4,000 WFs (providing about 95% text coverage) or preferably 7,000 WFs (providing about 98% text coverage) to comprehend the *Harry Potter* books series. If 98% text coverage is critical for comprehending *Harry Potter* book series as Nation (2001) suggested, then it may be a little bit challenging for many EFL learners in Korea to read them since 98% text coverage of the book series requires about 7,000 WFs. According to the findings of previous studies (Shin, Chon, & Kim, 2011; Lee, Chon, & Shin, 2012), the receptive vocabulary size of 402 high school students was around 6,000 WFs and that of 402 freshmen in a Korean university was around 7,000 WFs. Although these findings cannot be generalized into the whole population of Korean high school and university students, these figures can at least give a rough measure of the receptive vocabulary size of Korean EFL students. Given that, the *Harry Potter* book series is better to be used for advanced high school students or university students in general when lexical demand is solely considered.

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TABLE 3
Tokens, Types, and Word Families at Each Word Level in *Harry Potter* (books)

Word band	Tokens (%)	Types (%)	Families (%)
1st 1,000	873,898 (77.82)	4,326 (19.54)	1,457 (12.75)
2nd 1,000	66,291 (5.90)	3,319 (14.99)	1,230 (10.76)
3rd 1,000	54,186 (4.83)	2,538 (11.47)	1,103 (9.65)
4th 1,000	18,342 (1.63)	1,691 (7.64)	846 (7.40)
5th 1,000	12,574 (1.12)	1,410 (6.37)	766 (6.70)
6th 1,000	9,337 (0.83)	1,068 (4.82)	640 (5.60)
7th 1,000	9,073 (0.81)	863 (3.90)	537 (4.70)
8th 1,000	3,585 (0.32)	747 (3.37)	467 (4.09)
9th 1,000	4,205 (0.37)	711 (3.21)	473 (4.14)
10th 1,000	3,709 (0.33)	603 (2.72)	397 (3.47)
11th 1,000	2,787 (0.25)	501 (2.26)	361 (3.16)
12th 1,000	2,208 (0.20)	384 (1.73)	260 (2.27)
13th 1,000	1,264 (0.11)	382 (1.73)	274 (2.40)
14th 1,000	721 (0.06)	185 (0.84)	144 (1.26)
Proper Noun	55,790 (4.97)	1,254 (5.67)	1,110 (9.71)
Exclamation	2,062 (0.18)	801 (3.62)	620 (5.42)
Not in the list	2,941 (0.26)	1,352 (6.11)	745 (6.52)
Total	1,122,973	22,135	11,430

TABLE 4
Text Coverage Figures for *Harry Potter* (books)

Word band	Token	Coverage (%)	Cumulative coverage without proper noun & exclamation (%)	Cumulative coverage with proper noun & exclamation (%)
1st 1,000	873,898	77.82	77.82	82.97
2nd 1,000	66,291	5.90	83.72	88.87
3rd 1,000	54,186	4.83	88.55	93.70
4th 1,000	18,342	1.63	90.18	95.33*
5th 1,000	12,574	1.12	91.30	96.45
6th 1,000	9,337	0.83	92.13	97.28
7th 1,000	9,073	0.81	92.94	98.09**
8th 1,000	3,585	0.32	93.26	98.41
9th 1,000	4,205	0.37	93.63	98.79
10th 1,000	3,709	0.33	93.96	99.12
11th 1,000	2,787	0.25	94.21	99.36
12th 1,000	2,208	0.20	94.41	99.56
13th 1,000	1,264	0.11	94.52	99.67
14th 1,000	721	0.06	94.59	99.74
Proper Noun	55,790	4.97		
Exclamation	2,062	0.18		
Not in the list	2,941	0.26		
Total	1,122,973			

*95% coverage cut-off point, **98% coverage cut-off point

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In addition, as shown in Table 5, it was found that 66,265 tokens, 5,099 types, and 3,330 WFs were used in the *Harry Potter* movie series. As in the case of the book series, the words were spread over the fourteen word levels and beyond. The text coverage of tokens dropped exponentially as the word level increased and it became lower than 1% at the 5th 1,000 word level and onwards. The text coverage of the 1st 1,000 WFs was 84.01%, covering 55,670 tokens and those of the 2nd and the 3rd 1,000 WFs were 4.13% and 3.2%, covering 2,736 and 2,137 tokens respectively. Table 6 shows the cumulative text coverage with and without proper nouns and exclamations. Supposing that proper nouns and exclamations can be understood easily by the viewers, 95.98% text coverage can be obtained with the most frequent 3,000 WFs and 97.81% with the most frequent 5,000 WFs.

