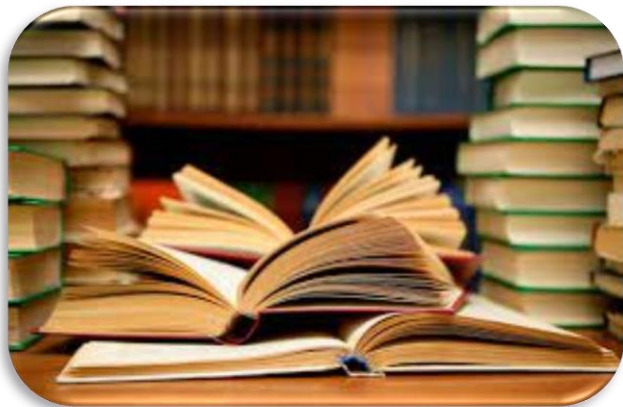




## Research Paper



## Effects of Different Modes of Spacing on Iranian EFL Learners' Lexical Knowledge Development: Proficiency Levels in Focus

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Received: 15 December, 2022

Accepted: 17 January, 2023

### ABSTRACT

This study examined the effect of spacing on lexical development focusing on the Iranian EFL learners' proficiency levels. Participants were 120 EFL learners from 22 to 26 of age who were studying at several English institutes in Isfahan. Three tests were used to collect the required data. First, OQPT was employed to place the learners with similar language abilities in an experimental group and a control group. Based on the OQPT results, each group was divided into two sub-groups including 30 high and 30 low proficiency learners. Then a pretest was conducted to evaluate the EFL learners' vocabulary knowledge. Learners in both control and experimental groups received the same lexicon but in different ways. Experimental groups were taught new words through spaced instruction, while control groups received through massed instruction. The spacing classes were held once a week in seven weeks while massed classes were held in one session in the eighth week. During the posttest, the researcher devised an achievement test, administered it after the treatment; the results were compared and analyzed in order to determine the extent of the participants' vocabulary improvement. Findings of this research showed that using spaced instruction caused high proficiency learners to significantly outweigh the low proficiency ones. Since spacing has been widely known to have a positive effect on learning and long-term memory (Cepeda et al., 2006), therefore it can be found useful for curriculum developers and syllabus designers in deciding where to put the new vocabulary in a course or a book.

**Keywords:** Spacing Instruction, Massed Instruction, EFL Proficiency Level, Lexical Development.

به بررسی تأثیر سطح مهارت فراگیران، آموزشهای فاصله دار و فشرده بر پیشرفت واژگان انگلیسی زبان آموزان ایرانی این پژوهش به بررسی تأثیر

سطح مهارت فراگیران، آموزشهای فاصله دار و فشرده بر پیشرفت واژگان انگلیسی زبان آموزان ایرانی پرداخته است. شرکتکنندگان در این تحقیق 120 زبان آموز زبان انگلیسی بین 22 تا 26 سال از موسسات مختلف زبان در شهر اصفهان بودند. برای دستیابی به اهداف پژوهش از سه آزمون استفاده شد. ابتدا، از آزمون OQPT برای قرار دادن زبانآموزان در گروههای آزمایشی و کنترل بر اساس مهارت زبانی آنها استفاده شد. هر گروه به دو زیرگروه متشکل از 30 زبانآموز با مهارت بالا و 30 زبانآموز با مهارت پایین تقسیم شدند. آزمون دوم یک پیش آزمون بود که محقق آنرا برای ارزیابی دانش واژگان زبانآموزان طراحی کرده بود. به گروههای کنترل و آزمایش، واژگان یکسان، اما با روشهای متفاوت ارائه شد. به گروههای آزمایشی کلمات جدید از طریق آموزش فاصله دار، در حالی که به گروههای کنترل از طریق آموزش فشرده تدریس شد. کلاسهای روش فاصله دار هفتهای یک بار در طول هفت هفته و کلاسهای فشرده در یک جلسه در هفته هشتم برگزار شد. در مرحله پس‌آزمون، محقق یک آزمون پیشرفت طراحی و بعد از درمان آن را اجرا کرد. نتایج مورد مقایسه، تجزیه و تحلیل قرار گرفت تا میزان پیشرفت واژگان شرکتکنندگان مشخص گردد. بر اساس یافتههای این تحقیق، مشخص شد، آموزش فاصله دار منجر به عملکرد قابل توجهی از زبانآموزان با مهارت بالا میشود. از آنجایی که تأثیر مثبت فاصله‌گذاری بر یادگیری و حافظه بلند به طور گسترده‌ای شناخته شده است، بنابراین میتوان آنرا برای توسعه‌دهندگان و طراحان برنامه درسی در تصمیمگیری برای قرار دادن واژگان جدید در یک درس یا

