

The effect of frequency of occurrence of lexical items in incidental vocabulary learning

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Abstract

This study attempts to examine incidental vocabulary instruction in terms of learners' frequency of encounter with target lexical items. A text containing target words with different occurrence frequencies was selected. Five frequency bands were created based on the occurrence frequencies of words. Subjects were asked to read the text guessing the meaning of the words with the help of contextual cues. Learners' retention of unknown words from five frequency bands was measured using immediate and delayed post test. The test included three sections: a recognition test, a multiple choice test and a translation test. Correct answers were analysed to see whether there exists differences in retention of words from various frequency bands.

Keywords: Vocabulary instruction, incidental vocabulary teaching, word retention, input frequency.

1. INTRODUCTION

The question of how language learners can be helped to learn vocabulary in instructed language context effectively has recently become the focus of the attention for many teaching practitioners and researchers alike. This recent interest in vocabulary teaching/learning has increased to such an extent that in some cases it has taken precedence over the grammar teaching, which has traditionally been the mainstay of language instruction. Now it can be seen that large majority of language teaching materials includes activities designed to help learners learn L2 vocabulary. A close look into recent language teaching textbooks would show that vocabulary teaching tasks are incorporated into textbooks alongside grammar tasks. It is a good sign that vocabulary teaching is not neglected any more in the field. However, as it has been the case for the teaching of grammar, methodological considerations still arise as to how vocabulary should be taught effectively. Some pertinent questions in this regard are: how should target lexical items be presented to learners or should learners encounter target lexical items in context or out of context in the form of vocabulary lists?

There exist numerous vocabulary instruction methods. These methods usually differ in terms of how they get learners process novel vocabulary. One encompassing distinction among those different ways of L2 vocabulary instruction is whether words should be taught explicitly or implicitly. According to Ellis (1994) implicit vocabulary teaching and learning involves indirect or

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incidental, whereas the explicit method involves direct or intentional methods. Within the construct of implicit teaching of L2 vocabulary, reading is usually thought as the main source of vocabulary instruction. Reading activity is usually considered as the main source of vocabulary learning as it allows learners to encounter new words in their natural context thus ensuring more naturalistic exposure to words.

When learners are engaged in reading, meaning of the new words is guessed by learners using contextual cues. This allows learners to meaningfully process new lexical items. Since they do it without conscious mental effort, vocabulary learning occurs naturally as a by-product of reading activity. For this reason, it can be said that incidental vocabulary instruction offers some advantages compared to explicit vocabulary teaching. In their review work of incidental vocabulary acquisition, Huckin and Coady (1999) assert that since the novel L2 words appear in naturally occurring contexts learners are given “a richer sense of a word’s use and meaning” (1999, p.184).

Although studies that support the benefits of reading activities as potential source for incidental vocabulary acquisition abound, some research findings do not confirm the benefits of reading as a source of vocabulary building activity. In her study of vocabulary acquisition in L2, Laufer (2003) attempts to evidence that lexical attainment in L2 does not necessarily always have come through reading. In her study with sixty university learners of English in Israel, two groups of learners were introduced to target lexical items in either explicit or implicit modes i.e. one group encountered the L2 words in reading passage and the other used these words in their own sentence constructions after explicit elaboration of the meanings. The retention test results showed that the subjects that used the words in their own sentences retained more of the target items than those who encountered the words in the reading text.

Such divergent results as to the potential benefit of reading in incidental learning of L2 words can be attributed to the way the L2 target words are presented in the reading text. The possibility that different ways of presenting the meaning of the lexical items to the learners would affect learners’ level of processing and retention of the target words in the texts was tested in a study by Watanabe (1997). He measured the effects of modifications on the organization of the reading text in L2 learners’ internalizations the target vocabulary in L2 text. He presented the target words in the reading text in various formats to various treatment groups. Depending on their assigned treatment group, the subjects were asked to read the text with appositives, marginal glosses or multiple choice glosses. The subjects in the control group, however, were not provided either of these meaning explanations. The study findings indicated that learners in all three treatment groups who read the passage with glosses retained more of the target lexical items in their memory than those in the control group who were not provided such cues as to the meaning of the target lexical items.

