

## **Effect of Spaced Repetition on Iranian EFL Learners' Form Recall of English Single Words and Collocations**

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### **Abstract**

Acquiring vocabulary has always been recognized as a significant and challenging part of language learning process. In this study, the researcher examined the extent to which form recall of target lexical items by learners of English as a foreign language (EFL) is affected by a) repetition and b) by the type of target item; single words versus collocations. The treatment consisted of non-communicative, (partly) decontextualized activities, in which the target items were taught and examined. For this purpose, 27 Iranian intermediate EFL learners were chosen and divided into two groups of A with 14 and B with 13 participants. In all activities, the participants had to supply the target items' forms. Data were collected in a classroom setting in two groups, differing only in the type of target item. In class A, the research focused on single words and in class B the focus was on collocations. A pre and post test was administered to the participants before and after the treatment. The findings show a large effect of spaced repetition on form recall of single words and collocations. However, the participants in class A who were treated with single words outperformed the other group.

**Keywords:** Collocation, form recall, repetition, single word, spaced repetition

### **Introduction**

Vocabulary is one of the most important factors in language learning. According to Thornbury (2002, p. 13), "without grammar very little can be conveyed, without vocabulary nothing can be conveyed". He also claimed that the learners not only need to learn a lot of words but also to remember them.

One of the common strategies in learning and recalling new words is repetition. In her latest book, Claire Kramsch (2009) argues, among other things, in an effort to make language use more authentic and spontaneous, communicative language teaching has moved away from memorization, recitation, and choral responses. It has put a premium on the unique, individual, and repeatable utterance in unpredictable conversational situations. And yet, there is a value in repetition as an educational device.

Research has shown that frequency of occurrence plays a significant role in the acquisition of new words; i.e. the more encounters with a word in the input, the more likely that the (meaning of the) word will be acquired (Chen & Truscott, 2010; Eckerth & Tavakoli, 2012; Laufer & Rozovski-Roitblat, 2011; Rott, 1999; Waring & Takaki, 2003; Webb, 2007). However, there is still no comment regarding the exact number of encounters that is necessary for acquisition to occur. Moreover, most frequency studies so far have focused only on the effect of multiple encounters on recall or recognition of the meaning of single words (for exceptions, see Chen & Truscott, 2010; Eckerth & Tavakoli, 2012; Webb, 2007).

Vocabulary is generally given little emphasis in the education curriculum. Generally, the emphasis on English teaching is on the four language skills. Teaching vocabulary in many classrooms is largely incidental, that is, when a particular word or phrase appears difficult for the

students, they are told the definitions. Occasionally, this may be supplemented with the collocations of the target words or information about how the words are used, for example, whether they are used to express negative emotions or whether the word is used in formal situations. More often, however, finding out about new vocabulary items is left to the discretion of the students, and they are encouraged to turn to dictionaries to look up for the meanings of words.

Depth knowledge supplies needs of knowledge of a word to understand and use it. Breadth knowledge helps the learners know the form and meaning. Hu and Nation (2000) reported that for avoiding comprehension problems knowledge of 98%-99% of lexical items is required. In addition to solving comprehension problems, knowing new vocabularies has direct effect on learners' performance and smooth communication as Schmitt (2010) argued.

### **Literature Review**

The impact of repetition in different linguistic contexts on vocabulary learning has been examined by many researchers (e.g. Vermeer, 2001; Waring and Takaki, 2003; Webb, 2007b and 2008). Rott (1999, cited in Webb, 2007) examined how two, four, and six repetitions affected 'incidental learning' of words and suggested that six repetitions might be enough to learn a word.

At the end of the twentieth century, due to focus on 'communicative approach' of language learning, learning words with repeated encounters has received a special attention (Brown, 2001). As a result, many researchers studied the effect of repetition in context on vocabulary learning, especially in the field of second and foreign language learning and teaching (e.g. Nation, 1990).

