Mental Elaboration Assist Foreign-Language Vocabulary Acquisition: Interactive Picture With Keywords

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Keyword mnemotechnics through the presentation of interactive images is getting more and more attention in the area of vocabulary acquisition in recent 40 years. Many researches have been done in order to prove if this mental process is really helping language learners to acquire vocabulary. However, most of the studies focus on the Western language learners. The study in this paper chooses 30 Chinese people as the participants, who learn third language (Spanish) through their second language (English). The results of the study verified again that the interactive picture connected with the keyword facilitates language learners to acquire foreign language. Although the group who have been supplied interactive pictures with keyword performed better than the group who only are told to create one themselves in the immediate test, there is no significant difference in the delayed retention test. Moreover, the mental elaboration methods are more likely to help people remember foreign words for a longer time.

Keywords: foreign language, vocabulary acquisition, mental elaboration, picture

Introduction

The knowledge of vocabulary is generally considered as an important factor in comprehension of language (Hell & Mahn, 1997). One having a large amount of vocabulary means he could seize enough information to facilitate his language acquisition. However, language learners always complain they have great difficulties in remembering the words. Many language researchers have tried to find an efficient way to help language learners get rid of this problem and make their memory last longer. One of the most outstanding strategy is keyword mnemotechnic, which was proposed by Atkinson and his fellow. The keyword method develops as an instructional method for the acquisition of foreign language vocabulary (Atkinson, 1975). Usually, it can be divided into two basic steps: first, choosing common words which people should be familiar with, also these words should be derived from the target (foreign) words based on acoustic or orthographic similarity; then, creating a visual image which makes a stable association between keywords and target words. By evocation of the keyword and interaction of image, people remember the target words. The keyword mnemotechnics "establishes both a form and a semantic (by means of image) connection between the novel foreign language and its translation" (Hell & Mahn, 1997).

Many studies have shown that the use of keywords method, via interactive image facilitates foreign

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language learning and recalls the comparison to rote learning and unstructured learning (learner use their own strategy) (Bugelski, Kidd, & Segmen, 1968; Bower, 1970; Atkinson et al., 1999; Thomas & Wang, 1996). However, some questions are still barren. One is about whether keywords should be supplied by the experimenter or generated by the participants themselves. Some researchers (Hall, Wilson, & Patterson, 1981) found experimenter-supplied keywords are more effective while others (Pressley et al., 1980) found there is no significant difference between the two methods. Also, some researchers (Campos, González, & Amor, 2001) found if the keywords generated by subjects with the same age and sociodemographic characteristics to the participants, the results will significantly better.

"Mental images play an important role in many cognitive processes" (Campos et al., 2001). A number of studies have shown that imaging capacity benefits both immediate and delayed recall of associated word pairs (Campos et al., 2001). However, most of these kinds of studies are in Western countries where people used to learn more than one kind of foreign languages. The research reported in this paper also related to keywords method, while unlike previous study, the author chose non-native English speakers (Chinese) to use their second language (English) as the common language to learn third language (Spanish). In Chinese schools, English is a common foreign language and to most of the students, English is the only one foreign language they could speak. Here, keywords are no longer confined to the first language. In this study, English was used as the keyword, which is second language for Chinese people. The author provided keywords to an uncontrolled group in which participants had some prepared interactive images, while another group drew their own interactive images in their mind according to the keywords found by themselves. There was also a controlled group that participants were suggested to use repeat way to remember Spanish words.

Method

Participants

The participants are 30 Chinese students (16 boys, 14 girls). They have similar ages (23-27) and English level (IELTS 6.0-6.5). All of them did not have any knowledge about Spanish. These 30 participants were assigned randomly to three experimental groups.

Materials

The stimulus material consists of 22 Spanish words including nouns, verbs, and adjectives. The common keywords (English words), which have the similar pronunciations with those 22 Spanish words were chosen carefully by two native Spanish speakers separately and then judged by each other. For example, the Spanish word "flor" has the same pronunciation with English word "floor", while the meaning is "flower" in English. So experimenter presented a picture like a pot of flower is on the floor. In real experiment, two words became practice as two examples. The practice words and experimental words then were recorded by a native Spanish speaker separately and transferred into computer.

Experimental Design

As mentioned before, the research has three groups and in each group, the participants were told to use a given strategy to remember the Spanish words as many as possible.

The participants in the first group were presented with 20 interactive images to help them remember the

Spanish words. Also, the keywords and the meaning of the Spanish words showed on the picture. For example, the picture of "flor" (Spanish word)—"floor" (sound)—"flower" (meaning) showed in Figure 1.

