

PSYCHOLOGICAL ACCOUNTS OF FOREIGN LANGUAGE VOCABULARY ACQUISITION

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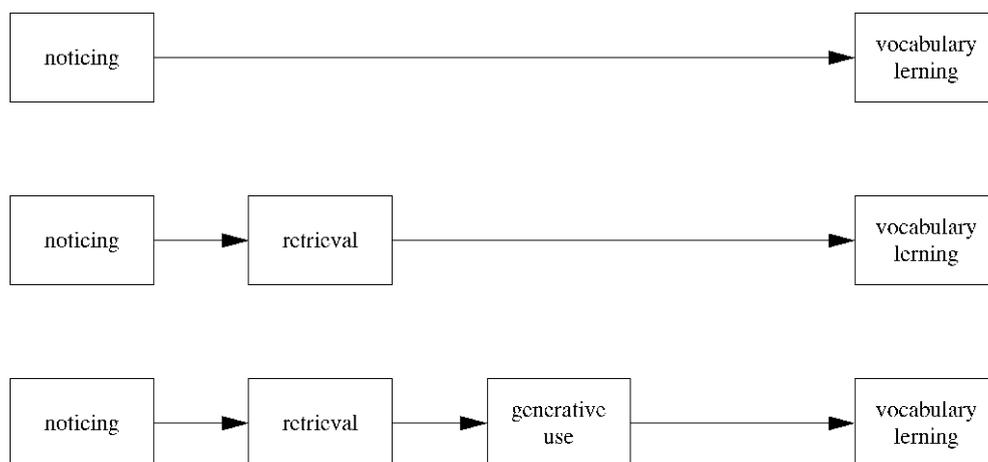
Introduction

Vocabulary is important in language learning. Joe (1994) emphasized the importance of vocabulary learning by mentioning “one cannot communicate or apply grammatical and phonological rules without having first developed a core vocabulary.” Indeed, language learners have to learn a great number of words to be able to function. This may even overwhelm language learners so that they feel anxious about this demanding task. Therefore, language teaching professionals should know what psychological processes will lead to vocabulary learning so that they can promote students’ learning of words as effectively and efficiently as possible. In this paper, I will mention three kinds of psychological processes of vocabulary learning. First, I would like to explain three general processes: noticing, retrieval, and generative use. Then, depths of processing theory will be explained. And last, I will explore the involvement load hypothesis. I will attempt to show both theoretical and empirical evidence to support the three psychological accounts of vocabulary acquisition among second or foreign language learners and discuss further research and classroom implications.

Three general principles of cognitive processes

Nation (2001) mentions three general processes of vocabulary learning: noticing, retrieval and generative use. The earlier steps are included in the later steps. In other words, retrieval occurs after noticing, and generative use happens after noticing and retrieval. The earlier steps are necessary to go through to reach the last stage of generative use (see Figure 1).

Figure 1. The Three General Processes of Vocabulary Learning



Let us explore each process with empirical evidence.

Noticing

Noticing is the first psychological process in vocabulary learning, and it means paying attention to the word item. Language learners experience “noticing” in a variety of language learning environments. Noticing should occur in decontextualization, in which the language learners consider the word item as a language item, not just as a part of the message (Nation, 2001).

One situation that usually involves decontextualization is negotiation. Ellis, Tanaka, and Yamazaki (1994) found that words that were negotiated were learned more than others that were not negotiated. They used Japanese high school students learning English as a Foreign Language (EFL) as subjects. Each student was given individual pictures of kitchen utensils that were labeled with numbers and a picture of a kitchen. After listening to the explanation of the kitchen item and its location, he or she had to choose from one of the kitchen utensils and write the designated number on the kitchen picture. Students were assigned to one of three conditions: the baseline condition, the premodified condition, and interactionally modified condition. The audio-recorded materials that the students in all the three conditions listened to included explanations of the kitchen utensils described in each picture and references of locations in the kitchen. The baseline group listened to directions read by native English teachers at about 180 words per minute, and students were not allowed to ask questions. The premodified version was made from the interactions between a native speaker and three students when they completed the task, and it was read at the rate of 90 words per minute. As in the baseline

group, students engaged in the task were not able to ask questions. The interactionally modified group listened to the same material that was read at the speed of 180 words per minute as in the baseline group. However, unlike in the baseline, the students in the interactionally modified group were allowed to interact with the teacher in order to complete the task. The statistical results show that interactionally modified group performed better than the other two.