The results suggested that learners should know at least the most frequent 3,000 WFs (providing about 96% text coverage) or preferably 5,000 WFs (providing about 98% text coverage) to comprehend the *Harry Potter* movie series. It seems that the lexical demand of the *Harry Potter* movie series is relatively lower than that of the movies and TV programs reported in previous studies. According to Webb and Rodgers (2009a, 2009b), 95% text coverage of 88 American and British TV series and 318 movies can be reached with about 3,000 WFs, while 98 % text coverage can be obtained with about 6,000 to 7,000 WFs. On the other hand, a much smaller vocabulary size (5,000 WFs) is necessary to have 98% text coverage in the *Harry Potter* movie series as found in the current study. In addition, the text coverage (96%) that can be obtained with the most frequent 3,000 WFs in the *Harry Potter* movie series is slightly higher than the coverage (95%) that can be gained in the movies or TV programs reported by Webb and Rodgers. Supposing that 3,000 WFs are adequate to understand the *Harry Potter* movie series as the combination of aural input and visual imagery would compensate for relatively low text coverage (Webb & Rodgers, 2009a), then they might be used for the high school students and possibly for the advanced middle school students in Korea. It is particularly more so since they have a number of visual attractions and interesting storylines, which would enhance the students' motivation to watch them.

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TABLE 5
Tokens, Types, and Word Families at Each Word Level in *Harry Potter* (movies)

Word band	Token (%)	Types (%)	Families (%)
1st 1,000	55,670 (84.01)	1,937 (37.99)	918 (27.57)
2nd 1,000	2,736 (4.13)	984 (19.30)	615 (18.47)
3rd 1,000	2,137 (3.22)	552 (10.83)	391 (11.74)
4th 1,000	824 (1.24)	298 (5.84)	253 (7.60)
5th 1,000	390 (0.59)	188 (3.69)	166 (4.98)
6th 1,000	353 (0.53)	138 (2.71)	118 (3.54)
7th 1,000	317 (0.48)	92 (1.80)	89 (2.67)
8th 1,000	101 (0.15)	70 (1.37)	62 (1.86)
9th 1,000	124 (0.19)	71 (1.39)	64 (1.92)
10th 1,000	118 (0.18)	60 (1.18)	49 (1.47)
11th 1,000	62 (0.09)	41 (0.80)	39 (1.17)
12th 1,000	111 (0.17)	36 (0.71)	31 (0.93)
13th 1,000	26 (0.04)	18 (0.35)	17 (0.51)
14th 1,000	17 (0.03)	13 (0.25)	12 (0.36)
Proper Noun	2,881 (4.35)	427 (8.37)	402 (12.07)
Exclamation	182 (0.27)	17 (0.33)	8 (0.24)
Not in the list	216 (0.33)	157 (3.08)	96 (2.88)
Total	66,265	5,099	3,330

TABLE 6
Text Coverage Figures for *Harry Potter* (movies)

Word band	Token	Coverage (%)	Cumulative coverage without proper noun & exclamation (%)	Cumulative coverage with proper noun & exclamation (%)
1st 1,000	55670	84.01	84.01	88.63
2nd 1,000	2736	4.13	88.14	92.76
3rd 1,000	2137	3.22	91.36	95.98*
4th 1,000	824	1.24	92.6	97.22
5th 1,000	390	0.59	93.19	97.81**
6th 1,000	353	0.53	93.72	98.34
7th 1,000	317	0.48	94.2	98.82
8th 1,000	101	0.15	94.35	98.97
9th 1,000	124	0.19	94.54	99.16
10th 1,000	118	0.18	94.72	99.34
11th 1,000	62	0.09	94.81	99.43
12th 1,000	111	0.17	94.98	99.60
13th 1,000	26	0.04	95.02	99.64
14th 1,000	17	0.03	95.05	99.67
Proper Noun	2881	4.35		
Exclamation	182	0.27		
Not in the list	216	0.33		
Total	66265			