کتاب مفید یافت. کلمات

کلیدی: آموزشهای فاصله دار، آموزشهای فشرده، مهارت فراگیران، پیشرفت واژگان انگلیسی

## INTRODUCTION

English has emerged as a dominant foreign language in Iran in recent years. Importantly, vocabulary plays a key role in effective communication and is regarded as a good indicator of language proficiency. However, many Iranian learners have difficulty learning English words. Furthermore, when learners' vocabulary does not grow sufficiently, they will have difficulty learning English (e.g., Gathercole, S. E., & Baddeley, A. D. (2014); Schmitt, N., & Schmitt, D., 2020). Therefore, to develop vocabulary, it is essential that vocabulary education includes the teaching and learning of foreign words and their meanings.

Vocabulary learning requires repeated exposure to target words in both intentional and incidental learning studies, yet exposure frequency alone might not ensure higher acquisition rates. The spacing between repetitions may also affect retention. Research on massing and spacing strategies within cognitive psychology has been extensively examined and is well-documented and robust, dating back to a hundred years ago (Ebbinghaus, 1885; Cepeda, Pashler, Vul, Wixted, & Rohrer, 2006). The strategy of massing is enacted by separating study trials for a given item by zero items or a time interval of less than one second, as defined by Cepeda et al. (2006). Alternatively, a study session is separated by a longer interval when using the spacing strategy.

Several researchers have since studied the spacing and its effects on vocabulary learning in foreign languages. Studies that have updated and developed substantial knowledge of spacing and vocabulary learning include: Challis, 1993; DeKeyser, VanPatten, & Williams, 2007; Greene, 1989; Miles, 2014; Namaziandost, Sawalmeh, & Soltanabadi, 2020; Pavlik, Anderson, 2005.

Additionally, research on the relationship between spacing and learners' proficiency levels is lacking. Clearly, spacing has a noticeable effect on vocabulary learning, as Sobel et al. (2011) pointed out. Spacing could be an effective teaching technique for Iranian EFL learners in terms of lexical development. The question is whether or not spacing affects vocabulary learning among learners with different proficiency levels, and if yes, would that influence be positive or negative? Iranian EFL learners of varying proficiency levels were studied for how spacing affects lexical development.

This led to the formulation of the following research question:

*Does spaced instruction vs. massed instruction have any significant effect on Iranian EFL learners' lexical development regarding their proficiency levels?*

Based on the abovementioned question, the following null hypothesis was formulated in this study:

*Spacing does not have any significant effect on Iranian EFL learners' lexical development regarding their proficiency levels.*

### Significance of the Study

In our study, we investigated whether spaced instruction and language proficiency of EFL learners have effect on their vocabulary learning. This study is important in the respect that it has been conducted in real-world classrooms with minimal experimental control. Findings of this study may be helpful for different educational groups such as EFL teachers and learners, syllabus and curriculum designers. Since the research provides a good way to improve vocabulary learning in EFL classes, it is supposed to help teachers promote teaching vocabulary.



## LITERATURE REVIEW

### Theoretical Background

Über das Gedächtnis was based on Ebbinghaus's personal capacity to recall and recite nonsense syllables that he did not understand at first and he had never encountered before. He is best known for describing the spacing effect, which he described first. It was proven by Ebbinghaus (1885) that it is most beneficial to review material at regular intervals. A rapid review of information (mass repetitions) reduces memory performance. A replication of the spacing effect is among the strongest and the most replicable experimental findings, according to Slavin (Educational psychology: Theory and practice, 2019), dozens of reviews and studies on memory tasks (e.g., DeKeyser, R., 2020) and meta-analyses (e.g., Dehaene, S., 2020).

