

How Many Word Encounters Do We Need?: In Regard to The Frequency and Presentation of Contexts

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The present study explored a more effective way of vocabulary learning in terms of the frequency of word encounters and the presentation of contexts. A total of 98 university students encountered 15 target words in the condition of either 'spaced encounters in separated contexts' or 'massed encounters in an integrated context'. Their vocabulary knowledge was evaluated in both the comprehension and the production tests. From the comparisons among 1, 3, 5, 7, 10 word encounters, the findings from ANOVA confirmed the positive effect at the 7 times of encounters on vocabulary learning. In addition, the results from an independent *t*-test suggest the advantage of the 'spaced encounters in separated contexts' over the 'massed encounters in an integrated context'. The study suggests pedagogical implications to English educators in Korea concerning how many times of word encounters that should be secured in class and how the words should be presented in contexts.

[L2 vocabulary/frequency/context/spaced encounters/massed encounters]

I. INTRODUCTION

Vocabulary learning has been a central focus in second language acquisition and pedagogy. Since the significant role of input (Krashen, 1985) and the importance of noticing and attention (Schmidt, 1990; 1995) in vocabulary learning drew researchers' attention, rigorous attempts have been made in the last few decades to seek the most effective way to learn second language vocabulary (e.g., Kim, Buja, 2006; Kim, Youngeun, 2008).

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There has been a substantial amount of research carried out on an array of word encounters. Many researchers (e.g., Brown, Waring & Donkaewbua, 2008; Jenkins, Stein & Wysocki, 1984; Horst, Cobb & Meara, 1998; Schmitt, 2008; Waring & Takaki, 2003; Zimmerman, 2009) agree that repeated exposure to target words in various contexts promotes acquisition of vocabulary knowledge. However, a consensus has yet to be reached on the optimal number of encounters of the target words. For example, compared to Rott's study (1999) suggesting six encounters, other studies have suggested more encounters (Brown et al., 2008; Jenkins et al., 1984; Horst et al., 1998; Waring & Takaki, 2003).

Research concerned with vocabulary learning in Korea has paid attention to the frequency of encounters and learners' task involvement during the exposure. Yang, Sookyong & Hong, Sunho (2013) suggested that four times of exposure per week was more effective than two or three times of exposure. Kim, Kyungbo and Hong, Sunho (2009) also found that four exposures were more effective than one exposure per week. Kim, Eunju and Lee, Jaekeun (2011) observed that exposure with word cards in every class had more positive effect than one exposure in a reading section. In the comparison of the massed repetition (15-minute-long review of the material learned during the week) with the spaced repetition (five repetitions separately conducted during the week), Lee, Joonwon (2016) confirmed the effect of spaced repetition. Regarding Korean L2 learners' task involvement during the exposure, Cho, Youngah and Ma, Jeehyun (2014) confirmed that higher task involvement such as writing a summary with the target words was more effective than reading a passage with glosses. Kim, Jeewon and Lim, Hyunwoo (2012) further insisted that the effect of task involvement outperformed the effect of frequent exposure.

The differences between the previous research in Korea and the present study lie in the design of the experiment. First, the previous research has concerned either frequency of exposure or task types during the exposure while the present study incorporated both issues. Second, rather than implementing the 'one to many' comparisons used in the previous research, the present study deployed more elaborated comparisons from one to ten encounters. Third, the context effect which was neglected in the previous research was included in the present study. Thus, rather than repeating the same context, various contexts were provided in each encounter.

In addition, the current study hopes to provide English educators practical suggestions regarding vocabulary learning. First, allowing for the pedagogical limitations in the EFL context and the realistic classroom constraints in Korea, one may argue that the incidental vocabulary learning through extensive reading seems marginally feasible in an ordinary class with those limitations in Korea. However, the present study focuses on deliberate vocabulary learning in instructional settings. Second, not all English classes in Korea are ready for learners' involvement in highly demanding tasks such as writing an English summary with the target words. Thus the current study was designed to reflect realistic classroom environments.

II. THEORETICAL BACKGROUND

1. How Much Input Do We Need?: Frequency of Word Encounters

Since Krashen's (1985) input hypothesis, an increasing attention has been paid to the importance of input in vocabulary learning. Researchers and educators are convinced that the more encounters of a new word in context a learner has, the more successful the vocabulary learning can be (e.g., Horst et al., 1998; Laufer & Rozovski-Roitblat, 2011; Pellicer-Sánchez & Schmitt, 2010; Webb & Chang, 2014).

