

The effect of visual mnemonic support practice on the reading comprehension of psychology texts

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Abstract

Iranian psychology students often face difficulties in understanding psychology texts in English. This can have an adverse effect on their opportunities of academic success. To help them overcome those difficulties, the current study investigated the effect of visual mnemonic support practice on students' reading comprehension. The participants of the present study were 55 Iranian psychology seniors chosen out of 71 students based on their PET language proficiency test scores. They were divided into two homogenous groups of experimental and control. The experimental group benefited from visual mnemonic techniques, including pictures and visualization. Open-ended questioning was used as a measure of reading comprehension. Results of Independent Samples T-test revealed that the experimental group outperformed the control group. Pedagogical implications of visual mnemonic aids are also discussed.

Keywords: visual mnemonics, pictures, visualization, reading comprehension, psychology texts.

Introduction

Crystal (2003, p. 117) believes that "vocabulary is the Everest of a language. There is no larger task than to look for order among the hundreds of thousands of words which comprise the lexicon". Moreover, "without grammar very little can be conveyed, without vocabulary, nothing can be conveyed", according to Wilkins (1972, p. 111). Memorizing and acquiring long vocabulary lists can be challenging, tedious, and ineffective for many. In consequence, the effectiveness of vocabulary learning techniques and strategies is a significant element in both first language (L1) and second language (L2) pedagogy. In fact, students' literacy growth is totally dependent upon vocabulary knowledge. The relation between vocabulary knowledge and reading comprehension has been strongly shown in both first language and second language settings (Grabe, 2004). In L2 reading research, there have been multiple studies that simply demonstrate this relationship. Laufer (1997) reports several studies that have shown strong correlations between vocabulary knowledge and reading ability. In a study on academic reading performance, Qian (2002) indicates that there is a very strong correlation between TOEFL reading subsection scores and three vocabulary measures. Droop and Verhoeven (2003) show a powerful relation between knowledge of vocabulary and reading proficiency in their research. Stahl (2003, p. 246) notes that studies from readability formulae have "found that the most important factor in determining the difficulty of a text is the difficulty of the words". Hence, it can be easily concluded that there is a strong and reliable relationship between vocabulary knowledge and reading comprehension. Further, research supports the fact that there exists an instructional connection between vocabulary knowledge and comprehension. Based on a meta-analysis of all vocabulary studies from 1924–1984 by Stahl and

Fairbanks (1986), vocabulary instruction is an important component for the development of comprehension. Other studies also found direct instruction in definitional and contextual strategies to be very crucial in increasing vocabulary learning (White, Graves, & Slater, 1990; Tomesen & Aarnoutse, 1998).

One well-cited and well-researched way to teach vocabulary is the mnemonic support practice. Memory techniques which are often called mnemonics play a key role in learning another language and their origin can be traced back thousands years ago (Yates, 1966). Mnemonics are considered cognitive strategies (Brown, 2007). According to Solso (1995), mnemonics are visual or verbal devices that serve to improve the storage and recall of the information. Mnemonics have been proven to be highly useful in helping people remember new pieces of information (Mastropieri & Scruggs, 1989; Bulgren, Schumaker & Deshler, 1994). When it comes to vocabulary learning, these effective learning tools can be employed to connect the word to some previously learned information, using some form of imagery or grouping, argue Mastropieri and Scruggs (1989). With regard to mnemonic strategies, Thompson (1987) concludes that mnemonic aids help learners memorize words more effectively. Cohen (1990) also claims that the mnemonic link is one of the best ways to learn and retrieve the meaning of new words.

Memory techniques have been differently classified by many researchers in the field. For example, Oxford (1990) identifies four strategies, including creating mental linkage, applying images and sounds, reviewing well, and employing action. Baddeley (1999), on the other hand, classifies mnemonic tools into visual imagery strategies and verbal strategies. Anyhow, Thompson's (1987) classification seems to be the most comprehensive one. Thompson (1987) surveys and analyzes vocabulary learning strategies mainly mnemonics in her discussion of the role of memory in acquiring a language. To her, mnemonic techniques fall into five major groups: linguistics mnemonics (the peg word method and the key word method), spatial mnemonics (the loci method and the spatial grouping), visual mnemonics (pictures and visualization), the verbal method (semantic organization and story-telling), and physical responses methods (physical response method and physical sensation method).