During spaced distribution practices, two types of hypothetical records are created: encoding variability and deficient processing. The encoding variability theory emphasizes the fact that spatially distributed materials are more likely to be remembered than massed ones in part, because the spaced distribution encodes each presentation differently, which provides more retrieval cues" (Polyn, S. M., Kragel, J., McCluey, J. D., & Burke, J. F., 2019). An item's meaning is encoded together with the context in which it is presented (Crowder, R. G. 2019). The context plays an important role in this theory. Deficient processing theory (Carpenter, S. K., 2020) suggests that massed materials are not properly processed in their second presentation, due to the fact that the previous presentation is still extremely recent. It is the opposite when a subject is presented after an interval and it has been shown that some intervening elements exist. Due to the limited accessibility of the former presentation, full processing is required.

According to different studies; spaced instruction improves literacy skills (Sewang, A., 2021; Nakata, T., & Suzuki, Y., 2019), grammar (Chen, O., Paas, F., & Sweller, J., 2021), and vocabulary (Uchihara, T., Webb, S., & Yanagisawa, A., 2019). It has been shown that delayed posttests can help learners remember target language structures which were instructed in distributed manners (Serrano, R., & Huang, H. Y., 2021).

There is some evidence that the spacing effect may enhance skills beyond rote memory, according to (Miles, 2014). Students learning touch-typing benefit from the spacing instruction, according to Hartshorne, J. K., & Makovski, T. (2019). After 35 hours of daily typing practice, the study's proficiency objectives were achieved. In another study practicing two hours per day for 43 hours led to target proficiency for two groups, and another group practiced for four hours per day (each day, there are two 2-hour sessions) after 50 hours (Wickens, C. D., Helton, W. S., Hollands, J. G., & Banbury, S., 2021).

Peters (2014) suggests that powerful memory strategies can enhance learners' vocabulary knowledge. One such strategy is the spacing technique, whereby vocabulary is revised with breaks between sessions (Wiseheart, M., Küpper-Tetzel, C. E., Weston, T., Kim, A. S., Kapler, I. V., & Foot-Seymour, V., 2019). According to Lyle, K. B., Bego, C. R., Hopkins, R. F., Hieb, J. L., & Ralston, P. A., 2020) using this technique, the information is learned in gradually increasing intervals. Therefore, it is important to repeatedly practice something after it is learned until it is stored in long-term memory.

Observational studies have been conducted in order to determine how spaced instruction affects English vocabulary learning, according to Rohrer (2015), a pretest, posttest, and delayed posttest was



conducted to compare the effectiveness of spaced instruction with that of massed instruction on vocabulary improvement. In spite of factually parallel gains in the posttests for both exploratory groups, results from the delayed posttest revealed that spaced instruction performed better than mass instruction. In the delayed posttest, neither group beat the other by a wide margin. Although compared to postponed posttests, the massed group saw much greater reductions in benefits in posttests, the results indicated that spaced instruction yielded better results.

### **Empirical Background**

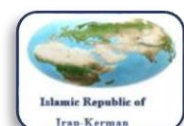
An analysis of how spacing affects fifth-grade classrooms by Carpenter, S. K. (2020) was conducted. 39 unfamiliar English words were taught in massed and spaced formats to 39 children. The vocabulary recall test was conducted five weeks later. In comparison to massed learning, there was a greater long-term retention rate with only one week spacing. According to researchers, spacing can be applied to middle-schoolers and other settings as well.

An investigation was conducted by Wegener, S., Wang, H. C., Beyersmann, E., Nation, K., Colenbrander, D., & Castles, A., 2022 to determine whether vocabulary learning in primary schools is affected by the spacing effect. 15 new words were taught to Grade 3 students using the massed method and 15 other words were explained using a spaced method. In one session, 15 words were divided into three sets of five words each. Three sessions were used to learn the 15 words: each word was practiced once per session. Following 1 week and 5 weeks of retention tests, spaced words were remembered better than massed words.

An analysis carried out by Lotfolahi and Salehi (2017) examined the spacing schedules of young EFL students. They used different spacing schedules for teaching English-Farsi word pairs to young EFL learners. Learning in a massed condition included learning five pairs of words in session one, followed by learning five pairs of other words one week later. One week after learning 10 word pairs in session one, learners studied them again. Various spacing schedules were incorporated with tests (with feedback) to enhance the benefits. To test students' vocabulary knowledge, students were instructed to quiz one another. It was measured one week and again five weeks after learning. Study results indicate that spaced practice leads to greater long-term retention than massed practice.

