



The Impact of Teaching English Synonym and Antonym Pairs Adjacently and Non-Adjacently on Iranian EFL Learners' Vocabulary Learning and Retention

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ABSTRACT

The present study investigated the effects of teaching English synonym and antonym pairs adjacently and non-adjacently on Iranian EFL learners' vocabulary learning and retention. In so doing, the study utilized an experimental design with 80 randomly selected participants ranging in age from 15 to 25 who were assigned into four experimental groups of 20. The results of a pre-test indicated that the participants of the two groups were homogenous regarding their proficiency level. All groups were exposed to the synonym and antonym pairs illustrated with pictures and Microsoft Power-Points slides. After interventions, immediate and delayed post-tests were administered with 2 weeks interval. The researcher came to the conclusion that teaching new words out of context might be as helpful as teaching them within the language context (co-text); teaching synonyms and antonyms gives the language learners an opportunity to enhance their memory for semantically-related words; teaching synonyms and antonyms in separate sessions with short intervals in between might positively affect the students' long term memory for words and consolidate their experience of learning words in a foreign language.

Introduction

In the last three decades, the field of second language acquisition has seen renewed interests in vocabulary learning and acquisition. There are many dimensions to vocabulary learning and acquisition, as reflected in the multitude of different areas of research being done on the topic. Richards and Schmidt (2010) defined vocabulary as "a set of lexemes, including single words, compound words and idioms" (p. 580).

According to Zimmerman (1997), vocabulary plays a significant and central role in language learning and language use. As Laufer (1997) asserted, speakers cannot communicate and convey meaning without vocabulary in every language. The results of several studies such as Vermeer (2001), Nunan (1999), and Meara (1996), especially in the last two decades, noticed that vocabulary knowledge is at the heart of foreign language acquisition. Then, vocabulary teaching plays a vital role in language teaching and learning.

One of the main provokes that foreign or second language learners continuously encounter is how to become proficient of the large pile of vocabulary items in a language to communicate successfully. In the same vein, it is stated that giving a list of antonymous words would be one of the most effective strategies to learn new words, since it accelerates the process of lexical learning and makes the retention of words better and easier (Schmidt, 2008). Similarly, Yaghoobi Karnami (2004) claimed that specific attention to vocabulary plays a vital role in teaching English to Iranian EFL learners.

The findings of Storkel and Maekawa (2005) indicated that learners, teachers, and material designers can make use of homonym pairs whenever the focus is on the short-term memory and word forms. Their experiment revealed that when learning is measured by semantic representations, synonyms can facilitate word learning by decreasing cognitive demands as the meaning of the words are rather equal in synonym pairs. Accordingly, practitioners in the field of language teaching can group and teach the words with the similar meaning for a better understanding and fast learning. Such being the case, if the center of attention is shifted towards the semantic learning phase, synonym pairs would be more successful.

2. Literature Review

The results of Higa (1963) suggested that learners are more likely to be confused by the words that are similar in meaning than words that do not have close semantic relations. Tinkham (1993) and Waring (1997) also maintained that learning semantically related sets is more difficult than learning semantically unrelated sets (i.e., the words that are not linked by meaning). They also mentioned that learning synonyms at the same time may reduce the probability of acquisition. Although their finding is very useful, it may not be used in the usual way of learning synonyms.

As mentioned before, Powell (1986) noticed that semanticists consider three types for antonyms including contradictories (complementary), contraries, and reciprocals (converse). Single/married and part/whole are examples for contradictories which are limited. This study focused on contraries which allow for gradations (e.g., giant/miniature; transparent/opaque). In reciprocals, one word opposites or unwraps the other's meaning (e.g., buy/sell; gather/disperse).

2.1 Internal Lexicon

When it is said that an individual knows a word, it is expected that he knows the phonological, morphological, syntactic, and semantic features of the word. Sense and reference are two important elements forming the meaning of the word. The former pertains to the relationship existing between a specific word and other words. While the latter is concerned with the relationship words and objects have in the real world. In this case, the term internal lexicon is employed in order to the organization of the knowledge of the word in an individual's permanent memory. Words, in a semantic network, are indicated as nodes that are connected to other words available in the network by some relations (Carroll, 2008).

2.2 Semantic Memory

According to Sowa (1987), a semantic or frame network is a network by means of which semantic relations between concepts are shown, and is often used as a form of knowledge representation. It is a directed or undirected graph that contains vertices which represent concepts, and edges by which semantic relations between concepts are represented.

2.3 Lexical Access

What is lexical access? According to Field (2004), it is firstly important to explain what the mental lexicon, lexical entries, and lexical storage are to see what lexical access is. He noticed that the lexicon refers to a systematic organization of vocabulary that is stored in the mind in the form of single lexical items. It has been alluded to as individuals' mental word reference and analogies between accessing a composed lexicon and accessing the mental vocabulary have developed. Lexical sections are characterized as the information kept in the mind with respect to a particular word. Information about lexical items' content is needed to identify and understand words. As Levelt (1989) noticed, lexical entries contain two types of information (including content about the form and meaning of lexical items) by which individuals can recognize and understand

words. The form refers to phonological and morphological information; while the meaning component refers to the syntax and semantic information. Lexical capacity alludes to the path in which lexical items are sorted out for ideal availability in the lexicon.

Field (2003) defined lexical access as the way which people access words in the mental lexicon. Some specialists like Chumbley and Balota (1984), Field (2003), Mason and Just (2007), Simpson (1984), Simpson (1994), Swinney (1979), Tabossi and Zardon (1993), Vakoch and Wurm (1997) have identified that lexical access could be affected by numerous factors such as the frequency effect, the word/non-word effect, word superiority effect, the length effect, and the image ability effect.

2.4 Models of Lexical Access

As Gleason and Bemstein (1998) stated, it is crucial to know how language users recognize a lexical item's meaning, so lexical access models try to clarify the way people access words and their related meanings in their minds.

2.5 Search Model

The autonomous search model was developed by Forster (1976) which is the earliest and most influential model that views the word recognition process as being divided into several parts. In this model the lexicon is compared to a library. Although several catalogs can be used to determine where the lexical items are located, considering lexicon and library, a word similar to a book can only be found in one place. Forster stated that orthographic, phonological, and semantic/syntactic elements are three major types of access files. The orthographic element which is the first type of access file means that words are accessed based on their visual features; words retrieved through the phonological access file are done so through how they sound; and finally, words recovered using the syntactic/semantic file are done so according to their meaning. The search model mainly involves the process of going to the precise access file and comparing stimulus with access code. Frequency effects can be clarified by the ranking of the bins, but as an example, training repetition is more difficult to describe. The activation of word candidates begins before a complete word has been presented. Therefore, memory traces facilitate decision.