The results of these studies are not consistent. Nation (1990) believes that 5-16 repetitions are needed in order to learn a word. Meara (1997) held that 100 encounters of an unknown word is needed for L2 learners to get the meaning of it. Horst, Cobb and Meara (1998; cited in Yongqi Gu, 2003) found that low intermediate EFL learners who read a 109-page book over a ten-day period, obtained a 20% rate of all the unknown words. Waring and Takaki (2003) found that learners would need to encounter the target words at least eight times to learn 50 percent of unknown words in one session of instruction to be able to recognize them after three months. Moreover, some studies show that different kinds of contexts have different effects on vocabulary learning of the learners (e.g. Kilian, Nagy, Pearson & Anderson, 1995; Webb, 2008).

In this regard, Gu (2003) also examined the effect of vocabulary learning strategy on one hundred Chinese EFL students in pre-university. Through the test, they filled a vocabulary learning questionnaire at the beginning and end of the instruction. At the end of the six-month course, the participants utilized different vocabulary learning strategies more than before and this study also showed that there was a positive relationship between vocabulary learning strategies and learners' improvement.

Cohen (2000), Cook (2001), Eggen and Kauchak (2004), Larsen-Freeman & Long (1991), Oxford (1990) believed that new data was stored in brain for a long time with learning strategies. In fact, they believed that these strategies could help learners in receiving and comprehending new data in a way that such new information is stored and reconstructed for learning. Oxford classified vocabulary strategies into two groups; 1) those for finding a new word's meaning and 2) those for consolidating a word once it has been encountered. In this taxonomy, discovery strategies include several determination strategies and social strategies. In fact, a learner may find a new word's meaning through guessing from context, guessing from an L1 cognate, using reference materials, or asking someone else. Another Oxford's

(1990) classification consisted of four strategy groups; social, memory, cognitive and meta-cognitive which seemed best to explain the variety of VLS.

O'Malley and Chamot (1990) also classified such strategies into three categories. The first one is meta-cognitive strategies that involve planning, monitoring, or evaluating improvement. The second one is cognitive strategies that directly impact received data to facilitate learning. The last one is social/affective strategies that are composed of interaction and connection with others and controlling the affective perspectives of language.

Besides knowing new words and collocations, recalling them is what repetition undertakes. However, many studies have proved the significance of repetition in vocabulary learning, little attention has been paid to the role of spaced repetition in recalling new vocabularies. Whether or not spaced repetition can have any role in recalling new words and collocations has remained unclear. Therefore, the focus of this study is to determine the effect of spaced repetition on form recall of single words as well as collocation in a classroom. Henceforth, the following research question is stated;

- Does spaced repetition have a statistically significant effect on EFL learners' collocation and single word recall?

- And the null hypothesis argued in the study is;

Spaced repetition has no statistically significant effect on EFL learners' collocation and single word recall.

## Methodology

### Participants

The current study was carried out among 45 language learners in three intermediate adult EFL classrooms at Iran Language House (Tose'eh) in Tehran, Iran, studying New Interchange 2 student's book by Jack C. Richards. The learners attended these classes three days a week, receiving two hours of instruction in each session, i.e., six hours of instruction each week. The participants were females aged between 20 and 30. The institute administered a placement test to determine the learners' proficiency level which was concluded to be intermediate level. After administering the homogeneity test, the learners whose scores fell one standard deviation below and above the mean were selected as the homogeneous EFL learners available for the study. Thereby, 31 subjects stayed available for the purpose of the study (N=31). Then, the participants were randomly divided into two groups of 16 in class A and 15 in class B, both named experimental groups. Class A received instruction for the purpose of single word learning and another group received instruction targeted for collocation recall.

### Instrumentation

To commence the study, at first a placement test was administered to determine the learners' proficiency level. Then for the purpose of participants' homogeneity, a Proficiency test was taken by the participants. The other instruments in this research were a pretest and a posttest. Before starting the treatment, the learners in both groups were asked to take a pretest, consisting of 25 items extracted from the book "English Vocabulary in Use" (Intermediate) by Michael McCarthy & Felicity O'Dell. Prior to the study, in order to ensure the appropriateness of the test difficulty, the test was piloted with 15 intermediate students from another class who did not participate in the study and who were also placed in that level by the same placement test.

