The Effect of the Keyword Method on Vocabulary Learning and Long-Term Retention

Ali Akbar Taheri
MA holder in TEFL
Hakim Sabzevari University
Iran

Dr. Mohammad Davoudi
Assistant Professor of TEFL
Department of English Language and Literature
Hakim Sabzevari University
Iran

Abstract

The present study investigated the effect of the keyword method of vocabulary teaching on the learning and long-term retention of vocabulary in a normal EFL classroom context. Fifty elementary EFL students were selected and assigned into experimental and control groups. The experimental group received vocabulary instruction using mnemonic keyword method and the control group received conventional memorization-based instruction of the same vocabulary items. Each group took two post-tests, one test immediately after instruction and one test two weeks later. Paired and independent samples t-tests were run on the data and the results indicated that participants in the keyword group outperformed the memorization group significantly in both their learning and retention of the vocabulary items. The results of the study support the effectiveness of the establishment of mental links and images, through the use of mnemonic strategies, for the vocabulary learning and retention of elementary level EFL learners.

Key Words: The Keyword Method, Rote Memorization, Vocabulary Retention, Vocabulary Learning.

1. Introduction

Historically, In EFL teaching contexts in Iran, vocabulary teaching, as a part of the school syllabus in EFL classrooms, has been less emphasized than the teaching of English grammar. In the past, the grammar translation method (GTM) clearly played an important role in the English language classrooms and still continues to do so. Learners inevitably tried hard to memorize English grammatical rules and the main strategy regarding vocabulary learning was the repetition of a long list of irregular verbs. The learners had to memorize the parts of speech of words. Besides, vocabulary teaching in the classroom was only limited to giving learners a long list of English words with translations. As a result, the learners learned only two things: the English word form and the L1 translation. Other types of information about new vocabulary items such as English definitions, synonyms, antonyms, etc. were optional. Normally, learners were asked to learn or memorize words on their own. The only method to memorize new words traditionally introduced to learners was word repetition, that is., saying the second language word form aloud with the first language translation.

With grammar translation being emphasized in class, the classroom atmosphere was rightfully depicted in Fox (1987) who claimed that "Students had been learning foreign languages by a grammar translation method which flooded them with new vocabulary items and grammatical structure, but did not allow time to assimilate them much." (p. 307). It could be claimed that, in the past, teachers and learners showed little interest or enjoyment when teaching and learning vocabulary. Today, in Iranian EFL context, vocabulary learning and instruction is not different from what it used to be. A teacher gives the learners many new vocabulary items in a list of foreign language word forms with the translation.

The learners are asked to memorize the words on their own outside classroom. Not having been introduced to vocabulary learning strategies, learners are asked to memorize the words to increase their vocabulary knowledge and to pass the examinations. Therefore, the learners struggle with memorizing large numbers of new words during the entire course. It is likely that without introducing any new vocabulary learning strategies in class either by the teacher or the course book, only the traditional strategy of repetition would be used by learners as a kind of help to learning and remembering the words.

As evidenced in the literature, there has been a rise in research and interest in L2 vocabulary learning and teaching in recent years. In spite of the fact that interest in teaching and learning vocabulary has increased, it is difficult to familiarize language teachers with the basic concepts of vocabulary teaching and also to equip them with the pedagogical 'know-how' of vocabulary teaching techniques (Maiguashca, 1993). This idea is supported by Maiguashca's statements emphasizing the underlying principle of vocabulary teaching gathered from resources concerning the concepts of vocabulary teaching and learning that giving teachers some guidance on how to translate the concepts and principles of theory into pedagogical practice is crucial (Maiguashca, 1993). In the classroom, teachers struggle to balance vocabulary and grammar instruction. In addition, how to help learners to recall a large amount of vocabulary is still a pedagogical question and a major concern needing a practical solution.

Another important point which needs to be addressed is the question of when to introduce vocabulary learning strategies and how to instruct learners to use them in the classroom so that they can use the techniques to deal with vocabulary learning more effectively while learning vocabulary independently. Teachers still struggle with the demanding and time-consuming job of teaching the subject matter in each course and the enormous task of checking the learners' homework. The learners are asked to memorize the vocabulary in isolation. Hence, the question remains as to when we could see a change in the balance between teaching English grammar and vocabulary and the development in vocabulary teaching and learning in EFL contexts.

