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The comparative effects of presenting new words in semantically related sets vs. semantically unrelated sets on the receptive acquisition of L2 vocabulary items

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Abstract
This study investigates the comparative effects of presenting the new vocabulary items to students in semantically related groups vs. semantically unrelated groups on vocabulary receptive acquisition in. Two groups of participants studying at the Iran Language Institute (ILI), a well-known second language school, in Isfahan, Iran, were presented twenty new vocabulary items thorough short reading texts, one group in semantically related sets and the other group in semantically unrelated sets. The results of the study indicate that the group which was taught the semantically unrelated sets of words outperformed the group which received semantically related sets of words in the post-test. The findings of this study provide evidence that presenting new words to students in semantically related sets may hinder receptive vocabulary acquisition due to interference of similar words with each other. Learners have to discriminate between the properties of the similar words and this can impede their learning and retention.

Key words: Semantically related sets, Semantically unrelated sets, Receptive vocabulary acquisition, Interference, Retention.

1. Introduction

Acquiring vocabulary is an important part of learning a foreign language. It would be impossible to learn a second language without vocabulary (Rivers, 1981). English teachers use a multitude of techniques and methods to help students learn new vocabulary items; however, there is no general agreement on which technique is more effective than others. According to Rivers (1981), items of vocabulary cannot be taught; they must be presented, explained or included in some activities in order for students to learn them. In other words, the way the new vocabulary items are presented to students is of high importance. Moreover, vocabulary must be learned by students themselves. The questions that are the primary concerns of this study are: how can teachers present the new words to students? And does the way vocabulary items are introduced to students have any effects on their long-term receptive vocabulary acquisition?

One strategy which has been proposed by various researchers, and has been widely used in different vocabulary books, is presenting the new words to students in semantically related groups or
semantic sets. Words such as flower names or parts of body (eye, nose, mouth, ear…) are good examples of semantic sets in which they share the same semantic or syntactic characteristics and are grouped under a common concept (Mirjalili, Jabari & Rezai, 2012).

Many books and language courses tend to present the new words in semantic sets (e.g. New Headway by Soars & Soars, 2000; and Vocabulary for high school students); however, according to some researchers (Higa, 1963; Laufer, 1989; Tinkham, 1993; Nation, 2000), this widely accepted strategy may not facilitate vocabulary learning due to interference theory; rather it may impede learning and consequently long-term retention of words. On the contrary, other researchers (Seal, 1991; Stoller & Grabe, 1995) are in favor of presenting the new vocabulary items in semantically related sets. They believe that presenting the new words in this way can facilitate learning. According to Aitchison (1994), words are organized in the brain semantically, and students remember the words on the basis of the semantic fields in which the words are stored. Hycraft (1993) believes that by learning the words in semantically related sets, students will be able to form a pattern of interrelated words. In a more recent study, Hashemi and Gowdasiaei (2005) suggested that the new vocabulary items should be presented in semantically related sets and in an appropriate context. In this case, learners would make more efforts to differentiate the words having the same semantic and syntactic characteristics due to the complexity imposed by the context in which many other words are used and as a result, their retention will increase.

Tinkham (1993), Nation (2000) and Waring (1997) maintain that presenting new words in semantic sets does not facilitate learning and this strategy has not been supported by research. They believe that if words that share common elements are presented to students simultaneously, they will interfere with each other and this interference has a negative effect on their long-term retention. That is why synonyms are learnt poorly by the students. According to these researchers, presenting the new vocabulary items in semantically related groups may actually impede rather than facilitate retention (Tinkham, 1993).

There is evidence against presenting the words in semantically related groups, which is called distinctiveness hypothesis (Eyseck, 1979, as cited in Mirjalili, Jabari & Rezai, 2012). This hypothesis maintains that distinct items or non-similar items are learnt easier than indistinct items. So the words which are semantically unrelated to each other can be learnt easier. Hence the rejection of semantically clustered based presentation strategy of words (Tinkham, 1993).

The current study focuses on the effects of presenting semantically related words to students on long-term receptive vocabulary acquisition. According to the aforementioned arguments, this strategy has not yet been proved by scientific research, nor has it been completely rejected by any other hypothesis. After all, many vocabulary books use this strategy widely, and it is believed that it can facilitate the retention of words in the long term memory.