In order to account for the better retention results for novel lexical items from different reading tasks, some studies checked the role of learners’ level of mental effort invested in guessing the meaning of the unknown lexical items in a reading text. In one such study, Laufer and Hulstijn (2001) tested learners’ retention of target L2 words by involving them in tasks in L2 that entailed various degrees of cognitive loads. Following the treatment sessions subjects in the experimental treatment group who invested more cognitive effort into the task in the target language retained more target lexical items.

Learners’ retention of the unfamiliar lexical items encountered during reading depends on many variables. Some of these variables were already mentioned. However one of the significant factors that contribute to learners’ incidental acquisition of target L2 words is perhaps the frequency of learners’ encounter with the target lexical items during reading. The role of frequency of occurrence of unfamiliar lexical items in L2 reading contexts was put to test in some studies. Warig and Takaki

(2003) tested the role of learners' encounter rates with the target L2 words in a reading text. A fairly long graded reader was presented to 25 Japanese learners of English. The target lexical items were replaced by non-words that sounded like real English words. Subjects were asked to read the text for comprehension and try to infer the meaning of unknown words in the text. Subjects' retention of the meaning of the target lexical items was tested in three tests with certain time intervals. The results from the retention tests indicated that words that occur more frequently in the reading texts were retained better than less frequently occurring words.

In a study examining the effects of frequency of occurrence of novel words in a reading, Rot (1999) examined the role of learners' encountering rate of target lexical items on retention. Along with the frequency of occurrence, the study also examined the role of learners' inference of the meaning of target lexical items. To test her hypothesis as to the incidental retention of the novel words, 95 learners of German as a foreign language at an American university were given a reading task that involved 12 unknown lexical items. Each target lexical item was embedded in six paragraphs that developed logically around a theme. Since the meaning of the target lexical items were not provided in the reading text, the subjects had to guess the meaning of the words. Depending on the treatment conditions, some subjects were allowed to read all six paragraphs with the target lexical items occurring six times. However, some subjects were allowed to read fewer paragraphs. In order to check the subjects' retention of the target lexical items, they were given retention tests after 4th and 13th weeks. The study found that students who encountered an unfamiliar word two, four, or six times during reading demonstrated significantly more word knowledge than students who encountered the target words fewer times. The researcher also found that four encounters with unfamiliar words during reading did not result in significantly more productive and receptive word knowledge than two encounters. On the other hand, however, six encounters were found to have made significant contributions to subjects' recall of the meaning of the target words.

Frequency effect of encountering the unknown lexical items in reading was examined in a study by Zahar, Cobb, and Spada (2001). Their study was designed to measure extent to which reading in the target language fostered lexical development. In this framework, they also measured the necessary frequency threshold level of learners' incidental acquisition of target lexical items. 144 ESL learners were assigned into appropriate lexical knowledge categories based on their results from Nation's Vocabulary Levels Test. A reading test of appropriate difficulty level was compiled and presented to the subjects. Once the subjects simultaneously read and listened to the reading text, they were given a vocabulary retention test. The correct number of retention scores was calculated in relation to the lexical knowledge categories. This was done to determine the relationship between frequency of occurrence of learned words in the reading text and subjects' lexical knowledge levels. Analysis of the results indicated that frequency of occurrence of novel words was three to four times more important for beginners than it is for more advanced students. It also showed that learners who know fewer words needed to meet a new word several times before they learn it. And learners who know more words seemed able to accomplish the same amount of learning in fewer occurrences.

As can be seen in the results of the prior studies, researchers can not easily give guidelines regarding necessary threshold level for the frequency of occurrence of novel lexical items in reading texts. There are perhaps many variables that bear on L2 learners' incidental acquisition of novel lexical items in a reading text. The reason why different studies find different conclusions as to the threshold level of frequency of word occurrence for learners' incidental acquisition of vocabulary may lie in the different types of retention tests employed researches. According to Warig and Takaki (2003) inconclusive findings of various studies regarding the threshold level of learners' encounter with target lexical items are down to the type of vocabulary retention tests used in these

studies. Some researchers consider that recognition tests really measures learners' knowledge of the target lexical items. Others however are not convinced that recognition tests completely measure learners' retention of target lexical items.

