

## **How syntactic processing training affects oral production of elementary level Japanese EFL learners\***

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**Morishita, Miwa and Tomoko Yamamoto. 2013. How syntactic processing training affects oral production of elementary level Japanese EFL learners. *Linguistic Research* 30(3), 435-452.** For EFL learners, especially elementary level learners, the initial step in language production is to combine several words into sentences. This study reports the results of classroom research aiming to facilitate oral production of elementary level Japanese EFL learners through syntactic processing training. University freshmen in five English classes which use CALL facilities engaged in a 15-minute training at the beginning of each lesson over a total of ten lessons. The training consisted of two types of tasks rearranging shuffled word groups, based on a hypothesis that such training might lead to better automatized language production. In the first half of the training, the written task, the students looked at four to five shuffled word groups and decided the correct order. In the second half of the training, the spoken task, they listened to three shuffled word groups and orally rearranged them into correct sentences. In working out such tasks, the test takers should access vocabulary in their mental lexicon, remember the shuffled word groups they listened to, and rearrange them into correct sentences, which might impose them a high cognitive load and can lead to automatized language production. The data of 88 students who engaged in such training were compared with those of 29 students who did not at both the pre-test and the post-test stages. It was found that although both the experimental and the control groups significantly increased their scores in the written task, only the experimental group significantly increased their scores in the spoken task. The results show that training as a whole seems to have had a positive effect on the students' oral production. (Kobe Gakuin University)

**Keywords** speaking, syntactic processing, rearrangement of shuffled word groups, e-learning, CALL

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## 1. Introduction

Among Japanese university students studying English as a foreign language, the majority are not English majors and most do not have opportunities to study English as EAP (English for Academic Purposes) or ESP (English for Specific Purposes). It is usually difficult for them to keep good motivation or set proper goals for learning English. Morishita, Yamamoto, and Nakanishi (2012) conducted a survey to understand the current situation and asked approximately 200 students majoring in business administration to (i) self-evaluate their proficiency levels and (ii) prioritize training in the areas of ‘Reading,’ ‘Writing,’ ‘Listening,’ ‘Speaking,’ ‘Pronunciation,’ ‘Vocabulary,’ and ‘Grammar.’ As a result, ‘Speaking,’ followed by ‘Listening,’ was the area which they think they are the poorest at, but at the same time, they want to improve the most. We also conducted a test to check the students’ syntactic knowledge, where they had to rearrange the shuffled words into correct sentences. It was found that there were a lot of wrong answers even for the relatively easy questions.

There are several mental processes that we go through when we say something. According to Levelt (1993)’s spoken language processing model (Figure 1), we first think about what we are going to say in the *conceptualizer*. Then, in the *formulator*, grammatical encoding and phonological encoding are done by accessing our mental lexicon. The utterance is completed in the *articulator*.

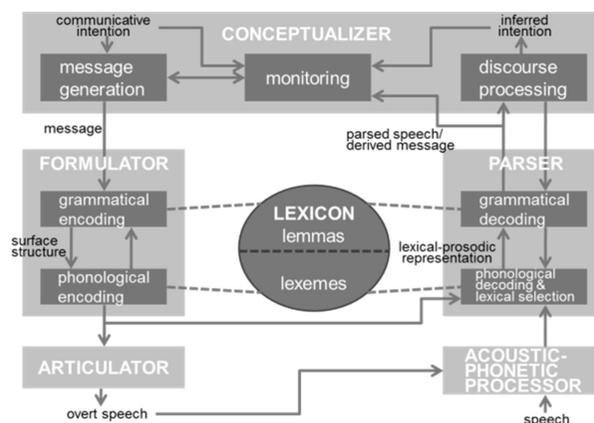


Figure 1. Spoken Language Processing Model (Levelt, 1993)

Although this speech process is automatic and simultaneously processed in the case of L1 speakers, it is a demanding process for L2 learners and trade-off effects are often observed between fluency, complexity, and accuracy of the speech (Morishita, 2010). In addition, according to Bock and Levelt (1994)'s grammatical encoding model (Figure 2), process of grammatical encoding consists of functional processing, where semantic roles are given, and positional processing, where word order is decided.