*95% coverage cut-off point, **98% coverage cut-off point

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Meanwhile, it should be noted that even though it was assumed that proper nouns such as names of people and places could be understood with a minimum learning burden while reading the book and watching the movie series in the current study, it may not be as it was presumed. According to the findings (See Table 4 and 6), proper nouns made up a relatively large proportion of running words of the books (4.97%: 55,790 tokens) and the movies (4.35%: 2,881 tokens). They may impede comprehension process and it is more so especially when learners process aural input through listening which, by its nature, involves real-time processing. Therefore, it seems essential to have learners be familiar with main characters, settings, and other important proper nouns before reading books or watching movies (Webb & Rodgers, 2009b). Otherwise, it should not be assumed that proper nouns can be understood easily, and if it is not assumed, the text coverage necessary for comprehension of texts (i.e., 95% or 98% text coverage) may not be obtained (See Table 4 and 6).

2. Number of Word Families That Could Be Learned Incidentally

The number of encounters of the WFs at each word band was calculated to identify the WFs that were frequently repeated in the *Harry Potter* book and movie series. As noted earlier, based on the findings of previous studies (e.g., Rott, 1999; Webb, 2010), more than ten encounters were set as the point at which incidental vocabulary learning could occur in the current study. In other words, the number and percentage of the WFs that were encountered more than ten times were interpreted as the number and percentage of the WFs that could be learned incidentally through reading and watching the *Harry Potter* series. Another assumption made was that incidental vocabulary learning can occur only when 95% or 98% text coverage is guaranteed. Nation (2001) argued that texts should contain no more than 5% unknown words and preferably no more than 2% for extensive reading and incidental vocabulary learning since comprehension of texts and guessing the meaning of unknown words are not possible otherwise.

Table 7 below displays the number of WFs from the 5th through the 14th 1,000 word levels and not in the list according to the number of encounters in the *Harry Potter* book series. The reason for choosing these particular word bands was that in order to measure the number of the WFs that could be incidentally learned, it should be assumed that learners know the most frequent 4,000 WFs, which can provide 95% text coverage of the book series. Otherwise, incidental vocabulary learning would not occur since the comprehension of the texts and guessing the meaning of unknown words are not possible. Then, the number of potential WFs that could be learned incidentally was measured by calculating the number of WFs that were repeated more than ten times from the 5th through

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the 14th 1,000 word levels and not in the list. As shown in Table 7 below, the number of WFs that occurred more than ten times from these word bands was 996 (19.67%), which implied that the learners with the vocabulary size of 4,000 WFs might be able to learn 996 WFs through reading the book series.

Table 8 below shows the number of WFs from the 8th through the 14th 1,000 word levels and not in the list according to the number of encounters in the *Harry Potter* book series. It was presupposed that 98% text coverage was essential for the comprehension of the book series and learners knew the most frequent 7,000 WFs which can provide 98% text coverage. Then, the number of potential WFs that could be learned incidentally was assessed by calculating the number of WFs from the 8th through the 14th 1,000 word levels and not in the list that were encountered more than ten times. The number of WFs that occurred more than ten times from these word bands was 475 (15.22%), which indicated that the learners who had the vocabulary size of 7,000 WFs could learn 475 WFs through reading the book series.