2.6 Logogen Model

The Logogen Model was developed by Morton (as cited in Field, 2003) who asserted that the model relies on the assumption that listeners have a limitless number of particular specialized recognition units and each listener can remember one particular word. The specialized recognition units are called logogens, and these contain data about the sounds of the word, its syntactic and semantic attributes, and data about word sort. According to Morton (1969), words are accessed by being activated by a certain threshold, not by determining their locations in the lexicon. Making a comparison between Morton's model and a light bulb together with a word and a light bulb, Gleason and Bernstein (1998) claimed that a word is activated when enough energy is being delivered to the source. In this manner in relations to the logogen show, words are initiated when their edge has gotten enough vitality to get to the lexical passage. Morton (as cited in Field, 2003) asserted that each lexical passage had its own logogen which followed the quantity of components a lexical section had in a similar manner as a focused on boost.

2.7 Cohort Model

The cohort model confesses similarities to Morton's (1969) logogen model in that multiple words can be activated, and the system continues searching through all activated words until it settles on a single choice. The second stage of Marslen-Wilson's (1987) model is known as the selection stage, during which every initiated word is continuously dispensed with in this manner narrowing the partner. An actuated lexical thing in the companion can be wiped out either in the light of unseemly setting or if a superior hopeful is enacted.

Every single lexical thing in the partner keep on being dispensed with until a solitary lexical thing stays, known as the joining stage. Moreover, the original cohort model asserted that an exact match was required between a lexical item and its phonological properties. According to Gleason and Bernstein (1998), however, consequent studies exposed that individuals are still able to access a correct lexical item, even if words are distorted or left out (i.e., if an individual yawned part way through a word). In the light of this information, the cohort model was revised and currently it conserves that an exact match between a lexical item and its phonology is not necessary for lexical access. The cohort model additionally represents recurrence and non-word impacts like Morton's logogen model. Both theories assume that context and primed words narrow the original set of activated lexical items leading to a faster recognition of directed stimulus.

2.8 Hierarchical Model of Lexicon

The hierarchical network model (HNM) was the first systematic model of semantic memory which was proposed by Collins and Quillian (1969), from which Teachable Language Comprehender (TLC) which was a computer program was created to model human language comprehension. The objective is using relations between the text input and a pre-existing large semantic network (SN) to understand it. This model proposes that semantic memory is organized into a series of hierarchical networks, consisting of nodes and properties. A node is a major concept, such as 'animal, bird, canary'. A property, attribute or feature is, as expected, a property of that concept. For example 'has wings, is yellow'. According to this model which focuses on the existence of the hierarchical levels, nodes are set on higher levels and a sentence is successfully comprehend if it appropriately connects inputs to the knowledge bags. In the same vein, learning is achieved when comprehended rules are successfully incorporated into SN.

3. Method

3.1 Participants

The data of this study were collected from 80 female EFL learners enrolled at private language institutes in Shahriar, Tehran. They were between 15 to 25 years of age. The participants were selected non-randomly from the population of 100 EFL learners after participating in the Preliminary English Test (PET). They were randomly assigned into four groups of 20 called Synonym Adjacent Group, Synonym Non-Adjacent Group, Antonym Adjacent Group, and Antonym Non-Adjacent Group.

3.2 Instruments

To accomplish the objectives of this study, the researcher utilized the following instruments.

3.2.1 Preliminary English Test (PET as pre-test)

Preliminary English Test (PET) is a well-known placement test consisting of four parts to homogenize the participants for their language proficiency on the four macro-skills of reading, writing, listening and speaking. PET is the second easiest diploma offered by University of Cambridge ESOL Examinations in England. The participants in this study took part in just the reading section of PET, 2004. The other sections were excluded due to the shortage of time and their irrelevance to the scope of the study. It took 90 minutes for the sample of 100 EFL learners to complete the pre-test. After administering the pre-test, 80 students whose scores ranged within the 2SD below and above the mean score were selected as the main subjects in this study.

3.2.2. Reading Comprehension Test (immediate and delayed post-tests)

After the treatment sessions, all four groups of the participants performed on a reading comprehension test twice as the immediate and delayed post-tests in this study. Two sets of descriptive passages were selected by the researcher after measuring their difficulty indices ($DI \geq 7$), which indicated that all of them were somehow at a same level. Each set consisted of 3 passages followed by 30 multiple choice items. The participants were

supposed to choose the best synonyms (in Synonym Adjacent and Synonym Non-Adjacent groups) or the best antonyms (in Antonym Adjacent and Antonym Non-Adjacent groups) out of three alternatives in every multiple-choice item (a, b, or c).

3.3 Procedure

The sample in this study was non-randomly selected and later homogenized after taking a Preliminary English Test (PET). After exclusion of the less proficient participants, the main sample was assigned into 4 experimental groups. The arrangement of the groups and the type of treatment they received are summarized in Table 1.

Table 1. Experimental Groups Arrangement

Group	Treatment Types
Synonym Adjacent Group (SA)	Received the synonym pairs simultaneously every session.
Synonym Non-Adjacent Group (SNA)	Received the synonym pairs in separate sessions.
Antonym Adjacent Group (NA)	Received the antonym pairs simultaneously every session.
Antonym Non-Adjacent Group (ANA)	Received the antonym pairs in separate sessions.

The number of the words was similar for all of the experimental groups every session. The Synonym Adjacent (SA) and Synonym Non-Adjacent (SNA) groups received similar synonym pairs with the only difference in one week time interval as the SA group had the chance to receive synonym pairs simultaneously and SNA group had similar synonym pairs separately. The words were illustrated within Microsoft office power point slides so that the students were exposed to some pictorial cues as well as the written target words for better learning and longer retention. It took nine sessions of 20 minutes that lasted for three consecutive weeks to present the target words. The Synonym and Antonym pairs in Adjacent groups (i.e., Synonym Adjacent and Antonym Adjacent) were instructed in binary sets such as affluent/wealthy and barren/fertile, while the Synonym and Antonym pairs were presented separately within a week time interval for the Non-Adjacent groups (i.e., Synonym Non-Adjacent and Antonym Non-adjacent). Right after the treatment sessions, a Reading Comprehension Test (RTC) was administered as the immediate post-test in this study. Two weeks later, the same RCT test was administered to assess the students' ability to retrieve the instructed words.