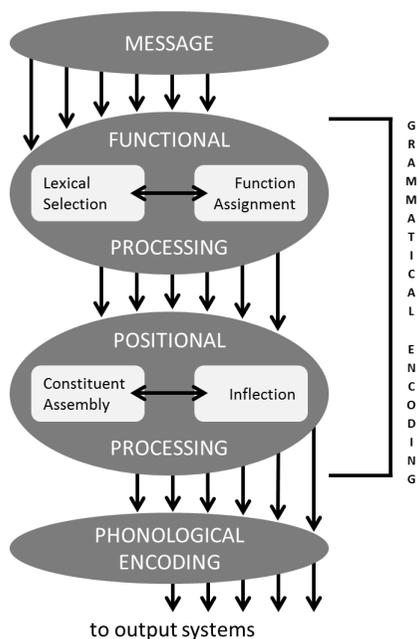


Figure 2. Grammatical Encoding Model (Bock & Levelt, 1994)

Therefore, even if we come across appropriate words, we cannot produce a sentence unless we can combine those words quickly and accurately based on the grammatical rules. Thus, it is inevitable to promote grammatical and phonological encoding in order to improve syntactic processing ability in speaking. It means that conscious input and output of spoken language is needed especially in EFL settings. This is also based on the usage-based theory of language acquisition (e.g., Tomasello, 2003), with the idea of Construction Grammar (Goldberg, 1995).

In this study, we conducted classroom research to see how syntactic processing

training facilitates oral production of elementary level Japanese EFL learners, using rearrangement tasks of shuffled word groups.

## **2. Experiment**

### **2.1 Participants**

143 university freshmen in five English classes conducted in CALL facilities engaged in a 15-minute training at the beginning of each lesson over a total of ten lessons. The training aimed at the elementary level learners, which make up the majority of Japanese EFL learners. The data of 88 students who took both the pre- and the post-tests were used in the analysis as an experimental group. Their mean score of Oxford quick placement test (Oxford University Press, 2001) was 26.6 (Full score = 60,  $SD = 4.6$ )<sup>1</sup>, which falls into A2 (elementary) level of CEFR (Common European Framework of Reference for Languages; Council of Europe, 2001). The data of the experimental group were compared with those of the control group consisting of 29 students in two classes (the mean score of OQPT = 25.3,  $SD = 4.4$ ), who did not engage in training, both at the pre-test and the post-test stages. There was no significant difference in the mean score of OQPT between the experimental group and the control group.

### **2.2 Materials**

We prepared 150 English sentences as materials for training based on English textbooks intended for university classes. Each sentence consisted of five to 13 words. 150 items of rearrangement tasks of shuffled word groups were created, with relatively easy 50 sentences with fewer words to be used in the spoken task and remaining 100 sentences to be used in the written task, in order for the students to learn gradually.

In the first half of the training, which is the written task, the students were

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<sup>1</sup> Six out of 88 students in the experimental group who took the pre- and the post-tests had not taken Oxford quick placement test, and therefore, the data in the present study is the mean score of 82 students.

instructed to look at four to five shuffled word groups (chunks), each consisting of one to four words, and tried to decide the correct order according to the meanings given as Japanese sentences. We implemented this training on an in-house e-learning system (Figure 3).

The figure displays two screenshots of an e-learning system interface for a written task. Both screenshots show the same question: "問題 1 (1点)" with instructions in Japanese: "下の日本語を参考に、正しい英文になるように語順を並べ替えなさい。" and "半角数字で入力すること". The list of words is "(1)by the arm (2)caught (3)John (4)me" and the Japanese sentence is "ジョンは私の腕をつかんだ".

The top screenshot shows a blank input field with a "解答をチェックする" button below it. The bottom screenshot shows the input field containing the rearranged words "3 2 4 1 1" and a "正解です!" message below it. Both screenshots have a navigation bar at the bottom with buttons for "はじめに", "1 2 3 4 5 6 7 8 9 10", and "終了".

