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Takahiro Iwanaka*

Shigenobu Takatsuka†

*Hyogo University of Teacher Education

†Okayama University, eng_taka@cc.okayama-u.ac.jp

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Influences of Attention and Noticing on Second Language Acquisition

Takahiro IWANAKA
Graduate School, Hyogo University of Teacher Education
Shigenobu TAKATSUKA
Okayama University

Abstract

This study aims to investigate how realizing problems during translation from Japanese to English and noticing forms in written model sentences encourage learners to internalize linguistic items. Thirty nine university students, classified into 3 proficiency levels, took part in an experiment, in which they wrote down problems they had realized while translating Japanese into English and also took notes of what forms they had noticed in looking at model sentences. A post test was given in the following week to examine how the participants internalized target linguistic items. The results are: 1) realizing problems and noticing forms prompt the immediate internalization of linguistic items and play an important role in mapping already learned forms with the new meanings in all proficiency levels, and 2) realizing problems and noticing forms make advanced learners internalize more linguistic items.

1. Introduction

It is obvious that input of a target language is indispensable in acquiring a foreign language. For the success of English learning, learners should be exposed to enough input of English. Merely decoding input, however, does not guarantee language acquisition. For example, Swain (1985), based on empirical data, argues that merely understanding input does not foster the ability to use grammatically correct expressions. Schmidt (2001) also claims that foreign language learners need to pay proper attention to target linguistic items in order to internalize new knowledge about the second language and that unattended learning, if any, is limited compared to

attended learning. Other researchers also suggest that noticing linguistic items plays a vital role in causing such cognitive processes as mapping forms with their proper meanings and internalizing new knowledge (Doughty, 2001; Gass, 1997; Izumi, 2002). As Peters (1998) proposes, it seems reasonable to suppose that in every domain of language learning (phonology, grammar, vocabulary, discourse structuring and so forth), learners have to attend to and notice any source of variation that matters, whatever makes a difference in meaning. The present study aims to clarify how realizing problems in output and noticing forms in model sentences encourage learners to internalize lexical items.

2. Theoretical Background

2.1 Attention and Noticing

Attention is viewed as a limited set of mental resources that have to be shared by various processing activities (de Bot, 1996). On the other hand, noticing refers to a phenomenon that arises by focusing attention. To put it more precisely, noticing arises when learners allocate attentional resources to a certain aspect of language. If a learner pays selective attention to a form, for example, it is likely that noticing a form occurs.

Realizing problems is regarded as a kind of noticing in the present study. Both realizing problems and noticing forms arise by focusing attention. While the former occurs in production, the latter occurs in looking at model sentences.

2.2 Linguistic Features of Target Forms

Takatsuka (2003) analyzes the influence of the cognitive process where learners realize problems in production and notice forms in model sentences on the acquisition of linguistic items and suggests three hypotheses. He states that it depends on the linguistic features of target forms whether the process can become an asset in second language acquisition. What do the linguistic features of target forms mean? Learning lexical items is a process of mapping forms with their appropriate meanings. To acquire lexical items, learners have to internalize both forms and their meanings. Let us set the following two categories for the present study.

1. Both forms and meanings are new to learners.

Learning new lexical items belongs to this group. Learners have to learn both their forms and meanings in order to acquire new lexical items.

2. While forms are already learned, their meanings are new to learners.

Collocations can be considered to belong to this group. In any language, certain words regularly combine with certain other words or grammatical constructions (Benson et al., 1997). These recurrent, semi-fixed combinations are called collocations.

2.3 Learners' English Proficiency and Attention

Do all the learners direct attentional resources to the same meaningful differences irrespective of their English proficiency? As stated above, attention is limited. Learners allocate the resources to what they think is important. As Schmidt (2001) pointed out, beginning learners cannot pay attention to all meaningful differences at once because they are cognitively overloaded. On the other hand, advanced learners have more capacity to attend to details such as prepositions, articles, pragmatics, and discourse structuring. As they acquire a better command of English, learners have easier access to linguistic items. As a result, some cognitive processes get automatized and attentional capacity is freed. It is possible to hypothesize that advanced learners notice what beginning learners do not and internalize more linguistic items into their interlanguage systems through the problem-realizing/form-noticing process.

2.4 Research Questions

Based on the above discussion, the following research questions were formulated:

1. Do problem-realizing and form-noticing promote the internalization of lexical items?
2. Does learners' proficiency in English influence their problem-realizing and form-noticing? As a result, does that influence the internalization of lexical items?
3. Do problem-realizing and form-noticing help learners acquire new lexical items or map already learned forms with their new meanings?

