The Acquisition of *Wh*-Interrogatives and Relative Clauses by Japanese EFL Learners

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1. Introduction

Since 1970's, syntactic researchers have focused on subject/non-subject asymmetries in *wh*-movement (Koopman, 1983, among others), and some (Lasnik & Saito, 1984, among others) have attempted to explain them in terms of the Empty Category Principle (ECP), which is considered to constitute one of the principles of universal grammar. Since the late 1980's, L2 acquisition researchers have investigated the relationship between universal grammar and second language acquisition (White, 1988, among others). In this study, we investigated the acquisition of *wh*-movement operation in English by English as a Foreign Language (EFL) learners in Japan. We focused on the *wh*-interrogative construction and the relative clause construction.

As for the *wh*-interrogative construction, there is a clear syntactic difference between English and Japanese. In English, a *wh*-phrase overtly moves to CP-SPEC, while in Japanese, it remains in the base-generated position, as shown in (1). (1a) shows that in English, the *wh*-phrase who undergoes movement to the clause initial position leaving a trace in the original position. On the other hand, (1b) shows that in Japanese, the *wh*-phrase dare 'who' remains in the base-generated position.

(1) a. Who did John find? (English)
   b. John wa dare o mitsuke mashi ta ka?

   John TOP who ACC find polite past Q
   'Who did John find?' (Japanese)

However, both (1a) and (1b) have the same interpretation at the level of semantics. Therefore, it has been assumed that the *wh*-movement operation takes place in the Logical Form component in Japanese (Nishigauchi, 1990). In the field of L2 acquisition, previous research within the generative grammar framework has attempted to parametrically distinguish *wh*-movement languages from *wh*-in-situ languages (Hawkins & Chan, 1997). Hasebe and Maki (2014) showed

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1 Under the definition of the ECP, a trace must be properly governed. The definition of proper government proposed by Chomsky (1981) is shown in (1).

   (1) a properly governs b iff a governs b and
       a. a is a lexical category X° (lexical government), or
       b. a is coindexed with b (antecedent government).

2 CP-SPEC is a specifier position of complementizer phrase.

3 The following is a list of the abbreviations used in this paper. ACC = Accusative Case, NOM = Nominative Case, past = Past Tense, polite = Polite Form, Q = Question Particle, and TOP = Topic Marker.
that Japanese junior high school EFL learners exhibited (i) an argument/adjunct asymmetry⁴ and (ii) two types of subject/object asymmetries in the acquisition of the \textit{wh}-interrogative construction.

As for the relative clause construction, there are several differences between the two languages. The examples in (2a) and (2b) are relative clauses in English and Japanese, respectively.

(2) a. Paul saw the man [who John found [d]].
      Paul-TOP John-NOM find-past man:ACC see-past
      ‘Paul saw the man who John found.’

(2a) contains an object relative clause in the object domain. The head nominal \textit{the man} is the logical object of the verb inside the relative clause, and a relativizer (\textit{wh}-word) appears at the edge of the relative clause. On the other hand, because Japanese is a head-final language⁵, the position of the relative clause is prenominal, and there is no relativizer to demarcate the beginning/end of the clause. O’Grady, Lee, and Choo (2003) focused on the acquisition of the relative clause construction by English speakers who were learning Korean, and found that they showed a subject/object asymmetry.

Based on these backgrounds, using participants of college and university EFL learners, we investigated whether the participants would show the asymmetries in the acquisition of the \textit{wh}-interrogative construction, just like Japanese junior high school EFL learners, and any asymmetry in the acquisition of the relative clause construction, which also involves the \textit{wh}-movement operation. Hasebe and Maki (2014) provided a production task to Japanese junior high school students. In order to see if college and university EFL learners exhibit the same tendency as the junior high school students, in this study, we used a translation test, and administered it to 178 participants. Through the analysis, we found (i) an argument/adjunct asymmetry in the acquisition of \textit{wh}-interrogatives, (ii) two types of subject/object asymmetries in the acquisition of \textit{wh}-interrogatives, and (iii) a subject/object asymmetry in the acquisition of relative clauses.

The organization of this paper is as follows. Section 2 provides the procedure of this study. Section 3 reports the result of the analysis, and Section 4 concludes this paper.