Stahl and Vancil (1986) emphasize the importance of negotiation during semantic mapping activities. In their paper, they refer to negotiation as discussion. According to them, semantic mapping may facilitate vocabulary learning because this procedure will help connect new information with existing knowledge, yet this is not the only reason why semantic mapping will be an effective device. In fact, semantic maps function as devices to promote discussion, or negotiation, and that will bring about vocabulary learning.

In addition, what language teachers and researchers should keep in mind is that observing negotiation by other students per se will lead to vocabulary learning. To put it another way, when students see others negotiate or discuss target words, they will learn as well as those who did actual negotiation or discussion. Stahl and Clark (1987) found the value of participatory expectation, where the learners were told that they would be called on and they observed other people discuss. The results showed that the experimental groups who had the anticipatory condition significantly outperformed the control group. It indicates that when language learners see other students negotiate word items, they will be able to retain word knowledge. That is, either negotiation itself or observing negotiation will provide opportunities for vocabulary acquisition.

Definition is another example of decontextualization. Words that were explained are likely to be remembered, compared with those that were not. As in the negotiation, the learner becomes aware of the target words (Nation, 2001). Toya (1993) had Japanese university students listen to the lecture, in which vocabulary was explained. She found that explicit vocabulary explanation was helpful. Elley (1989) also demonstrated that the subjects learned words that were explained while listening to stories. Watanabe (1997) used two types of marginal glosses in order to examine vocabulary acquisition. One type was single marginal gloss, in which the target words were explained, and the other type was multiple choice marginal glosses that force the language learners to choose correct meaning from the two choices. He concluded that both single and multiple choice glosses were effective in vocabulary learning.

Retrieval

Retrieval is the second major step that promotes vocabulary learning. The learner needs to retrieve the word after he or she noticed the teacher's explanation or dictionary definition. Retrieval can be either receptive or productive, and it does not happen when the meaning and the form of the word are shown at the same time. Receptive retrieval occurs when the learner recognizes the word form and remembers its meaning. On the other hand, productive retrieval involves wanting to express the meaning of the word and retrieve the word in spoken or written form (Nation, 2001). Stahl and Fairbanks (1986) uses the word "comprehension" to explain retrieval as follows: "comprehension, in which the child demonstrates the comprehension of a learned association either by showing understanding of a word in a sentence or by doing something with definitional information, such as finding an antonym, classifying words, and so forth" (p. 76).

There are studies that show the importance of retrieval in incidental vocabulary learning. In Elley's (1989) study, elementary school children learned target words by listening to the stories read by their teachers. The three most predictive factors of the learning were how frequent target words appeared in the text, whether the words were illustrated in the picture, and how much the words were repeated. I believe that the three predictive factors are three different forms of retrieval of target words. Similar results were obtained in other studies (i.e. Stahl & Fairbanks, 1986). Naturally, the frequency of the word may be a factor in vocabulary learning. When the same words were exposed to the learners a number of times, they are more likely to be retained (Elley, 1989; Ellis *et al.*, 1994; Stahl & Fairbanks, 1986).

Generative Use (Generation)

Generative (Creative) use is the third major process during vocabulary teaching (Nation, 2001). It occurs when the language learner "produces a novel response to the word" (Stahl & Fairbanks, p. 76). In other words, when the learner meets or uses the word that is used differently from previous meetings, he or she experiences generative use. In productive skills, learners change the concept of the word in this process when they make their own sentences, and they realize other features and properties of the word from before. This can be a change of meaning or part of speech (Nation, 2001). For example, the learner encounters the verb *water* (e.g. giving water to plants) after meeting the same word in the noun form, which causes the reconceptualization of the word *water*.