It was found that massed distributions and spaced distributions differed in their effect on learning vocabulary from reading for a second language by Nikita and Elgort (2020). Using context-based interpreting, 48 novel vocabulary items were presented to Japanese speakers and given English synonyms and translation equivalents in Japanese. Using semantic priming, meaning recall, and meaning-form matching posttests, we tested whether spacing effects might differentially affect explicit and tacit word knowledge development. There was a higher advantage in spaced learning than massed learning in posttests with meaningful recall and form matching. It was observed, no matter whether items were massed or spaced, the semantic priming effect remained the same. According to these results, spacing can be effective for revising explicit vocabulary knowledge in contextual word training, but massing can be as effective as spacing in deriving tacit semantic knowledge.

In a study published in 2021, Namaziandost et al. looked at vocabulary recall and retention for EFL learners receiving spaced or massed distribution instruction. The proficiency levels of 120 Iranian EFL students were evaluated using the QPT (Oxford Quick Placement Test). Three equivalent groups



were formed by randomly selecting 75 intermediate students: one control group ( $n = 25$ ) and two experimental groups ( $n = 25$  each). During both experimental groups, participants were instructed in two different ways following the pretest. There was only one intensive session per target vocabulary set for the massed instruction groups; for those in the spaced instruction group, however, three sessions were held at irregular intervals to acquire the same vocabulary. No vocabulary-specific instructions were given to the control group, which studied the same vocabularies. A total of 180 vocabularies were taught over the course of 12 weeks (15 vocabularies per week). Each week, each group received 60 minutes of instruction. Before treatment, a receptive vocabulary pretest was administered and followed by a posttest and delayed posttest. We administered a receptive vocabulary posttest one week after the treatment. After a four-week interval, students were given the delayed posttest. A delayed posttest and an immediate posttest showed that the spaced instruction group performed significantly better than the massed instruction group.

Taking the literature discussed in this paper into account, it is possible to state that most empirical studies have identified significant effects of spaced instruction on development of lexical knowledge of EFL learners. Although the effect of spacing on lexical development has been examined, far too little attention has been paid to the different language proficiency level of the learners. Taking this into account, this study is going to fill this gap.

## METHODOLOGY

### Design of the Study

In order to understand how spacing affects vocabulary learning of Iranian EFL learners with different proficiency levels, a quantitative study was conducted. Given the data collection instruments including an Oxford Quick Placement Test (OQPT), a pretest and a post test, this study employed a quasi-experimental design.

### Instruments

Three instruments were used in the present study:

Oxford Quick Placement Test (OQPT), vocabulary pretest and immediate vocabulary posttest. The OQPT is a kind of flexible quick placement test which is a standard discrete point test for assessment of general proficiency, and to place the students with similar abilities in the group under investigation. It is designed to give students and teachers an approximate idea of how proficient they are in all English skills and sub skills. In this study, the paper and pencil version of the Oxford Quick Placement test (Syndicate, 2001) was administered.

Another instrument used in the study for collecting the necessary data was a pre-test created by the researcher. All the items in the pre-test were derived from the books (Topnotch 1 & 3), which were instructed during the course. There were 50 items on this test. To estimate the reliability of the test, a pilot study was done on a small sample of EFL learners ( $n=15$ ) studying at the same institutes having the same characteristics as the target sample. A Kuder and Richardson Formula 21 (KR21) test was used to calculate the reliability of the pretest, which resulted in an internal consistency score of 0.84.



Additionally, three language experts reviewed it and commented on it to ensure its validity. Participants had 50 minutes to try all items during the test. There was an objective scoring procedure, which means that the rater's personal judgment did not affect the results. The mean scores of the massed and spaced groups did not differ significantly. In other words, both groups were homogenous before starting the treatment in terms of the level of language ability.

This study used a post-test designed by the researcher to determine how the treatment affected the participants' vocabulary. In this study, the post-test was modified from the pre-test, which served as both a pretest and a post-test. Students' answers to pre-test questions were rearranged between pre- and post-tests to prevent them from recalling answers from pre-tests. A total of three experts validating the pretest confirmed the validity of the posttest. The reliability was calculated using the KR-21 formula and was 0.844.

### Participants

There were 120 Iranian students participating in the study from 6 language institutes in Isfahan, Iran. Administering an Oxford Quick Placement Test (OQPT) to this group of EFL learners ranging between 22-26 years old, the researcher selected the participants of the study.

In the first stage of participant selection, the total number of spaced distribution group and massed distribution consisted of 120 participants, including 60 ones each. Dividing the participants into high and low proficiency categories was the second stage of the participant selection. The OQPT results were used to divide each group into two subgroups; 30 Iranian EFL learners with high proficiency and 30 with low proficiency. Table 1 displays the number of the participants and groups under study.