3. Method

3.1 Participants

Table 1. C-test Scores of Participants

Level	<i>M</i> (max. <i>n</i> =54)	<i>N</i> of Participants	<i>SD</i>
Elementary	24.8571	14	4.53800
Intermediate	36.9231	13	3.06761
Advanced	44.5000	12	3.11886
Total	34.9231	39	8.97184

Thirty nine Japanese learners of English participated in the study. They were undergraduate students whose major was not English. They were classified into 3 levels based on their English proficiency: advanced level (more than 41 points out of 54), intermediate level (between 40 and 31 points), and elementary level (below 30 points). The proficiency test used in the study was a C-test, in which every 11th word had been deleted. C-tests have proven to be a fairly reliable measure of global L2 competence (Kormos, 2000). The C-test given to the participants

consisted of 2 texts with 27 gaps each.

3.2 Linguistic Items Used in the Study

Based on the discussion in 2.2, we selected 12 linguistic items used in the study. They are classified into two categories: new words and familiar forms with new meanings. We selected the linguistic items which we thought were difficult for the participants to produce. In selecting them, we made use of the Standard Vocabulary List,¹ *The BBI Dictionary of English Word Combinations*, and Asahi Press SENTENCE.² The 12 linguistic items are in Appendix 1.

3.3 Procedure for Collecting Data

The participants had been informed of the procedure of the survey in advance. The procedure for collecting data is as follows:

Stage1. A Japanese sentence is shown to the participants on a screen. (5 sec.)

Stage2. The participants write down the thought processes that occur while putting the Japanese sentence into English. (90 sec.)

Stage3. The participants write down the final output. (45 sec.)

Stage4. A model sentence is shown to the participants on a screen. (5 sec.)

Stage5. The participants write down what they have noticed in the model sentence. (60 sec.)

Stage6. A post test is given in the next week without previous notice.

The post test was a written test, where the same Japanese sentences were shown to the participants and they put them into English. It was up to each participant whether s/he would use the expressions in the model sentences. We gave them a written test to confirm that realizing problems and noticing forms would help learners of English internalize linguistic items to such an extent that they could produce them on their own.

3.4 Number of Linguistic Items to Be Analyzed

Thirty nine participants took part in the study and 12 linguistic items were employed. That means there were 468 items to be analyzed in total. Five of them were excluded from the analysis because the participants had already internalized the target forms in the 5 cases.³ We obtained 156 new words and 307 familiar forms with new meanings to be analyzed in the study.

3.5 Analysis

Reliable criteria are necessary to judge whether the participants realized problems, they noticed forms, and they internalized target forms. Two investigators independently analyzed 6 randomly chosen participants' written reports⁴ and subsequently discussed their results. The following criteria were established for the analysis:

1. The participants realized a problem if s/he extracted the target part precisely and mentioned how to realize it linguistically in the description of his or her thought processes.
2. The participants noticed a form in a model sentence if s/he mentioned the target part metalinguistically and mapped the target form with its appropriate meaning in the comments on model sentences.
3. The internalization of target forms occurred if the participants produced the target forms correctly in the written post test.⁵

Following the above criteria, the first investigator analyzed all the data. The second investigator independently analyzed 9 participants' written reports. Agreement rates were: 88.9% for problem-realizing, 92.6% for form-noticing, and 98.1% for the internalization of target forms. The third investigator analyzed the written reports on which the 2 investigators had not reached agreement and made suggestions. The first investigator made the final decision based on the suggestions.

4. Results

4.1 Difficulty of Acquiring New Words

In the present study, there was only one case where a participant used a target new word in the post test. Irrespective of their levels, almost all the participants noticed new words when they looked at model sentences. In more than 80% of all the cases, the target parts were realized as problems. It is reasonable to say that new lexical items were noticeable enough to attract the participants' attention. However, they were not internalized through the problem-realizing/form-noticing process.

Only one intermediate participant used the word *mutilate* in the post test correctly. However, he wrote down that he had seen the word before when he looked at the model sentence. It means that the word was not a completely new linguistic item for the participant. Several participants did the same. They used the words they had noticed in model sentences in the post test though they were not target linguistic items. They also mentioned that they had seen the words before in looking at the model sentences. The result of the present study suggests that learners of English do not internalize completely new lexical items into their interlanguage systems through the problem-realizing/form-noticing process. In the subsequent parts, we will exclude acquisition of new words from our discussion.