Joe (1994) showed the importance of generative use, or generative processing. Although all subjects read and retold a 338-word expository text that included 12 low

frequency target words, they had different learning environments that caused the experimental group to go through more or less generative use and, as the result caused difference in retention. The experimental group had informal training in generative processing before reading the text and retold the story without looking at the text. On the other hand, the comparison group did not receive generative instruction, and they retold the story while having access to the story. Three types of posttests were given. First, the degrees of generative levels of the 12 target words ranged in the four-point scale of no generation (0), low generation (1), reasonable generation (2), and high generation (3). The word knowledge was also measured in the interview and was rated in the six-point-Likert scale. Finally, two sets of multiple choice tests to test the same 12 target words were given; an easier test was designed to be more sensitive to partial knowledge of vocabulary than the other.

Depth of Processing Model

What is the Depth of Processing Model?

Craik and Lockhart (1972) introduced the idea of depth of processing in their influential paper. They asserted that how “deeply” information is processed determines the amount of the information retained in long-term memory (Baddeley, 1999). It was suggested as an alternative to multi-store models or structural theories of memory, which were traditional and common models in those days. The traditional models asserted that information should be in short-term memory some time to be retained in long-term memory (Atkinson and Shiffrin, 1967, cited in Al-Hadlq, 2003). Craik and Lockhart argued that depth and shallowness of the processing that people experience in the first encounter influences retention in the long term memory. Namely, when the stimulus is moved from the shallow sensory level to deeper semantic level, it stays in the learner’s memory. They also proposed that different levels of processing exist. More precisely, the processing of phonological (acoustical) and orthographical (visual) aspects of lexical knowledge occur at a shallower level, while the semantic property of stimulus is processed at a deeper level.

Craik and Tulving (1975) developed the theory of Craik and Lockhart (1972) by adding the notion of elaboration. This means by making new information enriched by creating connections between the new information and preexisting information so as to strengthen memory trace. For the sensory level, additional acoustical or visual processing is needed for elaboration to occur. For deeper level processing, a meaningful response to questions brings about elaboration (Perry, 1982, cited in Brown and Perry, 1991).

Depths of processing theory was criticized. Hulstijn and Laufer (2001) mentioned two

serious questions that this theory cannot answer: “(1) What exactly constitutes a level of processing, and (2) How do we know one level is deeper than another?” (p. 541). To respond to the criticisms by researchers, Lockhart and Craik (1978) stressed the value of the theory was that it leads to new research.

Empirical Studies

Perry and Brown (1991) have investigated depths of processing theory while comparing three vocabulary learning strategies: keyword, semantic, and keyword and semantic. During keyword method, in order to remember the meaning of a new vocabulary word, the learner chooses a keyword which is acoustically similar to the target word, and then he or she imagines visual associations of the new word and the keyword. One can say that shallow process occurs during the keyword method activities because the focus of the method is the connection between the sound of a word in the first language and the one in the target language.

Suppose the Japanese learner wants to learn “cry” in English using the keyword method. Then, *kurai* (meaning “dark”) in the Japanese language will be a suitable keyword. During the visual imagination, the learner should visualize a child is crying in the dark. Another example target word “psychologist” can be remembered using the keyword method. The Japanese word *saikoro* (meaning “dice”) will be a helpful keyword when the student imagines that three psychologists roll dice while thinking about their theories.

Unlike the keyword method, the main focus of the semantic processing method for lexical learning is on the semantic association between the new word and its definition. Therefore, this method enhances deep processing. In the article by Brown and Perry (1991), they included two kinds of information: “Two different examples of usage were provided in order to activate appropriate semantic structures; also a question was asked whose answer necessitated the use of the new word” (p. 658). English learning students at the American University of Cairo were asked to learn 40 English target words using the designated methods. The keyword method group was provided with target words, their definitions, and keywords while the semantic processing group was presented with target words, their definitions, two example sentences, and a question to force the learner to use the target words. Following is information that was given to those who used the keyword method, the semantic processing method, or both to teach the target word *cord*.