2. Procedure

This section presents the procedure of this study. Subsection 2.1 provides research questions to be addressed in this paper. Subsections 2.2 and 2.3 provide an overview of the materials and details of the participants, respectively.

2.1. Research Questions

⁴ An argument is a noun phrase in a clause that is obligatorily required by the predicate. On the other hand, an adjunct is an adverb or a phrase that is not required by the predicate. Thus, argument \textit{wh}-phrases are \textit{what} and \textit{who}, and adjunct \textit{wh}-phrases are \textit{when}, \textit{where}, \textit{how}, and \textit{why}. Hasebe and Maki (2014) found that extraction of argument \textit{wh}-phrases was more difficult than that of adjunct \textit{wh}-phrases.

⁵ A head of a phrase is the word that determines the syntactic type of the phrase. In a head-final language, a head appears right side on the hierarchy structure.
In this paper, we address the three research questions shown in (3).

(3)  
   a. As for the *wh*-interrogative construction, is there any difference in the level of acquisition between argument *wh*-extraction and adjunct *wh*-extraction?  
   b. As for the *wh*-interrogative construction, is there any difference in the level of acquisition between subject *wh*-extraction and object *wh*-extraction?  
   c. As for the relative clause construction, is there any difference in the level of acquisition between subject *wh*-extraction and object *wh*-extraction?

First, if the answers to the research questions in (3a) and (3b) are *Yes*, Japanese EFL learners show some asymmetries in the acquisition of the *wh*-interrogative construction, which will support the result of Hasebe and Maki (2014). On the other hand, if the answers to the research questions in (3a) and (3b) are *No*, college and university EFL learners show a different tendency from junior high school EFL learners. Second, if the answer to the research question in (3c) is *Yes*, Japanese EFL learners also show a subject/object asymmetry in another type of construction with *wh*-movement. On the other hand, if the answer is *No*, they do not show an asymmetry in the acquisition of the relative clause construction.

2.2. Materials

We created and used a translation test with *wh*-interrogatives and relative clauses, which involve the *wh*-movement operation. The participants translated Japanese sentences into English. Some of the test sentences are shown in (4) and (5).

(4) *The Wh-Interrogative Construction*

   a. Subject *Wh*-Extraction (Argument (Subject), *who*)
      Question: Dare-ga Pam-o mitsuke-mashi-ta ka?  
                who-NOM Pam-ACC find-polite-past Q  
      Answer: Who found Pam?

   b. Object *Wh*-Extraction (Argument (Object), *wh*/*what*)
      Question: Ron-wa dare-o mitsuke-mashi-ta ka?  
                Ron-TOP who-ACC find-polite-past Q  
      Answer: Who did Ron find?

   c. Pseudo Adjunct *Wh*-Extraction (Adjunct (Time/Date), *when*)
      Question: Itsu Ron-wa Pam-o mitsuke-mashi-ta ka?  
                when Ron-TOP Pam-ACC find-polite-past Q  
      Answer: When did Ron find Pam?

   d. Adjunct *Wh*-Extraction (Adjunct (Reason), *why*)
      Question: Naze Ron-wa Pam-o mitsuke-mashi-ta ka?  
                why Ron-TOP Pam-ACC find-polite-past Q  
      Answer: Why did Ron find Pam?

(5) *The Relative Clause Construction*

   a. Subject *Wh*-Extraction from the Subject Domain
                Pam-ACC find-past man-TOP Richard-ACC help-past  
      Answer: The man who found Pam helped Richard.
b. Object WhExtraction from the Subject Domain
   Question: [Ron'ga mitsuke'ta hito'wa] Richard'o tasuke'ta.
             Ron'NOM find'past man'TOP Richard'ACC help'past
   Answer: The man who Ron found helped Richard.

c. Subject WhExtraction from the Object Domain
   Question: Richard wa [Pam'o mitsuke'ta hito'o] tasuke'ta.
             Richard'TOP Pam'ACC find'past man'ACC help'past
   Answer: Richard helped the man who found Pam.

d. Object WhExtraction from the Object Domain
   Question: Richard wa [Ron'ga mitsuke'ta hito'o] tasuke'ta.
             Richard'TOP Ron'NOM find'past man'ACC help'past
   Answer: Richard helped the man who Ron found.

