

The effect of semantically related and unrelated vocabularies on EFL learners' short-term and long term recognition and retention

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Abstract

The present study with a quasi- experimental design, aimed at comparing the effect of semantically related and semantically unrelated clustering on elementary EFL Iranian learner's recognition ability and their retention. Participants were divided into two groups of 30 learners at elementary level, randomly assigned as experimental and control groups. They were all females, with the age range of 12 to 14, learning English at one of the language Institutes in Mashhad, Iran. Some instruments were used for collecting the research data. The experimental group underwent semantic clustering in which they were provided with eight lists of words, whereas the control group was presented eight unrelated word list with their pictures. An ANCOVA test was used to compare the effectiveness of two groups during short and long period of time. The comparison of two groups in post immediate test have shown that control group outperformed the experimental group, whereas for the delayed test, the results showed a significant difference in favor of semantically related over semantically unrelated clustering. The results have some implications for teaching of foreign language vocabulary instruction.

Keywords: flashcard; long term; recognition; retention; semantically related clustering; semantically unrelated clustering; short term

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1. Introduction

Vocabulary is the “building blocks of language” (Schmitt, Schmitt, & Clapham, 2001, p. 33) Considered by some to be “the single most important aspects of foreign language learning” (Knight, 1994, p. 285). Vocabulary constitutes the basis of language (Laufer et al., 1997). Because of significance of vocabulary learning tasks it is evident that many second language teachers feel uncertain about how to guide students and this result to controversy among teachers. So, one of the issues that all student and teachers and material developers and researchers agreed upon is that the most important element of each second language learning is learning vocabulary (Groot, 2006). A well-established question in the field of teaching second language vocabulary is this better to teach L2 vocabulary in semantic grouping or not?

1.1 Statement of the Problem

The current empirical research is an endeavor to plug the gap in the literature on the effects of teaching semantically related and unrelated sets on Iranian EFL student's long term and its differences with the short-term retention to see which group leads to better retention. In line with what has been discussed so far, teachers also can become aware of how to manage learner's exposures to the target words during short and long term.

1.2 Significance of the study

In the view of the above discussion, attempts is made to trace the development of previous works and beside that the present scrutiny aims at identifying EFL Iranian learner's performance in two sets of related and unrelated words in short and long term period and analyzing the best technique for teaching vocabulary; through semantically related or unrelated clustering.

1.3 Research questions

The study was guided by four research questions:

- Q1: Is there any significant difference between the immediate students' recognition knowledge of semantically related and unrelated sets?
- Q2: Is there any significant difference between the delayed students' recognition knowledge of semantically related and unrelated sets?

2. Literature Review

The following sections provide theoretical and experimental evidence against and in favor of teaching related clustering.

2.1 Arguments that support presenting vocabulary in semantically linked groups

The most important principle in support of related cluster derived from linguistic theory of Semantic Field which posits that rather than being presented in a random list, vocabulary is organized by interrelationship between words, i.e., the mind group vocabulary by making association in meaning (Wilcox & Medina, 2013). Semantic Field theory which was the focus of many researchers reached its puberty by the idea of German scholar J. Trier in the 1930s, whose work has brought honor to having "opened a new phase in the history of

semantics" (Ullmann, 1957). They claimed that this technique suggested that there is network of semantic field in human brain (Aitchison, 1994; Carter & McCarthy, 1988; Lewis, 1997; McCarthy, 1990; Rogers, 1996) and individual is going to recall words according to the conceptual mapping in the brain (Aitchison, 1994, 1996). Those lexical units which belong to the same semantic category arranged in complex network, in which every single concept has its link to other related notions (See Aitchison, 1994).

2.2 Having considered the justification of presenting words in semantic set, in this section, researchers introduce contrary opinion by other researchers

Scholars such as Allen (1983) and Bowen (1985) have posited that lexical problems interfere with communication; in other words, wrong use of words breaks down communication. Also vocabulary has been regarded as a major constituent of language tests. Two theoretical ideas against semantic clustering are interference theory and the distinctiveness hypothesis (Wilcox & Medina, 2013). Delving into psychology of the first half of this century, different varieties of researchers dedicated to the study of "interference" and "the distinctiveness hypothesis". According to Interference theory (Baddeley, 1990; Higa, 1963), Waring (1997) asserted that "when words are being learned at the same time, but are too 'similar' or share too many common elements, these words will interfere with each other thus impairing retention of them" (pp. 261-262), because traces in the brain compete with each other. According to Interference theory which developed by McGeoch (1942) presenting L2 vocabulary in semantic set may impede rather than facilitate vocabulary learning. Behavioristic explained interference as:

The use of the first language (or other languages known) in a second language context when the resulting second language form is incorrect (McGeoch, 1942, p. 455).