Example of information given for keyword method

target word CORD

definition a covered electrical wire
keyword and its translation/kora/ (the meaning ball)

Example of information given for semantic processing method

target word CORD
definition a covered electrical wire
two example sentences

Please plug in the cord; I want to watch the news on television.

When bands set up their electrical instruments, the ground is covered with cords.

one question

What connects the refrigerator to electricity?

The researchers concluded that the group who learned with combination of keyword and semantic processing method outperformed the keyword only method group or semantic processing only group, regardless of their English proficiency level because the former method provided deeper processing.

Al-Hadlaq (2003) examined depths of processing theory, by having university students do four vocabulary learning tasks that varied in depths of processing. Two groups wrote original sentences or original texts that include target words. The other two groups filled in the same target words either in single sentences or text. After the task, their learning of target vocabulary words was assessed by a translation test. Those who engaged in the composition task (writing a text) retained target words significantly better than the other groups, followed by the group who filled in words in the text. The author concluded that this result was obtained due to the differences in depth of processing of the four vocabulary activities.

The two studies that dealt with the effects of the vocabulary learning revealed that those depths of processing influence the vocabulary learning. Since the researchers conducted quantitative studies, they did not probe into the learners' cognitive processes directly. Further studies must be added in order to find what actually occurs in light of cognition, probably with qualitative studies.

Involvement Load Hypothesis

What is the Involvement Load Hypothesis?

Hulstijn and Laufer (2001) and Laufer and Hulstijn (2001) have proposed a new construct that will contribute to vocabulary learning and called it "task-induced involvement

load” after reviewing literature on psycholinguistic models of vocabulary learning and going over empirical evidence. The hypothesis with this construct is called “involvement load hypothesis,” and it states that the degrees of involvement load during the vocabulary learning tasks influence the retention of words.

The researchers listed three components: need, search, and evaluation. Need comes from the construct of motivation. I believe that this seems to be similar to instrumental motivation by Keller (1983, cited in Laufer & Hulstijn, 2001) and intrinsic motivation. Search and evaluation come from cognitive dimension. Search occurs when the learner attempts to look for and find the meaning or the form of the unknown word during the communication. Evaluation involves comparison of target words and other words or meanings of the target word for appropriateness. When the learner compares the target word with other words or a specific meaning with other meanings of the same word, he or she experiences evaluation (Laufer & Hulstijn, 2001; Hulstijn & Laufer, 2001).

The three factors have different levels of involvement loads according to Hulstijn and Laufer (2001). They are index 0 (none), 1 (moderate) or 2 (strong). When the learner is forced to do a certain task, the need index is one. If the learner is intrinsically motivated to do the vocabulary learning task, the need index is two. Similar principles apply to the two cognitive factors which makes the learner give attention to the form-and-meaning connections. Trying to find the meaning of a specific word (i.e. looking up a word in a dictionary to find out the meaning of a specific word) entails search index one. If the form of the language is searched (i.e. finding the word form equivalent to a certain word in the first language), the index is two. Evaluation index one occurs when the target word is compared with other words in a provided context. Strong evaluation requires a situation in the context that learners provide. Table 1 shows the three levels of cognitive or motivational loads and actual learning situations.

This is distinctive from three perspectives. For one, this hypothesis covers motivation as well as cognition. The previous theories look at the vocabulary learning only from cognitive psychological points of view. Second, it states three separate factors that are equally important to vocabulary learning. The three general vocabulary learning principles of noticing, retrieval, and generative use are not independent from each other. As a matter of fact, noticing is the first step, retrieval the second and the generative use in the third step. To have generative use, the learner notices and retrieves the target word, and noticing should occur before retrieval. Related to the second reason is the third reason, that the three components have three different involvement loads. Finally, this focuses on foreign or second language learners, whereas all three general principles and the

depths of processing theory originate in first language learning, and have also been applied to second language learners.