4. Results and Discussion

To achieve the objectives of the current study, the researcher collected a wide range of data and a series of statistical analyses which are thoroughly elaborated in this section to draw the final conclusion. After the raw data were submitted to the Statistical Package for Social Science (SPSS) 21, the Descriptive Statistics of the pre- and post-tests together with the Inferential Statistics were calculated so that the researcher could test the five null hypotheses of the study.

4.1 Descriptive Statistics for PET as the Pre-Test

In the present research, Preliminary English Test (PET) was administered as the pre-test to the four experimental groups to homogenize the participants based on their English proficiency level. The descriptive statistics of the experimental groups on PET are presented in Table 2.

Table 2. Descriptive Statistics of PET as the Pre-Test

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis		
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Synonym Adjacent pre-test	20	13.00	23.00	17.9000	4.06396	-.077	.512	-1.761	.992
Synonym Non-Adj Pre-test	20	15.00	23.00	18.4000	2.30332	.544	.512	-.108	.992
Antonym Adjacent Pre-test	20	13.00	21.00	17.3000	2.29645	-.409	.512	-.408	.992
Antonym Non-Adj Pre-test	20	13.00	21.00	16.6000	2.34857	.267	.512	-.506	.992
Valid N (listwise)	20								

As Table 2 displays, the group size in four groups is equal to 20. The largest mean score on PET belongs to the Synonym Non-Adjacent group (18.40) and the smallest mean score can be seen in the Antonym Adjacent group (The measures of Standard Deviation are also reported as =4.063, =2.303, =2.296 and =2.348. The measures of Standard Deviation indicate that there is a large spread of scores in the Synonym Adjacent group that is almost twice more than the values available in the other experimental groups.

As Table 2 indicates, the Synonym Non-adjacent and the Antonym Non-adjacent groups had an asymmetrical distribution with positive skewness, while the Synonym Adjacent and the Antonym Adjacent groups had an asymmetrical distribution with negative skewness. However all measures of Skewness were statistically insignificant. Measures of Kurtosis that quantify the shapes of the data distribution in the four experimental groups rarely match the Gaussian distribution as all of the experimental groups had negative but insignificant Kurtosis. It can be concluded that the sample of participants were more or less homogenous. To further examine the normality of distribution of PET, a Kolmogorov-Smirnov Test of Normality was run.

Table 3. Kolmogorov-Smirnov Test of Normality of PET as the Pre-Test

One-Sample Kolmogorov-Smirnov Test						
		Synonym Adjacent Pre-test	Synonym Non-Adj Pre-test	Antonym Adjacent Pre-test	Antonym Non-Adj Pre-test	
N		20	20	20	20	
Normal Parameters ^{a,b}	Mean	17.9000	18.4000	17.3000	16.6000	
	Std. Deviation	4.06396	2.30332	2.29645	2.34857	
Most Extreme Differences	Abso	.197	.197	.220	.168	
	Positive	.186	.197	.142	.152	

	Negative	-.197	-.103	-.220	-.168
Kolmogorov-Smirnov Z		.882	.882	.983	.750
Asymp. Sig. (2-tailed)		.417	.418	.289	.628

- a. Test distribution is Normal.
- b. Calculated from data.

As it can be seen in Table 3, measure of = .882 was insignificant at P-value= .417 in the Synonym Adjacent group, = .882 was insignificant at P-value= .418 in the Synonym Non-adjacent group, = .983 was insignificant at P-value= .289 in the Antonym Adjacent group and = .750 was insignificant at P-value= .628 in the Antonym Non-adjacent group.

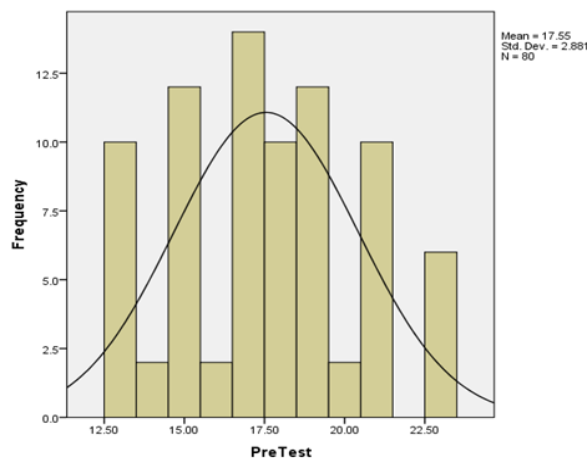


Fig. 1. Normality of distribution in the experimental groups' scores on PET as the pre-test
Figure 1 illustrates the histogram for the pre-test scores and also it shows an approximately normal distribution of scores. To statically demonstrate the homogeneity of variances among the four experimental groups and their insignificant initial differences, a Levene's Test for equality of variances was conducted.

Table 4. Levene's Test of Homogeneity of Variances for PET as the Pre-Test

Levene	df1	df2	Sig.
Statistic			
9.231	3	76	.000

As the results of Levene's statistic displays, the variances of scores on PET are not homogeneous as the index of F=9.231 is significant at p-value=.000. This statistic pushed the researcher to run a group box plots.

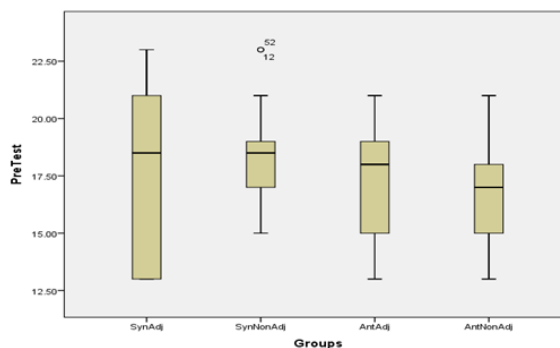


Fig. 2. Box plots for the experimental groups' scores on PET as the pre-test.