As already mentioned, the visual mnemonics group includes two sub-techniques which are pictures and visualization.

For the picture sub-technique, new words are paired with appropriate pictures (Thompson, 1987). "Demonstrably, imagery facilitates learning", states Kordjazi (2010, p. 7). The presence of visuals elicits improved comprehension (Pan & Pan, 2009). Ridgeway (2003, p. 69) mentions that pictures and iconic images promote inter-hemispheric communication and guarantee vocabulary retention. Ellis (1993) also comments that visual stimuli like verbal stimuli are organized in comprehension and memory. Clearly, remembering can be improved by using visuals. Shimada and Kitajima (2006) are of the opinion that pictures and illustrations increase comprehension through two effects that are motivation and elaboration. Finally, Sert (2006, p. 109) argues that "[...] while teaching new vocabulary, if new words are reinforced with relevant pictures, the result will be the long term coding of this target language item".

For the visualization sub-technique, new words are acquired through imagining a picture or scene. Abstract words can be learned through this method by relating them to a visual picture (Thompson, 1987; Amiryousefi & Ketabi, 2011). Visualization can be an aid in vocabulary learning (O'Malley & Chamot, 1990). If the new word is "exploration", the learner may come up with this mental picture "A scientist is using special drills for oil exploration" by relating it to the picture of a scientist, based on Amiryousefi and Ketabi (2011). Learners can simply go beyond the word, visualize the concept and think metaphorically.

Statement of the problem

It has been reported that many university students majoring in psychology have low levels of English reading ability. This can have a detrimental effect on their chances of academic success. In order to meet the reading needs of students in the 21st century, educators are pressed to develop and look for useful instructional means for teaching reading comprehension and reading strategy use.

Apparently, research on using mnemonic techniques especially visual mnemonics as instructional tools for improving reading comprehension is almost non-existent. This study focuses on visual memory techniques to reveal their effect on the reading ability. And for this reason, it would be a worthwhile research endeavor in bringing into light the importance of visual mnemonics and their influence on the reading comprehension.

Research question

What is the effect of visual mnemonic support practice on the reading comprehension of university psychology students?

Review of related literature

A large body of research on mnemonic support practice and its effect on vocabulary retention and recall shows that mnemonic devices can improve vocabulary learning, boost memory, and increase creativity (Scruggs, Mastropieri, Berkeley & Marshak, 2010; Amiryousefi & Ketabi, 2011). Actually, the powerful impact of the keyword method on the learners' memory concerning recall and retention has been confirmed by many researchers: Roediger (1980) took into consideration four mnemonic techniques. All four mnemonic groups recalled the 20-word list better than the control group. Overall, the method of loci and the peg word system proved to be resourceful. Scruggs, Mastropieri, Jorgensen, & Monson (1986) asked the subjects of their study to transfer mnemonic strategy that was taught by the researchers to a novel content area. Interestingly, both gifted and non-gifted students benefitted from mnemonic strategy instruction. Rodriguez and Sadoski (2000) examined the effects of rote rehearsal, context, keyword, and context/keyword methods on immediate and long-term retention of English vocabulary in Venezuela. Based on the findings, context/keyword method produced superior recall to any of the other three methods after one week. The effects of memory strategy instruction along with learning through context on the ESP vocabulary recall of Turkish EFL learners were investigated by Atay and Ozbulgan (2007). They found that mnemonic strategies can positively affect vocabulary learning. Baleghizadeh and Ashoori (2010) compared the effect of keyword and word list methods on immediate retention of vocabulary. The meaning recall test indicated that the keyword group outperformed the word list group. In a similar study, Soleimani, Saeedi and Mohajerani (2012) explored the comparative effects of the keyword and context method on immediate and long-term vocabulary retention of Iranian EFL learners. Learners who received the keyword strategy training recalled more words right after training and one week later than the learners who were in the context group.