Taking into account the results of the previous studies, the present study attempts to further examine learners' retention of unknown lexical items in a reading context by replicating the research design originally created by Warig and Takaki (2003) in Turkish EFL context. The study measures subjects' retention of target lexical items with respect to the frequency of occurrence of the target lexical items after a reading task. In the study lexical retention was tested through three types of retention tests. Scores from recognition, multiple choice and meaning translation tests were compared with each other in terms of consistency. In line with the purpose of the study, the research questions were formed as such;

1. To what extend does the frequency of occurrence of unknown L2 words in a reading text affects learners' retention of these words?
2. Do different types of retention tests vary in their measurement of learners' lexical knowledge of the newly encountered L2 lexical items?

2. METHOD

2.1. Participants

Fifty five intermediate level learners of English at a state university in Konya, Turkey served as subjects in the study. The subjects had been placed in their current intermediate level classes according to their scores from a placement test given prior to the commencement of their studies. At the time of the implementation of the study, the subject they were into their three months of the academic term.

2.2. Materials

A "grade 1" simplified reader was selected as reading material in the study. Since the subjects were all intermediate level learners of English, the choice of a "Stage 1" reader was deemed to provide ample cues for subjects' inferring of the unknown lexical items in the text. The storyline of the simplified reading text, "A little Princess", was simple and coherent. It was assumed that the subjects would have no difficulty in reading the story since words in the story were considered to be well below the current vocabulary levels of the subjects. In other words, the story was assumed to be easy for the subjects to read. The reader was originally intended for reading classes for beginners.

In the reading passage, 25 words were selected. The selected words, which occurred in the text with different frequencies, were replaced with invented words. The new words sounded exactly like English words so that subjects were expected to treat target words as if they were real English words which they did not learned yet. The fact that non-words were used as target L2 lexical items was to ensure that the subjects had no prior knowledge of them. In that way, the possibility of subjects' encountering target lexical items between the treatment and delayed post test period was ruled out too. Although the words were totally unfamiliar to subjects, the contextual cues were clear enough for them to easily deduce the meaning without consulting their dictionaries. Based on the frequency of occurrence of the target words, five occurrence ranges were formed. Each frequency

range contained five target words. The frequency criterion served as the main variable in the research design.

2.3. Testing Materials

Recognition Test

Subjects' recognition of the word forms was measured by asking them to find and circle the 25 target words in a list of 42 lexical items. In order to check subjects' random guessing, an additional seventeen distractor words were added to the 25 target words.

Multiple Choice Tests

The multiple choice test was formed by presenting the target words as head words and four three distractor English words along with correct English word for the target lexical item. Additionally, an "I don't know" choice was added to the four choices. The subjects were asked to circle their choices among three others.

Translation Test

In the translation test, the target words were given in a list. Next to these words in the list three answer options were provided. Subjects were allowed to give three possible interpretations of the meanings of the target words. They could either provide an exact translation of the meaning of the target lexical item or its near synonyms.

2.4. Scoring

Each correct answer to the lexical items in three types of test was scored with "1" point. The same scoring procedure was adopted in immediate and delayed tests.

2.5. Procedure

The reading sessions and testing sessions were administered in normal class hours with usual classroom teachers who were supposed to teach at the time. The subjects were not informed about the purpose of the reading session. Each subject was given a copy of the reading passage and was instructed to read and enjoy the story. No time limitation was set for the reading task. Each subject was given ample time to read through the story. When they encountered any unfamiliar words during reading task they were given the instruction that they should carry on until they infer the meaning of the new words through different contexts. Following the completion of the reading task they were given an immediate retention test. The same test was given without prior notice one week later.

The three types of test were given in strict order in that subjects were first asked to answer form recognition test, secondly multiple choice test and finally meaning translation test. By doing so, the possibility of subjects' using test items in the previous sections as recall cues was avoided.

3. FINDINGS

The number of correct answers in recognition test, multiple choice test and translation test was found and marked. Similar to the original research design each, correct answers in three test types were marked with one point. Incorrect answers were not calculated. The raw total of correct

number of answers was converted into mean scores. The same procedure was performed for immediate and delayed recall tests.