2. Literature Review

The keyword technique is simply defined as a two-stage procedure for remembering new words that have an associative component (Pressley, Levin, and Delaney, 1982). To use this method, a sound or image linkage between a new L2 word and a word in the first language should be created. Therefore, this method encompasses two main acoustic and mental linkages. In his view of the keyword method, Nation (1990) stated that in this technique, learners create an unusual association between the words. He also adds that the more imagination you have, the more useful the technique. In Nation's notion, the associations can be made between L1 and a new L2 word, or between a new L2 and already known L2 words. Pressley et al. (1982) and Paivio & Desrocher (1981) give thorough reviews of the experimental research on the keyword method. There are eight conclusions in the survey of almost 50 studies of this technique.

A number of studies have been conducted to investigate the effect of training in a known memory strategy called the *keyword method*. The keyword method was first developed by Atkinson (1975) in an experimental study. So far, the keyword method has been conducted in several studies to examine its effectiveness on learners' second language vocabulary retention. For example, Atkinson & Raugh (1975) found that the keyword method helped learners successfully to learn Spanish nouns. Nation (2001) states that more than one hundred studies have been conducted to discover how effective this technique is. He states that the keyword technique is primarily a way of making a strong link between the form of an unknown word and its meaning. Researchers conducting studies on the keyword method such as Pressley, Levin, and Delaney (1982); Avila & Sadoski (1996), Rodriguez & Sadoski (2000) and Kasper (1993) believe that the technique may benefit learners in terms of facilitating second language word retention. Some studies on the keyword method are presented in this part. In a study conducted by Cohen & Aphek (1980), the effect of mnemonic association on recall of second language vocabulary overtime was investigated. The results showed that after being trained in making associations, students were relatively successful in recalling L2 words learned through these associations.

Pressley, Levin & Miller (1981) investigated the effect of the keyword method on vocabulary comprehension in context. Subjects, who enrolled in Psychology courses at Western Ontario University, were 16 students as keyword subjects for experiment one, 14 and 15 students were randomly selected as the keyword and control subjects respectively for experiment two. The results showed that in terms of comprehending vocabulary in context, keyword subjects in both experiments outperformed control subjects.

In a study conducted by Brown & Perry (1991), sixty Arabic language learners were trained in three vocabulary learning strategies (the keyword, semantic, and keyword-semantic) and the learners' performance in ESL vocabulary acquisition was compared. The findings from the immediate cued-recall tests indicated that the keyword method was helpful for lower proficiency learners in vocabulary acquisition. The delayed tests obtained from recognition and cued-recall tests showed that the combined keyword and semantic method was significantly superior to the keyword and semantic methods.

Avila & Sadoski (1996) conducted a study involving two training sessions in the keyword method with eight teachers and their assistants. Information about the keyword method was provided in the first session. In the second session, a 'warm-up session' was held to check teachers' understanding of the technique in addition to the ways of training in the method. Sixty Mexican students were divided into two groups, namely experimental and control. The findings showed that the keyword method was superior concerning recall and comprehension both immediately and after one week. Rodriguez & Sadoski (2000) investigated the effects of four strategies of rote rehearsal, context, keyword, and context/keyword on immediate and delayed recall of EFL vocabulary. To teach the methods, two teachers were assigned randomly to train two different techniques in four normal classes. The mean results showed that in the long-term condition, the combined context/keyword method was superior to the other methods. The results of the context method used in this study are in line with the findings of the semantic method of Brown and Perry's (1991) study.