The importance of vocabulary and vocabulary teaching is undeniable in the era of language teaching, hence finding a proper and effective technique in vocabulary teaching is necessary. There are many vocabulary and course books in which the new words are presented to students in semantically related sets; however, the usefulness of this technique has not yet been empirically proved. Hence conducting a research study on this issue might be quite warranted. The objective of the present study is to compare the effects of two distinct and opposite techniques of vocabulary teaching on long-term receptive vocabulary acquisition. In the first technique words are presented to students in semantically related sets, and in the second technique words are introduced in semantically unrelated sets to students. Hence the aim of this study is to examine the effects of both techniques on vocabulary retention in long-term memory. Within this framework, the current study seeks to answer the following questions:

1. Is there any significant difference between the two groups (semantically-related and semantically-unrelated) of the study in terms of long-term receptive vocabulary acquisition?
2. Does presenting the new words to students in semantically related sets facilitate receptive vocabulary acquisition?

3. Which technique (semantically related sets or semantically unrelated sets) has a better effect on receptive vocabulary acquisition in long-term memory?

Research hypothesis
Hypothesis 1: There is no significant difference between the groups of the study in terms of receptive vocabulary acquisition.
Hypothesis 2: Presenting the new words to students in semantically related sets does not facilitate long-term receptive acquisition of vocabulary items.
Hypothesis 3: There is no significant difference between the effects of the two techniques on receptive vocabulary acquisition.

2. Review of literature

Vocabulary learning and teaching is a central part of language acquisition, whether it is the first, second or foreign language acquisition (Decarrico, 1995, cited in Celce-Murcia, 2001). Vocabulary knowledge is an integral part of language learning. Students’ lack of knowledge in vocabulary impedes their success in language classes.

Nearly all vocabulary specialists believe that lexical competence is at the center of communicative competence which is an essential ability for successful communication in the real world (Coady & Huckin, 1997, cited in Celce Murcia, 2001). In the late 1980s and early 1990s, vocabulary teaching and learning were gaining much importance in the era of language teaching; however, some other issues raised after that, among them was finding the best and the most efficient method of teaching vocabulary such as “whether effective vocabulary learning should focus on explicit or implicit leaning” (Celce-Murcia, 2001, p. 286). Vocabulary acquisition has two levels in the field of language learning, receptive and productive vocabulary acquisition. These two significant levels are discussed in the following section.

2.1 Receptive vs. productive vocabulary acquisition

Two levels of vocabulary knowledge are distinguished in the field of language learning, receptive and productive acquisition of words. Receptive vocabulary knowledge which is also called recognition vocabulary or passive vocabulary refers to the number of vocabulary items a person understands (Richards & Schmidt, 2002). On the contrary, productive or active vocabulary knowledge is the number of words a person can actively produce in their speech or writing. Some experts (e.g., Meara, 1996; Nation, 1990) believe that vocabulary acquisition moves from receptive to productive knowledge; hence, it can be argued that receptive vocabulary acquisition is of the same importance as productive vocabulary acquisition.

2.2 Semantically related vs. semantically unrelated words

There are many techniques in vocabulary teaching and learning and one of them is introducing the new vocabularies to students in semantically related sets. This technique has been popular for a long time. It is believed that this method is a very effective way of improving students’ vocabulary knowledge by connecting the new words to the already known items. According to Celce Murcia (2001) the meaning associations that are attached to the words are very important because it seems that new words are stored in mind semantically.
Some authors and researchers (Grandy, 1992; Seal, 1991; Stoller & Grabe, 1995) are in favor of this technique; they believe that this technique in presenting new vocabularies to students can enhance their retention. According to Aitchison (1994), Carter and McCarthy (1998) and McCarthy (1990), words are stored in our brain semantically. That is, there are semantic fields in our brain in which words are stored. When words are semantically related, one word can improve the learning of other words in the same semantic field (Seal, 1991).

Nation (2001) believes that in this technique, first “less effort is required to learn words in a set” second, “it is easier to retrieve related words from memory” and third “it helps learners see how knowledge can be organized in brain.” Moreover, Grains and Redman (1986) and Hashemi and Gowdasiaei (2005) contended that when students are presented with semantically related words, they process the words more deeply.

On the other hand other researchers (Nation, 2000; Tinkham, 1993; Waring, 1997) claim that this widely accepted technique does not facilitate vocabulary learning, rather it would impede retention due to the interference between the words. According to Celce-Murcia (2001), similarity between the new words can make their learning difficult for learners due to interference or cross-associations.