The interests started from L1 vocabulary learning; however, recent years have seen the transition of research interests towards the L2 vocabulary learning. Regarding L1 acquisition, Jenkins et al. (1984) found that there was marginal difference between two and six and between six and ten encounters of a word; however, the difference was significant between two and ten encounters. In regard to L2 vocabulary learning, Webb and Chang (2014) observed learners' improvement of vocabulary through reading 10 'graded readers'.

Many researchers who have explored the relationship between the frequency of encounters and the L2 vocabulary learning have paid attention to the incidental vocabulary learning through extensive reading. For example, Vidal (2011) suggested that the frequency of exposure of words in readings made a positive contribution to successful L2 vocabulary learning. However, researchers currently do not have a consensus on the exact number of encounters. For example, significant vocabulary improvement was found between two and three repetitions in Vidal (2011) while six encounters in Rott (1999) and seven to nine encounters in Brown et al. (2008) were found to be desirable for distinctive vocabulary increase. Waring and Takaki (2003) insisted that eight repetitions were the minimum encounters in a graded reader that were required for 50% of long-term memory. Horst et al. (1998) also suggested eight or more encounters were desirable but the cases of concrete nouns and pictures provided in the book enabled five encounters to be effective. There have been other voices espousing more encounters. Pigada and Schmitt (2006) and Webb (2007) suggested that ten encounters were necessary for word retention. Waring and Takaki (2003) guardedly suggested that even twenty encounters may be desirable in incidental vocabulary learning.

2. How Should a Word Be Encountered?: Task Types and Repetition Methods

In addition to the question about 'how many word encounters are optimal?', the issue

concerning 'how should a word be encountered?' needs to be discussed. There are two important factors; task type and the method of repetition.

First, Laufer and Rozovski-Roitblat (2015) compared three task types (reading only, reading with a dictionary, reading with word exercises). Among three groups of L2 learners who experienced three different tasks respectively, the group who read with word exercises produced better results. Interestingly, the effect of task type overrode the effect of the number of encounters in some studies. For example, Cho, Youngah and Ma, Jeehyun (2014) compared three task types; reading a passage with marginal glosses, filling in the blanks with a word list, and writing a summary. They found that writing an English summary using the word list was the most effective. Kim, Jeewon and Lim, Hyunwoo (2012) provided high school students with three different post-reading tasks; high exposure frequency with low involvement, moderate exposure frequency with moderate involvement, and low exposure frequency with high involvement. The groups with low exposure frequency (one encounter) and high involvement (writing an English summary using the target words) were better in productive vocabulary; however, the differences among the groups in receptive vocabulary were not significant.

Second, regarding the method of repetitions, Nation (2001a) suggested two ways of presenting words to learners. The massed repetition method provides the learners with one extended period of one time repetition, while in the spaced repetition the word exposure is given with multiple intervals. For example, the given target words can be encountered either for one uninterrupted hour or for 6 times each lasting 10 minutes with intervals in between, and therefore the total amount of time allocated to the word encounters is the same in both methods. He suggested that the spaced repetition promotes longer retention of the words because word encounters are repeated before the learners forget the words.

Many researchers have been in favor of spaced repetition; however, the designs of their studies are inconsistent and thus the findings seem inconclusive. In early research, Bloom and Shuell (1981) found a better retention of target words through 10-minute encounters on three successive days compared with 30-minute encounters of all three units for a single day. Barcroft (1998) compared three conditions of spacing; 8 repetitions at 3 seconds, 4 repetitions at 6 seconds, and 2 repetitions at 6 seconds. It was evident that the condition of 8 repetitions at 3 seconds was the most effective for L2 word learning. More recently, Sobel, Cepeda, and Kapler (2011) tested middle school students in real classroom setting and confirmed the positive effect of one week spacing of word encounters. Kim, Eunju and Lee, Jaekeun (2011) observed Korean elementary school students for a semester and suggested that repeated encounters in every class produced superior outcomes compared to a one massed encounter in a reading session. Lotfolahi and Salehi (2017) found that learning 10 L1-L2 pairs in one session followed

by a review a week later was more effective than splitting the acquisition of the target word pairs into two sessions over two weeks.