In another study carried out by Wei (2015), the comparative effect of the keyword method and word part method was investigated. The participants were one hundred and twenty one Chinese freshmen from three departments of one university with a six-year English course experience who were randomly assigned to two learning conditions: One as the keyword and the other as the word part subjects. As a result of the study, it was found that the keyword method was inferior to the word part technique and the translation test format. Piribabadi & Rahmany (2014) investigated the effect of word-list method and keyword method instruction on ESP vocabulary learning across proficiency levels. Subjects were one hundred and twenty intermediate students of Industrial engineering, aged at about 21, at Islamic Azad University of South Tehran branch. The results of the study revealed that the keyword method instruction has superiority over the word-lists method in learning ESP vocabulary regarding the proficiency level of the students. Köksal & Çekiç (2014) examined the effect of the mnemonic keyword method, plus the context method, on L2 vocabulary learning in comparison with rote rehearsal plus the context method. The findings of the study revealed that the scores of the groups who employed the keyword method combined with the context method were higher than those of first language translation group.

Most studies have been conducted to compare the keyword method with rote learning. However, Dolean (2014) examined the efficiency of a method (experimental) using a pair of pictures representing the new word and its keyword meaning against a method (control) using just a picture representing the new word, using rehearsal in both treatments. Participants were one hundred and one elementary students aged 9 to 10 in a city in Romania. Results indicated that showing a picture for a new L2 vocabulary word and one for the keyword at the same time increases retention. Campos, Rodríguez-Pinal & Pérez-Fabello (2014) investigated the efficacy of the keyword method in the learning of the non-dominant language in bilingual students. One hundred and two students used the keyword and one hundred students used the rote method to learn the Spanish meaning of twenty Galician words. Participants using the mnemonic keyword outperformed those who used the rote learning in terms of both receptive and productive retention. This finding supported the efficacy of the keyword method in other languages such as Galician than those studied such as English, Italian, French or German.

Banisaeid (2013) conducted a study in which she compared the effect of memory strategies and cognitive strategies on learning vocabulary of a group of intermediate Iranian EFL learners. The results of the research indicated that those trained by memory strategies were not better in word learning than those who were trained cognitively. That is, they remembered the meaning of the word as fast as those trained cognitively. In another study, AhmadiSafa & Hamzavi (2013) investigated the effect of the keyword method on the learning and retention of vocabulary in the long term in a normal classroom context. The results showed that subjects in the keyword group outperformed the memorization group at a significant level in both their learning and retention of the newly learned vocabularies. The results of the study underscore the efficacy of the establishment of mental links and images for the vocabulary learning and retention of novice and beginning level EFL learners. Tavakoli & Gerami (2013) conducted a study in which the comparative effects of two mnemonic techniques, namely the keyword method and pictorial method, on vocabulary learning and retention were examined.

Sixty female elementary students who were studying English at a language institute in one of the cities in Iran were selected to participate in this study. Their immediate and long-term memory recall of the vocabulary items was measured. The researchers found that students who used the keyword method stored and retained lexical items better than those who used the pictorial technique.

In another study which was carried out by Ashoori Tootkaboni (2012), the effects of three strategies called keyword, context and word list, on long-term retention of vocabulary items in an EFL context was compared. Participants consisted of sixty five female learners studying English at an institute in Iran. In line with similar studies on the keyword method, the results indicated that the keyword group outperformed the context and wordlist groups. Campos, Camino & Pérez-Fabello (2011) carried out a study to assess word imagery on the immediate and long-term retention of words using rote learning and the keyword method in a sample of eighty adults (fifty five women and thirty men) aged between fifty five and seventy years old. The researchers found that subjects who used the keyword recalled more words than those who used repetition method both immediately after instruction and after a one-day interval.

In another study by Wyra, Lawson & Hungi (2007), the effects on recall of word meaning pairs of instruction in use of mnemonic keyword method at the time of interval and the effect of self-rated ability to image was investigated. Subjects consisted of 77 male and female students in three primary schools in South Australia. The results indicated that training in the use of the keyword method at the time of retrieval offered an educationally meaningful advantage for recall performance.

Beaton, Guneberg, Hyde, Shuffle bottom, & Sykes (2005) compared the influence of the keyword method with rote learning method on vocabulary recall. Subjects who took part in this study were 30 female psychology students at the University of Wales Swansea aged at 18 to 43. The researchers reported that compared to rote repetition, learning can be improved by the mnemonic keyword method. Zhang & Schum (2000) investigated the comparative effects of the keyword method and rehearsal method on the vocabulary learning of students with Limited English Proficiency (LEP). Sixty participants with LEP took a vocabulary recall test and a sentence completion test over two time intervals: immediate and one-week delayed. Post hoc tests indicated that students in keyword groups outperformed their counterparts in the rehearsal group in vocabulary recall tests and sentence completion tests over time. Moreover, most of the participants who took part as the keyword group enjoyed this method and planned to use it in the future.