In more recent studies, it has been found that learning words that are semantically related to each other, takes much more time than learning those which are not semantically related (Erten & Tekin, 2008; Nation, 2000; Waring, 1997). According to Tinkham (1993) and Waring (1997), students learn semantically related words more slowly than those students who learn semantically unrelated words. Learning words which are related semantically takes 50% longer than the words which are unrelated to each other. Higa (1963) maintains that presenting semantically related words to students causes interference between the words and this can increase the difficulty in vocabulary learning. These studies found that introducing semantically related words to students confuses them and makes the learning process more difficult. Erten and Tekin (2008) found that the results of learning semantically unrelated words were much better than the results of learning semantically related words. In another study (Bolger & Zapata, 2011) the same results were obtained. It was found that presenting semantically related words to students simultaneously, may inhibit learning and retention. As it is clear, the results of the previous studies are mixed and there is no general agreement on which technique is more effective than the other. Because there are controversial point of views regarding the use of this technique, conducting a research in this area might be necessary. Thus, in the present study, two different techniques of teaching vocabularies to learners are compared with each other in order to see which one has better effect on students’ receptive vocabulary acquisition. In the first technique, the new words are presented to students in semantically related sets and in the second technique the words presented, are not related to each other in any case. After the treatment session the effectiveness of these two different ways of presenting the words to learners on vocabulary retention will be investigated statistically.

3. Methodology

3.1 Participants

The participants of the present study (N= 30) were selected from a group of 85 students who were studying at the pre-intermediate level at the Iran Language Institute, a well-known language school in Iran. The Total Placement Test published by Pearson Education (2006) was used in order to select a homogenized group of 30 students out of the larger group of 85. Students whose scores were within one standard deviation above and below the mean score were selected as participants of the study. Then they were randomly assigned to the two groups of the study, a control group and an experimental one. Each group consists of 15 male students whose ages range from 13 to 16 years old.
3.2 Instruments

The vocabulary items used in this study are chosen from the *Oxford Picture Dictionary* (OPD), the Second edition. Twenty vocabulary items are chosen and are divided into four groups of five words. These words were selected out of 50 words chosen from OPD. The results of the pre-test indicate that the selected words are unknown to participants of the study. The vocabulary items chosen for the study are all concrete words such as family members, animals, vegetables and furniture names. A pre-test and a post-test were designed by the researcher and went through all the stages of reliability through the KR-21 formula. The estimated reliability of the pre-test was .83.

3.3 Data collection procedure

Total placement test was used to determine if students were homogenous. Learners who were one standard deviation above and below the mean were selected for the study. Then they were randomly assigned to the groups of the study.

The next step of data collection is the administration of the pre-test (see Appendix One) which consists of 20 items. Each item of the test is supposed to measure the participants' knowledge about one of those twenty selected words. The results of the pre-test indicated that nearly all of the participants did not know the meanings of the selected words. Participants' scores and the pre-test results are presented in the results section. The results of the pre-test assured the researcher that they were the appropriate words for this study.

In the treatment session, the researcher taught the selected contextualized words to the participants. Each word was presented in an appropriate context. In the experimental group, the words were divided into four groups of five vocabulary items. In each group the words were semantically related to each other, i.e. in group one the words are furniture names, group two vegetables, group three animals and group four family members.

The control group was also presented with the same twenty words; however, the order of their presentation is different i.e. there are four groups of five words but the contents of each group are not semantically related to each other. In other words the words are shuffled in a way that they are not organized and arranged semantically.

The procedure for teaching the words were as follows. First, the teacher read the words of each group aloud in the class and learners were asked to only listen to what the teacher is reading. Second, students looked at the sentences containing the words while the teacher read the sentences clearly and in normal speed. Third, the teacher defined each word with simple words and gave examples to the students. And fourth, learners were asked to do some exercises after the teacher finished the lesson.

It must be noted that there was a time interval between instructing each group of words. That is because we wanted to reduce the effects of learning each set of words on the other sets. The time interval used in both groups was nearly 15 minutes. That is, four groups of words were presented to the participants; each word group took 15 minutes to be completed. Furthermore, there was a time interval of 15 minutes between the instructions of the word groups. Hence, the whole treatment session took about one hour and forty five minutes. A sample lesson plan is presented in Appendix Two. Figure one elaborates more on the treatment session.

The last step of data collection was the post-test which is administered one week after the treatment session in order to measure the participants' progress in both groups. The post-test was not different from the pre-test; however, the distribution of correct answers was changed in comparison with the pre-test. The complete results of these two tests are given in the results section.
In order to analyze the data an independent sample t-test was used for the results of the post-tests of both groups to compare the means of the control and the experimental groups. Also a paired t-test was used to compare the results of the pre-test and the post-test of each group in order to determine whether or not the groups showed any improvement.

4. Results

The results of the pre-test indicate that nearly all of the participants did not know the meanings of the key vocabularies before the treatment session. Table One clearly shows the results of the pre-test for both groups.