Then, during the research, the learning material consisted of a word list of 24 items, 12 single word and 12 collocations, with their L2 definitions and eight vocabulary activities that were assigned to the participants. The vocabulary activities consisted of eight written and

decontextualized vocabulary exercises. Participants were asked to provide synonyms and antonyms of each item and complete the exercises through “matching” and “fill in the blank” activities.

Furthermore, “Oxford Collocation Dictionary for Student of English” (Lea, Crowther, and Dignen, 2002) and “The BBI Dictionary” (Benson, Benson & Ilson, 1996b) were used to choose single words and collocations.

### Procedures

The data collection was fulfilled among 31 language learners that were divided into two groups of A & B. The course duration was 10 sessions plus two more sessions to administer the pre and post test. This experimental study was set out to find out the effect of spaced repetition on learning and recalling single words and collocations during an explicit vocabulary instruction. The 100 target items were divided into two different parts; each part included 50 words and 50 collocations. These two groups of items were tested based on frequency of occurrence through time intervals or the level of difficulty in order to show the effect of spaced repetition. Each class was served with a different pre and post test. Class A took part in single word test and another class took a test of collocation knowledge. The vocabulary proficiency level of all learners that are speakers of Persian is measured by the vocabulary levels test (Schmitt, Schmitt & Clapham, 2001) in the fourth session before the first learning session. After making sure of the two groups’ homogeneity, the learners were divided into two groups; A & B with 14 and 13 participants, respectively. Class A was considered to fulfill 50 single words and class B was treated with 50 collocations in teaching program. The vocabulary was taught in form of spaced repetition. In spaced repetition, revising and repeating the exercises happen over a time interval. The program took ten sessions. Therefore in each session five single words and five collocations were taught in each class. The following session, the learners were allowed to ask their questions regarding previous words. Through this method, the time interval between subsequent reviews of previously learned material is increased. The words can be scheduled based on easy to difficult or based on the frequency of occurrences through time intervals; for instance, if the new words are repeated once in every two sessions, the easier words can be omitted through the repetition schedule and more emphasis can be put on more difficult words that are repeated by the learners the two following sessions and they can be added to the list of new words. This way the learners would have long time to spend on repeating (spaced repetition) rather than repeating in a short span of time (massed repetition). After 10 sessions of treatment, a post-test is administered to clearly illustrate the effect of treatment. As it was previously mentioned, the posttest is exactly the same as pre test in both classes. One test includes 25 single words and another one includes 25 collocations. The test items are chosen from the new words that have been taught during the treatment.

### Results and Discussion

After the normality test, it was concluded that the data in proficiency test was normally distributed. Therefore, the parametric statistic method of t-test was used to show the effectiveness of the treatments.

**Table 1.** *Descriptive Statistics of Pretests’ Scores*

|   |         | Class A in pre<br>test | Class B in pre<br>test |
|---|---------|------------------------|------------------------|
| N | Valid   | 16                     | 15                     |
|   | Missing | 0                      | 1                      |

|                |                    |         |
|----------------|--------------------|---------|
| Mean           | 28.8750            | 28.8000 |
| Median         | 29.0000            | 29.0000 |
| Mode           | 28.00 <sup>a</sup> | 30.00   |
| Std. Deviation | 2.18708            | 2.21037 |
| Variance       | 4.783              | 4.886   |
| Minimum        | 25.00              | 24.00   |
| Maximum        | 34.00              | 32.00   |

Table 1 illustrates the statistical description of the scores gained from pretest administered to both groups, class A and B. According to the data, the scores in pretest are almost the same in two classes that is logical since the participants are homogeneous.