3. Limitations of Previous Research

First, previous research concerning the relations between the frequency of encounters and the L2 vocabulary learning has been conducted in the context of incidental vocabulary learning through extensive reading (Pigada & Schmitt, 2006; Rott, 1999; Vidal, 2011; Waring & Donkaewbua, 2008; Waring & Takaki, 2003; Webb, 2007). As Nation (2014) pointed out, the chance that a learner encounters the target word frequently enough to improve vocabulary is low in one reading book, and thus the learner may not maintain the word retention before the next encounter in another book. He further warned that averages of the target words in a reading may not be actual repetitions that a learner can experience. Worse, the repetitions may vary in words in a given reading. Laufer (2003) also argues that vocabulary learning with frequency of encounters through extensive reading is hard to be realized in EFL contexts. Considering the fact that manipulating the actual frequency of word encounters in extensive reading is challenging for English educators in Korea, the importance of deliberate vocabulary learning in class (Nation, 2001b) will be taken into consideration in the present study.

Second, the studies comparing the spaced and massed repetitions have focused on either the total amount of time allocated to word encounters or the simple comparison of one with many repetitions (Cho, Youngah and Ma, Jeehyun, 2014; Kim, Eunju & Lee, Jaekeun, 2011; Lee, Joonwon, 2016).

Third, regrettably, the L1-L2 word pairs were tested without context in many studies (Barcroft, 1998; Lotfolahi & Salehi, 2017; Pavlik & Anderson, 2005). Therefore considering the importance of context in vocabulary learning (Aitchison, 2003; Clark, 1993; Saeed, 2003), words should be encountered in context at least at the sentence level.

The present study incorporated the two issues which have been separately explored in the previous research. First, regarding the frequency of word encounters this study adopted a more elaborated frequency span as in 1, 3, 5, 7, and 10 encounters. Second, in regard to the issue of massed vs. spaced repetitions, the present study also concerned the importance of contexts. That is, previous studies comparing the massed vs. spaced repetitions utilized the same material for each repetition; however, this study concerns the repeated encounters of the target word but not the repetition of the context. This enables the learners to experience the target words in various contexts, which better reflect the real world. For this reason, this research project utilized revised terms; 'spaced encounters in separated contexts' (hereafter separated context) vs. 'massed

encounters in an integrated context' (hereafter integrated context). The research questions are as follows:

1. How many encounters of a word in different contexts are required to promote L2 vocabulary learning?
2. Which is a better way to encounter a word: 'spaced encounters in separated contexts' or 'massed encounters in an integrated context'?

III. METHOD

1. Participants

A total of 98 university students participated in the study. They were freshmen majoring in English at a local university who were taking the same English course in two classes (N=50, N=48). The English learners (N=50) in one class were designated to 'spaced encounters in separated contexts' and those in the other class (N=48) were exposed to massed encounters in an integrated context'. There was no significant difference in English proficiency (TOEIC practice test) for class 1 (M=575, SD=59.29) and class 2 (M=576, SD=81.69; $t(96)=.07$, $p=.94$, two-tailed).

2. Materials and Procedure

Regarding the target vocabulary list, instead of creating non-words as in Webb's (2007) study, the current study selected the highest level of words (10,000 frequency level in Nation, 2012) and confirmed that the participants had no prior knowledge of the target words. In addition to nouns and verbs used in his study, the present study included adjectives. To provide context for words, the example sentences of the target words were obtained from online dictionaries. The target words were LOLL, ARCANE, SAVVY, FLOUT, CANNY, CHALET, BEGUILLE, DINGY, PEEVE, SWIG, FICKLE, MORGUE, GOOF, SENILE, PRANK. The target vocabulary items have good internal consistency, with a Cronbach alpha coefficient¹ as shown in Table 1.

¹ Cronbach's alpha above .7 is considered acceptable, and α above .8 indicates good internal consistency.

TABLE 1
Reliability of the Target Vocabulary Items

Condition	Test type	Number of items	Alpha
Separated	Comprehension	15	.74
	Production	15	.78
Integrated	Comprehension	15	.88
	Production	15	.91

Note. Separated: spaced encounters in separated contexts, Integrated: massed encounters in an integrated context

The design of the study entails two different ways of word encounters. That is, the various contexts of words were presented either separately with intervals (Condition 1: spaced encounters in separated contexts) or in a lump (Condition 2: massed encounters in an integrated context). Table 2 shows the example.