Methodology

Participants

The participants of the present study were 55 Iranian psychology seniors chosen out of 71 students based on their PET language proficiency test scores. The students were from Payam-e-Noor University, Sari, Iran. Based on the data obtained by a personal questionnaire, all participants were senior students who had passed *English in Psychology 1* prior to their participation in this study and following the results of PET proficiency test all enjoyed intermediate English proficiency. The participants belonged to both genders and the ages went from 22 to 30 years old. There were 28 students in the experimental group and 27 students in the control group.

Materials

Four passages on psychology were selected and used from an academic textbook titled *English in Psychology 2* for the current study (Appendix). The subjects in both groups studied the passages in the same order.

Procedures

In order to have a homogeneous group of 55 subjects, Preliminary English Test (PET) was administered to all the 71 students who passed *English in Psychology 1*. Only those students whose scores were one standard deviation above and below the mean of the normal distribution curve were chosen for the study.

In the experimental treatment, students participated in four 90-minute visual mnemonic support practice sessions, one session per week. At first, the researcher informed students upon the significant influence of visual mnemonic support practice as a reading strategy on reading comprehension. New and difficult words were paired with relevant and real pictures by the researcher. With respect to the visualization sub-technique, the students were encouraged to work as a group and come up with their own mnemonic solutions for word retention problems. They benefited from researcher-induced visualization solutions when they could not find solutions themselves.

In the control group, students studied the same passages in four 90-minute sessions, one session per week. Students read the passages and the researcher simply explained the convoluted and unknown words.

One day prior to the onset of the training, all subjects were given a reading comprehension test as the pre-test. Four weeks later, one day after the final training, all subjects were given the same reading comprehension test as the post-test. Time limitation for the five open-ended questions of the test passage was 45 minutes. Open-ended items are commonly used in testing reading comprehension since they mirror readers' mental processing of textual information (Carrell, Pharis, & Liberto, 1989). The rationale for using one passage (Creativity) for both pre-testing and post-testing was to assure an exactly comparable tests, thus avoiding the problem of equating different forms of pre-test and post-test. The interval (four weeks) between administrations was deemed long enough to control for any short-term memory effect.

Scoring

The open-ended questions were each scored on a 3-point scale according to how well the student's answer demonstrated understanding of the passage (Carrell, 1989):

3 Answer must be in student's own words and demonstrate a fundamental, deep understanding of the passage;

2 Answer may or may not be in student's own words, but must demonstrate some understanding of the passage;

1 Answer may or may not be in student's own words, but fails to demonstrate an understanding of the passage;

0 Answer is void of content or not related to the questions or passage or is simply wrong.

Results

In order to analyze data obtained from the post-tests, the SPSS package was used. Because the study contained one independent variable (mnemonic support practice) and one dependent variable (reading comprehension) in addition to two groups of students (control and experimental), it was assumed that an Independent Samples T-test would be appropriate to show the effect of visual mnemonic support practice on psychology students' reading comprehension.

SPSS output:

Table 1 Group Statistics

	codes	N	Mean	Std. Deviation	Std. Error Mean
scores	1.00	27	9.7778	1.86740	.35938
	2.00	28	12.4643	2.13406	.40330

Table 2 Independent Samples Test

		Levene's Test for Equality of Variances	
		F	Sig.
scores	Equal variances assumed	.928	.340
	Equal variances not assumed		

Table 3 Independent Samples Test

		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
scores	Equal variances assumed	-4.961	53	.000	-2.68651
	Equal variances not assumed	-4.973	52.517	.000	-2.68651

Table 4 Independent Samples Test

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
scores	Equal variances assumed	.54152	-3.77266	-1.60036
	Equal variances not assumed	.54019	-3.77023	-1.60279

As Table 1 presents, the participants' mean score in the control group is 9.77 (SD = 1.8) while the mean score of the experimental group is 12.46 (SD = 2.1). This indicates that those participants who were mnemonically trained were more successful in comprehending psychology texts than those who were not trained. By resorting to the results of Independent Sample T-test in Table 3, it can be easily concluded that visual mnemonic support practice was beneficial and effective ($p = 0.00 < 0.05$).