**Table 2. Group Statistics of Pretest**

| group   | N  | Mean    | Std. Deviation | Std. Error |
|---------|----|---------|----------------|------------|
|         |    |         |                | Mean       |
| Class A | 16 | 28.8750 | 2.18708        | .54677     |
| Class B | 15 | 28.8000 | 2.21037        | .57071     |

**Table 3. Independent Sample Test of pre-test**

| Levene's Test for Equality of Variances |      | t-test for Equality of Means |      | 95% Std. Confidence Interval of the Difference |                 |                 |                       |          |         |
|-----------------------------------------|------|------------------------------|------|------------------------------------------------|-----------------|-----------------|-----------------------|----------|---------|
|                                         | F    | Sig.                         | t    | df                                             | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower    | Upper   |
| Equal variances assumed                 | .018 | .893                         | .095 | 29                                             | .925            | .07500          | .79008                | -1.54090 | 1.69090 |
| Equal variances not assumed             |      |                              | .095 | 28.8                                           | .925            | .07500          | .79036                | -1.54189 | 1.69189 |

Table 3 illustrates the first t-test results. In this part it is seen that the score difference of the two groups is  $0.075 > 0.05$  and can be concluded that there is no significant difference between the mean scores of the two groups. Considering the Leven test probability that is  $0.893 > 0.05$ , and the test probability,  $\text{sig}=0.925$ , it is accepted that the subjects in two groups are homogenous.

**Table 4. Descriptive Statistics of Posttest**

|        |         | Class A | Class B |
|--------|---------|---------|---------|
| N      | Valid   | 16      | 15      |
|        | Missing | 15      | 16      |
| Mean   |         | 25.87   | 21.1333 |
| Median |         | 26.0000 | 21.0000 |

|                |         |         |
|----------------|---------|---------|
| Mode           | 24.00   | 24.00   |
| Std. Deviation | 1.82117 | 2.26358 |
| Variance       | 3.317   | 5.124   |
| Minimum        | 23.00   | 17.00   |
| Maximum        | 29.00   | 24.00   |

Table 4 presents the statistics related to the posttest administered to both groups. The numbers show the mean score, median, standard deviation and other statistical features. According to the numbers the mean score of the participants increased that is a representative of an improvement and the effectiveness of the treatment.

**Table 5. Group Statistics**

| group   | N  | Mean    | Std. Deviation | Std. Error Mean |
|---------|----|---------|----------------|-----------------|
| Class A | 16 | 25.8750 | 1.82117        | .45529          |
| Class B | 15 | 21.1333 | 2.26358        | .58445          |

**Table 6. Independent Sample Test**

|        |                             | Levene's Test for Equality of Variances |      | t-test for Equality of Means |       | 95% Std. Confidence Interval of the Difference |                 |        |        |
|--------|-----------------------------|-----------------------------------------|------|------------------------------|-------|------------------------------------------------|-----------------|--------|--------|
|        |                             | F                                       | Sig. | t                            | df    | Sig. (2-tailed)                                | Mean Difference | Lower  | Upper  |
| scores | Equal variances assumed     | .910                                    | .348 | 6.44                         | 29    | .000                                           | 4.7416          | 3.2372 | 6.2461 |
|        | Equal variances not assumed |                                         |      | 6.40                         | 26.90 | .000                                           | 4.7416          | 3.2212 | 6.2620 |

The first phase of the test above is related to checking the homogeneity of the two groups' score variance. As it is seen, the test probability (sig) is 0.348 ( $P > 0.05$ ). So, the two groups' score variance is homogenized.

In t-test result, it is observed that the score difference between the two groups is 4.7 and sig ( $p$ ) = 0.000 < 0.05. Henceforth, the null hypothesis stated in the study is rejected and can be resulted that there is a significant difference between the two groups' scores. So the participants, whose knowledge and improvement in English single words was targeted and tested, showed a better result. Thereby, it can be concluded that spaced repetition can have a better effect on form recall of English single words rather than English collocations. This may be due to the more difficult structure and the basis that collocations carry.

Although recall scores were higher for single words than for collocations, the high learning gains found in the study suggest that explicit vocabulary learning, operationalized as non-communicative activities, could indeed be an appropriate and effective way to establish

initial form–meaning connections of both single words and collocations in a classroom-based course. The findings of the present study are consistent with the result of Peter’s (2014) findings implying that massed repetition has a better impact on form recall of single words than collocations.