Figure 3. Written task

In the second half of the training, which is the spoken task, they were instructed to listen to three shuffled word groups and orally rearranged them into correct sentences. This training is based on the format of Part D (Sentence Builds) of the Versant English Test (Pearson Knowledge Technologies). In this part of the test, the test takers should access the vocabulary in their mental lexicon, remember the shuffled word groups they listened to, and rearrange them into correct sentences at

the same time. Such tasks might have a high cognitive load and can lead to automatized language production. We created ten PowerPoint files for each lesson (Figure 4).

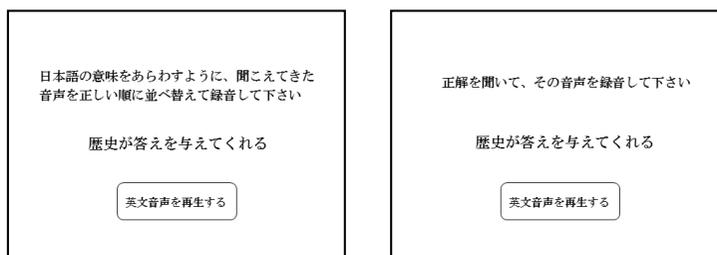


Figure 4. Spoken task

Each item has two slides with the Japanese translation and a play button. The students clicked the play button on the first slide, listened to three shuffled word groups with pauses between them (e.g., gives us / history / the answer), and orally rearranged them into correct sentences. They then clicked the play button on the second slide, listened to the correct sentence (e.g., History gives us the answer.), and orally repeated it. Sounds for each item were created by GlobalvoiceEnglish (HOYA Service Corporation). Recorded voices of students' responses were saved as WAVE files on each machine the students were using and then collected via CALL LAN. The number of items for training in each lesson was ten in the written task and five in the spoken task, respectively. The items for training in the first and the last lesson were combined into 20 and 10 items, respectively, where the same items were used for the pre- and the post-tests to measure the possible effect of the training (Appendix A).

In addition, 13 students who did not belong to either the experimental or the control groups answered the pre- and the post-tests in the paper and pencil test. We adjusted the level of difficulty for each test based on the number of correct answers as well as the number of words / syllables. Preliminary survey was conducted in other classes to check if there was no problem with operational performance.

### **2.3 Procedure**

A 15-minute training was conducted at the beginning of each lesson over a total of ten lessons. The students were given the following instructions:

1. Log in to the in-house e-learning system and do the written task (Figure 3).
2. Answer all the items (questions) and check your own score as well as the list of all correct sentences.
3. Run the audio software (SoundEngine Free ver. 4.59, which has already been installed in each student's PC) and start recording.
4. Open the slide show of the PowerPoint distributed and answer the spoken task (Figure 4).
5. Answer all the items (questions), stop recording, and check if your voice is clearly recorded.
6. Save the recording on the desktop and drag and drop the WAVE file into the dialog box "File submission."

### **2.4 Analysis**

For the written task, we gave one point to the correct answer in each blank. For the spoken task, we excluded the answer for the first item from the analysis. This is because even if we gave some practice exercises, the students did not fully understand the procedure and produced quite a few outliers. Errors in the use of articles or morphemes were ignored and treated as correct answers. We conducted two-sided repeated measures *t*-test for the data of the students who took both the pre- and the post-tests ( $n = 88$ ) to investigate the possible effect of the training.

## **3. Results and discussion**

### **3.1 Written task**

Table 1 shows the mean rates of correct answers for the written task recorded in the in-house e-learning system.

Table 1. Mean rates of correct answers for the written task (%)

	Pre-test		Post-test	
	Mean rates	<i>SD</i>	Mean rates	<i>SD</i>
Experimental group	85.2	8.2	86.9	7.1
Control group	83.0	7.8	89.2	7.5

The mean rates of correct answers for the written task was relatively high as it only requires the input of numbers with reference to written sentences. Both the experimental group ( $t(87) = 2.34, p < .05, d = .25$ ) and the control group ( $t(28) = 3.31, p < .01, d = .62$ ) had the significant differences between the pre- and the post-tests, with the former showing slower improvement (with small and medium effect sizes, respectively). Therefore, no effect of the training was found in the written task, where either the practice effect of the task itself or the effect of classroom lessons cannot be denied.