As Figure 2 shows, the Synonym Adjacent group's scores on the pre-test range from 13 to 23, while the range of scores in the Synonym Non-adjacent group is from 15 to 21 with two outlier scores of 12 and 25, the range of scores in the Antonym Adjacent group is from 13 to 21, and in the Antonym Non-adjacent group, it ranges from 13 to 21. Following Figure 2, the length of hinges in the Synonym Adjacent group's score is the most among the other experimental groups, whereas the Synonym Non-adjacent group shows the smallest variance. The absence of similar variance in the experimental groups made the researcher draw her conclusions with more cautions.

4.2 Descriptive Statistics of the Immediate Post-Test

In the current research, immediately after the treatment period was over, a Reading Comprehension Test was conducted to assess the participants' vocabulary achievement. The descriptive statistics for immediate post-test scores are presented in Table 5.

Table 5. Descriptive Statistics for the Immediate Post-Test

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis		
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Synonym Adjacent Immediate post-test	20	14.00	20.00	18.0000	2.0000	-1.053	.512	.169	-.92
Synonym Non-Adj Immediate post-test	20	20.00	25.00	21.8000	1.7048	.629	.512	.759	-.92
Antonym Adjacent Immediate post-test	20	13.00	20.00	17.6000	2.2103	-.928	.512	.062	.92
Antonym Non-Adj Immediate post-test	20	21.00	25.00	23.3000	1.3018	-.305	.512	.967	.92
Valid N (listwise)	20								

As it can be seen in Table 5, the immediate post-test scores' ranged from 14 to 20 in the Synonym Adjacent group, 20 to 25 in the Synonym Non-adjacent group, 13 to 20 in the Antonym Adjacent group and 21 to 25 in the Antonym Non-adjacent group. The largest mean score on the immediate post-test belongs to the Antonym Non-adjacent group (23.30) and the smallest mean score was achieved by the Antonym Adjacent group (17.60). The measures of Standard Deviation on the immediate post-test for the four experimental groups are also presented as =2.00, =1.70, =2.21 and =1.30. The measures of Standard Deviations indicate that the largest spread of scores exists in the Antonym Adjacent group. To further examine the normality of distribution on the immediate post-test scores, a Kolmogorov-Smirnov Test of Normality was run.

Table 6. Kolmogorov-Smirnov Test of Normality for the Immediate Post-Test
One-Sample Kolmogorov-Smirnov Test

		Synonym Adjacent Immediate Post-test	Synonym Non-Adj Immediate Post-test	Antonym Adjacent Immediate Post-test	Antonym Non-Adj Immediate Post-test
N		20	20	20	20
Normal Parameters ^{a,b}		Mean	18.0000	21.8000	17.6000
		Std. Deviation	2.00000	1.70448	2.21003
Most Extreme Differences	Absolute	.291	.181	.272	.205
	Positive	.159	.181	.139	.141
	Negative	-.291	-.145	-.272	-.205
Kolmogorov-Smirnov Z		1.303	.808	1.216	.915
Asymp. Sig. (2-tailed)		.067	.532	.104	.372

According to Table 6, the scores of the four groups on post-test1 can be assumed as normally distributed (= 1.303 insignificant at P-value=.067 in the Synonym Adjacent group, = .808 insignificant at P-value=.532 in the Synonym Non-adjacent group, = 1.216 insignificant at P-value=.104 in the Antonym Adjacent group and = .915 insignificant at P-value=.372 in the Antonym Non-adjacent group). To graphically demonstrate the distribution of immediate post-test scores a histogram was created.

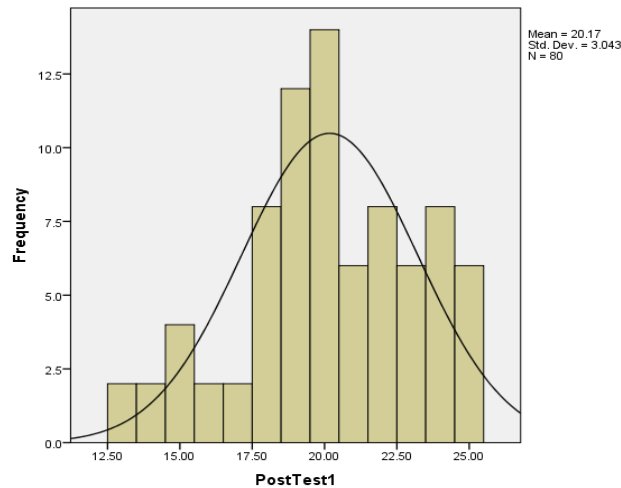


Fig. 3. Normality of distribution in the experimental groups' scores on immediate post-test

As Figure 3 illustrates, the immediate post-test scores are distributed asymmetrically with a long tail to the left to represent a negative skewness of scores around 18.00 and 25.00. However the measure of skewness needed statistical proof which was given with a Leven's test of homogeneity of Variances.

Table 7. Test of Homogeneity of Variances

Levene	df1	df2	Sig.
Statistic			
1.544	3	76	.210

As Table 7 demonstrates, the index of F in Levene test is equal to 1.544 and is insignificant at p-value=.210 which proves the statically insignificant performance of the four groups on the immediate post-test. To graphically examine the heterogeneity of variances among the four experimental groups, box plots of the immediate post-test scores were drawn.

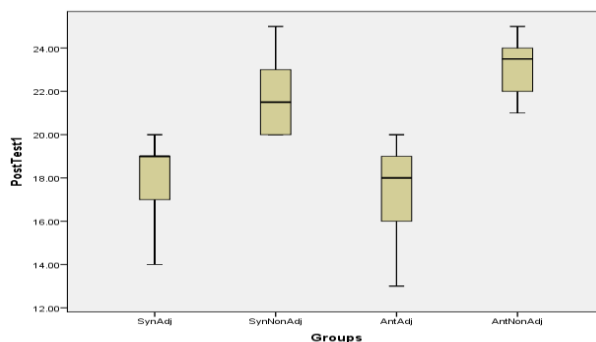


Fig. 4. Box plots for the experimental groups' scores on the immediate post-test

As Figure 4 indicates, the four groups' variances are more or less similar but around different scores. Accordingly, the Synonym Non-Adjacent and the Antonym Non-Adjacent groups performed much better than the other two adjacent groups. Meanwhile, as Figure 4 shows, the long lower whiskers for the Synonym Adjacent and the Antonym Adjacent groups show their positive skewness and their weaker performance on the immediate post-test.