**Table 1**

*Iranian EFL Participants of the Study*

Groups	Language Proficiency Groups	N
Experimental	Low, N=30	120
	High, N=30	
Control	Low, N=30	
	High, N=30	

### Procedure

Using a vocabulary pre-test, a test of participants' English vocabulary proficiency was conducted. After that, the experimental groups received a similar treatment, but in a different manner. The experimental groups received spaced instructions, while the control groups received mass instructions. The spacing classes were held once a week for seven weeks while massed classes were held in one session in the eighth week. One intensive session was used for the massed distribution group in the study, while seven sessions were used for the spaced distribution group (about 210 minutes total). Each session lasted 30 minutes. In the spaced groups there were seven-day intervals among the sessions while in massed groups all the seven sessions took place in the eighth week. Among these sessions there were short breaks of ten minutes. All the materials of the study were 140 English words in total, 70 words taken from Topnotch 1 for low proficiency level groups and 70 words taken from Topnotch 3 for high proficiency level groups.



Including the post-test, the study lasted eight weeks. In total in both learning conditions, each target word was first presented, then practiced using different exercises either in massed or spaced condition. In experimental groups of the study the presentation stage began with presenting all the 70 words for high proficiency level subgroup and 70 words for low proficiency level one on a TV screen, during the first presentation session. The teacher read aloud words in English, their conceptual meaning, and sample sentences along with the scanned pages on the screen. The teacher instructed students to read the words quietly and not to take notes. After seven days and in the second presentation session they went through the same procedure for the same words.

Massed groups' presentation and learning stages were conducted altogether on the eighth week. They were given different booklets based on their proficiency level consisting of seven lists of vocabulary for each session, which contained 10 words and followed by exercises related to those lists. In the first session, the booklet's page 1 contains the exercises that learners are required to complete, after the time was up there were five-minute intervals to the next learning session. Finally, learners working on the last section of the booklet were required to write down the meaning of every English word in the space provided, and then the booklets were collected. All the sessions took place on one day. For both spaced and massed groups, to keep the participants interested during the learning stage, new exercises were introduced at each session, and sample sentences and vocabulary exercises were provided as part of the rehearsals, combined with quizzes and communication activities. Finally, on completion of the 8th session, each group took an immediate post-test. The test was administered immediately after completion of the 8th session of learning, regardless of whether that was a massed or spaced learning group. The post-test had similar content as the pretest, and the results were compared and analyzed. This enabled the researcher to determine the participants' recall of vocabulary terms. A total of 210 minutes were spent on instruction for both the spaced distribution group and the massed distribution group. The vocabulary presentation was in two thirty-minute sessions then practiced in five equally distributed learning sessions.

### **Data analysis**

A mean and standard deviation were used to determine the difference in performance between the two groups during the pretest. For quantitative analysis, after the post test, paired samples t-tests and one-way ANCOVA were used to determine the differences between the two groups. As a final step, SPSS (Statistical Package for Social Sciences), version 25, was used to analyze the data in the pretest and posttest of the study.

## **RESULTS**

This study assessed the effects of spaced instruction versus massed instruction on Iranian EFL learners' lexical development regarding their proficiency levels. For the purpose of this research question, since spaced vs. massed instruction was one independent variable and proficiency level was a moderator variable (which is in fact a type of independent variable), and also lexical development of the learners was the dependent variable. In order to capture any possible differences in terms of their lexical development between high and low proficiency EFL learners in the two groups, a two-way ANCOVA was conducted while controlling for a covariate (i.e., the pretest scores of the learners). Prior to



conducting the parametric test of one-way ANCOVA, the assumptions underlying this test (such as the normality assumption) had to be checked. To that end, Table 2 represents the results of the Kolmogorov-Smirnov test for pre-test and post-test considered in this study:

**Table 2**

*Results of the Normality Tests for the scores of pretest and post-test*

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
EG Low P. Pretest	.211	30	.058
EG Low P. Posttest	.182	30	.195
EG High P. Pretest	.167	30	.200*
EG High P. Posttest	.160	30	.200*
CG Low P. Pretest	.153	30	.200*
CG Low P. Posttest	.167	30	.200*
CG High P. Pretest	.167	30	.200*
CG High P. Posttest	.160	30	.200*

Note: P. means proficiency in this table.

