

Effects of Word Frequency on Incidental Vocabulary Learning under Tasks with the Same Involvement Load

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ABSTRACT

Most researches of the involvement load hypothesis have investigated the effect of incidental vocabulary learning with different tasks involvement load, and there is a relative lack of studies that analyze incidental vocabulary learning from the perspectives of word frequency. To investigate the effect of incidental vocabulary learning of junior high school students, the study controlled the involvement index and conducted an empirical study on word frequency. The results of the immediate test and the delayed test showed that word frequency (twice, four times, and six times) had a certain effect on incidental vocabulary learning under equal involvement load, and the word frequency rates were proportional to the effect of incidental vocabulary learning. However, in the delayed test, the data analysis showed that there was no significant difference between the scores obtained by subjects exposed to different word frequencies. Therefore, in vocabulary teaching and learning, we should pay attention to the role of word frequency in incidental vocabulary learning on the one hand, and consider the influence of time factor on vocabulary learning on the other.

Keywords: *involvement load hypothesis, tasks with the same involvement load, word frequency, incidental vocabulary learning*

1. INTRODUCTION

The importance of vocabulary knowledge cannot be overstated. As Milton^[1] argues, a goal of language learning had to be building a vocabulary large enough to communicate successfully. But how learners effectively acquire vocabulary knowledge, or in what way, has been the focus of researchers.

Incidental vocabulary learning is one of the most researched ways of vocabulary knowledge in recent years. For the definition of it, Laufer^[2] argues that incidental vocabulary learning, different from intentional vocabulary learning, refers to students' unintentional learning while completing other tasks.

A number of experimental results have been conducted on incidental vocabulary learning to confirm its effectiveness (e.g., Laufer & Hulstijn^[3]; Gai, Shuhua^[4]; Miao, Lixia^[5]; Li, Lingling^[6], etc.). However, the question of which perspective can help learners improve the effectiveness of incidental learning of vocabulary has not been uniformly recognized. The

Involvement Load Hypothesis (ILH) was put forward by Laufer & Hulstijn^[3] based on the task load, and they argued that tasks with higher involvement load resulted in better incidental vocabulary learning. Since the hypothesis was proposed, most researches of the ILH have investigated the effect of incidental vocabulary learning with different tasks involvement load, but there is a relative lack of studies that analyze incidental vocabulary learning from the perspectives of word frequency. Therefore, this study investigates the effect of incidental vocabulary learning by controlling the total amount of task involvement load and conducting an empirical study on word frequency.

2. LITERATURE REVIEW

Laufer & Hulstijn^[3] pointed out that the task involvement load can be measured by three factors: need, search, and evaluation. Among them, need belongs to the affective dimension, which refers to motivational factors; search and evaluation belong to the cognitive dimension. Under each factor, it can be further divided into multiple

levels due to the different ways in which learners process the task. For example, the need factor, when a task triggers an internal demand of the learner, the need at that time is the intensity (noted as ++), and when the learner completes the task out of an external demand, the need at that time is moderate (noted as +); if the learner is given the meaning of a new word, there is no search (noted as -), and if the learner finds the meaning of an unknown word by looking it up in the dictionary or asking the teacher, etc., there is a search (noted as +); if the learner compares the target word with other words in order to find the word meaning that best fits the given context, the evaluation is the moderate one (notated as +), and if the learner is asked to make a sentence or write with the given target word, the evaluation is an intensity one (notated as ++). If neither of these conditions exists, then there is no evaluation (noted as -). According to the ILH, the sum of the degrees of the three factors is called the task involvement load, and the number is called the involvement index. The hypothesis holds that the task involvement load is proportional to the effect of incidental vocabulary learning.