The lexical items that appeared in the reading passage with similar frequencies were categorized into five groups and corresponding correct number of answers were assessed under the same frequency categories. (See Table 1 to 5)

The data was entered into a software program called *Microsoft Excel*. With the help of the software, mean scores were found. Based on these mean scores, graphic representations were created that showed the general tendency of subjects' scores in two tests. Mean scores for each lexical item in five frequency categories were added to find the total means for the correct answers in each category. The same procedure was performed for immediate and delayed tests.

The resulting means for subjects' correct answers in three test types in both testing sessions (i.e. immediate and delayed recall tests) were analyzed with respect to the independent variables of frequency of word occurrence, immediate and delayed testing and three types of test employed in two testing sessions. The dependent variables were subjects' performance in three test types in immediate and delayed lexical retention tests.

The mean scores of subjects' correct answers to target lexical items can be seen in detail in the tables that follow.

	Immediate Test			Delayed Post Test		
	RT	MCT	TRT	RT	MCT	TRT
15-18 Group						
windle	0,87	0,36	0,27	0,78	0,33	0,3
yoot	0,95	0,3	0,56	0,34	0,38	0,57
mand	0,6	0,54	0,4	0,4	0,38	0,35
brench	0,72	0,34	0,14	0,47	0,21	0,07
mear	0,76	0,58	0,32	0,54	0,52	0,4
TOTAL	0,78	0,424	0,338	0,506	0,364	0,338

RT: *Recognit. Tests.* MT: *Multiple Choice Tests.* TRT: *Translation Tests*

Table 1: Mean scores of correct answers for words with 15-18 occurrences.

When the retention mean scores for the highest frequency word group (15-18 occurrences) are considered, it can be seen that subjects' scores vary in terms of test types. Recognition test score (RT) is higher than the two. Subjects' scores observedly fall in three test types for delayed testing.

13-14 Group	Immediate Test			Delayed Post Test		
	RT	MCT	TRT	RT	MCT	TRT
mork	0,87	0,34	0,29	0,66	0,16	0,16
cadle	0,8	0,14	0,07	0,76	0,11	0,09
smorty	0,76	0,54	0,41	0,71	0,52	0,38
Tantic	0,76	0,23	0,29	0,47	0,21	0,21
Bettle	0,72	0,21	0,12	0,61	0,19	0,19
TOTAL	0,782	0,292	0,236	0,642	0,238	0,206

RT: *Recognit. Tests.* MT: *Multiple Choice Tests.* TRT: *Translation Tests*

Table 2: Mean scores of correct answers for words with 13-14 occurrences.

When the retention mean scores for the second highest frequency word group (13-14 occurrences) are considered, it can be observed that retention scores do not vary greatly from those for highest frequency group. The retention test scores are higher for recognition test (RT) in both testing sessions. As is the case for the highest frequency group, subjects' correct responses tend to fall during delayed testing.

8-10 Group	Immediate Test			Delayed Post Test		
	RT	MCT	TRT	RT	MCT	TRT
Parrow	0,87	0,27	0,18	0,78	0,21	0,14
Jurg / s	0,85	0,81	0,69	0,83	0,71	0,64
Molden	0,81	0,4	0,3	0,61	0,33	0,21
Tring	0,67	0,25	0,16	0,4	0,19	0,16
Toker	0,76	0,34	0,23	0,5	0,23	0,19
TOTAL	0,792	0,414	0,312	0,624	0,334	0,268

RT: *Recognit. Tests.* MT: *Multiple Choice Tests.* TRT: *Translation Tests*

Table 3: Mean scores of correct answers for words with 8-10 occurrences.

The means scores for third high frequency group (8-10 occurrences) do not vary greatly from the first two group. Again, delayed testing scores are lower than immediate testing.

4-5 Group	Immediate Test			Delayed Post Test		
	RT	MCT	TRT	RT	MCT	TRT
Nase	0,8	0,2	0,07	0,5	0,19	0,04
Bick	0,5	0,07	0,03	0,35	0	0,02
Prink	0,67	0,21	0,6	0,5	0,09	0,02
Sind	0,43	0,09	0,03	0,35	0,09	0,07
Greal	0,6	0,38	0,23	0,52	0,19	0,11
TOTAL	0,6	0,19	0,192	0,444	0,112	0,052

RT: *Recognit. Tests.* MT: *Multiple Choice Tests.* TRT: *Translation Tests*

Table 4: Mean scores of correct answers for words with 4-5 occurrences.