4.3 Descriptive Statistics of the Delayed Post-Test

In this study, a delayed post-test similar to the immediate post-test in its content was administered after a two-week time interval to examine the participants' level of retention in this study. The descriptive statistics for the delayed post-test scores are presented in Table 4.7.

Table 8. Descriptive Statistics of the Delayed Post-Test

	Descriptive Statistics								
	N	Mini mum	Maxi mum	Mea n	Std. Devi ation	Skewness	Kurtosis		
	Stati stic	Statis tic	Statisti c	Stati stic	Statis tic	Stati stic	St d. Er ror	Stati stic	St d. Er ror
Synonym Adjacent\ Delayed Post-test	20	13.00	19.00	17.3000	1.71985	-1.622	.512	2.446	.992
Synonym Non-Adj Delayed Post-test	20	13.00	19.00	17.3000	1.71985	-1.622	.512	2.446	.992
Antonym Adjacent Delayed Post-test	20	10.00	19.00	14.3000	3.11364	-.404	.512	1.104	.992
Antonym Non-Adj Delayed Post-test	20	22.00	27.00	24.5000	1.31789	-.153	.512	.466	.992
Valid N (listwise)	20								

As it can be seen in Table 8, the mean scores on the delayed post-test in the Synonym Adjacent, Synonym Non-adjacent, Antonym Adjacent and Antonym Non-adjacent groups are = 17.3000, = 17.3000, = 14.3000

and = 24.5000, respectively. The measures of Standard Deviation for the delayed post-test in the four groups are also reported as =1.719, =1.719, =3.113 and =1.317. As it can be seen, the participants in the Antonym Non-adjacent group outperformed the other experimental groups with a more homogeneous variance. To further examine the normality of distribution in the delayed post-test scores, a Kolmogorov-Smirnov Test of Normality was run.

Table 9. Kolmogorov-Smirnov Test of Normality of the Delayed Post-test

		One-Sample Kolmogorov-Smirnov Test			
		Synonym Adjacent Delayed Post-test	Synonym Non-Adj Delayed Post-test	Antonym Adjacent Delayed Post-test	Antonym Non-Adj Delayed Post-test
N		20	20	20	20
Normal Parameters ^{a,b}	Mean	17.3000	17.3000	14.3000	24.5000
	Std. Deviation	1.71985	1.71985	3.11364	1.31789
	Absolute	.258	.258	.289	.252
Most Extreme Differences	Positive	.161	.161	.216	.252
	Negative	-.258	-.258	-.289	-.248
Kolmogorov-Smirnov Z		1.154	1.154	1.292	1.128
Asymp. Sig. (2-tailed)		.139	.139	.071	.157

As Table 9 shows, the performance of the groups on the delayed post-test can be assumed to be normally distributed (= 1.154 insignificant at P-value=.139 in the Synonym Adjacent group, = 1.154 insignificant at P-value=.532 in the Synonym Non-adjacent group, = 1.292 insignificant at P-value=.071 in the Antonym Adjacent group and = 1.128 insignificant at P-value=.157 in the Antonym Non-adjacent group). To graphically demonstrate the distribution of experimental groups' scores on the delayed post-test, another histogram was created.

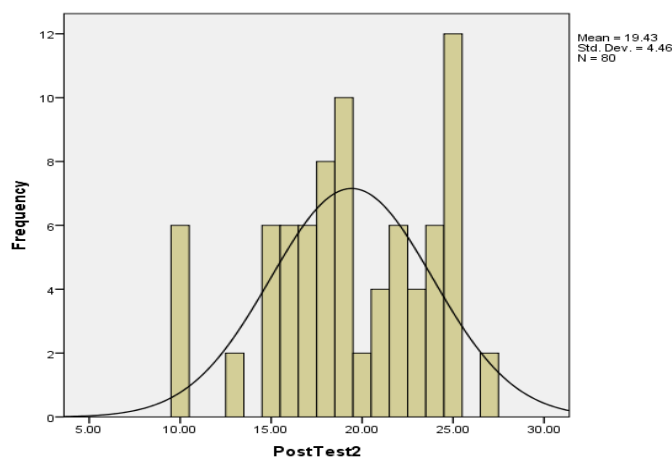


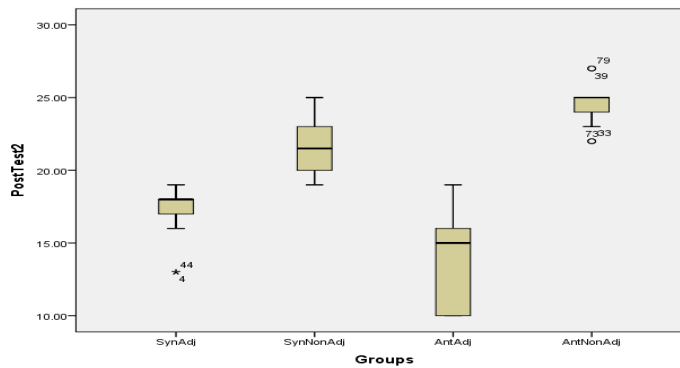
Fig. 5. Normality of distribution in experimental groups' scores on the delayed post-test

As Figure 5 displays, the experimental groups' scores are distributed rather symmetrical with most frequent scores jammed around the mean. However a slight skewness is observable which encouraged the researcher to interpret the results more cautiously.

Table 10. Levene's Test of Homogeneity of Variances for the Delayed Post-Test Scores

Levene	df1	df2	Sig.
Statistic			
6.611	3	76	.000

As Table 10 displays, the index of F in Levene's test is 6.61 that is considered to be significant at p-value=.000 and suggests a lack of variances experimental plots further discrepancies.



statistically significant homogeneity of among the groups. The drawn box explored such

Fig. 6. Box plots for experimental groups' scores on the delayed post-test

As Figure 6 shows, the scores on the delayed post-test show a various pattern of homogeneity and dispersion. The highest box plot belongs to the Antonym Non-adjacent group with four outlier scores and a twisted range of scores. The next noticeable performance belongs to the Synonym Non-adjacent group with a normally spread scores and a slightly negative skewness. The Synonym Adjacent group ranked third with a very small variance of scores and two outlier scores far below the range. The worst performance on the delayed post-test belongs to the Antonym Adjacent group which displays a large range of low scores which are negatively skewed. After statistically describing the performance of the experimental groups on the pre-test, immediate post-test and the delayed post-test, the researcher testifies the null hypotheses by running parametric tests with the scores.