TABLE 7

Number of the WFs from the 5th through the 14th 1,000 Word Levels and Not in the List According to the Number of Encounters (books)

	1	2	3-4	5-7	8-9	10+
5th 1,000	203	89	109	95	46	224
6th 1,000	173	93	91	80	30	173
7th 1,000	142	84	87	64	36	124
8th 1,000	161	57	78	53	20	98
9th 1,000	164	66	56	59	27	101
10th 1,000	125	60	66	42	17	87
11th 1,000	119	66	54	46	14	62
12th 1,000	96	41	45	30	8	40
13th 1,000	104	47	46	30	12	35
14th 1,000	63	20	20	12	5	24
Not in the list	433	144	96	32	12	28
Total	1,783	767	748	543	227	996
Percentage	35.21	15.15	14.77	10.72	4.48	19.67

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TABLE 8
Number of the WFs from the 8th through the 14th 1,000 Word Levels and Not in the List According to the Number of Encounters (books)

	1	2	3-4	5-7	8-9	10+
8th 1,000	161	57	78	53	20	98
9th 1,000	164	66	56	59	27	101
10th 1,000	125	60	66	42	17	87
11th 1,000	119	66	54	46	14	62
12th 1,000	96	41	45	30	8	40
13th 1,000	104	47	46	30	12	35
14th 1,000	63	20	20	12	5	24
Not in the list	433	144	96	32	12	28
Total	1,265	501	461	304	115	475
Percentage	40.53	16.05	14.77	9.74	3.68	15.22

Table 9 below exhibits the number of WFs from the 4th through the 14th 1,000 word levels and not in the list according to the number of encounters in the *Harry Potter* movie series. Similar to the assumptions made in measuring the number of WFs that could be learned incidentally through reading the book series, it was presupposed that learners knew the most frequent 3,000 WFs and 95% text coverage was sufficient to comprehend the movie series. Then, the number of potential WFs that could be learned incidentally was measured by calculating the number of WFs from the 4th through the 14th 1,000 word levels and not in the list that were repeated more than ten times. In a similar vein, the number of potential WFs that the learners with the vocabulary size of 5,000 WFs (which can cover about 98% of the running words of the movie series) could incidentally learn was measured by calculating the number the WFs from the 6th through the 14th 1,000 word levels and not in the list that were repeated more than then times (See Table 10). The number of WFs that occurred more than ten times was 30 (3.01%) from the 4th through the 14th 1,000 word levels and not in the list, and it was 15 (2.60%) from the 6th through the 14th 1,000 word levels and not in list, which might be the estimates of WFs that the learners with the vocabulary size of 3,000 WFs and 5,000 WFs could learn respectively through watching the movie series.

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TABLE 9

Number of the WFs from the 4th through the 14th 1,000 Word Levels and Not in the List According to the Number of Encounters (movies)

	1	2	3-4	5-7	8-9	10+
4th 1,000	134	52	41	11	7	8
5th 1,000	105	31	16	6	1	7
6th 1,000	69	20	11	10	3	5
7th 1,000	55	14	11	2	3	4
8th 1,000	49	6	6	1	0	0
9th 1,000	42	9	8	4	0	1
10th 1,000	32	6	5	2	2	2
11th 1,000	31	4	3	0	0	1
12th 1,000	19	3	2	2	3	2
13th 1,000	12	2	3	0	0	0
14th 1,000	9	2	1	0	0	0
Not in the list	68	13	8	6	1	0
Total	625	165	115	44	20	30
Percentage	62.75	16.27	11.55	4.42	2.01	3.01

TABLE 10

Number of the WFs from the 6th through the 14th 1,000 Word Levels and Not in the List According to the Number of Encounters (movies)

	1	2	3-4	5-7	8-9	10+
6th 1,000	69	20	11	10	3	5
7th 1,000	55	14	11	2	3	4
8th 1,000	49	6	6	1	0	0
9th 1,000	42	9	8	4	0	1
10th 1,000	32	6	5	2	2	2
11th 1,000	31	4	3	0	0	1
12th 1,000	19	3	2	2	3	2
13th 1,000	12	2	3	0	0	0
14th 1,000	9	2	1	0	0	0
Not in the list	68	13	8	6	1	0
Total	386	79	58	27	12	15
Percentage	66.90	13.69	10.05	4.68	2.08	2.60