Interference theory hypothesis act in two ways: 1) Retroactive interference / inhibition and 2) Proactive interference/inhibition. Retroactive inhibition is difficulty recalling old information because of interference of newly learned material while Proactive inhibition is difficulty in learning new items because of already existing information (Gass & Selinker, 2008). So, according to interference theory the more similarities between new information which is going to be learnt, the more difficulty happens in retaining them. Regarding learning some words (like fork, knife and spoon) their learning has been impeded rather than facilitated (for examples, see Crowder, 1976). Erten (2008), in their study investigated student's recalling ability in vocabulary test which comprised of related and unrelated words. They reached to this conclusion that semantically related words took longer time to retain than unrelated set of words.

Another theoretical view "distinctiveness hypothesis" (see Hunt & Elliott, 1980; Hunt & Mitchell, 1982) assumes that non similarity of information or words which are supposed to be learnt, facilitate learning.

3. Methodology

3.1 Participants

This study was carried out in Meraj-e- Andisheh Institute in Mashhad, Iran. The researcher felt at ease in choosing this institute, because she has worked there for so many years. However the researcher made arrangements to meet the authorities of the faculty to prepare the setting for the start of the study. This study was conducted with 60 Iranian elementary EFL learners. The subject of study divided into two groups of 30 students. Their level of English language in this Institute was elementary based on their scores on Institute's Standard Placement Test.

Their age range was 12-14 years old, female with Persian as their first language disaggregated by two classes. The research sample selection was based on Non-probability sampling; the researcher had easy access to the subjects. So, choosing subject is based on convenience strategy. They took part in regular English classes and

each semester takes two and half months, even days for girls. Since students were eager to develop their English proficiency to be able to use concrete words as the outset means of making communication, they were motivated enough to learn vocabulary through the procedure in this study. Due to lack of time on the part of researcher she could not manage all classes simultaneously, so two teachers had been chosen to carry out the research procedures. They were trained and skillful teachers who pass TTC course and are known as well-chosen and motivated elementary level teachers in this institute.

3.2 Instrument

It seems important to ensure about the subject's homogeneity in proficiency level, so they were supposed to have taken a standard placement test of Institute before putting into starter *Hip Hip Horray* classes. On the whole, 2 types of instrument will be implemented in this study to collect the research data. The instrumentation used in this study included a standard and validated test.

Immediate Recall posttest - Two groups of participants were tested on two types of clustering. The first group was SR group; the second group is SU group. At the end of each session, semantically related and semantically unrelated instruction to each class, students were taken a recall matched test with eight items in each test. The subjects had 1 minute's time for each item in the list to study carefully.

Delayed recall posttest - Delayed recall posttest shed light on the delayed effects of vocabulary type of categorization on acquisition. To accomplish this aim an overall test of related and unrelated vocabulary was handed out to students and they were required to answer this overall matching test. This exam took about 10 minutes time of the last session.

3.3 Procedure

First of all, researcher insured about homogeneity of learners by considering placement test of the institute which was based on *Hip Hip Horray* book. The researcher made a 30 item matching test and did a pilot study on a smaller group of 15 subjects. The reliability was calculated to be 0.94. To make the test valid, the researcher made a correlation between the students' grades on their final exam of the preceding semester and their grades on the researcher's test in the pilot study. The correlation was 0.8116. Then, the researcher acquired the necessary permissions to conduct the study from Meraj- e- Andisheh Institute. Two instructors volunteered to administer the tests on the students. The instructors distributed the consent forms to the subjects and read aloud to them the recruitment statement to participate in the study. The students were analyzed in two groups: 1) One group: semantically-related clustering (SR), 2) The other group: semantically unrelated clustering (SU).

There were 64 words which were divided into two groups. The 32 related words and 32 unrelated words. Selecting vocabulary was based on some criteria; they should be physically concrete, easy to learn, or in other words, they should be from the same level of difficulty, each word should not be longer than the other word in the list (Ellis & Beaton, 1993; Erten, 1998), each word should be of the same syllable as the other words. Vocabulary lesson consisted of presenting 8 related words in one class and 8 unrelated words the other class by providing picture for each word and the process continue in this way. These words were selected from words which were unknown to the students. In each session, students were exposed to a list of 8 vocabulary items by distributing flashcards and pictures. The subjects had 1 minute's time for each item in the list to study carefully.