4.4 Testifying the Null Hypotheses

In order to testify H01, the researcher planned to run the One-way ANOVA with the scores of the Synonym Adjacent group on the pre-test, immediate post-test and delayed post-test.

Table 11. One-Way ANOVA for Synonym Adjacent Group's Scores on the Pre-Test, Immediate Post-Test and Delayed Post-Test
ANOVA Table

			Sum of Squares	Df	Mean Square	F	Sig.
Immediate post-test* Adjacent Pre-test	Between Groups	(Combined)	27.217	5	5.443	.689	.040
	Within Groups		110.583	14	7.899		
	Total		137.800	19			
Delayed post-test* Adjacent Pre-test	Between Groups	(Combined)	33.867	5	6.773	.770	.006
	Within Groups		123.083	14	8.792		
	Total		156.950	19			

Table 11 shows the output of One-way ANOVA. The participants in the Synonym Adjacent group outperformed differently both on the immediate and the delayed post-tests relative to the pre-test, with the index $F(df=5, 14) = .689$ which is significant at $P\text{-value} = .040$ and the index $F(df=5, 14) = .770$ that is significant at $P\text{-value} = .006$. The results confirmed the effectiveness of teaching synonym pairs adjacent to one another in similar sessions of EFL classrooms. To further study the effect size of teaching synonyms adjacently, a test of Eta Squared was run.

Table 12. Effect Size of Synonym Adjacent Teaching on Vocabulary Learning and Retention Measures of Association

	Eta	Eta Squared
Immediate Post-test * Synonym Adjacent Pre-test	.444	.398
Delayed Post-test* Synonym Adjacent Pre-test	.465	.216

As Table 12 suggests, the measures of Eta squared show high effect sizes. It can be interpreted that a large amount of variances in the immediate post-test and delayed post-test can be accounted for by the treatment that the students received in the Synonym Adjacent group. Therefore, the first null hypothesis is rejected. Accordingly, it can be said that:

Teaching synonym pairs adjacently has a significant effect on EFL learners' vocabulary learning and retention. Similar to the scores of the Synonym Adjacent group, to testify H02, the researcher decided to run the One-way ANOVA with the Synonym Non-Adjacent group's scores on the pre-test, immediate, and delayed post-tests.

Table 13. One-way ANOVA for the Synonym Non-adjacent group's Scores on the Pre-Test, Immediate and Delayed Post-Tests
ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Immediate post-test* Non-Adj Pre-test	Between Groups	(Combined)	43.467	6	7.244	.998	.006
	Within Groups		94.333	13	7.256		

	Total		137.800	19			
Delayed post-test* Non-Adj Pre-test	Between Groups	(Combined)	44.867	6	7.478	.867	.004
	Within Groups		112.083	13	8.622		
	Total		156.950	19			

As Table 13 illustrates, the participants in the Synonym Non-adjacent group have performed differently on the pre-test from immediate and delayed post-tests, with the index $F(df=6, 13) = .998$ which is reckoned to be significant at $P\text{-value} = .006$, and $F(df=6, 13) = .867$ that is significant at $P\text{-value} = .004$. The significant indices of F support the effectiveness of the treatment in the group. To measure the effect size, a measure of Eta Squared was calculated.

Table 14. Effect Size of the Synonym Non-Adjacent Teaching on Vocabulary Learning and Retention Measures of Association

	Eta	Eta Squared
Immediate Post-Test * Synonym Non-Adj Pre-test	.562	.315
Delayed Post-Test * Synonym Non-Adj Pre-test	.535	.286

As Table 14 demonstrates, the measures of Eta squares are large enough to account for the major variances in the immediate and delayed post-tests. Therefore, the second null hypothesis is rejected. In accordance with the findings of the study, it can be stated that:

Teaching synonym pairs non-adjacently has a significant effect on EFL learners' learning and retention of vocabulary.

Similarly, the One-way ANOVA was run among the Antonym Adjacent group's scores on the pre-test, immediate post-test and delayed post-test.

Table 15. One-way ANOVA for the Antonym Adjacent Group's Scores on the Pre-Test, Immediate and ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig
Immediate Post-test* Antonym Adjacent Pre-test	Between Groups	(Combi ned)	24.967	5	4.993	.620	.687
	Within Groups		112.833	14	8.060		
	Total		137.800	19			
Delayed Post-test* Antonym Adjacent Pre-test	Between Groups	(Combi ned)	30.867	5	6.173	.685	.642
	Within Groups		126.083	14	9.006		
	Total		156.950	19			

As Table 15 shows, the participants in the Antonym Adjacent group did not have a different performance on the pre-test, immediate and delayed post-test. This finding suggests the absence of meaningful impact of this treatment on the participants' vocabulary achievement and retention. Accordingly, the index F (df=5, 14) = .620 is insignificant at P-value= .687 for the immediate post-test and the index F (df=5, 14) =.685 is insignificant at P-value= .642 for the delayed post-test. To measure the effect size in this experiment, the index of Eta Squared was calculated.

Table 16. Effect Size of the Antonym Adjacent Teaching on Vocabulary Learning and Retention Measures of Association

	Eta	Eta Squared
Post-Test1 * Antonym Adjacent Pre-test	.426	.181
Post-Test2 * Antonym Adjacent Pre-test	.443	.197

As Table 16 suggests, the Eta Squared for the effectiveness of teaching antonyms adjacently (.181) is not large enough to account for the impact of this treatment on the participants' vocabulary achievement. Therefore, the researcher failed to reject the third null hypothesis.

In order to testify Null Hypothesis 4, the researcher ran another One Way ANOVA.

Table 17. One Way ANOVA for the Antonym Non-adjacent group's vocabulary learning and retention
ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Immediate Post-test * Antonym Non-Adj Pre-test	Between Groups	(Combined)	35.800	6	5.967	.760	.013
	Within Groups		102.000	13	7.846		
	Total		137.800	19			
Delayed Post-test * Antonym Non-Adj Pre-test	Between Groups	(Combined)	35.450	6	5.908	.632	.003
	Within Groups		121.500	13	9.346		
	Total		156.950	19			

As Table 17 shows, contrary to the Antonym Adjacent group, the participants in the Antonym Non-adjacent group performed differently on the pre-test, immediate and delayed post-tests with the index F (df= 6, 13) = .760 to be significant at P-value= .013 in the immediate post-test and the index F (df=6, 13) = .632 as significant at P-value= .003 in the delayed post-test. An index of Eta squared was measured to study the effect size of the treatment.