To sum up, it was found that the learners with the vocabulary size of 4,000 WFs might have a chance to learn 996 WFs (19.67%) from the 5th through the 14th 1,000 word levels and not in the list, when it is assumed that 95% coverage is adequate for understanding the *Harry Potter* book series and incidental vocabulary learning. Supposing that 98%

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text coverage is necessary for comprehending the book series and incidental vocabulary learning, the learners with the vocabulary size of 7,000 WFs might be able to learn 475 WFs (15.22%) from the 8th through the 14th 1,000 word levels and not in the list. This being the case, the *Harry Potter* book series has a strong potential to be used in and out of classrooms for extensive reading not only because it is one of the most popular English book series worldwide but also because it provides readers ample opportunities for incidental vocabulary learning.

Meanwhile, supposing that 95% text coverage is adequate for learners to understand the *Harry Potter* movie series as Webb and Rodgers (2009a) suggested, the learners with the vocabulary size of 3,000 WFs could have an opportunity to learn 30 WFs (3.01%) from the 4th through the 14th 1,000 word levels and not in the list. It seems that the number of the WFs that could be learned incidentally through watching the *Harry Potter* movies series is relatively small when compared to the number of WFs that could be learned through reading the *Harry Potter* book series. However, it may not be as it appears. The relatively small number of WFs that could be learned through watching the movie series seems largely due to the limited viewing time (20 hours) and the relatively small number of tokens accordingly. The total number of tokens used in the book series is about 17 times larger than that used in the movie series: 1,118,981 vs. 66,265 tokens. If learners watch the movies whose lexical demand is similar to that of the *Harry Potter* movie series for an extended period of time, per se, 200 hours, which are approximately 4 hours (about 2 movies) per week over a year, it can be postulated that one can learn about 300 WFs per year with the ratio of 30 WFs per 20 hours (See Table 9). Furthermore, as Webb (2010) found, the percentage of WFs that were encountered more than ten times increased as more movies were watched. According to Webb, the percentage of WFs encountered ten or more times was 3% in 8 movies, whereas it was 7% in 70 movies, and this indicated that as learners watch more movies, the ratio of learning unknown words would increase, and consequently they would be able to learn increasingly more WFs. Then, learners would learn more than 300 WFs when they watch the *Harry Potter* movie series and the likes for 200 hours.

Also of note is that even smaller than ten encounters may lead to acquiring partial knowledge of vocabulary. In the current study, it was presupposed that more than ten encounters of unknown words were necessary for incidental vocabulary learning to occur. However, this should not mean that little can be learned about unknown words when they are encountered fewer than ten times because partial knowledge of vocabulary may be gained each time repetition increases. Webb (2007) reported that after three encounters of the unknown words, gains on receptive knowledge of orthography, grammatical functions, and syntax were observed, and after seven encounters, larger gains in productive knowledge were demonstrated. Along the same lines, Vidal (2011) observed that gains in vocabulary knowledge occurred between two

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and three repetitions of unknown words in reading academic texts and they occurred between five and six times in listening academic lectures. These findings implied that gains in vocabulary learning though repeated exposure of words are incremental. Therefore it may not be just 475 WFs and 30 WFs that could be learned through reading and watching the *Harry Potter* book and movie series. It is presumable that learners may acquire at least some aspects of word knowledge (e.g., form recognition) even when unknown words are repeated fewer than ten times.

On the other hand, ten exposures should not be interpreted as the point at which full lexical knowledge of unknown words are learned either. Rather, it should be interpreted as the point at which substantial gains in learning some aspects of lexical knowledge begin to occur. As a few researchers (e.g., Waring & Takaki, 2003; Zeeland & Schmitt, 2013) suggested, maybe more than ten exposures are necessary to learn unknown words incidentally.