Since the involvement load hypothesis was proposed, it has triggered a large number of empirical studies (e.g., Laufer & Hulstijn^[3]; Keating^[7]; Kim^[8]; Nassaji & Hu^[9]; Hazrat^[10]; Wu Xudong^[11]; Li, Tianyi & Wang, Qi^[12]; Liu, Zhen^[13], etc.), but to some extent it has also been questioned on some issues (Yu, Qingping^[14]). Some of these issues are categorized as questioning the variables that affect the predictive power of the involvement load hypothesis (i.e., time on task, learners' levels of proficiency, the frequency of the learner's exposure to the vocabulary).

Firstly, many scholars have different opinions on whether time on task has any effect on the predictive ability of the ILH. Laufer and Hulstijn^[3] argued that tasks with more involvement load would take a lot of time; accordingly, tasks with less involvement load would take a small amount of time, therefore, the variable of task time should be left out of consideration. However, Keating^[7] pointed out in a related study that the time consumed to complete the task may affect the effectiveness of the task and lead to misinterpretation of the results. Then whether learners' levels of proficiency affect the predictive of the hypothesis, Kim^[8] showed in his study that the effect of task involvement on vocabulary learning was not affected by learner proficiency, and Yanagisawa and Webb^[15] confirmed this in their meta-analysis of the ILH. As for word frequency, Yanagisawa and Webb excluded the advantage of those factors on vocabulary learning in their meta-analysis, but at the same time they encouraged more researchers to investigate them.

To sum up, the ILH has a significant role for incidental vocabulary learning (Ren, Hulin & Liu, Yaling^[16]). However, the effects of word frequency on

incidental vocabulary learning still need to be further explored. Based on this, the present study will investigate the effects of word frequency on incidental vocabulary learning.

3. METHOD

3.1. Research Questions

To achieve the purpose of the study, two research questions can be set up as follows:

1. What is the effect of different frequencies (twice, four times, and six times) on incidental vocabulary learning in the immediate test under the equal involvement load?

2. What is the effect of different frequencies (twice, four times, and six times) on incidental vocabulary learning in the delayed test under the equal involvement load?

3.2. Research Method

3.2.1. Research Subjects

The subjects were students of Dalihai Junior High School in Shanxian, Shandong Province. 30 students with English scores between 90-110 (out of 120) were randomly selected according to the results of the first monthly examination in the second semester. A one-way ANOVA was conducted on the subjects' monthly exam scores ($p=.903>0.05$), whose results showed no significant difference in their English proficiency.

3.2.2. Research Materials

As for reading materials, the difficulty of the texts should match the cognitive development level of the subjects. The reading materials were selected from *The Adventures of Robinson Crusoe* by Daniel Defoe as the test text. To help the participants understand the text, complex words were replaced with simple words (e.g., beasts were replaced with animals). In addition, the reading text was analysed using the software Vocabulary Profiler, and the results showed that about 91.43% of the words belonged to the range of 1-1000 words and about 6.94% of the words fell within the basic vocabulary of 1000-2000. According to the curriculum standard, the difficulty of the text was in line with the subjects' cognitive level.

For the selection of target words, 15 students of the same level and not participating in the experiment were asked to read the materials before the experiment and were asked to mark the words they found difficult to comprehend. After that, according to the vocabulary list of the PEP (go for it), the words that students must master at the junior high school level were selected from these

marked unknown words to be the target words, a total of six words, namely gun, island, ship, tool, kill, mark.

To test the effect of word frequency on incidental vocabulary learning, two experienced English teachers were invited to modify the reading materials so that the target words were presented at different word frequencies, and words that appeared in the text twice were called low frequency words, four times were called medium frequency words, and six times were called high frequency words. The revised reading material had 240 words and did not affect the original meaning of the text. The frequency distribution of target words in the text was as follows.

	Word	frequency/times
low frequency words	mark	2
	tool	2
Medium frequency words	gun	4
	island	4
high frequency words	ship	6
	kill	6

Figure 1 Target words and their frequency

Task design: subjects were asked to select words to fill in the blanks, i.e., they were asked to select appropriate target words to complete the sentences, and each target word was required to be used only once. Subjects read the text to fill in the blanks, where the teacher gave instructions to make full use of the annotated word meanings for text comprehension, and subjects were asked not to refer to the text when performing the word selection task. According to the ILH, the involvement index for this task was 2 (moderate demand, no search, moderate assessment). After reading the text material, a vocabulary test was administered.