As can be seen in the literature, most studies have been conducted in ESL contexts. The present study aims as investigating the effect of one of the vocabulary learning strategies (the Keyword Method) on students' learning and recall of vocabulary in an EFL context. It also tries to compare this method with the rote learning method. It is hoped that by comparing the findings of the study, educators and learners will use more effective strategies, e.g. the Keyword Method, in vocabulary instruction. The present study strives to find answers to the following research questions:

1. Does the teaching of Keyword Method as a mnemonic strategy affect the vocabulary learning of Iranian elementary EFL learners?
2. Does the teaching of Keyword Method as a mnemonic strategy affect long-term vocabulary recall of Iranian elementary EFL learners?

3. Method

3.1 Participants

Fifty students participated in this study. Of the 50 students, 25 were female and 25 were male. The participants' gender was not considered as a moderator variable in this study. Thus, its influence on results was not taken into consideration. They enrolled in EFL classes in an English Language institute named Iran Language Institute (Neyshabour branch).The participants of the study (aged from 15 to 30) were selected and divided into experimental and control groups.

The researcher was teaching a class consisting of boys and girls in Neyshabur branch. This class which was available to the researcher was considered as the experimental group. The second group studying in Mashhad branch was considered to be the control group. The experimental group was instructed based on the keyword method and the control group was taught based on the conventional rote memorization. The reason for selecting these students was the principle of availability. For all of the participants, the Persian language was their first language and the English language was their foreign language.

To make sure that the participants were at the same level of proficiency, a placement test (The New Inside Out Quick Placement taken from www.insideout.net) was conducted. In order to ensure that samples were fairly homogenous in terms of their level of proficiency, the researcher included those students whose scores obtained from the placement test fell one standard deviation below or above the mean and ignored the rest. By doing so, the selected participants would be at the same level of language proficiency.

3.2 Research Design

The purpose of this research was to determine the effect of the keyword method (independent variable) on the learning and retention of elementary EFL (Iranian) learners' vocabulary learning (dependent variables). The design of the present paper is an experimental design in which the experimental and control groups were compared with each other based on the results of their pre-tests and post-tests. In this study, there were both pre-tests and post-tests and the experimental group received the treatment and the control group received instruction based on rote learning. Also, the participants of the study were selected and assigned to the experimental and control groups.

3.3 Research Instruments

For the purpose of data collection, three instruments were used, which are described in order:

3.3.1 Placement test

In the present study, The New Inside Out Quick Placement Test taken from www.insideout.net was used at first to determine the participants' proficiency level. The reason behind using such a test was to curtail the effect of subject selection on the outcome of the study.

3.3.2 Vocabulary Pre-Test

To make sure that the participants were unfamiliar with the target words, a test of vocabulary was used prior to the experiment. It was a test with thirty items; each item questioned the meaning of the target vocabulary items. The words were chosen from one of the elementary books taught in Iran Language Institute. These items were arranged based on the units of the book. The items used in this experiment were from different parts of speech including verbs, nouns, adjectives and adverbs. To suit the purpose of the study, the words had to meet two criteria: first, they had to be appropriate for the students' level; second, the words that had a strong phonological similarity with Persian language (L1) were selected. Therefore, twenty words with which no student was familiar were used in the study.

3.3.3. Vocabulary Post-Test

A twenty-item vocabulary test was employed to measure the learners' lexical acquisition and recall. The post-test was administrated two weeks after the treatment to test the retention of the learned words in long-term memory.