Thus, repetition in non-communicative activities seems to be promising because the repeated opportunities with the target items allowed learners to strengthen their form–meaning connection. In line with other studies (Chen & Truscott, 2010; Folse, 2006; Laufer & Rozovski-Roitblat, 2011; Peters, 2012a; Webb, 2007), this study demonstrates that repetition can bring about a significant increase in vocabulary learning gains. It thus supports Schmitt’s (2008) claim that “virtually anything that leads to more exposure, attention, manipulation, or time spent on lexical items adds to their learning”.

In this study, since participants were required to provide or recognize the form in each of the activities, they could not process the formal properties of the target items as well. This is especially relevant for collocations since they are often semantically transparent and consequently easily over-looked when reading a text (Nation, 2001; Nesselhauf, 2003; Peters, 2012b). Since research has demonstrated that EFL learners come across as more proficient when using formulaic sequences (Boers et al., 2006), “it is crucial that the learning process of collocations is fostered via instructional interventions” (Nation, 2001, p. 336). Although it is clearly not possible to teach all collocations by means of decontextualized vocabulary activities, it “seems indispensable that a number of collocations be taught and learnt explicit” (Nesselhauf, 2003, p. 238).

### **Conclusion**

According to the result, spaced repetition affects the learners’ acquisition of English single words and collocations. Both groups received the same instruction and made progress. However, comparing the two groups, the participants in class A whose knowledge in single words were examined, performed better than those who received the instruction to improve their knowledge in collocations and the difference was statistically significant.

Therefore, this result supports the research on repetition conducted by Peter (2014). He examined the effect of massed repetition on form recall of single words and collocation with a definite number of occurrences. The findings of his study also revealed that the participants involved in single word acquisition outperformed the other group.

However, some researchers rejected rehearsal strategy as an appropriate way to learn vocabulary especially for a long time (Wei, 2007), but many EFL learners frequently use word repetition and memorization to learn vocabulary. One possible answer to applicability of rehearsal strategy might be learning vocabulary through memorization that is still common among language learners. Word repetition is a favorable condition in learning vocabulary (Nation, 2001). Vocabulary learning through lists of words is useful when a large numbers of vocabularies are needed to be learnt in short periods of time especially in early stages of language learning (Nation, 1980).

Since there are vast differences in research findings concerning the exact number of repetition required, it is unlikely that researchers will be able to pinpoint the precise number. One could argue that ‘the goal of research should not be to identify a definitive number of exposures needed but rather to understand a complex process involving multiple, interacting variables’, as Chen and Truscott (2010, p. 694) do. They demonstrated that non-lexicalized words were more difficult to learn than lexicalized ones. The present study adds to our understanding that EFL learners tend to have more difficulties recalling the form of collocations than of single words,

which is consistent with Peters' (2012b) findings. It is not unlikely that the learning collocations hires a much more difficult burden because it is more challenging to allocate resources to the formal properties of two (or more) words compared to one, which would be in line with a limited attentional capacity model of SLA (Skehan, 1998).

The aim of the present study was to investigate the efficacy of spaced repetition as an approach that leads to the acquisition of single words and collocations. Although recall scores were higher for single words than for collocations, the high learning gains found suggests that explicit vocabulary learning, as non-communicative activities, could indeed be an appropriate and effective way to contribute so much to a classroom-based course. This study adds to the growing body of evidence supporting this claim.

Since participants were required to provide or recognize the form in each of these activities, they could not process the formal properties of the target items. This is especially relevant for collocations since they are often semantically transparent and consequently easily over-looked when reading a text (Nation, 2001; Nesselhauf, 2003; Peters, 2012b). Since research has demonstrated that EFL learners come across as more proficient when using formulaic sequences (Boers et al., 2006), it is crucial that the learning process of collocations is fostered via instructional interventions (Nation, 2001).

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