4.2 Relationship between Problem-realizing and Form-noticing

Realizing a problem triggers form-noticing. If a certain part is realized as a problem, its correspondent in a model sentence is more likely to be a focus of attention. We hypothesized that the following process would prompt the acquisition of linguistic items.

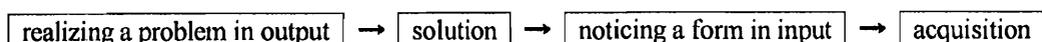


Figure 1.

A hypothetical way in which problem-realizing/form-noticing process contributes to acquisition

The participants' written reports, however, did not reflect this. After the post test, we interviewed 3 participants to know what they had actually thought in Stages 2 and 5. Two of them said, "In Stage 5, I referred to what I had not mentioned in Stage 2." The analysis of all the written reports suggested that a considerable number of the participants had done the same. According to the second criterion proposed in 3.5, it has to be interpreted that form-noticing did not occur, yet the interpretation is superficial. Although it is reasonable to think that the participants noticed forms in model sentences but did not mention them, we do not have hard evidence to prove it. As we cannot discuss how problem-realizing triggered form-noticing and they contributed to acquisition of linguistic items together, we are concerned with how problem-realizing and form-noticing encouraged acquisition of linguistic items respectively in the study.

4.3 Relationship between Problem-realizing and Acquisition

The term "problem-realizing" is usually used to mean having difficulty in realizing intended messages linguistically. It is generally considered that elementary level learners realize more problems because of their limited linguistic resources. In the study, however, the term is extended to cover the notion of directing attentional resources. We suppose that advanced level learners also realize problems in that they pay selective attention to certain parts in output, and that contributes to acquisition of linguistic items. Even if they do not experience difficulty, their paying attention to certain parts in output plays an important role in internalizing linguistic items. In the study, the term "problem-realizing" covers both experiencing difficulty in realizing intended messages linguistically and directing attentional resources to certain parts in output.

Table 2. Contingency Table of Problem-realizing and Acquisition

		N of acquisition		Total
		(+)	(-)	
Problem-realizing	(+)	101	94	195
	(-)	23	89	112
Total		124	183	307

Table 2 indicates how problem-realizing encourages the participants to internalize linguistic items. Of the 195 cases where problems were realized, the participants used the target forms in the post test in 101 cases. On the other hand, of the 112 cases where problems were not realized,

the participants used the target forms in only 23 cases. The results of statistical analysis show that problem-realizing and acquisition of linguistic items are not independent ($\chi^2(1, N = 307) = 27.588, p = 0.000$). It can be concluded that realizing problems in output encourages learners to internalize linguistic items.

4.4 Relationship between Form-noticing and Acquisition

Table 3. Contingency Table of Form-noticing and Acquisition

		N of acquisition		Total
		(+)	(-)	
Form-noticing	(+)	100	78	178
	(-)	26	103	129
Total		126	181	307

Table 3 shows how noticing forms encourages the participants to internalize linguistic items. Of the 178 cases where form-noticing occurred, the participants used the target forms in the post test in 100 cases. Of the 129 cases where form-noticing did not occur, however, the participants used the target forms in only 26 cases. The results of statistical analysis show that form-noticing and acquisition of linguistic items are not independent ($\chi^2(1, N = 307) = 38.639, p = 0.000$). Our conclusion is that noticing forms encourages learners to internalize linguistic items.

4.5 Learners' Proficiency and Acquisition

Table 4 shows the mean scores on the post test of the participants with different levels. It does not include the new words because they were not acquired at all except in only one case as discussed in 4.1. Although the performance scores of the three levels were not significantly different from each other ($H = 3.684, df = 2, p = 0.158$), advanced level learners internalized more target forms than intermediate and elementary level learners.

Table 4. Mean Performance Scores of Participants With Different Levels

Level	M (max.n=8)	N of Participants	SD
Elementary	3.0000	14	1.03775
Intermediate	3.4615	13	1.33012
Advanced	3.7500	12	1.21543
Total	3.3846	39	1.20559

Though the result was not statistically significant, realizing problems and noticing forms are likely to encourage learners with more linguistic knowledge to acquire more linguistic items. The detailed discussion of the matter is going to be given in the next part.

5. Discussion

The major findings of the study are as follows:

1. Problem-realizing and form-noticing prompt the immediate internalization of linguistic items and play an important role in mapping already learned forms with the new meanings.

As Tables 2 and 3 show, the participants reproduced the target forms in the post test more successfully when they realized problems in output or they noticed forms in model sentences. It is worth stating that problem-realizing and form-noticing help learners of English develop the ability to use linguistic items on their own.