Components	Gap-filling exercise		
	Low frequency words	Medium frequency words	High frequency words
Need	+	+	+
Search	-	-	-
Evaluation	+	+	+
Involvement index	2	2	2

Figure 2 Task involvement load index

3.2.3. Vocabulary Test and Scoring Method

The vocabulary test included word meaning test and word form test. Three sets of test papers were prepared according to the target word frequency, and each set of papers contained two parts: the first part was the word meaning test and the second part was the word form test. Those two parts were tested separately. Each set of papers had four questions, one point for each question, total four points. The scoring of the word meaning test

was 1 point for correct interpretation, 0.5 point for partial correct interpretation, and 0 point for the rest of other situations; the scoring of the word form test was based on Schmitt’s “three-level scoring system”: 1 point for correct spelling; 0.5 points for writing only one letter incorrectly (gun-gan*) or for writing a word that is pronounced the same as the target word but with a difference in spelling (bizarre-bizzare*); 0 points for the rest.

3.2.4. Experimental Steps

The teacher distributed the modified reading materials to the subjects and asked our subjects to read the articles with a time limit of five minutes. Immediately after the reading of the article was completed, the material was retrieved and a word choice task was administered. Before the task began, the subjects were not informed that there was a word choice test, the purpose of which was to avoid having the subjects deliberately engage in vocabulary recognition during the reading. Immediately after the task, the teacher administered a vocabulary test to the subject in the following manner.

- a) Issue test paper (I), the subjects were asked to fill in the Chinese meaning of the words in the blank space after the target words. After 3 minutes, the word meaning test paper was withdrawn and the word form test paper was issued, which required the subjects to translate and write English according to the Chinese meaning of the target word, and withdrawn after 3 minutes.
- b) Issue test paper (II), the requirements of which are the same as those of test paper (I).
- c) Issuance of test papers (III), same requirements as above.

The delayed test was conducted in class one week later, and the content and procedure of the test were the same as those of the immediate test. In order to avoid the test effect of the subject, the number of questions in papers (I), (II) and (III) was changed when the delayed test was administered.

4. RESULTS AND DISCUSSION

4.1. Results

The test results are shown in figure 3. The subjects in the high frequency vocabulary group have the highest averages in the immediate and delayed tests, 1.583 and 1.150, respectively; the subjects in the medium frequency vocabulary group have lower mean averages in both tests, 0.950 in the immediate test and 0.650 in the delayed test; the subjects in the low frequency vocabulary group have the lowest averages in both post-tests, 0.850 in the immediate test and 0.567 in the delayed test scores.

Repeated measures ANOVA is performed on the data using SPSS (24.0). The one-way within-group ANOVA sphericity assumption test table for the immediate test shows that $p=.530 > .05$, and the one-way within-group ANOVA sphericity assumption test p-value for the delayed test is $.538 > .05$, indicating that the data obtained from both the immediate and delayed tests meet the sphericity assumption and are suitable for one-way within-group ANOVA, and the results of the one-way within-group ANOVA multiple comparison test are shown in figure 4. On the immediate test, there is a significant difference between the performance of subjects in the low- frequency vocabulary group and the high frequency vocabulary group ($p=. 031 < .05$), but in the delayed test, there is no significant difference between the low frequency vocabulary group subjects' performance and the high frequency vocabulary group subjects' performance ($p=. 085 > .05$). In both post-tests, there is no significant difference between the low frequency vocabulary group and the medium frequency vocabulary group, with a p-value of 1.000 for both the immediate and delayed tests; there is a significant difference between the medium frequency vocabulary group and the high frequency vocabulary group with a p-value of $.042 < .05$ for the immediate test, but a p-value of $.078 > .05$ for the delayed test, which is not significantly different. (See figure 4 and 5).