TABLE 2
Presentation of Contexts

Target word	Condition	Presentation of contexts
MORGUE (7 encounters)	Separated	<ol style="list-style-type: none"> 1. After a person dies, the person's body is often placed in a morgue. 2. Occasionally, the body needs to be identified by family members in a morgue as well. 3. Last year, a dead body wrapped in a plastic bag was taken off to the morgue. 4. The mystery man in the morgue was not identified. 5. In the morgue, there were several dead men remained unidentified. 6. One night the morgue staff dropped something and it made a loud noise. 7. Suddenly one of the dead men woke up in the morgue 24 hours after being pronounced dead.
	Integrated	<p>After a person dies, the person's body is often placed in a morgue. Occasionally, the body needs to be identified by family members in a morgue as well. Last year, a dead body wrapped in a plastic bag was taken off to the morgue. But the mystery man in the morgue was not identified. In the morgue, there were several dead men remained unidentified. One night the morgue staff dropped something and it made a loud noise. Suddenly one of the dead men woke up in the morgue 24 hours after being pronounced dead.</p>

Note. Separated: spaced encounters in separated contexts, Integrated: massed encounters in an integrated context

To explore the number of word encounters required for successful comprehension and

production, the participants encountered the target words with different number of times. Among only a few studies conducted in the frequency scale up to ten encounters, the present study adopted Webb's (2007) scale of 1, 3, 7, 10 encounters and additionally included 5 encounters as shown in Table 3.

TABLE 3
Frequency Scales of Word Encounters

	Verb	Adjective	Noun
Encounter 1	LOLL	ARCANE	SAVVY
Encounter 3	FLOUT	CANNY	CHALET
Encounter 5	BEGUILE	DINGY	PEEVE
Encounter 7	SWIG	FICKLE	MORGUE
Encounter 10	GOOF	SENILE	PRANK

The participants in the group of separated presentation were exposed to each context of the target word with the designated number of times with 10 minute intervals while those in the integrated presentation group encountered the words with the same number of times but in one paragraph. For example, the word designated for 'Encounter 10' was encountered in 10 different sentences in either separately with spacing or in an integrated paragraph as a whole. The learners experienced the same number of repetitions in both conditions. The only difference between the two conditions is the presentation method being either separated with spacing or integrated.

The learners were allowed to use English-Korean dictionary to understand word meanings and an equal amount of exposure time was allocated to both groups.

After the word encounters, the participants' vocabulary knowledge was evaluated. In the comprehension test, the learners were asked to write the meaning of the target words in their L1 (e.g., What is the meaning of the word *arcane*?). For the productive vocabulary knowledge, Nation's (2001b) format of the productive levels test was adopted. One minute for one word was allocated as suggested in Lee, Joonwon (2016). The example is as follows.

Loll	
Bawl	_____ to lie or sit in a relaxed way
Arcane	_____ mysterious and known only by a few people
Jaded	_____ practical knowledge and ability
Savvy	
Amnesia	

3. Data Collection and Analysis

First, the answers in each test were organized using Microsoft Excel program. Second, the data were fed to the statistics program SPSS 24. Third, to compare the participants' vocabulary knowledge in English comprehension and production in two different word encounter conditions, independent *t*-test was used. Fourth, in the 'separated presentation' condition, ANOVA was used to compare the participants' vocabulary knowledge among different number of encounters.

IV. RESULTS

1. Condition 1: Spaced Encounters in Separated Contexts

In the condition of 'spaced encounters in separated contexts', each sentence containing the target word was presented with 10 min spacing. The sentences for the target word were different in each encounter so that the learners could experience various contexts for each target word.

TABLE 4
Test Scores according to the Number of Encounters (Condition 1)

Testtype	N=50	Encounter 1	Encounter 3	Encounter 5	Encounter 7	Encounter 10	Total
Comprehension test	M	1.58	2.30	2.64	2.94	2.80	2.45
	SD	1.16	0.99	0.66	0.24	0.49	.92
Production test	M	1.82	2.22	2.44	2.90	2.90	2.46
	SD	1.27	1.13	0.88	0.46	0.36	.98

Table 4 shows the vocabulary knowledge in the comprehension and the production test in the condition of 'spaced encounters in separated contexts'. The vocabulary learning improves until it reaches Encounter 7 both in the comprehension (M=1.58, SD=1.16 in Encounter 1 to M=2.94, SD=0.24 in Encounter 7) and the production tests (M=1.82 in Encounter 1 to M=2.90, SD=0.46 in Encounter 7).