3.4 Procedure

The normality of data was checked through Skewedness test (see Table 4.1). The two groups' mean scores were compared before the treatment through a pre-test. To find out the difference between the means of the two groups, an independent-samples-t-test of the pre-test was conducted. After the participants were instructed in the keyword method, their vocabulary learning was tested. A paired-samples-t-test was run between the pre-test and post-test scores of the experimental group. In other words, an independent-samples-t-test was applied to see if the mean differences were statistically significant. The significance of the difference between the mean scores of both the experimental and control groups was tested at probability value of .05. For comparing the development in the post-test group, a paired-samples-t-test was used. To see which method (rote learning or the keyword method) was more effective in the participants' long-term recall, the results of delayed post-tests in rote learning and keyword groups were compared through independent-samples t-test. The effect size was also measured and taken into account.

First, a sixty-item test of language proficiency was used to ensure homogeneity of the students. All the sixty students took part in the test. They were given forty five minutes, as required by the test, to answer the questions. The results were then used to select those students who were supposed to be the final participants of the study. Those students whose scores fell between 10 and 19 were chosen, based on the test requirement, for the final data analysis. In the next phase, the pre-test was administered to the participants. The students were asked to write the Persian translation or the English definition of each word in front of it.

After administrating the test of vocabulary unfamiliarity and placement test, there remained 50 participants and 20 words with which none of the students were familiar. These words were then divided into groups of five to six words to be taught during each session. The reason for exposing the participants to 5-6 words each session lies in Finocchiaro and Bonomo's assertion (1973) that in general, no more than about eight new words should be presented at one time; otherwise, it is not manageable by the students. The treatment consisted of 15 days of instruction: thirteen sessions every day, each session 15 minutes.

In the experimental group, the keyword method was introduced in the first session of the experiment. In the control group, papers including the same five to six words as the experimental groups were distributed among the learners and they were told to memorize these words just by reading the Persian equivalent of each word written in front of it. Right after the treatment, first, a test was administered as the immediate post-test. They were designed to measure short-term memory of the participants regarding the words taught the same day by the instructor. These tests were administered randomly in five sessions immediately after the instruction and the test was based on just the words presented in the very session. The time the students had to give Persian equivalents was six minutes. The average of each student's score on these five quizzes was recorded as their short-term memory score. Second, two weeks after the treatment, the delayed post-test was administered to measure the subjects' long-term memory regarding the instructed words. The test comprised all the 20 words which were taught during the treatment. The time for this test was 20 minutes. The learners were supposed to write the Persian meaning of the new words on their answer sheets. The order of the items in the test was different from the order in which the target words were instructed to avoid memorization effect.

The two groups were told from the beginning that they were participating in an experiment and that they would be tested on vocabulary before the end of the course. The participants were told that their opinions, answers, or any comments would not have any effect on their scores or performance in the course. The participants were not obliged to take part in the study if they did not want to. It was also made clear, and repeated immediately before the test, that there was strict anonymity, that is, the test papers would not reveal the names of the participants. Both groups were tested identical vocabulary items because their textbooks were similar. Vocabulary items with minor spelling mistakes were considered as correct. As in all applications of the keyword method, only the meaning of the item was taught. The word lists consisted of concrete and abstract nouns, verbs, adverbs and adjectives.

4. Results and Findings

4.1 Normality of Data

In order to make sure that the sample was normal, some tests were run. These tests were run through SPSS which are presented below:

Table 4.1: ***Descriptive Statistics for Normality***

		control group	experimental group
N	Valid	25	25
	Missing	25	25
Mean		2.1200	3.8800
Std. Deviation		1.33292	1.73973
Skewedness		.222	.148
Std. Error of Skewedness		.464	.464
Kurtosis		-.401	-.803
Std. Error of Kurtosis		.902	.902

Table 4.1 indicates that the students' scores in the control and experimental groups were normal because the skewedness for both groups was less than one. Therefore, the researcher concluded that the sample for the control and experimental groups was normal and thus parametric tests could be used.

4.2 Results of Pre-tests for Control and Experimental Groups

The two groups' mean scores were compared before the treatment through a pre-test. To find out the difference between the means of the two groups, an independent-samples-t-test of the pre-test was conducted. The results of test are displayed in Table 4.3.