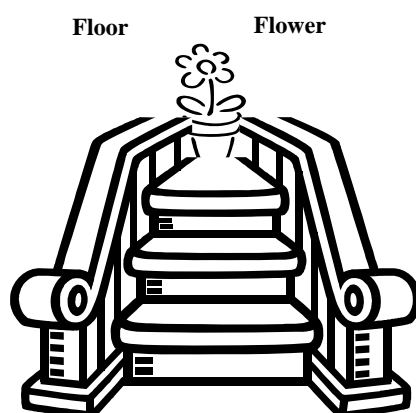**Floor**   **Flower**

Figure 1. The interactive image for the Spanish word "flor".

All 22 interactive images (including two practice words) were made into PowerPoint so that they could be presented by computer screen.

In group two, there was no interactive picture for the participants. They were told to use a mnemonic strategy by which they should generate their own interactive-image mnemonics to connect the sound and an English word (keyword). Experimenter only presented the English meaning of the Spanish words while the participants are hearing the pronunciation of the Spanish words from the record. Then participants were told to find an English word (keyword) which has the similar pronunciation as the Spanish word, and after that, they should draw an interactive picture in their own mind to associate the keyword and the meaning of the Spanish word.

Group three was a controlled group. The participants in this group were provided the meaning of the Spanish words as group two. The most significant difference is that the participants in this group were told to learn the words by repeating the Spanish words and their English meaning over and over again. For example, they should repeat "flor-flower" several times to make themselves remember this pair of words.

Each participant was requested to do a self-report after experiment to show how he or she had learned each Spanish word. All 20 Spanish words and their English meaning are listed on the self-report, what the participants should do is just choose if they use one of the following ways to remember the words: (1) Elaboration way. Use keywords and interactive image to help acquisition of Spanish words. (2) Repetition way. Repeat the Spanish words and its English meaning again and again to remember. (3) Other method and explain it. (4) Did not remember. The suggestions to group one and group two belong to use elaboration way and to group three is repetition way.

Procedure

The experiments were held in a small room with two big tables. Three groups did their experiment respectively. Before start, experimenter explained the purpose of the experiment was to test several different methods for learning foreign language vocabulary. In group one, participants could see a computer screen in front of them, which was used to play the interactive images. In group two and three, the screen was used to display the

English meaning of the target language words (Spanish). Experimenter explained the way of vocabulary acquisition they expected participants to use in each group and informed there would be 20 Spanish words. After that, two practice words were provided to make sure every participant knows exactly how to manage his or her learning.

After the instruction and practice period, the record of 20 Spanish words was played on the computer while at the same time, the correlative interactive image (including keyword and English meaning) was presented on the screen for participants in group one, while only English meaning of the Spanish word was shown for group two and three. Each Spanish word was pronounced twice with three seconds' interval. After each word, there was a 12 seconds' blank time for participants to process what they heard in mind. The record was only played once. The immediate test was following just after all 20 words had been presented. This time, 20 Spanish words were pronounced in a new sequence, and participants wrote down its English meaning while hearing as more as they could. Like learning record, each word played twice and had 12 seconds' time for participants to recall their memory.

Following test, there was a small self-report form need to be filled by each participant in order to report how he or she really remembered each word. One week later, participants got together again by groups. They had a delayed retention test by listening to 20 Spanish words in random sequence as the first time and trying to write down their English meanings.

Results

Experimenter performed 3 (group) by 2 (test) multivariate analysis of variance (MANOVA) on the proportion of correct answers of the participants. Experimenter treated groups (according to three instructions) as the between-subject variable, which has three levels (present interactive image, create own interactive image and repetition) and test as the within-subject variable which has two levels: immediate test and delayed retention test. The data are normally distributed ($p > 0.05$) and fulfilled with homogeneity requirement. The mean appears in Figure 2.

From Figure 2, it could been seen clearly that in all three groups, there was a gradually decreased tendency, which showed the falling of memory. The analysis of the proportion of the correct answers showed a significant effect of the factor TEST ($F (1, 27) = 125.966, p < 0.05$ with Sphericity Assumed), as well as the interaction of factors TEST * GROUPS (iv_b_01) ($F (2, 27) = 6.973, p = 0.004$ with Sphericity Assumed). From Pairwise Comparisons in the immediate test, it showed that the mean (proportion of correct answer) from the third group (repetition group) was 0.275, which was significantly less than the interactive-image given group and create own interactive-image group (0.58 and 0.44 respectively) $p < 0.05$ in both cases, with Bonferroni-adjustment. However, there was no significant difference between these three groups in delayed retention test since $p > 0.05$ with Bonferroni-adjustment.