TABLE 5
Difference of Test Scores among the Different Number of Encounters

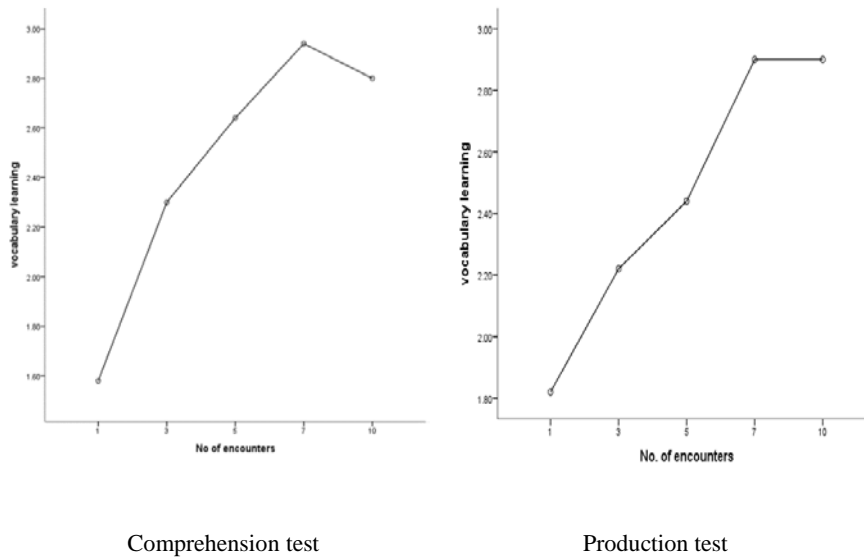
Encounter	Comprehension test		Production test		
	Mean difference	SD	Mean difference	SD	
Encounter 1	3	-.72*	.16	-.40	.18
	5	-1.06*	.16	-.62*	.18
	7	-1.36*	.16	-1.08*	.18
	10	-1.22*	.16	-1.08*	.18
Encounter 3	1	.72*	.16	.40	.18
	5	-.34	.16	-.22	.18
	7	-.64*	.16	-.68*	.18
	10	-.50*	.16	-.68*	.18
Encounter 5	1	1.06*	.16	.62*	.18
	3	.34	.16	.22	.18
	7	-.30	.16	-.46	.18
	10	-.16	.16	-.46	.18
Encounter 7	1	1.36*	.16	1.08*	.18
	3	.64*	.16	.68*	.18
	5	.30	.16	.46	.18
	10	.14	.16	.00	.18
Encounter 10	1	1.22*	.16	1.08*	.18
	3	.50*	.16	.68*	.18
	5	.16	.16	.46	.18
	7	-.14	.16	.00	.18

As shown in Table 5, ANOVA (a one-way between-groups analysis of variance) was conducted to compare the difference of test scores among the different number of encounters. Regarding the vocabulary knowledge in the comprehension test, since the assumption of homogeneity of variances has been violated ($p < .05$), Welch's adjusted F ratio was obtained. There was a statistically significant difference at the $p < .05$ level in scores among different frequency of encounters (Welch's $F(4, 112) = 21.32$, $p < .001$). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Encounter 1 ($M = 1.58$, $SD = 1.16$), Encounter 3 ($M = 2.30$, $SD = 0.99$), Encounter 7 ($M = 2.94$, $SD = 0.24$) were significantly different from one another.

With regard to the production test, Welch's adjusted F ratio was obtained since the assumption of homogeneity of variances has been violated ($p < .05$). There was a statistically significant difference at the $p < .05$ level in scores among different frequency of encounters (Welch's $F(4, 116) = 13.99$, $p < .001$). Post-hoc comparisons using the Tukey HSD test indicated that Encounter 1 ($M = 1.82$, $SD = 1.27$) was significantly different from Encounter 5 ($M = 2.44$, $SD = 0.88$), 7 ($M = 2.90$, $SD = 0.46$), and 10 ($M = 2.90$, $SD = 0.36$).

respectively. It also indicated that Encounter 3 ($M=2.22$, $SD=1.13$) was significantly different from Encounter 7 ($M=2.90$, $SD=0.46$), and 10 ($M=2.90$, $SD=0.36$) respectively.