Completely new linguistic items, or new words in the study, were not internalized at all. Problem-realizing and form-noticing did not enable the participants to reproduce new words in the post test. However, it does not mean that they do not contribute to learning lexical items at all. Some participants used the words which they had noticed in model sentences in the post test. A participant, for example, used the word *burglars* in the post test though she was not able to use it in Stage 2. When she looked at the model sentence, she reported that she had learned the word before but could not remember it. In this case, she noticed a form and internalized it. Eleven similar examples were found in the study, including the example discussed in 4.1. Though further research is indispensable, it is possible to hypothesize that problem-realizing and form-noticing contribute to vocabulary learning in the way that they enable learners to retrieve words that have already been learned but not yet acquired.

2. Problem-realizing and form-noticing make advanced learners internalize more linguistic items.

As Table 4 indicates, advanced learners used more target forms in the post test. In the study, the participants were not allowed to use dictionaries. They solved the problems which they had encountered during production and analyzed the model sentences only with their own knowledge. To put it more precisely, they processed the meanings that should be communicated so that they could convey them with their linguistic knowledge in Stage 2. In Stage 5, they analyzed the model sentences, compared them with their own outputs, and mapped the target forms with the meanings.

In looking at the expression *travel light*, for example, an advanced participant, after mapping the form with its meaning successfully, reported that he had learned that the word *light* could be used as an adverb. Another advanced participant directed his attention to the similarities between his original output and the model sentence and internalized the target form by comparing them. The point is that the advanced participants' reports on model sentences are more elaborate and detailed than those of the elementary participants. Elementary participants sometimes had difficulty in understanding why a form bears a certain meaning. One elementary participant reported, for example, "I do not understand why the expression *travel light* can be used to mean traveling without taking a lot of baggage." In this case, the target form was not internalized.

For learners to perform analytic operations such as drawing inferences, comparing, and classifying, they have to resort to what they already know. As Marzano (2001) acutely pointed out, the success of the process where new knowledge gets systematized resting on present knowledge, is highly dependent on the amount of the latter. This explains why advanced participants internalized more linguistic items in the study. It is possible to conclude that their good prior knowledge about English helped them internalize target forms more successfully.

6. Conclusion

Skehan (1998) suggests three factors in foreign language aptitude: the ability to notice what is in input, language analytic ability, and the ability to retrieve chunks from memory for fluent speech production. The first two abilities can be fostered by noticing forms in model sentences. Realizing problems fills the role of triggering form-noticing. Both realizing problems and noticing forms play a crucial role in acquiring a foreign language. Though further research is required to show how realizing problems triggers noticing forms, the results of the study indicate that the problem-realizing/form-noticing process contributes to the acquisition of linguistic items.

Notes

1. It is a vocabulary list compiled by ALC Inc. For more information, see <http://www.alc.co.jp/>.
2. It is a database of Japanese-English sentence equivalents. For more information, see <http://www.asahipress.com/e-park/>.
3. In the 5 cases, the participants did not realize any problems. They mentioned that they used the expressions they already knew.
4. The 6 participants consist of 2 elementary level participants, 2 intermediate level participants, and 2 advanced level participants.
5. Some participants used other expressions than the target forms in the post test. In these cases, we judged that the internalization of target forms had not occurred.

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Appendix 1: Linguistic Items Used in the Study

1. New Words

- (1) The storm has gradually abated. (あらしが次第に治まってきた。)
- (2) When I came home, my house had been ransacked by burglars.
(家に帰ると、我が家は強盗に荒らされていた。)
- (3) Her arms were mutilated in the accident. (彼女の腕は事故で切断された。)
- (4) The studies elucidate earth environment issues scientifically.
(その研究は地球環境問題を科学的に解明している。)

2. Familiar Forms with New Meanings

- (1) I always travel light whenever I go abroad. (私は海外に行くときはいつでも身軽に旅行する。)
- (2) I am working part-time at a convenience store. (私はコンビニでアルバイトをしています。)
- (3) Tom waved goodbye to us. (トムは手を振って私たちに別れを告げた。)
- (4) It's hard for me to meet my father's expectations. (父の期待に応えるのは難しい。)
- (5) The apple tree is dying. (そのリンゴの木は枯れかけている。)
- (6) There's a good chemistry between us, isn't there? (私たち相性がいいのね。)
- (7) What the teacher said cut me badly. (先生の言ったことは、ひどくこたえた (辛かった)。)
- (8) An old car eats gas. (古い車はガソリンを食う。)