**Table 3**

*Descriptive Statistics for Posttest Scores of High and Low Proficiency Learners in the EG and CG*

Groups	Proficiency	Mean	Std. Deviation	N
EG	Low	35.9667	3.81000	30
	High	42.3000	4.01849	30
	Total	39.1333	5.02693	60
CG	Low	25.9000	3.88942	30
	High	33.1333	3.14844	30
	Total	29.5167	5.06062	60
Total	Low	30.9333	6.35094	60
	High	37.7167	5.84573	60
	Total	34.3250	6.96710	120

Low proficiency learners' mean scores in EG was 35.96 on the posttest; while for the high proficiency learners it was 42.30. In addition, CG posttest mean scores for low proficiency and high proficiency learners were 25.90 and 33.13, respectively. In addition, EG (M = 39.13) and CG (M = 29.51) had different total mean scores. According to the two-way ANCOVA table below, one must examine the p values in front of Groups in order to find out whether the differences between low proficiency learners and high proficiency learners were statistically significant.



**Table 4**

*Two-Way ANCOVA for Posttest Scores of High and Low Proficiency Learners in the EG and CG*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4209.831	4	1052.458	77.263	.000	.729
Intercept	3103.218	1	3103.218	227.815	.000	.665
Pretest	48.940	1	48.940	3.593	.061	.030
Groups	2797.556	1	2797.556	205.375	.000	.641
Proficiency	772.839	1	772.839	56.736	.000	.330
Groups * Proficiency	7.113	1	7.113	.522	.471	.005
Error	1566.494	115	13.622			
Total	147161.000	120				
Corrected Total	5776.325	119				

As is shown in Table 4, there was a statistically significant difference in the posttest scores of the learners in the EG ( $M = 39.13$ ) and CG ( $M = 29.51$ ) since the  $p$  value under the Sig. column in front of Groups was smaller than the specified level of significance (i.e.,  $.00 < .05$ ). Partial Eta Squared displays a large (.641) difference under this column. Similarly, proficiency level's  $p$  value was lower than significance level's ( $p < .05$ ), indicating that the learners' level of proficiency could significantly modify the relationship between the application of spaced vs. massed instruction and their lexical development. In fact, high proficiency learners with a total mean score of 37.71 significantly outweighed the low proficiency learners with a total mean score of 30.93.

Due to the fact that the  $p$  value for Groups\*Proficiency seemed to exceed the significance level ( $.471 > .05$ ), the interaction between the independent variables under study (type of instruction and proficiency level) failed to exert a statistically significant impact on learners' performance on the posttest. The results obtained here are also graphically shown in the bar chart below.

**Figure 1**

*Posttest mean scores of high and low proficiency learners in EG and CG*

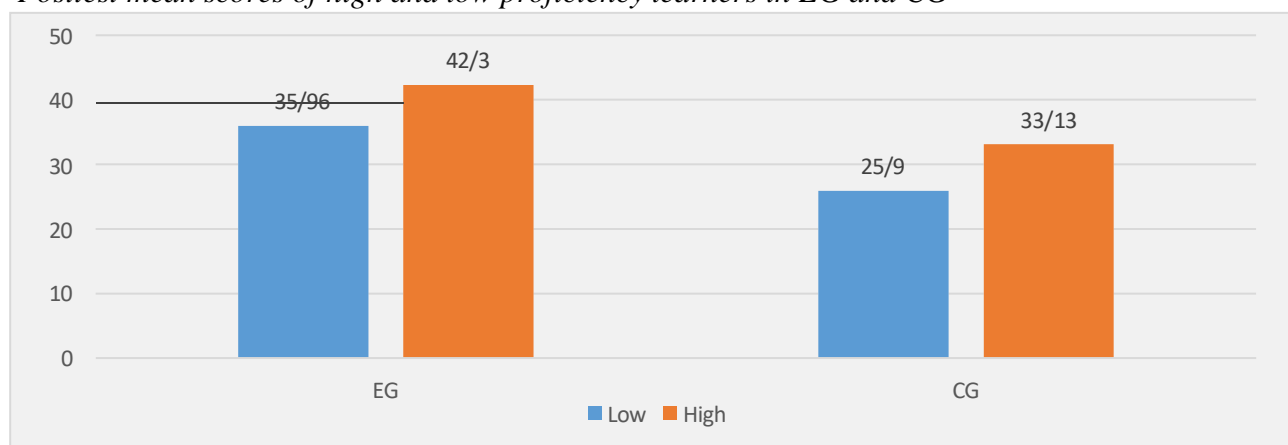


Figure 1, shows that (a) both low and high proficiency learners in the EG managed to obtain considerably higher scores than low and high proficiency learners in the CG, and that (b) the differences between low and high proficiency learners in both EG and CG were considerable.