FIGURE 1
Vocabulary Learning and Frequency of Encounters



As shown in Figure 1, frequency effect of word encounters on vocabulary learning in the condition of 'spaced encounters in separated contexts' can be observed. However, after Encounter 7 the advancement of vocabulary learning reaches a plateau in the production test and even regresses in the comprehension test.

2. Condition 2: Massed Encounters in an Integrated Context

The learners in this condition encountered the target words in a passage which involved various contexts of the target words in an integrated way. For example, the word that was designated for Encounter 10 appeared 10 times in the passage. Therefore the learners were provided with different passages for each word and the repetition of the word in the passage was based on the designated number of encounters.

TABLE 6
Test Scores according to the Number of Encounters (Condition 2)

	N=48	Encounter 1	Encounter 3	Encounter 5	Encounter 7	Encounter 10	Total
Comprehension test	M	1.00	1.54	1.42	2.79	2.79	1.91
	SD	1.17	1.30	1.30	0.46	0.46	1.25
Production test	M	1.33	1.69	1.58	2.33	2.73	1.93
	SD	1.37	1.37	1.40	1.06	0.61	1.30

Table 6 shows the test scores of the comprehension and the production test in the condition of ‘massed encounters in an integrated context’. Overall, the vocabulary learning improved as the number of encounters increased with slight fluctuation both in the comprehension test (M=1.00, SD=1.17 in Encounter 1 to M=2.79, SD=0.46 in Encounter 10) and in the production test (M=1.33, SD=1.37 in Encounter 1 to M=2.73, SD=0.61 in Encounter 10).

TABLE 7
Difference of Test Scores among Different Number of Encounters

Encounter	Comprehension test		Production test		
	Mean difference	SD	Mean difference	SD	
Encounter 1	3	-.54	.21	-.35	.25
	5	-.42	.21	-.25	.25
	7	-1.79*	.21	-1.00*	.25
	10	-1.79*	.21	-1.40*	.25
Encounter 3	1	.54	.21	.35	.25
	5	.13	.21	.10	.25
	7	-1.26*	.21	-.65	.25
	10	-1.26*	.21	-1.04*	.25
Encounter 5	1	.42	.21	.25	.25
	3	-.13	.21	-.10	.25
	7	-1.38*	.21	-.75*	.25
	10	-1.38*	.21	-1.14*	.25
Encounter 7	1	1.79*	.21	1.00*	.25
	3	1.26*	.21	.65	.25
	5	1.38*	.21	.75*	.25
	10	.00	.21	-.40	.25
Encounter 10	1	1.79*	.21	1.40*	.25
	3	1.26*	.21	1.04*	.25
	5	1.38*	.21	1.14*	.25
	7	.00	.21	.40	.25

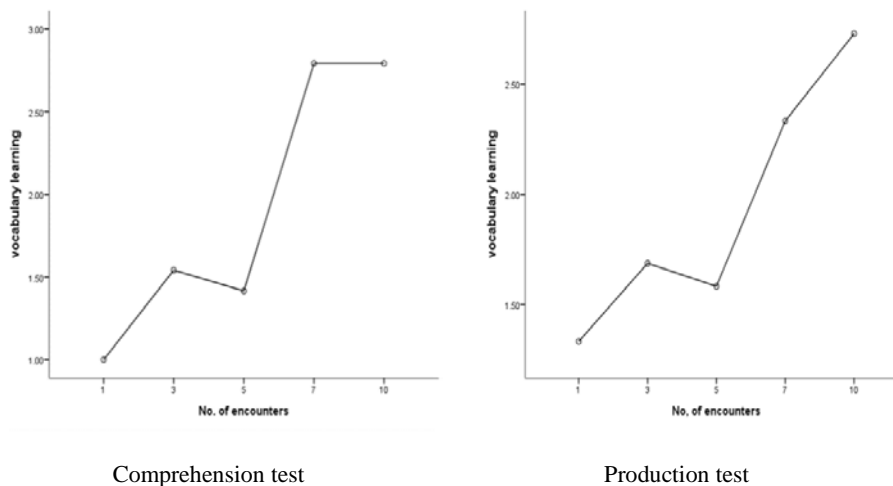
As shown in Table 7, ANOVA (a one-way between-groups analysis of variance) was