Discussion

Vocabulary instruction, as already noted, is a crucial component of reading comprehension development. And an ideal source for learning L2 vocabulary from context is reading (Ellis, 1997). Besides, low-frequency lexical items occur more frequently in written than in spoken language. Diana & Reder (2006, p. 805) believe that "in addition to the advantage of low frequency words at retrieval, there is a low frequency disadvantage during encoding". "It means that rare words need more processes to be encoded", argues Kordjazi (2011, p. 1425). Mnemonic support practice is one of the individual reading strategies that can have a significant influence on reading comprehension by assisting learners in the recall of particularly difficult words. As a matter of fact, "mnemonic devices are techniques based on cognitive processes which are used to enhance retention of material one would otherwise forget", comments Takač (2008, p. 59). Surprisingly, learners know little about

the use of mnemonics that can be of great help to them when it comes to the integration of new material in the existing cognitive units or the retrieval of the acquired via special cues (Thompson, 1987). What is more, reading research in both L1 and L2 fields has shown that reading strategies can be taught to students, and when taught, they improve students' performance on tests of comprehension and retention (Carrell, 1985; Pearson & Fielding, 1991; Grabe, 2004). Although many studies have claimed the positive effect of strategy training in the first language or ESL settings, there has been no study taking into account mnemonic support practice as a single reading comprehension strategy. The results of this study, thus, clearly demonstrate that the introduction and application of visual mnemonic aids are totally successful. Visual memory techniques have the capacity to be incorporated into the foreign language teaching curriculum for learning will be more complete as the number and types of cues in the learning situation increases, according to cue summation theory (Croft & Burton, 1994). Cue summation theory (multiple cues across multiple channels) is a type of information processing theory that deals with learning and retention. It predicts that the use of auditory, visual, and written channels simultaneously increases comprehension and recall. Cue summation theory, undeniably, guarantees the cognitive-load-reducing properties of visual mnemonics and supports an enjoyable learning experience.

Conclusions

This research aimed to explore the effect of visual mnemonic support practice on the reading comprehension of English psychology texts. The results indicated that Iranian university students who were mnemonically trained received both statistically and practically significantly higher marks on the reading comprehension test than did the students in the control group. The data presented by this research is encouraging regarding the usefulness of visual mnemonics and its two sub-techniques (pictures and visualization) in making students strategic and independent readers.

Indubitably, the pedagogical values and implications of visual mnemonic techniques are highly promising. These memory techniques can be very effective and can make the students motivated and the classroom more interesting (Groeger, 1997). Motivation is considered to be the main factor that affects the comprehension and recall of the information being read. To keep students motivated, the language teacher should introduce and apply reading comprehension techniques to the learners. Visual memory techniques have proved to be of great advantage for they can easily prod the memory of the learners. Interested teachers should encourage learners to work as a group to come up with their own mnemonic solutions. The teacher can offer a mediator when students fail to find a solution. In fact, "the collective imagination of a group of students together with their teacher will always be richer than the imagination of a single learner or of the teacher alone" (Hulstijn, 1997, p. 218). It is also discussed that a specific mixture of processes is necessary for the effectiveness of mnemonic instruction and application (Worthen & Hunt, 2008). Moreover, it is a must to remind the students of the importance of visual mnemonic support practice repeatedly in order to make its use a natural habit.

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Appendix

Passages used in the study:

1. Creativity	Kordestani & Zare (2010)
2. Stress and coping	Kordestani & Zare (2010)
3. Personality	Kordestani & Zare (2010)
4. Psychological disorders	Kordestani & Zare (2010)