### 3.2 Spoken task

Table 2 shows the mean rates of correct answers for the spoken task calculated on the basis of audio recordings.

Table 2. Mean rates of correct answers for the spoken task (%)

	Pre-test		Post-test	
	Mean rates	<i>SD</i>	Mean rates	<i>SD</i>
Experimental group	56.0	2.4	68.8	2.1
Control group	57.9	1.9	61.7	1.6

Although easier sentences were used in the spoken task than in the written task, the overall mean rates of correct answers was lower in the former than the latter, which might show that the difference in modality largely influenced the result. A significant difference was found between the pre- and the post-tests in the experimental group with a medium effect size ( $t(87) = 5.49, p < .01, d = .58$ ), but not in the control group ( $t(28) = 1.08, p = .29$ ). Therefore, there was a clear effect of the training in the case of the spoken task.

The fact that there was a significant improvement in the post-test in both tasks

suggests that the students learned the basic word order by training and became sensitive to sentence structures. However, both experimental and control groups showed a significant improvement, showing that the effect of the training was found not in the written task but rather in the spoken task.

Oral training on rearrangement of shuffled word groups requires a series of mental processes. Students remember each word groups, rearrange them, and say the full sentence aloud. Since it has a higher cognitive load than simple repeating, resulting in a higher learning effect, a significant improvement was found in the post-test of the spoken task.

Table 3 shows the common errors and their possible reasons in the spoken task.

Table 3. Common errors and their possible reasons

#	Errors	Correct answers	Reasons for errors
1	milk tea	make tea	They cannot match the meaning and the sound. They do not understand sentence structures.
4	My husband playing golf really enjoys	My husband really enjoys playing golf	They do not know the usage of “enjoy ~ing.” They are affected by Japanese word order.
5	an interesting story	an exciting story	They can distinguish parts of speech. They might implicitly translate English into Japanese.
7	Do you~?	Will you~?	They cannot match the meaning and the form (syntax). They do not understand speaker’ intension (invitation).
8	Where the dictionary can I find?	Where can I find the dictionary?	They are affected by Japanese word order.
9	The clock is slow in our living room	The clock in our living room is slow	They do not know which word is the subject in a sentence. They are not used to a sentence with a long subject clause.

Overall, it was found that elementary-level Japanese EFL learners tend to have difficulty in paying attentions both to sentence structures (syntax) and meanings during sentence production.

### 3.3 Questionnaire

In the last lesson, we conducted a questionnaire survey (Appendix B). The students evaluated training on a scale of 0 to 7 regarding the level of satisfaction (1: not satisfied at all, 4: so so, 7: quite satisfied), the level of difficulty (1: very easy,

4: so so, 7: very difficult), and the improvement of English ability (1: did not improve at all, 4: so so, 7: improved a lot).

Table 4 shows the mean scores of each item.

Table 4. Result of the questionnaire (on a scale of 0 to 7)

Items	Mean scores
Level of satisfaction for the written task	5.1
Level of difficulty for the written task	3.7
Level of satisfaction for the spoken task	4.1
Level of difficulty for the spoken task	4.9
Development in listening skills	4.2
Development in speaking skills	3.8
Development in vocabulary	4.0
Development in grammatical knowledge	4.3
Development in pronunciation	3.7

The responses to the questionnaire, in terms of overall mean scores regarding the level of satisfaction and the improvement of English ability were not so high, are consistent with the results presented in Morishita (2012), which also conducted an implicit training in a similar way. To be precise, the students were relatively satisfied with the written task and satisfied so so with the spoken task. They felt that the former was relatively easy and the latter was relatively difficult. In other words, the students felt that the spoken task was more difficult and their level of satisfaction was lower than the written task, although their scores were more increased in the spoken task than in the written task.

In their reflective comments on the written task, a lot of students mentioned their satisfaction with training as follows:

- I was able to remember or learn idioms by checking word groups.
- I should answer quickly.
- It was good that I was able to check the correct answers and my scores.