As in T-test, the differences and similarities between three groups became obviously. All three groups performed quite different between two tests with group one (interactive-image given) $t = 6.297, df = 9, p < 0.05$; group two (create own interactive image) $t = 13.37, df = 9, p < 0.05$; group three (repetition) $t = 4.333, df = 9, p < 0.05$. For group one and group two or three, there were significant differences in immediate test ($t = 2.466, df = 14.911, p = 0.026$ and $t = 5.058, df = 16.608, p < 0.05$) since the mean is 0.58 bigger than 0.44 and 0.275 in the

other two; but not so much significant in delayed retention test ($t = 1.155$, $df = 13.887$, $p = 0.268$ and $t = 2.005$, $df = 15.875$, $p = 0.062$) with mean 0.265 similar with 0.2 and 0.145 in the other two. The same situations presented between group two and group three which also revealed significant difference in immediate test ($t = 3.542$, $df = 17.368$, $p = 0.002$) with mean of 0.44 to 0.275 in group three and similar in delayed retention test ($t = 1.276$, $df = 17.149$, $p = 0.219$) with mean 0.2 to 0.145 in group three.
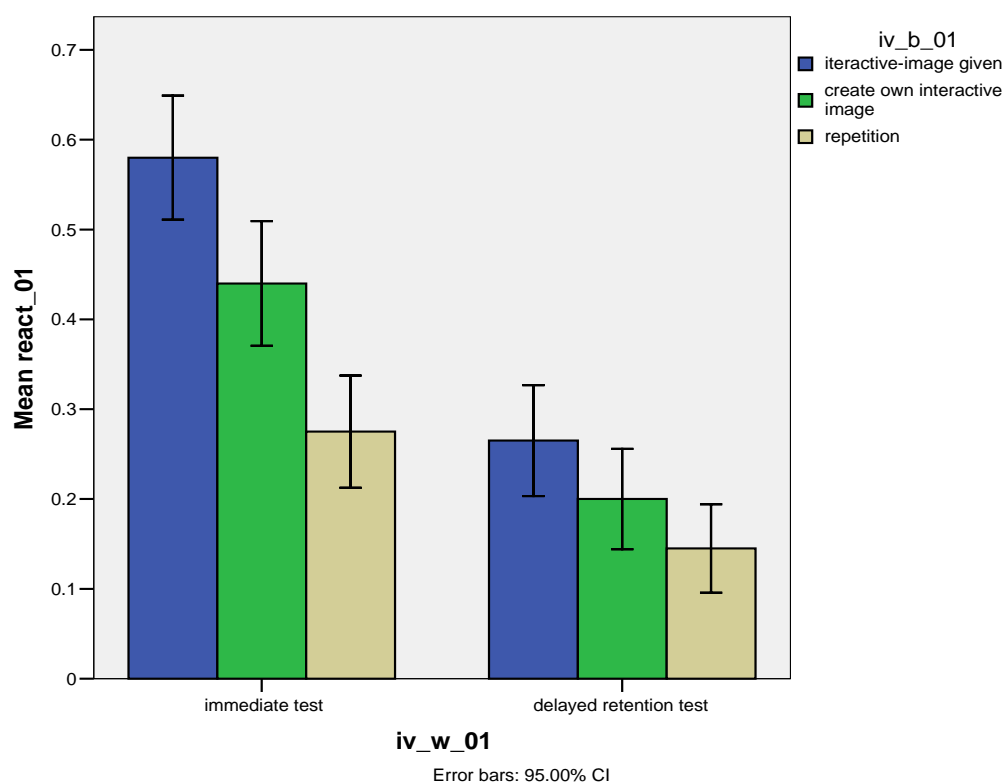

Figure 2. Proportion of correct answers in three groups in two tests.

Table 1

Percentage of Correct Answer According to Reported Learning Strategies

Strategy	Interactive-image given	Create own interactive image	Repetition
Immediate Test			
Elaboration	73%	69%	54%
Repetition	16%	23%	30%
Other methods	6%	5%	4%
Didn't remember	5%	3%	11%
Delayed Retention Test			
Elaboration	84%	78%	73%
Repetition	9%	12%	17%
Other methods	3%	8%	4%
Didn't remember	4%	2%	6%

From the self-report, some more interesting results appeared. Here, the elaboration contains all interactive-image used strategies. Although the participants were instructed in using different strategy in each group, the self-reports showed the elaboration and repetition were used by all groups. For all three groups, the

majority correct answers were reported used elaboration strategy in both two tests. The most interesting thing is in delayed retention test, more correct answers were reported learned by elaboration than in immediate test.