Table 1 Three Components in the Involvement Load Hypothesis

Components	Indexes	Explanations	Examples of tasks
Need	0	do not need to learn	reading comprehension, but glossed word are not relevant to task
	1	forced by external forces	reading comprehension, and target words are relevant to task
	2	wants to learn	writing a composition about concept that the learner has chosen
Search	0	do not find out the meaning or the form of the target word	reading comprehension, and target words are glossed
	1	find out the meaning of the target word	reading comprehension, and target words are relevant and are not glossed
	2	find out the form of the word that the learner wants to express	the L2 word form is found in a dictionary
Evaluation	0	do not compare the target words from other words	reading comprehension, but the word is glossed
	1	compare the target words in the provided context	answering reading comprehension questions and filling in gaps, and the target words are glossed at the end of text
	2	compare the target word in the context the learner provided	writing a composition, and the L2 words are looked up in a dictionary

Empirical Study

In the best of my knowledge, the involvement load hypothesis has been tested only in the empirical study by Hulstijn and Laufer (2001). Ten low frequency words, such as *wrath*, were selected as target words. Advanced English learners in Israel and Holland were assigned to one of three tasks with different involvement loads. Task #1 group read a 621-word text in order to answer comprehension questions. The target words were

highlighted and the meanings of those words were provided in the learners' first language in the marginal gloss. Task #2 required students to read the same text and answer the same comprehension questions as the task #1 students did. However, they were given the translations of the 10 target words in task #1 and an additional five words in their first language and an explanation in English on a different sheet of paper. Not only that, the target words themselves were eliminated so that the learners would need the information for the target words. The students in Task #3 were asked to write a composition using the 10 target words while the translation, English explanation and example sentences of the words were provided.

All three groups had the same index in need and search. The need index was one, for the task forces the learners needed to be engaged in the task. The meanings were provided, and therefore they were not searched. Thus, the search index was zero. The only difference seen among the three groups was evaluation. The task #1 group had zero evaluation index because they did not compare words at all. The task #2 group had to go through one evaluation index task while they had to evaluate target words with others so as to compare to fill in the blanks.

Table 2 Three Tasks in Hulstijn and Laufer (2001)

	Tasks	Target words	Involvement Index
Task #1	Reading comprehension	The target words and their explanations were provided	Need 1 Search 0 Evaluation 0 Involvement load index 1*
Task #2	Reading comprehension and filling in blanks	The target words and their explanations were provided	Need 1 Search 0 Evaluation 1 Involvement load index 2*
Task #3	Writing a composition	The target words and their explanations were provided	Need 1 Search 0 Evaluation 2 Involvement load index 3*

* Involvement load index is calculated by adding the indexes of the components (need, search, and evaluation).

The statistical results indicated that the highest involvement load from the task #3 caused

the highest word retention.

This study was informative. Nonetheless, it has several drawbacks. The time on the task varied. The highest involvement load tasks took the longest time, so it may have caused the difference in the result. Another problem is that these three tasks varied only in evaluation index; therefore, this experiment tests evaluation index. The most serious problem is that they assume that different task induced involvement loads lead to the results without studying what happened in learners' mind. It is true that this is hard to investigate learners' learning processes since we cannot see the inside of people's brains. However, qualitative studies such as interviews and observing can help researchers assure learning processes.

Conclusion

Three psychological perspectives have both theoretical and practical values. Indeed, these psychological explanations are stimulating in the field, and more research should be conducted to find out how vocabulary is learned. In addition, language teaching professionals have to include activities that would fulfill some of the psychological conditions mentioned here.