In contrast, regarding the spoken task, their comments varied regarding what aspects they mentioned and their evaluation on them. The following are their comments on listening, speaking, and memory, respectively:

*Listening*

- I tried to concentrate on listening to each word.
- I could not catch the words / sentences without listening several times.
- I could not rearrange the word groups as I could not listen to them well.

*Speaking*

- It was hard to make sentences although they were easy enough.
- I was only striving to speak and could not pay attention to pronunciation.
- Repeating was difficult.

*Memory*

- It was hard to memorize and rearrange the word groups at the same time.
- It was hard to say something after getting all sorted out inside my head.

These comments might show that the students noticed the complex nature of speaking process. The following are the reasons why they were not satisfied with the spoken task:

- I wanted to check the answers in writing in the last training (i.e., post-test) as well.<sup>2</sup>
- I wanted to know my scores in the spoken task as well.

Regarding the improvement of English ability, the students felt that, without much difference between each item, their grammatical knowledge improved the most, while speaking and pronunciation did not improve much, although both of them are directly related to the spoken task. Comments such as “I can listen better than before, but I do not know about other skills as I have not tried them.” show that they have little opportunities to actually use English both inside (due to a relative lack of integrated language learning) and outside classes. This implies that it is difficult for them to realize their improvement in English ability, especially in language production, in their everyday life.

Comments on overall training are as follows:

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<sup>2</sup> Correct sentences were presented both in sounds and letters in the spoken task during the training, but they were presented only in sounds in the pre- and the post-tests. Therefore, the students were possibly a little puzzled, especially at the repeating in the post-test.

- It was a new experience for me to engage in such training.
- The training can improve a lot of skills.
- I came to pay attention to the location of verbs.
- I needed a detailed explanation for the items which I could not answer correctly.

The first three comments indicate that the students seem to understand the objectives of the training, while the last one shows that some felt they needed explicit instructions.

#### **4. Conclusion and future research**

In the present study, we conducted training of syntactic processing in order to improve speaking skills, which non-English major Japanese university students think they are the poorest at, but at the same time, they want to improve the most. Although it seems the positive effect of the training was observed based on the result of the pre- and the post-tests, design and operability should be improved to create more versatile training materials by taking account of the following points.

First of all, contrary to the experimenters' expectations, there were a number of cases where the students could not repeat properly the correct sentences aurally given after the reshuffling exercise in the pre- and the post-tests of the spoken task, which shows that elementary-level Japanese EFL learners are not only poor at rearranging shuffled word groups but also at repeating correct sentences. One of the possible reasons for this is that although word groups were divided into three (short chunks consisting of one to four words) in the spoken task in the present study, longer chunks (correct sentences consisting of five to eight words) were given for repeating, which makes the overall processing difficult in the case the students who did not fully understand sentence structures. Furthermore, each word group was read aloud slowly between pauses, while the correct sentences were read aloud more quickly with phonetic changes, making listening itself difficult for repeating. At the same time, improvements in phonetics such as the better intonations in the ending of interrogative sentences are also found, which shows that sound presentation of correct sentences as a model has a point. Although the students repeated the correct

sentences as a part of the training, the effect of the training on repeating itself and the difference in the improvement between rearrangement and repeating should also be examined.

Items with 3-1-2 order (e.g., from here / Tokyo is / not far) tend to be correct sentences when they were listened several times. This is because the students were allowed to listen to both the shuffled word groups and the correct sentences as many times as they wanted, which should be controlled together with other improvements in the system such as the limitation of times or backward operations in the future studies.

We only checked the correct order in the present study as it is hard to judge the correctness of morphemes in the audio data. We plan to analyze morphemes in the next stage, however, when the students are ready to understand and produce sentences in the correct word order. We can also check the data in the middle of the training together with those of the pre- and the post-tests to examine the changes in more detail. Other possible analyses include the changes in the reaction time between the pre- and the post-tests to check the processing speed, errors based on sentences (grammatical items), and differences in the effect of the training according to proficiency levels.

In addition, we plan to increase the number of items and improve the interface to optimize the effect of the training. Since factors such as lack of attention, together with lack of English skills, have a big impact on the results of self-learning by elementary-level learners, interesting contents and personalized level setting are indispensable to increase their motivation to keep learning.