Table 18. Effect Size of the Antonym Non-Adjacent Teaching on Vocabulary Learning and Retention
Measures of Association

	Eta	Eta Squared
Immediate Post-test* Antonym Non-Adj Pre-test	.510	.260
Delayed Post-test * Antonym Non-Adj Pre-test	.475	.226

As Table 18 demonstrates, the measures of Eta squares are large enough to account for the major variances in the immediate and delayed post-tests. Therefore, the fourth null hypothesis is rejected. By the same token, it should be asserted that:

Teaching antonym pairs non-adjacently has a significant effect on EFL learners' vocabulary learning and retention.

To testify Null Hypothesis 5 which assumes no significant differences can be observed with regard to the effects of teaching synonyms and antonym pairs adjacently or non-adjacently on EFL learners' vocabulary learning and retention, a ANOVA Test was run.

Table 19. One-way ANOVA for the Experimental Groups' Performance on the Immediate and Delayed ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Post-Test1 * Groups	Between Groups	(Combined)	475.350	3	158.450	47.003	.000
	Within Groups		256.200	76	3.371		
	Total		731.550	79			
Post-Test2 * Groups	Between Groups	(Combined)	1225.350	3	408.450	89.666	.000
	Within Groups		346.200	76	4.555		
	Total		1571.550	79			

As displayed in Table 19, in both of the immediate and delayed post-tests, all of the four experimental groups performed significantly different from pre-test, which partly proves the effectiveness of all treatments in this study. The index $F (df= 3, 76) = 47.003$ is regarded to be significant at $P\text{-value} = .000$ for the first immediate post-test and the index $F (df= 3, 76) = 89.666$ is significant at $P\text{-value} = .000$ for delayed post-tests are presented in the table. The measure of Eta squared for both immediate and delayed post-tests are totally large and meaningful as illustrated in Table 20.

Table 20. Effect Size of all Treatments on the Immediate and Delayed Post-Tests Measures of Association

	Eta	Eta Squared
Immediate Post-test* Groups	.806	.650
Delayed Post-test * Groups	.883	.780

Finally, to compare the four treatments in this study, Table 21 summarizes the participants' improvement of mean scores in the immediate post-tests and their lower achievement in the delayed post-tests.

Table 21. Comparison of the Groups' Performance on Immediate and Delayed Post-Tests

Groups		Immediate Post-test	Delayed Post-test
Synonym Adjacent	Mean	18.0000	17.3000
	N	20	20
	Std. Deviation	2.00000	1.71985
Synonym Non- Adjacent	Mean	21.8000	21.6000
	N	20	20
	Std. Deviation	1.70448	1.95744
Antonym Adjacent	Mean	17.6000	14.3000
	N	20	20
	Std. Deviation	2.21003	3.11364
Antonym Non- Adjacent	Mean	23.3000	24.5000
	N	20	20
	Std. Deviation	1.30182	1.31789

According to Table 21, the outstanding performance in both immediate and delayed post-tests belongs to the Antonym Non-Adjacent group with the mean scores of 23.30 and 24.50 on the immediate and delayed post-tests, respectively. The second performance belongs to the Synonym Non-adjacent group with the mean scores of 21.80 and 21.60 on the immediate and delayed post-tests, respectively. At the third level of performance the Synonym Adjacent group stands with the mean scores of 18.00 and 17.30 on the immediate and delayed post-tests, respectively. Finally, the lowest performance on both of the immediate and delayed post-tests belongs to the Antonym Adjacent group with the mean scores of 17.60 and 14.30, respectively. Therefore, the researcher could reject the fifth null hypothesis and maintain that:

It makes a meaningful difference on EFL learners' vocabulary learning and retention whether synonym and antonym pairs are taught adjacently or non-adjacently.

5. Discussion

Teaching synonym pairs adjacently has no significant effect on EFL learners' vocabulary learning and retention.

The observational and statistical results in this study confirmed the effectiveness of teaching synonym pairs adjacently on Iranian EFL learners' vocabulary learning progress and their longer retention. In the same vein, Nation (2000) stated that synonyms are one of the most versatile materials in teaching English vocabulary. Since, effective vocabulary instruction has an enormous impact on all language skills, knowing about different semantic aspects of words would cause better language performance. In this research, the findings supported the effectiveness of teaching new words out of context through the technique of using synonym pairs.

According to Aksoy (2006), intentional vocabulary learning is defined as intended learning of vocabulary.

Language learners endow the necessary mental efforts and memorize the words until they know their meanings when they want to upturn their vocabulary or have to learn new words for a test. Incidental learning, on the other hand, does not encompass an effort to learn words.

Explicit vocabulary learning is essential for beginners who need to learn adequate words to be able to read more texts. Students can improve their reading with studying the 3000 most frequent words until the word forms and meanings become inevitably known. Explicit vocabulary instruction helps comprehending difficult words or passive words that represent complex concepts that are not part of their everyday experiences. It also leads to a better reading comprehension by installing known words into a given text.

Teaching synonym pairs non-adjacently has no significant effect on EFL learners' vocabulary learning and retention.

Several recent studies have examined the relative effectiveness of different techniques to presenting new words (Morsali, 2012; Soleimanifard, 2011). Some may be more helpful for improving language learners' vocabulary learning and retention than others. According to Hashemi and Ghodasiae (2005), there has been a growing interest in the effectiveness of the Lexical Sets and the Semantically Unrelated vocabulary instructions, but a firm conclusion is still somewhat elusive.

They also noticed that several studies supported semantic lexical sets to be useful in organizing and chunking words into related classes as vocabulary instructions. The applicability of the concept of vocabulary spurt to L2 vocabulary contexts was also supported. However, with all the predictions made by the first language interference theory, the results were not as reliable as expected.

Teaching antonym pairs adjacently has no significant effect on EFL learners' vocabulary learning and retention.

To reach this conclusion, the researcher ran a One-way ANOVA among the Antonym Adjacent group's scores on the pre-test, immediate post-test and delayed post-test and findings proved that they made no meaningful improvement in their knowledge of vocabulary before and after receiving the antonym pairs adjacently.