We created two types of test sheets for the counterbalanced design. The test sentences have eight types of structure, which constitute minimal pairs. There are eight examples in each type of structure, and each test sheet contains four examples for each of the eight types of structure based on the Latin square method. Both test sheets consisted of 68 questions in total (32 test sentences and 36 filler sentences). Some remarks on the test are in order. First, the time limit for the interrogative formation test is 40 minutes. Second, the answers with spelling mistakes were not counted as wrong, but those with mistakes on dislocation, tense, and agreement were. Third, and finally, all the sentences in the translation test were graded either as correct or wrong.

2.3. Participants

178 Japanese EFL learners who were learning English as a second language at one college and one university in Japan (age range: 18-22, average age: 18.99) participated in this study. They took an English proficiency test\(^6\) at the same time. Based on the deviation value of the proficiency test ($DV$), the participants were classified into three EFL level groups (46 beginner learners ($DV<45$), 73 intermediate learners ($45 \leq DV < 55$), and 59 advanced learners ($55 \leq DV$)).

3. Results

This section reports the result of the analysis. The collected data was analyzed by a repeated measure of ANOVA and a multiple comparison (Bonferroni). In all analyses, the significant level was set at $\alpha<.05$.

3.1. Asymmetries in Wh-Interrogatives

To address research questions (3a) and (3b), we examined whether the participants would show an argument/adjunct asymmetry and a subject/object asymmetry in the level of acquisition with respect to the wh-interrogative construction. The descriptive statistics on the wh-interrogative construction is shown in Table 1, where Argument indicates the average scores of the rate of accuracy on subject wh-extraction (4a) and object wh-extraction (4b), and Adjunct indicates those on extraction of time wh-phrases (4c) and reason wh-phrases (4d).

\(^6\) In order to measure participants' English proficiency, we used the Minimal English Test (MET). To avoid a great amount of exhaustion for test takers, Maki, Wasada, and Hashimoto (2003) developed the MET, which is a five-minute English test, and requires the test taker to write a correct English word into blank spaces of the given sentences, while listening to the CD. For more details of the MET, see Goto, Maki, and Kasai (2010).
By a repeated measure of 3x2x2 (EFL level type, interrogative construction (argument/adjunct) type, and trace position (subject/object) type) ANOVA, we found (i) a statistically significant main effect for factor interrogative construction type ($F(1, 175) = 41.60, p < .001, \eta^2 = .192$), (ii) a statistically significant main effect for factor EFL level type ($F(2, 175) = 12.20, p < .001, \eta^2 = .122$), and (iii) a statistically significant interaction among the three factors ($F(2, 175) = 7.68, p < .001, \eta^2 = .081$). However, there was no statistically significant main effect for factor trace type ($F(1, 175) = .025, p < .874, \eta^2 = .001$).

First, we examined whether the participants would show an argument/adjunct asymmetry in the level of acquisition with respect to the wh-interrogative construction. By a multiple comparison, we found statistically significant differences between argument and adjunct wh-extraction, as shown in (6), which are more clearly represented by Figure 1.

(6) a. For the beginner EFL learners, there was a statistically significant difference in the rate of accuracy between argument wh-extraction and adjunct wh-extraction ($n = 46, F(1, 175) = 4.05, p < .046, \eta^2 = .023$).

b. For the intermediate EFL learners, there was a statistically significant difference in the rate of accuracy between them ($n = 73, F(1, 175) = 30.87, p < .001, \eta^2 = .150$).

c. For the advanced EFL learners, there was a statistically significant difference in the rate of accuracy between them ($n = 59, F(1, 175) = 27.36, p < .001, \eta^2 = .086$).

Thus, the Japanese EFL learners showed an argument/adjunct asymmetry in the level of wh-interrogative acquisition. For them, it was more difficult to generate wh-interrogatives with argument extraction than adjunct extraction.

Second, we investigated whether the participants would show a subject/object asymmetry in the level of acquisition with respect to the wh-interrogative construction. Through the analysis, we obtained the results shown in (7), which are more clearly represented by Figure 2.
(7) a. For the beginner EFL learners, there was a statistically significant difference in the rate of accuracy between subject and object extraction \((n = 46, F(1, 175) = 7.01, p < .009, \eta^2 = .039)\).

b. For the intermediate EFL learners, there was a statistically significant difference in the rate of accuracy between them \((n = 73, F(1, 175) = 9.94, p < .002, \eta^2 = .054)\).