Unlike subjects' mean scores for the first three frequency group, retention scores are obviously lower for words that occur in the text with a frequency of 4-5, suggesting a critical frequency level under which retention scores are considerable lower. Again delayed testing scores are lower than immediate test scores.

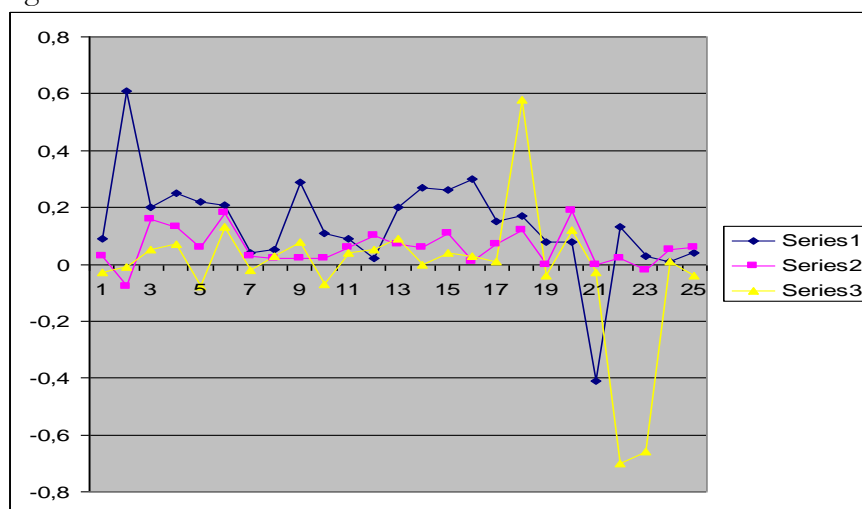
One occr. Gr.	Immediate Test			Delayed Post Test		
	RT	MCT	TRT	RT	MCT	TRT
Blund	0,25	0,32	0,2	0,66	0,32	0,23
Palk	0,36	0,09	0,01	0,23	0,07	0,71
Tance	0,5	0,12	0,05	0,47	0,14	0,71
Vack	0,36	0,12	0,05	0,35	0,07	0,04
Rimple	0,56	0,1	0,07	0,52	0,04	0,11
TOTAL	0,406	0,15	0,076	0,446	0,128	0,36

RT: *Recognit. Tests.* MT: *Multiple Choice Tests.* TRT: *Translation Tests*

Table 5: Mean scores of correct answers for words with one occurrence.

When we consider the retention scores for the lowest frequency level words (one occurrence) a decline can be seen. This indicates that when the occurrence frequency of a word in a text is lower it is not strongly recorded in memory. The immediate and delayed test scores show that retention of words are affected by the time lapse.

Graphic representation of the subjects' mean scores for three test types i.e recognition test (RT), multiple choice test (MCT) and translation test (TRT) clearly shows how recognition test scores are higher than other two test scores.

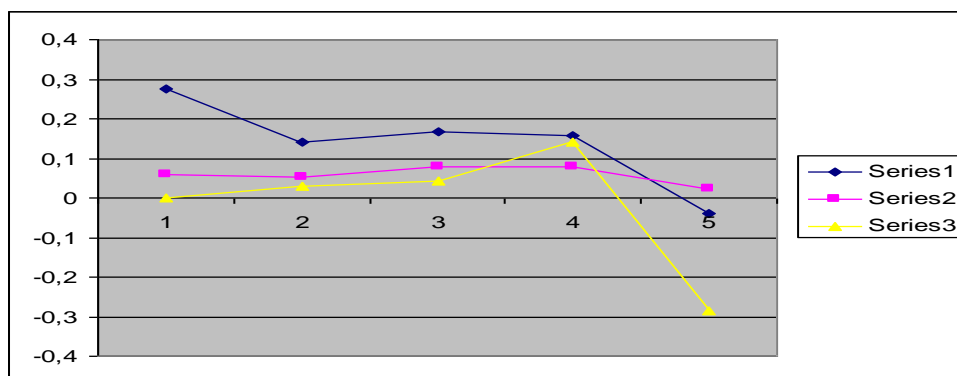


Series 1: Recognition Test. Series 2: Multiple Choice Test. Series 3: Translation Test

Fig 1: Comparison of subjects scores in immediate and delayed retention tests.