In general, rearrangement tasks are often used in the form of objective tests for entrance examinations to check the grammatical knowledge of learners. The written task in the present study falls into this type. A comparison between the mean rates of correct answers for the written and the spoken tasks indicated a tendency that the students may understand the correct word order of sentences but may not be able to produce similar or shorter sentences in the correct word order. It is suggested that oral rearrangement of the shuffled word groups possibly facilitates the automatization of syntactic processing and improves the basic speaking skills. Such improvements may be difficult to be achieved with explicit grammatical instruction alone.

Although the needs for communicative classes are increasing, speaking generally tends to be difficult to be dealt with in the classroom and the number of e-learning

materials is very limited. Therefore, versatile e-learning materials which can be used to improve basic speaking skills in the classroom should be created. It is quite possible that students might improve all four skills of English comprehensively and make use of opportunities to improve their verbal communication skills even in the classes not focusing on communication as suggested by the present study. In the future studies, we will further examine the correlation between such training and the improvement in actual communication skills to obtain the pedagogical implications.

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## Appendix A

### The pre- and the post-tests

Written task		
#	Rearrangement tasks	Correct sentences
1	(1) by the arm (2) caught (3) John (4) me	John caught me by the arm.
2	(1) to communicate (2) quite fun (3) it's (4) in English	It's quite fun to communicate in English.
3	(1) was broken (2) the boy (3) this window (4) by	This window was broken by the boy.
4	(1) at the door (2) who is (3) standing (4) the lady	Who is the lady standing at the door?
5	(1) answer questions (2) by making people (3) the machine (4) works	The machine works by making people answer questions.
6	(1) to Chicago (2) that they moved (3) it was (4) last month	It was last month that they moved to Chicago.
7	(1) keep your room (2) you should (3) as possible (4) as clean	You should keep your room as clean as possible.
8	(1) a night game (2) let's go (3) in that stadium (4) to see	Let's go to see a night game in that stadium.
9	(1) he didn't (2) through the night (3) as normal people (4) sleep (5) do	He didn't sleep through the night as normal people do.
10	(1) be the very (2) in our class (3) she used to (4) best student	She used to be the very best student in our class.
11	(1) me (2) some good advice (3) gave (4) Bob	Bob gave me some good advice.
12	(1) water (2) she brought (3) me (4) a glass of	She brought me a glass of water.
13	(1) a ticket (2) buy (3) how to (4) please tell me	Please tell me how to buy a ticket.
14	(1) very friendly (2) the man (3) is (4) I work with	The man I work with is very friendly.
15	(1) that is (2) I have been (3) looking for (4) what	That is what I have been looking for.
16	(1) till late at night (2) the problem (3) the couple (4) discussed	The couple discussed the problem till late at night.
17	(1) to the rice crops (2) the typhoon (3) serious damage (4) caused	The typhoon caused serious damage to the rice crops.
18	(1) without music (2) to live (3) it is (4) for me (5) impossible	It is impossible for me to live without music.
19	(1) eating food (2) from convenience stores (3) I could not (4) put up with	I could not put up with eating food from convenience stores.
20	(1) whether (2) it is (3) someone is lying (4) to tell (5) not always easy	It is not always easy to tell whether someone is lying.
Spoken task		
#	Rearrangement tasks	Correct sentences
1	shall I / for you / make tea	Shall I make tea for you?
2	gives us / history / the answer	History gives us the answer.
3	a tulip / this flower / we call	We call this flower a tulip.
4	really enjoys / playing golf / my husband	My husband really enjoys playing golf.
5	told us / the teacher / an exciting story	The teacher told us an exciting story.
6	from here / Tokyo is / not far	Tokyo is not far from here.
7	have a drink / will you / with us	Will you have a drink with us?
8	where / the dictionary / can I find	Where can I find the dictionary?
9	in our living room / is slow / the clock	The clock in our living room is slow.
10	with customers / was crowded / the shopping mall	The shopping mall was crowded with customers.





Please write the reasons.

6) Please write anything freely.

Thank you very much for your cooperation.

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