Table 1. Pre-test Results for both Groups

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental group</td>
<td>3.06</td>
<td>15</td>
<td>2.18</td>
</tr>
<tr>
<td>Control group</td>
<td>3.2</td>
<td>15</td>
<td>1.97</td>
</tr>
</tbody>
</table>

As we can see, the mean score for the experimental group is 3.06 and for the control group is 3.2. The pre-test has twenty items and twenty points. The mean scores show that most of the words were unknown for the participants in both groups.

The results of the independent sample t-test for the pre-test clearly shows that the performances of both groups in the pre-test were almost the same and there was no significant difference between our two groups before the treatment sessions, because they were also homogenized by the Total Placement Test (Pearson Education). Table 2 shows the results of the independent sample t-test.

Table 2. Independent Sample t-test for the Pre-test

<table>
<thead>
<tr>
<th></th>
<th>t-test for equality of Means</th>
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<tbody>
<tr>
<td></td>
<td>T</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>-1.175</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>-1.175</td>
</tr>
</tbody>
</table>

The difference is significant at P< 0.05*

The treatment session was held a week after the administration of the pre-test. Students were taught the new words by the researcher. After being instructed, the students did some exercises. These exercises were in the form of multiple choice questions and students were supposed to choose the best answer to complete the sentences. One week after the treatment session, the post-test was given to the participants in order to measure their improvement in learning the new key words. The results of the post-test are shown in Table 3.

Table 3. Post-test Results for both Groups

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental group</td>
<td>10.86</td>
<td>15</td>
<td>2.53</td>
</tr>
<tr>
<td>Control group</td>
<td>15.53</td>
<td>15</td>
<td>1.76</td>
</tr>
</tbody>
</table>

Exp Mean= 10.86, Cntrl Mean= 15.53
The scores obtained from the post-test show interesting results. The mean scores for both groups increased notably. That is, mean score of the experimental group was 10.86, and that of the control group mean score was 15.53. This shows that both groups had made some development in learning the specified words. However, the mean score of the control group was higher than that of the experimental group, which probably is the indication of the effectiveness of the technique used for them, namely presenting them with unrelated sets of vocabulary items. The results in Table 3 can also provide an answer to our second research question and reject the second hypothesis of the present study. In fact, as it can be clearly observed, presenting the students with semantically related sets of words can indeed promote receptive vocabulary acquisition. However, in order to measure its effectiveness in comparison with the control group we need an independent sample t-test for the post-test results.

An independent sample t-test was used in order to examine whether our third null hypothesis can be rejected or not. The results of the independent sample t-test are shown in Table 4.

Table 4. Independent Sample t-test for the Post-test

<table>
<thead>
<tr>
<th></th>
<th>t-test for Equality of Means</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>t</td>
<td>df</td>
<td>Sig. (2-tailed)</td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>-5.85</td>
<td>28</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>-5.85</td>
<td>25.027</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

The difference is significant at P< 0.05

As it can be seen, there is some evidence in the t-test results that indicate the rejection of our null hypothesis. In the post-test results, the amount of p-value is lower than our alpha level (p < .05). This indicates that it is necessary to reject the null hypothesis in which it is stated that there is no difference between the effectiveness of both techniques.

As shown in Table 3, the mean score for the control group is 15.53 while the mean score for the experimental group is 10.86. The results of the t-test show that the difference between the two groups is significant and the control group which were presented with the semantically unrelated sets of words, outperformed the experimental group in the post-test. In other words presenting the students with unrelated vocabularies facilitates retention of the words more than the semantically related sets.

5. Discussion and Conclusion

The difference between the experimental and the control group is proved to be significant; and the semantically unrelated sets facilitate receptive vocabulary acquisition better than semantically related sets. There might be some possible explanations and arguments for better performance of the control group. For example, it has been argued that words are stored in mind semantically, which is the last destination of vocabulary learning and acquisition rather than a means of acquiring new words. When words are presented in semantically related groups, students have to discriminate between their semantic properties in order to learn them (Mclaughlin, 1990, as cited in Erten and Tekin, 2008). According to Higa (1963), Tinkham (1993) and Nation (2001), this technique may cause confusion for the students because they have to discriminate between similar words. This might explain why similar words and also synonyms are more difficult for students to learn.

There is another argument why similar words may cause confusion and that is the interference theory. Specifically, dissimilar vocabularies cause less interference and confusion for
students. According to Mclaughlin (1987), in cognitive learning theories, it has been shown that our short term memory is limited in its capacity of processing. When learners try to discriminate between the properties of the new words which are semantically related, the complexity of their task increases to a great extent, and our limited short term memory is not able to process this amount of information simultaneously, hence learning and retention of them are negatively affected by presenting students with semantically related words. In other words the limited capacity of our short term memory tries to figure out the complexity and similarity between the semantically related words rather than sending them to our long term memory. Hence retention of semantically related sets of words takes a longer time and is done with more difficulty.