Class 1 - The teacher who had chosen 8 related words show students the flashcards which consists of written form of words and their equivalent pictures and he encouraged them to learn words by repeating the words one by one after teacher, in order to facilitate their learning.

Class 2 - Each student was given a set of flashcards and teacher show the words and picture to them. In this group, students were required to learn 8 unrelated words.

So the subjects were required to study them for a total of 8 minutes for each set. After eight minutes, the

participants were instructed to stop referring to the lists.

At the end of each session an immediate post-test would be handed out to students in order to scrutinize their vocabulary retrieval in matching test format. A matching test was used to check the learners' recognition of the words during one session. It took about 8 minutes. Each subject was required to turn to the paper, which contained the eight English words on one column eight scrambled pictures on the other column. They were required to choose the best picture for each item. After 8 sessions of teaching related and unrelated words, an overall delayed test of these words was taken from students to see the student's performance during such a longer period of time. This delayed recall test was administered two weeks after the last instruction in order to prevent memory effect. The aim of the posttest was to reveal the efficacy of the instruction provided to the experimental and control groups during the semester. It deserved to be mentioned that immediate recall post-test and delayed recall post-test were the same in the vocabulary selection, but the order in which they were presented in the matching test were different.

4. Result and discussion

Following the data collection, the participants' vocabulary learning proficiency levels were measured on the basis of their performances in two groups. In order to answer the research questions, the data were then submitted to statistical analysis.

Inferential statistics - Researchers use inference analysis to generalize their results from sample to population (Gay & Airasian, 2003). Besides descriptive statistics, ANCOVA test was run in order to compute the differences between the means of the experimental and control group students.

Assumptions of ANCOVA - An ANCOVA was used to test statistical procedures for the pretest–posttest comparisons of the two groups using SPSS software. According to Pallant (2007), “the scores of the pre-test are treated as the covariate to ‘control’ for pre-existing differences between the groups. Preliminary checks of the data were conducted to test the ANCOVA assumptions. Therefore, this assumption of the ANCOVA was met.

4.1 Research findings

Analysis of Hypothesis for Research Question 1

- Q1: Is there any significant difference between the immediate students' recognition knowledge of semantically related and unrelated sets?
- H01. There is no significant difference between the immediate students' recognition knowledge of semantically related and unrelated sets.
- Alternative hypothesis: There is no significant difference between the immediate students' recognition knowledge of semantically related and unrelated sets.

First, in order to see whether we are able to use a parametric test, we should check whether the data have been normally distributed or not. If the level of significance is more than 0.05, it indicates the normality of data distribution. Therefore, we can use parametric test for further data analysis.

4.2 Test of Normality

So the researcher applied Kolmogorov-Smirnov Test to insure about normality of variables under study (according to the following hypothesis).

- H0. The data are normally distributed.
- H1. The data are not normally distributed.

As it is evident from Table 1, the result of normality test shows that p values of two groups are more than significance level (0.05). Therefore; we can accept the assumption of normality. So, we can use T-Test for comparing the results of pretest and posttest in this study.

Table 1*One-Sample Kolmogorov-Smirnov Test*

Group		PRE DELAYED	POST DELAYED	PRE IMMEDIATE	POST IMMEDIATE
Experimental	N	30	30	30	30
	Kolmogorov-Smirnov Z	1.095	1.095	.670	.787
	Asymp. Sig. (2-tailed)	.182	.182	.761	.566
Control	N	30	30	30	30
	Kolmogorov-Smirnov Z	.700	.700	.711	.792
	Asymp. Sig. (2-tailed)	.711	.711	.693	.558

The homogeneity of Variance - The two-way ANCOVA with the Levene's Test of Equality of Error Variance was used to check that the assumption of equality of variance was met (Pallant, 2007). According to Pallant, the significant value should be greater than .05. Pallant (2007) asserted that if "this value is smaller than .05 (and therefore significant), this means your variances are not equal and that you have violated the assumption" (p. 308). In this study, the assumption was met. The significance was .298, which was greater than .05, so the variances are homogenized.

Table 2*Levene's Test of Equality of Error Variances - Dependent Variable: POST IMMEDIATE*

F	df1	df2	Sig
1.102	1	58	.298

Examining Table 2 suggested that all tests meet Levene's formal test of homogeneity of variance.

An ANCOVA was used to analyze vocabulary teaching technique's main effect. The independent variables were the instructional method composed of presenting related and unrelated sets of words and dependent variable was short-term retention of EFL Iranian learners at elementary level. The pre-test score on both kinds of tests; related and unrelated, was the covariate. The results were significant was $F(71.409) = .000$. The data show that there is significant difference between the immediate students' recognition knowledge of semantically related and unrelated sets. Therefore, the null hypothesis was rejected (Table 3).