Table 4.2: Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
pretest scores	experimental	25	3.88	1.73	.34
	control	25	2.12	1.33	.26

Table 4.3: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
pretest scores	Equal variances assumed	2.256	.140	4.015	48	.00	1.76
	Equal variances not assumed			4.015	44.95	.00	1.76

According to Table 4.3, there was no statistically significant difference in the mean scores of the control and experimental groups. The magnitude of the difference in the means (mean difference= 1.76) was small. This indicates that the two groups were homogeneous and having homogeneous groups is a requirement to investigate the effect of the keyword method on vocabulary learning. The results of this test confirmed that both control and experimental groups were at the same level of proficiency in vocabulary knowledge.

4.3 Results of Pre-test and Post-Test in the Experimental Group

After the participants were instructed in the keyword method, their vocabulary learning was tested. A paired-samples-t-test was run between the pre-test and post-test scores of the experimental group to answer the first research question and to check for any change in the participants' performance. The results are presented in the following tables.

Table 4.4: Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Post-test	18.04	25	1.85	.371
Pre-test	3.88	25	1.73	.34

Table 4.5: Paired Samples Test

	Paired Differences							
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
PostPre	14.1	2.21	.44	13.24	15.07	32.01	24	.000

Results of paired-samples t-test of the pre-test and post-test in the experimental group indicated that there was a significant difference between the mean score of pre-test (M=3.88, SD=1.73) and the mean score of the post-test (M=18.04, SD=1.85), t(24)=32.01, P=.00<.05(two-tailed). The eta-squared statistic (0.97) proved a large effect size based on Cohen (1988).

4.4 Results of Post-tests in Control and Experimental Groups

An independent-samples-t-test was conducted in order to compare post-tests of both control and experimental groups. Tables 4.9 and 4.10 display the results of this test.

Table 4.6: Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Post-Test	experimental	25	18.04	1.85	.37
	control	25	13.40	3.60	.72

Table 4.7: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
post	Equal variances assumed	12.17	.001	5.719	48	.000	4.64	.81
	Equal variances not assumed			5.719	35.92	.000	4.64	.81

Based on the independent-samples-t-test, there was a statistically significant difference in scores for control group (M=13.40, SD=3.60) and experimental group (M=18.04, SD=1.85, t (35) =5.71, P=0.00<0.05 two-tailed). The eta squared statistic (0.96) indicated a large effect size based on Cohen (1988). According to tables 4.6 and 4.7 and results presented above, it could be claimed that the experimental group, instructed through the keyword method, outperformed the control group which received instruction on the rehearsal method because there was a significant statistical difference between post-test scores of both groups and also a significant statistical difference between the experimental group pre-test and post-test scores.

Moreover, the change in the mean scores of the experimental group in post-test from M=13.40 to 18.04 shows that the students improved significantly in their vocabulary learning after the treatment. It displays the superiority of the experimental group over control group in terms of their performance on learning vocabulary after the treatment. In both independent-samples-t-test and paired-samples-t-test, the level of significance was below (0.00) the probability value (0.05). Therefore, it might be claimed that these statistically significant differences were due the treatment and the first null hypothesis of the study, which states that: the teaching of Keyword Method as a mnemonic strategy does not affect the vocabulary learning of Iranian elementary EFL learners significantly, is safely rejected.

4.5 Results for the second research question

In order to investigate the second research question, a number of analyses were run. The results of delayed post-tests in rote learning and keyword groups were compared through independent-samples t-test. The results of the analysis are shown in Table 4.8 and 4.9.

Table 4.8: Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Delayed post-tests	experimental	25	18.08	1.73	.34
	control	25	13.08	3.70	.74

Table 4.9: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
delayed post	Equal variances assumed	11.435	.001	6.11	48	.000	5.00	.81
	Equal variances not assumed			6.11	33.9	.000	5.00	.81

As can be seen in Table 4.8, there was a significant difference in scores for the rote learning (M=13.08, SD=3.70) and keyword (M=18.08, SD=1.73; t (48) =5.86, P=.01, two tailed) groups. The probability value was set at (.01), therefore, the analysis confirmed that the participants who were instructed through the keyword method proved to be more successful not only in remembering the meanings of vocabulary items in their short-term memory, but in retaining the meanings in their long-term memory, which leads to the rejection of the second research hypothesis.