V. CONCLUSION AND IMPLICATIONS

The current study aimed to ascertain the vocabulary size necessary for understanding the *Harry Potter* book and movie series and to measure the number of potential words that could be learned incidentally through reading the book and watching the movie series. It was found that if it is assumed that proper nouns and exclamations can be easily understood with a minimal learning burden, learners have to know at least the most frequent 4,000 WFs (about 95% text coverage) or preferably 7,000 WFs (about 98% text coverage) to understand the book series. Meanwhile learners should know at least the most frequent 3,000 WFs (about 96% coverage) or preferably 5,000 WFs (about 98% coverage) to comprehend the movie series. It was also revealed that the learners with the vocabulary size of 4,000 WFs and 7,000 WFs might incidentally learn 996 WFs and 475 WFs respectively through reading the book series. In addition, the learners with the vocabulary size of 3,000 WFs and 5,000 WFs could incidentally learn 30 WFs and 15 WFs respectively through watching the movie series. The results indicated that reading *Harry Potter* book series can provide substantial opportunities for incidental vocabulary learning, whereas watching the movie series does not seem to provide similar gains in vocabulary learning. However, the results implied that regular viewing of movies over an extended period time would provide adequate opportunities for vocabulary learning.

There are some limitations that should be taken into account when interpreting the results of the current study. First, it was assumed that 95% or 98% text coverage would lead to comprehension of written and spoken texts. However, it may not be the case since there are a number of other factors such as prior knowledge (topic familiarity), speech rate, and grammatical complexity that could significantly influence the

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comprehension of the spoken and written texts. It was also presumed that if learners knew the meaning of each word of word chunks, they knew the meaning of the word chunks. However, such word chunks as phrasal verbs and idioms are often opaque and non-compositional in meaning. In other words, knowing a meaning of each component of a word chunk does not necessarily lead to the comprehension of the whole word chunk. For example, knowing the meaning of *put*, *up*, and *with* separately does not mean knowing the meaning of *put up with*. Thus, text coverage should be interpreted with caution.

The findings of the current study lead to a few pedagogical implications in relation to the use of novels and movies for vocabulary learning in and out of classrooms. Most of all, it seems critical to examine the lexical demand of the novels and movies that are intended to be used (i.e., how much vocabulary is necessary to have 95%-98% text coverage) and then it should be checked whether learners reach the vocabulary level that is needed for comprehending the texts and for incidental vocabulary learning.

In addition, examining how frequently words are encountered in novels or movies can be conducive to setting a vocabulary learning goal and vocabulary instruction in general. For example, if learners have the vocabulary size of 3,000 WFs which covers 95% or 98% of the text to be used, learners' immediate target words would be the WFs that are encountered more than ten times at the 4th 1,000 word level. If possible, a list of the target words can be provided to the learners in advance so that they can pay selective attention to those words when they encounter them while reading books or watching movies. Also, the target words can be explicitly taught in their classroom in advance, which would significantly increase likelihood of acquiring those words.

Particularly relevant to vocabulary learning through watching movies, as the findings of the current study indicated, watching movies for limited time would not give adequate opportunities for incidental vocabulary learning because only a small number of words would be frequently encountered. Thus, teachers and learners should be well aware that watching movies on a regular basis over a long period of time is essential for incidental vocabulary learning to occur. This is the similar approach adopted in extensive reading. Learners need to read and watch as much as possible to ensure multiple encounters of unknown words. Web and Rodgers (2009a) suggested that if learners with the vocabulary size of 3,000 WFs watch two or three movies a week over a year, they would have substantial opportunities for incidental vocabulary learning. Another strategy to increase possibility of learning unknown words through watching movies is to watch the same movie repeatedly to the point at which unknown words are sufficiently encountered. This method has been found to be effective in both reading (Horst & Meara, 1999, cited in Webb & Rodgers, 2009a) and listening (Elley, 1989). Webb and Rodgers pointed out that this may be particularly effective in EFL contexts where learners may not have adequate opportunities to watch movies on TV.

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Indeed, both reading novels and watching movies seem to have the strong potential to be used for vocabulary learning as found in the current study. However, as aforementioned, teachers and learners should be well cognizant that reading books extensively and watching movies over an extended period of time are critical for incidental vocabulary learning to occur. Then, teachers need to make sure that the materials to be used are interesting to learners and within or a little bit beyond their vocabulary level to enhance their motivation to read and watch them extensively.

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Examples in: English
Applicable Languages: English
Applicable Level: Secondary and Tertiary

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