In terms of empirical research, I strongly believe that we need two types of solid research to explore psychological processes for vocabulary instruction: qualitative and quantitative studies. We have to have research to find out what is going on in learners' minds through qualitative studies such as observation, interview, and questionnaires. Without these studies, learning process will not be directly examined. Furthermore, even when we have the results of quantitative results, we can only guess what really happened and will not be sure what the cause was. Needless to say, vocabulary learning should be measured carefully and precisely. Although a number of vocabulary tests only test whether language learners know the vocabulary or not, depths of vocabulary knowledge should be measured (Read, 2000).

When it comes to classroom instruction, language teachers should include activities that facilitate the vocabulary learning processes. Among the three sets of processes, noticing, retrieval, and generative use are more accepted among researchers. Therefore, these three should be especially kept in mind when activities are planned. Then, teachers should assess vocabulary learning in language learning and observe how language learners are learning vocabulary; ask questions, and give questionnaires so that they will know whether learners are actually go through optimum vocabulary learning processes. As the consequences of these data, vocabulary learning activities should be improved. Thus,

language teachers should do ongoing vocabulary learning research and seek to improve vocabulary learning activities. Other explanations may be uncovered through these efforts, or the three sets of psychological accounts will possibly be elaborated so that language learners may be able to learn words more efficiently.

References

- Al-Hadlaq, M. S. (2003). *Retention of words learned incidentally by Saudi EFL learners through working on vocabulary learning tasks constructed to activate varying depths of processing*. Unpublished doctoral dissertation, Ball State University, Muncie, IN.
- Baddeley, A. D. (1999). *Essentials of human memory*. East Sussex, UK: Psychological Press.
- Brown, T. S., & Perry, J. F. L. (1991). A comparison of three learning strategies for ESL vocabulary acquisition. *TESOL Quarterly*, 25, 655-669.
- Craik, F. I. M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology*, 104, 268-294.
- Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior*, 11, 671-684.
- Elley, W. B. (1989). Vocabulary acquisition from listening to stories. *Reading Research Quarterly*, 24, 174-187.
- Ellis, R., Tanaka, Y., & Yamazaki, A. (1994). Classroom interaction, comprehension, and the acquisition of L2 word meanings. *Language Learning*, 44, 449-491.
- Hulstijn, J., & Laufer, B. (2001). Some empirical evidence for the involvement load hypothesis in vocabulary acquisition. *Language Learning* 51, 539-558.
- Joe, G. A. (1994). *The effects of text-based tasks on incidental vocabulary*. Unpublished M. A. thesis, Victoria University of Wellington, Wellington, New Zealand.
- Laufer, B., & Hulstijn, J. (2001). Incidental vocabulary acquisition in a second language: The construct of task-induced involvement. *Applied Linguistics*, 22, 1-26.
- Lockhart, R. S., & Craik, F. I. M. (1978). Levels of processing: A reply to Eysenck. *British Journal of Psychology*, 69, 171-175.
- Nation, P. (2001). *Vocabulary learning in another language*. Cambridge: Cambridge University Press.
- Read, J. (2000). *Assessing vocabulary*. Cambridge: Cambridge University Press.
- Stahl, S. A., & Clark, C. H. (1987). The effects of participatory expectations in classroom discussion on the learning of science vocabulary. *American Educational Research Journal*, 24, 541-555.
- Stahl, S. A., & Fairbanks, M. M. (1986). The effects of vocabulary instruction: A model-based meta-analysis. *Review of Educational Research*, 56, 72-110.
- Stahl, S. A., & Vancil, S. J. (1986). Discussion is what makes semantic maps work in vocabulary instruction. *The Reading Teacher*, 40, 62-67.
- Toya, M. (1993). *Form of explanation in modification of listening input in 12 vocabulary learning*. Paper presented at the Occasional Paper No.23, Department of Hawaii at Manoa, Department of English as a Second Language.
- Watanabe, Y. (1997). Input, intake, and retention: Effects of increased processing on incidental

learning of foreign language vocabulary. *Studies of Second Language Acquisition*, 19, 287-307.