4.6 Discussion

The major findings obtained from the statistical analysis generated by SPSS (e.g. Paired samples T-test and independent samples T-test) reveal that the difference between the pre-tests and post-tests is significantly greater for the experimental group than the control group. To put it another way, after the instruction in the vocabulary learning strategy, the treatment group showed better improvement (having better post-test scores) in retaining L2 words than the control group. The findings reject the first null hypothesis. This suggests that the keyword method has a positive effect on the subjects' ability in second language vocabulary learning.

The fact that the experimental group outperformed the control group on the immediate post-test as well as the delayed post-test is primarily shows that the experimental group linked the new words with already existing words in their minds in a meaningful way. In line with some studies conducted previously (e.g**.** McDaniel, Pressley & Dunay, 1987; Pressley, Levin & Delaney, 1982), this study confirms the positive effect of the keyword method on the learners' memory in recalling word meanings. On the post-test, the subjects in the keyword group outperformed the subjects in the control group on the total number of items answered correctly immediately after training.

The conceptual peg hypothesis of Dual Coding Theory (DCT) **(**Paivio, 1971, 1986) is a good source for interpreting the powerful impact of the keyword method. According to this hypothesis, it is claimed that the imagery value or concreteness of words is the reason for the students' success to remember them. It is also claimed that if the words are concrete, they can be recalled easily later on. The keyword method is based on Dual Coding Theory because it involves the use of imagery and also the use of verbal connections between the new word and the stimuli imaged. In other words, the acoustic similarities make a link between the new word and its translation equivalent in first language and then learners are presented with an interactive image. These arguments are supported by Ellis & Beaton's (1993) statement that the keyword method makes it possible for learners to make an association between the foreign word and the keyword through an interactive image. According to Pressley, Levin, Kuiper, Bryant, and Michener (1982), in the keyword method, a phonetic link is made between the L2 word and the keyword and an interactive image makes the meaning connection between them and because of the imagery linkage, learners' retention of meanings is improved.

The results of this study can also be explained in terms of depth-of-information processing (Craik & Lockhart, 1972; Craik & Tulving, 1975). According to the depth-of information-processing theory, when the information is processed at deeper levels, there will be better and more retention. As one reaches deeper levels, memory traces become more stable. Regarding this theory, it can be explained that because in the keyword method students employ the combination of picture and an acoustically familiar word in their first language, more information is processed in deeper levels compared to the rote learning method in which students are only provided with a list of new words and their meanings and asked to memorize them by repeating. There are a few constraints on the effectiveness of the keyword method. In some cases, students learning through the keyword method are not exposed to either a keyword or an imagery-link learning phase.

Therefore, in these cases learning the acoustic and imagery links is not guaranteed because a third link in which the L2 and the L1 words are similar to each other is made after the two previous links. According to Atkinson (1975), most probably, this direct link is responsible for supporting this method. As practice of the keyword method becomes more explicit, its effectiveness increases. In the present study, before beginning the instruction, the participants were asked to report what methods they use for learning vocabulary. Almost none of them reported using acquisition techniques similar to the standard keyword method. The participants in the experimental group were exposed to the strategy prior to the treatment. When the learners in this group were instructed how to work with the elaborative techniques such as the keyword method, they showed noticeable outperformance compared to the uninstructed control group. Very few of the participants in the control group reported they had used elaborative techniques in the process of the experiment. According to the participants' report in the control group, most of them had used some form of repetition. Undoubtedly, repetition is one of the most common strategies used by students for vocabulary learning and it has been demonstrated to have influential effects (Ellis & Beaton, 1993**).** However, here the main emphasis is on the elaborative techniques such as the keyword method which has substantial potential for vocabulary growth in language classrooms.

A body of research studies has been conducted in natural foreign language classrooms by high school students (e.g. Hogben & Lawson, 1994), elementary school students (e.g., Avila & Sadoski, 1996**),** and college students (Brown & Perry, 1991; Moore & Surber, 1992). In most of these studies, the keyword method has been compared with a no-strategy control group (e.g., Avila & Sadoski, 1996) or rote rehearsal group (Willerman & Melvin, 1979). As for the findings of the present study, it should be mentioned that they are consistent with those of Brown & Perry (1991) and Wang, Thomas, Inzana, & Primicerio (1993).