In figure 1 the numbers on the horizontal axis represents lexical items. The further we go on the horizontal axis the less frequently occurring words are represented. From left to right frequency categorizations of five words can be determined. Sharp curves of in the lines represent significant differences in subjects' performances in immediate and delayed retention tests.

Also, the graphic representation of subjects' performances in immediate and delayed tests was also created for five lexical frequency categories. The graph in figure 2 was formed by determining the total means in respective test types in two testing sessions. Once the total means were found in immediate and delayed test comparisons were performed and based on the results of comparisons the following graph was created. As in the previous graph in figure 1, the three different test types were represented differently with respect to five frequency categories.



Series 1: Recognition Test, Series 2: Multiple Choice Test, Series 3: Translation Test

Fig 2: Retention Scores for Words in Five Frequency Groups.

The figure 2 shows that test scores of subjects for three test types do not vary greatly except for translation test. As can be seen on figure 2, the translation test (TRT) scores are lower than those

for RT and MCT. This difference shows that translation involves richer word knowledge and thus calls for further elaboration of the meaning of word. For subjects to translate a word, productive language skills are needed. Hence, reading alone may not be enough.

4. DISCUSSION

The results of the analysis of subjects' correct answers to retention questions in three types of tests showed that a frequency of 4 occurrences sufficed for the subjects to retain the meaning of target lexical items. No significant difference was found between the words in 4-5 and higher frequency groups. Indicating that a subjects' four encounter with the target lexical items was enough for them to internalize the meaning of the unfamiliar lexical items.

As for the types of retention tests employed in the study we can clearly see the difference in between three types of test. Subjects performed better in the recognition test than multiple choice and translation tests. This significant difference can be noticed in the total means of subjects corrects answers in three types of test. In immediate test and delayed retention tests the recognition test total means are higher than other. This finding indicates that subjects' recognizing the form of the lexical item does not necessarily means that they have fully know the meaning of the target lexical item. This is most evident when we compare the mean scores in the recognition test with means scores in multiple choice and translation tests.

The retention scores in immediate and delayed test vary significantly across three types of tests in that while subjects performed better in the translation test module of the immediate the they failed to attain the same retention level in the delayed test. In figure 1 and 2, the sharp curve pattern of Line 3 representing difference in two translation test results around the category five on the graph means that less frequent words were translated better in the immediate test while their retention was lost in the long term. This finding can be interpreted as the positive role of frequency of occurrence of lexical items on the longer retention.

The results indicate that multiple exposures with the words has a considerable effect on learners committing newly encountered word to their memory. The positive effect of encounter frequency on word retention can be attributed to the fact that each time a words in a new context it is processed in terms of its contribution to the meaning to the new context. This allows learner to extend his available knowledge to make sense of the word in its new context. This type of input-rich processing seems to be conducive to word retention. It can thus be said learners' encountering new lexical items in different contexts should be encouraged. This can be achieved by selecting teaching materials that carefully recycles words in reading texts. The graded readers for language learners are ideally suited for this purpose as the themes revolve around particular topics and contexts. The fact that the language used in the readers are selected carefully, enable readers to guess the meaning of words with ease.

Again, the textbooks created for language teaching that recycle words at spaced intervals could optimally teach new words using encounter frequency as an effective vocabulary teaching strategy. Thus, among other factors, it can be said that a good language teaching textbook would also consider encounter frequency as one effective word attack strategy and recycle words organically in its texts rather than presenting words on ad hoc basis.

To ensure that language learners benefits from encounter frequency, language teachers should be vary of keeping track of vocabulary they introduce. For this purpose they can carefully select reading texts that contain previously encountered vocabulary items. Texts that deal with similar

subjects may help in this regard. The reading texts in the textbook can be supplemented with reading assignments that deal with the themes covered in the classroom textbooks. When L2 learners are given ample opportunities to do reading, they will cumulatively enrich their partial knowledge of words with each new encounter and eventually commit words to their memory. As the word knowledge is gained incrementally over time, a large part of learners' lexicon will be acquired incidentally, which would save the learner time spent consciously cramming for words and cognitive load.

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