Table 3*Tests of Between-Subjects Effects - Dependent Variable: POST IMMEDIATE*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	62.902	2	31.451	36.811	.000
Intercept	264.817	1	264.817	309.945	.000
PRE IMMEDIATE	1.393	1	1.393	1.630	.207
group	61.012	1	61.012	71.409	.000
Error	48.701	57	.854		
Total	1240.438	60			
Corrected Total	111.603	59			

Still another justification for rejecting Null hypothesis according to Figure 1 is that, the mean score of control and experimental group are respectively 7.99 and 3.325 and indicating that control group performed

better in post immediate test compared to experimental group, so the null hypothesis is rejected.

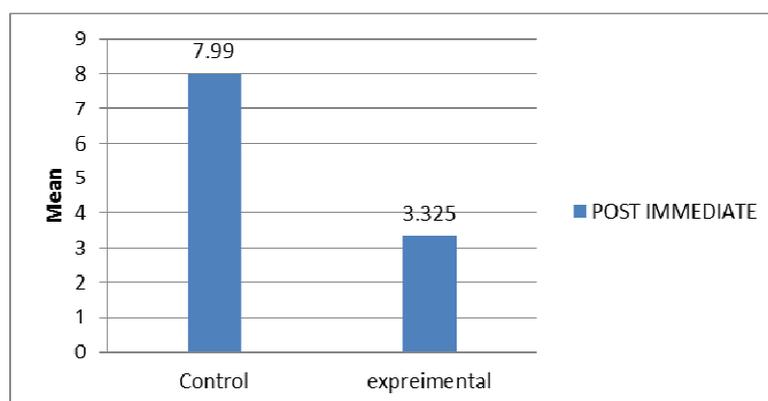


Figure 1. Bar plot for control and experimental groups for Post Immediate

Analysis of Hypothesis for Research Question 2

- Q2: Is there any significant difference between the delayed students' recognition knowledge of semantically related and unrelated sets?
- HO2: There is no significant difference between the delayed students' retention of semantically related and unrelated sets.
- Alternative hypothesis: There is no significant difference between the delayed students' retention of semantically related and unrelated sets.

Examining Table 4 suggested that all tests meet Levene's formal test of homogeneity of variance. Levene's Test of Homogeneity of variance assumes that the groups contain equal population variances (Tabachnick & Fidell, 2001). To ensure that the hypotheses tests fit the assumption, Levene's test of homogeneity was used to determine if the variances were equal. Because the Levene statistic was not significant at the .05 level in each group, the researcher assumed that the groups have equal variances.

Table 4

Bar plot for control and experimental groups for POST DELAYED

F	df1	df2	Sig
1.159	1	58	.296

Table 5

Tests of Between-Subjects Effects - Dependent Variable: POST DELAYED

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	30.215	2	15.108	65.027	.000
Intercept	.120	1	.120	.518	.482
PRE DELAYED	11.927	1	11.927	51.337	.000
group	6.334	1	6.334	27.265	.000
Error	3.950	57	.232		
Total	984.641	60			
Corrected Total	34.165	59			

An ANCOVA was used to analyze vocabulary teaching technique's main effect. The independent variables were the instructional method composed of presenting related and unrelated sets of words and dependent

variable was long-term retention of EFL Iranian learners at elementary level. The pre-test score on both kinds of tests; related and unrelated, was the covariate. The results of table 5 were significant, $F(6.334) = .000$. The data show that there is significant difference between delayed students' recognition knowledge of semantically related and unrelated sets. Therefore, the null hypothesis was rejected.

Still another justification for rejecting Null hypothesis according to Figure 2 is that, the mean score of control and experimental group are respectively 8.0067 and 11.8 indicating that experimental group performed better in post immediate test compared to control group, so the null hypothesis is rejected.