conducted to compare the difference of test scores among different number of encounters. In the comprehension test, since the assumption of homogeneity of variances has been violated ($p < .05$), Welch's adjusted F ratio was obtained. There was a statistically significant difference at the $p < .05$ level in scores among different frequency of encounters (Welch's $F(4, 112) = 43.30$, $p < .001$). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Encounter 7 ($M = 2.79$, $SD = 0.46$) was significantly different from Encounter 1 ($M = 1.00$, $SD = 1.17$), Encounter 3 ($M = 1.54$, $SD = 1.30$), and Encounter 5 ($M = 1.42$, $SD = 1.30$) respectively.

Regarding the production test, Welch's adjusted F ratio was obtained since the assumption of homogeneity of variances has been violated ($p < .05$). There was a statistically significant difference at the $p < .05$ level in scores among different frequency of encounters (Welch's $F(4, 112) = 17.15$, $p < .001$). Post-hoc comparisons using the Tukey HSD test indicated that Encounter 7 ($M = 2.33$, $SD = 1.06$) and 10 ($M = 2.73$, $SD = 0.61$) were significantly different from Encounter 1 ($M = 1.33$, $SD = 1.37$) and Encounter 5 ($M = 1.58$, $SD = 1.40$) respectively. It also indicated that Encounter 3 ($M = 1.69$, $SD = 1.37$) was significantly different from Encounter 10 ($M = 2.73$, $SD = 0.61$).

FIGURE 2

Vocabulary Learning and Frequency of Encounters



As shown in Figure 2, the improvement of vocabulary learning reaches a plateau at Encounter 7 in the comprehension test. However it continues to increase in Encounter 10 in the production test.

3. Comparisons between the Two Conditions

TABLE 8
Comparisons of Test Scores Between Two Conditions

	Condition 1 Separated (N=50)		Condition 2 Integrated (N=48)		p.	<i>t</i>	df	d
	M	SD	M	SD				
Comprehension test	12.26	2.55	9.00	4.26	.00	4.57*	76	.18
Production test	12.28	2.81	9.67	4.69	.00	3.33*	76	.10
Total	24.54	5.07	18.67	8.78	.00	4.03*	75	.14

In Table 8, an independent *t*-test was conducted to compare the vocabulary learning between the two conditions. In the comprehension test, there was a significant difference in the condition of ‘spaced encounters in separated contexts’ (M=12.26, SD=2.55) and the condition of ‘massed encounters in an integrated context’ [M=9.00, SD=4.26; $t(76)=4.57$, $p=.00$]. The magnitude of the differences in the means was small (eta squared=.18).

In the production test, there was a significant difference in the ‘spaced encounters in separated contexts’ (M=12.28, SD=2.81) and ‘massed encounters in an integrated context’ [M=9.67, SD=4.69; $t(76)=3.33$, $p=.00$]. The magnitude of the differences in the means was small (eta squared=.10).

Regarding overall vocabulary learning which was evaluated in both tests, there was a significant difference in the ‘spaced encounters in separated contexts’ (M=24.54, SD=5.07) and ‘massed encounters in an integrated context’ [M=18.67, SD=8.78; $t(75)=4.03$, $p=.00$]. The magnitude of the differences in the means was small (eta squared=.14).

V. DISCUSSION

1. How many encounters of a word are necessary?

The importance of frequent word encounters for vocabulary learning has long been stressed (e.g., Horst et al., 1998; Laufer & Rozovski-Roitblat, 2011; Pellicer-Sánchez & Schmitt, 2010; Webb & Chang, 2014). Furthermore Barcroft (2015) pointed out that the frequency effect of word encounters far outweighs the effect of increased interval length.

The findings of the present study are in line with the results from previous research (Brown et al., 2008; Pigada & Schmitt, 2006; Waring & Takaki, 2003; Webb, 2007). The learners' vocabulary knowledge advanced as the number of encounters increased. However, the number of encounters for distinctive effect is higher than two to three repetitions in Vidal (2011) and six encounters in Rott's study (1999), while lower than ten encounters were found in Pigada and Schmitt (2006) and Webb (2007). It should be noted that simple comparisons with previous research may not be telling and perhaps tangential since different task types and repetition methods are used in the present study. As such, this study did not promote incidental vocabulary learning through extensive reading as in Rott's study (1999) and Webb (2007) nor it used simple L1-L2 pairs for vocabulary learning.