Frequency/times	Number	Immediate Test		Delayed Test	
		Mean	Std.	Mean	Std.
Low frequency words (twice)	30	0.850	1.0268	0.567	0.9260
Medium frequency words (four times)	30	0.950	1.0116	0.650	0.8110
High frequency words (six times)	30	1.538	1.1302	1.150	1.1076

Figure 3 Descriptive statistics of three groups vocabulary scoring

Frequency/times	Frequency/times	Mean Difference (I-J)	Std.Error	Sig.
Low frequency words	Medium frequency words	-.100	.291	1.000
	High frequency words	-.733*	.268	.031
Medium frequency words	High frequency words	-.633	.242	.042

*The mean difference is significant at the 0.05 level.

Figure 4 Multiple comparison test in the immediate test

Frequency/times	Frequency/times	Mean Difference (I-J)	Std.Error	Sig.
Low frequency words	Medium frequency words	-.083	.235	1.000
	High frequency words	-.583	.253	.085
Medium frequency words	High frequency words	-.500	.213	.078

*The mean difference is significant at the 0.05 level.

Figure 5 Multiple comparison test in the delayed test

4.2. Discussion

The data of this study shows that as the frequency of vocabulary reproduction increases, the vocabulary acquired by the subject also increases. When the target words are reproduced twice, the effect of the incidental vocabulary learning is almost no different from that after the vocabulary is reproduced four times. But when the target words are repeated six times, the amount of vocabulary incidentally acquired by the subjects is significantly higher than the former two. This is mainly because when the subjects are exposed to the target words, their attention to the target words increases invisibly as the frequency of word repetition increases, and this input attention provides the conditions for the subjects to extract the target words. This is also consistent with the Noticing Hypothesis proposed by Schmidt.

Comparing the data from the two post-tests, the results shows that the subjects incidentally learn less vocabulary in the delayed test. Although subjects' performance remains proportional to the frequency of vocabulary recurrence, after data analysis, there is no significant difference between the two groups' performance when the target words are recurred two times versus when the target words are repeated six times. The reason for this is that after a week of vacancy, the subjects have less access to the target words and have forgotten the meanings and forms of the target words, and when the subjects are tested again, their scores will decrease to a certain extent, which is reflected in the incidental vocabulary learning. In addition, the effect of incidental learning of low frequency vocabulary is less significant and less effective than the effect of incidental learning of high frequency vocabulary in both tests. After one week, the subjects are tested again, and the effect of incidental acquisition of high frequency vocabulary is greatly reduced due to cognitive factors such as memory forgetting and concept loss, while the effect of these factors on incidental learning of low frequency vocabulary is less. Therefore, SPSS (24.0) is used to analyze the subjects' low frequency vocabulary scores versus high frequency vocabulary scores, and its results shows that there is no significant difference between them.

5. CONCLUSION

This study investigates the effect of different word frequencies on the effect of incidental vocabulary learning from the perspective of the ILH. One the one hand, the results find out that the effect of incidental vocabulary learning in the high frequency vocabulary group is better than that in the low frequency and medium frequency vocabulary groups under tasks with the same involvement load, further confirming the positive role of word frequency in vocabulary incidental learning. The implication of this result for foreign language vocabulary teaching is that in the teaching process, foreign language teachers should constantly repeat the vocabulary that should be mastered by learners at the stage of compulsory education as well as high school education, and consciously cultivate them to pay attention to those words.

On the other hand, the analyzed data shows that the effect of incidental vocabulary learning will slowly decrease over time as the subjects are exposed to very few target words. This also confirms the Ebbinghaus Forgetting Curve proposed by Ebbinghaus. Therefore, in vocabulary teaching, we should not only consider the influence of word frequency on vocabulary incidental acquisition, but also consider the combination of word frequency factor and time factor to ultimately improve learners' incidental learning efficiency.

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