## DISCUSSION

The purpose of this study was to examine whether spaced and massed instruction could help EFL students develop their lexical knowledge. After the needed data was collected the researcher used paired samples t-test and One-way ANCOVA to analyze them to find out the differences between the two groups and effectiveness of treatment on the learners' lexical development. According to the results of the study, the role of spacing was recognized by EFL teachers, which requires more elaboration to pave the way for EFL teachers to instruct efficiently the lexicons and practice them in distributed manner. Spacing has been found to be effective both in theory and practice, helping EFL learners to learn the instructed vocabulary successfully. In general, researchers believe that by spaced presentation of the materials, the information is learned in gradually increasing intervals. Therefore, it is important to repeatedly practice something after it is learned until it is stored in long-term memory.

The results indicated that high proficiency level groups in both experiment and control group were improved in their post-test compared to their pre-test. Findings also showed there was advantage for experiment group over the control group because the control groups with low and high level of proficiency showed no progress compared to those for learners with low and high level proficiency in the experiment. As a result, the null hypothesis "spacing does not affect Iranian EFL learners' lexical development with respect to their proficiency level" was rejected.

A two-way ANCOVA revealed that recall of vocabulary in spaced condition ( $M=39.13$ ,  $SEM=5.02$ ) was higher than the massed one ( $M= 29.51$ ,  $SEM=5.06$ ). In addition, the  $p$  values corresponding to learners' proficiency levels were lower than the significance level ( $p < .05$ .) which indicates the learners' proficiency levels significantly impact their lexical development in response to spaced instruction versus massed instruction. Total mean score of 37.71 indicated that high proficiency learners outweighed low proficiency learners with 30.93.

The study found that Iranian EFL learners developed their lexical skills more efficiently when spacing instruction was given. Based on previous studies, spaced instruction was found to be effective in different domains of learning, which was confirmed by the results of the present study. For instance, Sobel, Cepeda, Kapler (2010), found that children recalled almost three times as many definitions when they were spaced than when they were massed. It has been demonstrated that EFL learners perform better when vocabulary learning is spaced rather than massed.

Pavlik & Anderson, 2005; Seabrook, Brown, & Solity, 2005) also found that spaced instruction impacts learning across different domains (Pavlik & Anderson, 2005). The spaced instruction and proficiency level had effect on learning vocabulary together. Adding the proficiency level of learners as a moderator variable to this study made it apart from the other studies in cognitive psychology (e.g. Carpenter, et al., 2012) and foreign language learning (e.g., Miles, 2014) support the importance of spaced instruction.



## CONCLUSION AND IMPLICATIONS

This study examined Iranian EFL learners' lexical development, language proficiency level, and spaced vs. massed instruction in Isfahan. Based on the data statistical analyses and the findings, this study appeared to find significant effect among the variables. Furthermore, the findings also suggested that there was significant effect between the independent variables (spaced versus massed instruction and learners' proficiency level) and the dependent variable (lexical development).

As a general conclusion to the study, it can be stated that spaced instructions affects improving lexical learning of Iranian EFL learners. This study has important implications for teachers of languages in general, especially EFL teachers, syllabus designers, and material developers. Language teachers should bear in mind that even though the use of spaced instructions is necessary; it does not mean that the teacher should deny the EFL learners' proficiency levels in their expected lexical development. Rather, a blended effect of the two seems to be more appropriate. Textbook writers and course book developers should develop materials with appropriate spacing which are finely tuned toward learners' lexical development process and proficiency levels.

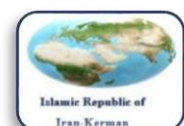
Despite making efforts to conduct a comprehensive research, this study has some limitations. Participant availability determined the sampling. It is possible to provide more generalizable results by conducting more studies with a more comprehensive sample. Lastly, this study included both males and females; future studies should examine the effect of spacing and massed instruction across genders. Additionally, only a small population was studied in this study. The future studies can include more participants. This research worked on lexical development, therefore, other skills and sub skills can be explored in future studies.

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