The findings of the present study are in line with some other studies (Erten & Tekin, 2008; Nation, 2000; Tinkham, 1993; Waring, 1997), which found that presenting the words in semantically related sets may actually impede vocabulary learning. These results may have sound implications for teachers and material developers who want to make appropriate materials for students. Based on these findings, it might be better to present the words in semantically unrelated groups and avoid categorizing and classifying the new vocabulary items in semantic groups.

The findings of the study provide empirical evidence that in language classes, it is more effective to teach new vocabulary items in semantically unrelated groups. Although this approach seems to benefit receptive vocabulary acquisition, its effectiveness on long-term receptive vocabulary acquisition and productive vocabulary acquisition needs to be investigated. It is concluded that, although semantically related groups of vocabulary items may be easier to read or study, they do not have positive effects on receptive word acquisition. Thus, language teachers need to be cautious of this technique while teaching new L2 vocabulary items.

References


Appendices

Appendix 1: Pre-test

Fill each blank with the most appropriate word.

1. The Jacksons’ baby is a (an)…………now. He has just started to walk.
   a) toddler  b) cousin  c) niece  d) infant

2. A……..is an animal with a hard shell on its back, which moves very slowly.
   a) shark  b) walrus  c) lizard  d) tortoise

3. Guess what! My sister gave birth to a boy last night. I have a……..now.
   a) teenage  b) nephew  c) niece  d) cousin

4. If you catch a cold you should try………. It’s a round white vegetable that grows under the ground.
   a) Lettuce  b) turnip  c) radish  d) cabbage

5. Which of these animals is a young dog?
   a) a rooster  b) a chipmunk  c) a puppy  d) a ladybug

6. The ……….are very heavy. If you draw them the light cannot enter the room from the window.
   a) Mantles  b) candles  c) hampers  d) drapes

7. Amy’s father got married last year. She doesn’t like her……..very much.
   a) Mother-in-law  b) grandma  c) stepmother  d) half-sister

8. What is an electric machine that you use to mix liquids and soft foods together?
   a) Pillow  b) blender  c) tile  d) crib

9. A……..is a kind of bird that can copy human speech.
   a) Pigeon  b) parrot  c) sparrow  d) robin

10. Your…………..is the son of only one of your parents.
    a) Stepbrother  b) half-brother  c) brother-in-law  d) brother

11. A. What’s the meaning of………?
    B. That is the father of someone’s husband or wife.
    a) grandfather  b) step-father  c) single father  d) father-in-law

12. I bought a new ………for the bed yesterday. It is very warm and its color is very bright.
    a) pillow  b) outlet  c) rug  d) quilt

13. A……..is a very large strong bird which can see very well and eats small birds and animals.
    a) squirrel  b) tiger  c) eagle  d) parrot

14. The janitor couldn’t find the ……….yesterday, so he didn’t clean the floor.
    a) scale  b) mat  c) broom  d) drain

15. What is this vegetable?
    a) cucumber  c) mushroom
    b) celery  d) squash

16. What is this vegetable?
    a) pea  c) spinach
    b) garlic  d) cauliflower

17. What is this vegetable?
    a) bell pepper  c) pumpkin
    b) beet  d) scallions

18. What is this animal?
    a) snail  c) goat
    b) leopard  d) peacock

19. What is this vegetable?
    a) parsley  c) lettuce
    b) mint  d) spinach
Appendix 2
A sample lesson plan for teaching the vocabulary items.

Step 1: The teacher reads the new words aloud and in normal speed.
tortoise, leopard, eagle, puppy, parrot

Step 2: The students are asked to listen to the teacher while he/she is reading the sentences containing the target words.

A tortoise has a very hard shell on its back. It moves very slowly.

Step 3: The teacher defines each word as simply as possible. If possible the definition is accompanied by pictures.

Tortoise: it is an animal that lives in lands and water. It has a very hard shell on its back and moves very slowly.

Step 4: Learners are asked to do some exercises about the target words.

Match the words with their Persian meanings.

(1) Tortoise  a) عقاب
(2) Leopard  b) طوطی
(3) Eagle  c) لاک پشت
(4) Puppy  d) پلنگ
(5) Parrot  e) توله سگ

20 What is this picture?

a) cradle  c) mantle
b) faucet  d) scale