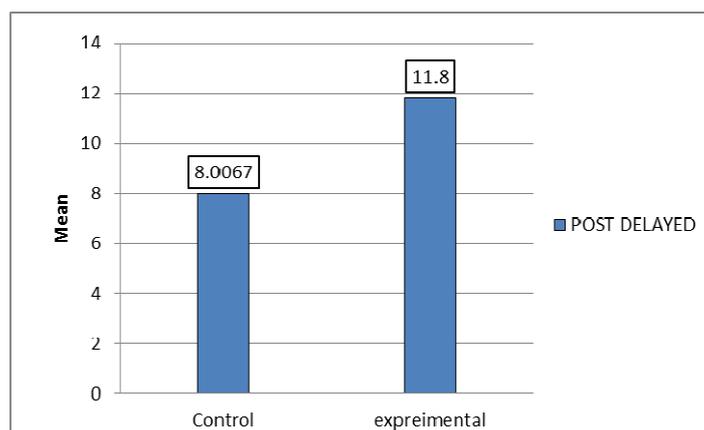


Figure 2. Bar plot for control and experimental groups for POST DELAYED

5. Conclusion

About the first research question, there is significant difference between student's recognition of semantically related and semantically unrelated sets during short period of time, the result manifested that unrelated vocabulary instruction was more useful during short period of time. The finding was in line with the work of some previous researches which have done so far by other researchers. According Nation's (2000) interference theory, the interference between the related words through the learning process can be harmful since this may lead to more difficulties in learning. He suggested that "words should occur in the normal communication situations, not in conditioned, language- focused activities" (p. 5). So, he recommended teaching words separately. As interference theory provides considerable explanation of the problems semantic clustering can cause in the acquisition of vocabulary.

Unrelated words can also be advantageous over related words in which the former leads to acquisition, while the later simulates learning. Unrelated words occur more naturally than sets of semantically related words that rarely applied in the real world. Therefore, this finding was in line with that of Scarcella and Oxford (1992). According to their idea, presenting unrelated words creates authentic environment and facilitate learning.

In regard to the second question, the result indicated that, there was significant difference between student's recognition of semantically related and unrelated sets during long period of time. Here, the researcher examined the effect of long term and short term on retention of vocabulary recognition ability by considering the amount of vocabulary retention by student's score. This manifested that semantically related group outperformed semantically unrelated sets. Two factors contribute to the priority of using semantically related set over semantically unrelated sets during long period of time, which include: practicing and applying memory strategies.

Our finding suggested that in long term retrieval better performance was achieved which was the result of practice. Practice phase not only provided faster recognition but also it has been observed that it eliminates forgetting after a long period of time. Practice especially with long term was advantageous. In the case of

retrieval practice, long term retention benefited from retrieval practices. Two arguments have been formulated here, retrieval was attempted soon after the initial study, or subsequently retrieval attempts occur after progressively longer delays. The assumption regarding the grouping words is that, on the basis of Oxford's grouping memory strategy, grouping items according to a common attribute lead learner to make association between them and so it can be helpful for learning. In one study by Khayef and Khoshnevis (2012), they presented contradictory result to the present research. Semantic clustering group performed better in immediate posttest but not on delayed posttest and consequently had less impact on retention. Still in the same study by Ramezani and Behrouzi (2013), they discovered that in the delayed recall posttests control group outperformed their peers in the experimental group and could retain a larger proportion of the words in long term.

From this study, teachers may gain insights into the role of both presenting words in semantic grouping and random grouping. Teachers should be aware of situations in which semantically related sets and semantically unrelated sets can be beneficial and they should try to apply the best and efficient method for short term and long term purposes. Therefore, the methodology for teaching vocabulary must match the learning strategies. Semantically related sets can be an important factor in increasing student's vocabulary size as well as semantically unrelated sets. They can have a number of advantages for teachers, dictionary developers and also material developers.

Knowledgeable teachers in the field of vocabulary strategies could plan their lessons more efficiently and also they can help their students in selection of strategy. In other words, the methodology for teaching vocabulary must match the learning strategies. If teachers decide to introduce related words at once, students should be aware of interfering effects. They also should help learners to find explicit strategies to keep the words separate in their minds or they should encourage students to use memory strategy for learning vocabulary to make association between related objects. It is important to find effective methods and strategies for presenting new vocabularies to learners in general. This method enriches learner's vocabulary, so some books like Oxford picture dictionary are effective especially for elementary learners in order to increase their vocabulary size especially in the case of learning words in semantic clusters. The finding can be helpful for material developers, especially those who are interested in lexical sets and vocabulary development. From this perspective, they should develop materials which help learners avoid the interfering effect. It is expected that more consideration will be devoted to the theoretical backbone of vocabulary books before publishing.

In conclusion, EFL teachers should teach vocabulary by using different methods instead of just focusing on one method. It means both vocabulary teaching methods; related and unrelated proved to be useful for increasing students' vocabulary domain. One suggestion to researchers who are interested in second language vocabulary learning is to study the effect of teaching vocabulary through these methods in online setting (by using Twitter or YouTube). The author suggests further researches investigating the effectiveness of semantically related and unrelated grouping for teaching and learning vocabulary for higher proficient EFL learners in Iran. There is a possibility that the result might lead to different findings from the current study and may prove otherwise.

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