There are a number of studies arguing the effectiveness of presenting new vocabulary items loaded in single classroom sessions (Morsali, 2012; Soleimanifard, 2011). In Morsali's research, the participants who practiced semantically unrelated sets of words performed better than those who received antonym word sets adjacently (as semantically related). The findings in Soleimanifard (2011), however, proved that the presented vocabulary in terms of hyponyms and semantically related clusters would lead to longer word retention. The results of these studies also put emphasis on presenting and practicing the semantically related words in separate sessions.

Teaching antonym pairs non-adjacently has no significant effect on EFL learners' vocabulary learning and retention.

In the current study, participants in the Antonym Non-adjacent group outperformed on the immediate and delayed post-tests than on the pre-test. It was interpreted as teaching the antonym pairs separately might positively affect the language learners' vocabulary improvement and retention. This finding supports Waring (1997) who believed that teaching new vocabulary items in semantic sets increases the burden of learning on the shoulders of the learners since they should not only try to gain the meaning of the new items but also attempt to keep them apart in order to prevent themselves from the long-term confusion.

It makes no significant difference on EFL learners' vocabulary learning and retention if synonym and antonym pairs are being taught adjacently or non-adjacently.

After data analysis, the researcher examined whether or not any difference can be observed in EFL learners' vocabulary learning and retention when the synonym and antonym pairs are taught adjacently and non-

adjacently. In Table 21, the first ranked performance in both immediate and delayed post-tests belonged to the Antonym Non-Adjacent group. The second performance belonged to the Synonym Non-adjacent group. The Synonym Adjacent group stands at the third level of performance. Finally, the lowest performance on both the immediate and delayed post-tests belonged to the Antonym Adjacent group. These graded performances suggested the superiority of teaching semantically related words, either antonyms or synonyms, non-adjacently.

Nation (2000) declared that if the words are to be instructed in semantically-related sets, the teacher should create a context which helps learners to relinquish the extent of interference caused by semantic clustering through visual aids. Like some scholars, Nation (2000) believed that clustering words is troublesome when the pair words are new and the learners have no background knowledge for both, but when the learners know at least one of the words and try to learn the other one, their previous knowledge facilitates learning and retaining the word set. This accounts for the relative outperformance of Non-Adjacent groups over adjacent groups in this study.

6. Conclusion

The purpose of this study was to examine the comparative impacts of teaching synonym and antonym pairs adjacently and non-adjacently on Iranian EFL learners' vocabulary learning and retention. Based on the findings, the following conclusions were drawn:

First, teaching new words out of a context might be as helpful as teaching them within the language context (i.e., co-text). As Stahl and Fairbanks (1986) reviewed, not long ago, vocabulary instruction techniques most often relied on mastering lists of new words along their definitions. Today, it is believed that such instructions are of limited value, mostly in terms of improving students' language skills such as reading comprehension or spontaneous speech production. Students need to know how a word functions in different contexts. Therefore, instructional methods that provide students with both definitional and contextual information do improve comprehension, and do so significantly.

Morsali (2012) confirmed that the vocabulary items presented in a list but not in a context could be learned successfully if pictorial primes were used to suggest their meaning. Using a pictorial context which was suggested by some scholars like Nation (2000) minimizes the word disruption while learning semantically related words. In the same vein, this study suggested that the use of pictures to create a situational context for the new and semantically related words can be as effective as a linguistic context, or co-text.

Second, teaching synonyms and antonyms gives language learners an opportunity to enhance their memory for semantically-related words. As Morsali (2012) pointed out, a disputable technique for presentation of new words is that they are packed as semantically unrelated sets in order to prevent the probable confusion for lexical internalization. Some scholars such as Erten and Tekin (2008), Tinkham (1993), and Waring (1997) suggest that the presentation and instruction of new vocabulary items in semantically related sets might be more confusing for novice learners and so learning those related words will be more difficult. Soleimanifard (2011) asserted that a glance into most of the English language textbooks shows that each unit usually contains many related words that the teacher must present in one session and the students have to learn them all together. She also noticed that it seems that many people consider bring words of related meaning together such as lexical sets, synonyms, antonyms, and so on, much more useful since they allow learners to see their difference and to advance a better knowledge of the new items in their definite relation with other words. (Soleimanifard, 2011)

Third, teaching synonyms and antonyms in separate sessions with short intervals in between might positively

affect the students' long term memory for words and consolidate their experience of learning words in a foreign language.

In Morsali's (2012) study, the vocabulary items were presented in a list accompanied with pictorial cues but not in a context. Priming pictures, which was suggested by some scholars like Nation (2000) in order to minimize the word disruption while learning semantically related words, was not quite successful. Although learners learnt the new vocabulary items through pictures, yet those participants who received the target words without semantic relations had less confusion.

The current study attempted to investigate the impact of teaching synonym and antonym pairs adjacently versus non-adjacently on Iranian intermediate EFL learners' vocabulary learning and retention after a two-week interval. Accordingly, foreign language syllabus designers and materials writers who select and order new words to be presented in different courses and classes might receive better results if the words are grouped under a hierarchy of semantically-related words.

In addition, the findings of this study can be beneficial for language teachers by providing them with further opportunities to presenting new vocabulary and add variety to the classroom tasks and activities so that they could enhance learners' vocabulary acquisition. The findings also suggest the possibility of including some out-of-the-context enlisted words sets to the students every session so that the words are noticed not purely based on their contribution to the language discourse but according to their componential differences and similarities to one another.

Suggestions for future research on this topic may go around the following issues: Further studies might be conducted to study the role of teaching other semantically related words, such as meronyms or hyponyms on EFL learners' vocabulary learning and retention. Moreover, according to Powel (as cited in Blachowics & Fisher, 2005), there are three main kinds of antonyms including contradictions (which are mutually exclusive such as female/male), contraries (the terms used in the current research such as giant/ miniature), and reciprocal terms (or converse terms like give/take). In this research, a set of contrary antonyms were selected which were presented adjacently and with one week time interval. Further research can investigate the effect of other kinds of antonyms on EFL learners' vocabulary achievement. Finally, the participants in the study received the materials in Microsoft power point slides where some pictorial cues helped them learn and recall better. Other presentation aids such as flash cards or games may have different effects on language learners and a different result might be achieved.

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