5. Conclusion

The present study investigated the effect of mnemonics (the keyword technique) on vocabulary learning and long-term vocabulary retention in Iranian students learning English as a foreign language. The study enjoyed a quantitative design. The obtained data was analyzed through SPSS software. Two types of t-tests (paired-samples-t-test and independent-samples-t-test) were carried out. Based on the independent-samples-t-test, there was a statistically significant difference in scores for control group (M=13.40, SD=3.60) and experimental group (M=18.04, SD=1.85, t (35) =5.71, P=0.00<0.05 two-tailed). The results confirmed that the treatment was effective. In other words, the experimental group outperformed the control group at the end of the treatment. The effect size (0.96) also proved the effectiveness of the treatment. Based on the results of quantitative data analysis, it was claimed that there was a significant difference between these two methods of teaching vocabulary. Hence, since the mean score of experimental group was higher than control group, it was confirmed that the subjects in the keyword group outperformed the rote memorization group.

The findings obtained in this study may lead to a number of implications which could possibly be beneficial for language practitioners, teachers and students in an EFL context. Students can easily learn the procedure of keyword technique in a short period of time and recall more definitions and vocabulary items compared to the other strategies such as rote learning. Therefore, it is strongly recommended to incorporate this method into EFL classroom settings. This, however, does not mean that all foreign language vocabulary should be learned through the keyword method because it is difficult to apply this method to all vocabulary, especially abstract words. In such cases, learners can use other strategies, including repetition, word-part method, semantic mapping, learning words in context, and so on.

In the long run, syllabus designers and textbook writers will also benefit from the results of this study; different mnemonics can be introduced within the graded vocabulary books and other materials in accordance to the level of the students for whom the material is designed. The present study may be a call for language teachers and researchers in language teaching and learning to pay more attention to second language vocabulary teaching techniques. The findings of the present study and similar studies may encourage teachers who still make use of the traditional verbal method of translation in teaching new words to change their point of view in favor of a nonverbal method of teaching vocabulary. The results may also be of great importance to high-school teachers in an EFL context who are usually faced with the students' request for information about effective techniques of vocabulary learning. Amiryousefi & Ketabi (2011) state that the keyword technique enhances vocabulary learning and this method is considered as a useful way for improving vocabulary learning and retention. Therefore, if the time of the class allows, it would be better to incorporate the keyword method to the students' regular language learning schedule.

As Amiryousefi and Ketabi (2011) state, memory techniques should not replace other vocabulary learning approaches, but should complement them. The findings of this study can help syllabus designers to allocate more space in their course books to the mental images of the lexical items. They can also design special vocabulary course books to teach vocabulary to learners through mental images. Besides, the results of this study can have some insights for the researchers and help them to examine other dimensions of this research.

Attempts at generating mnemonic associations may produce effects beyond the recall of new vocabulary words. In generating associations, whether by the instructor or by the students themselves, there are opportunities for creative use of associative links-more specifically mental image and sound links – both in and outside of the classroom. For example, an instructor may choose to provide associative links that are designed to make students laugh and enjoy the class, while still enjoying the proved benefits of using mnemonic associations. There is considerable evidence that users find the keyword method much more enjoyable and motivating than rote learning. In addition, as Shapiro &Waters (2005) have asserted that the method can also be turned into a game in which the entire class participates. For example, each student can be given one or more words and assigned the task of coming up with keywords and interactions to present to the class. In this way, class members enjoy themselves, get to know their classmates, and help each other with vocabulary. The exercise can be turned into a contest for the most outrageous or memorable images. Such games can be very motivating to students and they are pedagogically sound.

This study was a first step to examining the utility of the keyword method in genuine classroom settings. Obviously, more research is needed to confirm the results (or not) and to strengthen the case for possible generalization and transferability. One important issue needing further investigation is whether participants will cease to use mnemonics when instruction is no longer provided (Hulstijn, 1997). The researcher's experience suggests, and the learners in the experimental group have confirmed, that learners rarely continue with the strategy in a principled way after instruction has ceased. However, the sample was too small to arrive at a firm conclusion. More research with larger samples is needed.

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