The frequency effect was found both in the condition of 'spaced encounters in separated contexts' and in the condition of 'massed encounters in an integrated context'. The effect was present both in the comprehension and the production tests, with no significant difference of vocabulary knowledge between the tests. It may be presumed that the production test (adopting the format of the productive levels test in Nation, 2001b) where they may infer the answer from the provided word examples was not so cognitively demanding as the comprehension test which required the learners to write the meaning in the L1 without any examples.

It should be noted that the present study utilized more elaborated frequency spans from Encounter 1 to 10. The frequency effect became neutralized after Encounter 7 in both the comprehension and the production tests in the 'spaced encounters in separated contexts' and the comprehension test in 'massed encounters in an integrated context'. The only increase after Encounter 7 ($M=2.33$ in Encounter 7 to $M=2.73$ in Encounter 10) was observed in the production test in the condition of 'massed encounters in an integrated context'; however, it was not statistically significant. These findings suggest that 7 times of word encounters in either separated or integrated contexts is desirable for English learners in Korea.

2. How should the contexts of a word be presented?

The present study suggests the desirable number of word encounters for Korean L2 learners. However, there are more important pedagogical issues regarding how the word encounters should be implemented. In recognition of the limitations of the previous research which has focused on either the frequency or spacing of repetitions, the present study incorporated frequency and spacing of word encounters, and more importantly the presentation of contexts. Therefore it compared the spaced encounters in separated contexts with the massed encounters in an integrated context. Rather than providing the

same context of the target word for repetitions as in previous studies, the participants were exposed to different contexts for each encounter in the study. The study confirmed that the spaced encounters in separated contexts may be more effective than the massed encounters in an integrated context for promoting vocabulary learning both in the L2 comprehension and production.

Regarding the spacing effect, as Pavlik and Anderson (2005) suggested, it can be well explained in the activation-based memory model. In connectionist models (Ellis & Humphreys, 1999; Haastrup & Henriksen, 2000; Levine, 2000), each time a word is encountered the activation level increases but it gradually decreases. If additional encounters are attempted before the activation level declines significantly, the activation level required for the word to be accessed can be maintained. This may suggest to English educators that repetitive exposure (ideally seven times according to the results) to the target English word should be provided before the nodal activation of the word dissipates in the learners' mental lexicon.

Concerning the context effect, in the condition of 'the spaced encounters in separated contexts' the contexts of the target word were presented at a sentence level, while in the condition of 'the massed encounters in an integrated context' the repeated encounters were made in a richer context at a discourse level. The results suggest that the effect of the spaced encounters overrode the effect of rich context. It may be assumed that the sentence level of context in the condition of 'the spaced encounters in separated contexts' already fulfilled the requirement of vocabulary learning and thus the effect of discourse level of context was not dramatic.

VI. CONCLUSION

Due to the limited resources and pedagogical constraints in the EFL context, incidental vocabulary learning through extensive reading and high-level tasks such as writing an English summary with the target words may not be realized in English classes in Korea. As such, vocabulary learning still seems to be limited to building lexical associations between the L1 and the L2 translation equivalents.

The present study explored a more effective way of vocabulary learning in relation to the frequency of word encounters and the presentation of contexts. From the comparisons among 1, 3, 5, 7, 10 encounters, this study confirmed the positive effect at 7 times of encounters on vocabulary learning. The advantage of the 'spaced encounters in separated contexts' over the 'massed encounters in an integrated context' was also found.

Suffice to say that learner autonomy should be highly regarded in vocabulary learning; however it does not justify any instructor's complacency that repeated encounters of L2

words can be left entirely to the discretion of the learners or can be achieved through homework assignment. The following pedagogical implications can be derived from the current research findings: First, new English words should be presented above a lexical level such as L1-L2 translation equivalents. Second, English learners should be provided with approximately seven different examples of the target word. Corollary to this, it would seem effective for the examples to be presented separately in seven different exposures.

Since the present study did not include other factors such as L2 proficiency, learners' motivation, and learning styles, it would be germane to take a more comprehensive approach in the investigation of these factors in future research undertakings.

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Examples in: English

Applicable Language: English

Applicable Level: Tertiary

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