Discussion

From this study, two conclusions could be drawn. First, mental elaboration methods promote learners' acquisition of foreign language and make the memory last longer. Because from Table 1, self-report showed what participants remembered words in delayed retention test were mostly learned by elaboration methods. Second, it is easier and faster for people to learn foreign words with interactive image and keywords supplied since group one performed significantly better than group two and three in the immediate test.

A previous study shows peer-generated keywords (generated previously by subjects of the same age and sociodemographic characteristics as the participants) were significantly more effective than subject- or experimenter-generated keywords (Campos et al., 2001). In this study, the experimenters and the participants are all Chinese students in the university. As a result, researchers and participants have a lot of similarities that make the experimenter-supply keywords become "peer-generated keyword". So what have been chosen should be easier for participants to remember and more or less avoid conflict between the experimenter and participant's mode of coding.

Also, some limitations need to be pointed out in this study. Experimenter ignored the participants' native language's affects, which will also influence their learning strategies. Twelve seconds' interval seems to short for participants in group two, since they need to find a keywords as effective as those identified by the experimenters and at the same time drawing their mental interactive image which may also be the reason of why group one performed better than group two. Although experimenter had suggested participants to use a specific strategy in each group, there are still a number of participants using their own way to remember the words. This may cause the non-significant difference between three groups in delayed retention test since elaboration methods were used widely between groups.

Conclusion

This study testified again that the validity of mental elaboration to foreign language acquisition. As mentioned above, if more time was given to group two since they need to find both keyword and interactive image in a limited time, the results may be varied. Although in this study a great difference ($p < 0.05$) was presented in the immediate test between elaboration groups (group one and two) and repetition group, there were not any significant difference ($p > 0.05$) which experimenters expected between them in the delayed test. Only the information from self-report shows most correct answers are from people who use elaboration way to remember them. As a result, some researches should be done to find other factors which also influence learners acquisition of new vocabulary. All participants in this study had similar background knowledge about language learning (English is their only foreign language and their native language are all Chinese). Do experienced language learners (know more than one foreign language) perform better than less experienced learners in keyword method? Does the background knowledge (culture and nation) influence learners use interactive picture? Since the acquisition of a foreign language is a complex process, a lot of further studies still need to be done to identify those differences.

Reference

Atkinson, R. C. (1975). Mnemotechnics in second-language learning. *American Psychologist, 30,* 821-828.

Atkinson, R. K., Levin, J. R., Kiewra, K. A., Meyers, T., Kim, S., Atkinson, L. A., Renhandya, W. A., & Hwang, Y. (1999). Matrix and mnemonic text-processing adjuncts: Comparing and combining their components. *Journal of Educational Psychology, 91,* 342-357.

Bower, G. H. (1970). Imagery as a relational organizer in associative learning. *Journal of Verbal Learning and Verbal Behavior, 9,* 529-533.

Bugelski, B. R., Kidd, E., & Segmen, J. (1968). Image as a mediator in one-trial paired-associate learning. *Journal of Experimental Psychology, 76*(1), 69-73.

Campos, A., González, M. A., & Amor, A. (2001). *Different strategies for keyword generation*. Manuscript submitted for publication.

Compos, A., Amor, A., & Gonzalez, M. A. (2002). Presentation of keywords by means of interactive drawings. *The Spanish Journal of Psychology, 5*(2), 102-109.

Hall, J. W., Wilson, K. P., & Patterson, R. J. (1981). Mnemotechnics: Some limitations of the mnemonic keyword method for the study of foreign language vocabulary. *Journal of Educational Psychology, 73,* 345-357.

Hell, J. G., & Mahn, A. C. (1997). Keyword mnemonics versus rote rehearsal: Learning concrete and abstract foreign words by experienced and inexperienced learners. *Language Learning, 47*(3), 507-546.

Pressley, M., Levin, J. R., Nakamura, G. V., Hope, D. J., Bispo, J. G., & Toye, A. R. (1980). The keyword method of foreign vocabulary learning: An investigation of its generalizability. *Journal of Applied Psychology, 65,* 635-642.

Thomas, M. H., & Wang, A. Y. (1996). Learning by the keyword mnemonic: Looking for long-term benefits. *Journal of Experimental Psychology: Applied, 2,* 330-342.