Thus, the Japanese college and university EFL learners showed two types of subject/object asymmetries in the level of wh-interrogative acquisition. For the beginner EFL learners, it was more difficult to generate wh-interrogatives with object extraction than subject extraction. On the other hand, for the intermediate EFL learners, it was more difficult to generate wh-interrogatives with subject extraction than object extraction.

3.2. A Subject/Object Asymmetry in Relative Clauses

To address research question (3c), we examined another structure that involves wh-movement, namely, the relative clause construction. The descriptive statistics on the four types of relative clauses is shown in Table 2.

<table>
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<tr>
<th>Table 2</th>
<th>Mean Scores on the Rate of Accuracy and Standard Deviation (Relative Clauses)</th>
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<tr>
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By a repeated measure of 3x2x2 (EFL level type, operation domain type, and trace position type) ANOVA, we found (i) a statistically significant main effect for factor operation domain type \((F(1, 175) = 13.40, p < .001, \eta^2 = .071)\), (ii) a statistically significant main effect for factor trace type \((F(1, 175) = 42.27, p < .001, \eta^2 = .195)\), and (iii) a statistically significant main effect for factor EFL level type \((F(2, 175) = 8.22, p < .001, \eta^2 = .086)\). However, there was no statistically significant interaction among the three factors \((F(2, 175) = 1.43, p < .242, \eta^2 = .016)\).

By a multiple comparison, we found statistically significant differences between subject and object wh-extraction in (8)-(9), which are more clearly represented by Figures 3-4.
(8) **Subject Domain**
   
a. For the intermediate EFL learners, there was a statistically significant difference in the rate of accuracy between subject *wh*-extraction and object *wh*-extraction (*n* = 73, *F*(1, 175) = 6.00, *p* < .015, η² = .033).

b. For the advanced EFL learners, there was a statistically significant difference in the rate of accuracy between them (*n* = 59, *F*(1, 175) = 15.05, *p* < .001, η² = .079).

(9) **Object Domain**
   
a. For the beginner EFL learners, there was a statistically significant difference in the rate of accuracy between subject *wh*-extraction and object *wh*-extraction (*n* = 46, *F*(1, 175) = 5.97, *p* < .016, η² = .033).

b. For the intermediate EFL learners, there was a statistically significant difference in the rate of accuracy between them (*n* = 73, *F*(1, 175) = 11.41, *p* < .001, η² = .061).

c. For the advanced EFL learners, there was a statistically significant difference in the rate of accuracy between them (*n* = 59, *F*(1, 175) = 45.05, *p* < .001, η² = .205).

![Figure 3. Wh-Extraction from the Subject Domain](image1)

![Figure 4. Wh-Extraction from the Object Domain](image2)

Thus, the Japanese EFL learners showed a subject/object asymmetry in the acquisition of relative clauses. For them, subject *wh*-extraction was easier than object *wh*-extraction.

4. **Conclusion**
   
In this study, we investigated the acquisition of the *wh*-interrogative construction and the relative clause construction by Japanese college and university EFL learners. First, the answer to research question (3a) was *Yes*, because the Japanese EFL learners showed an argument/adjunct asymmetry in the acquisition of the *wh*-interrogative construction. For them, it was more difficult to generate *wh*-interrogatives with argument extraction than adjunct extraction. This result supports Hasebe and Maki (2014).

Second, the answer to research question (3b) was *Yes*. This is because the Japanese EFL learners showed two types of subject/object asymmetries in the acquisition of the *wh*-interrogative construction. For the beginner EFL learners, it was more difficult to generate *wh*-interrogatives with object extraction than subject extraction. On the other hand, for the intermediate EFL learners, it was more difficult to generate *wh*-interrogatives with subject extraction than object extraction. This result also supports Hasebe and Maki (2014).

Third and finally, the answer to research question (3c) was also *Yes*, because the Japanese EFL learners showed a subject/object asymmetry in the acquisition of the relative clause construction. For them, subject *wh*-extraction was easier than object *wh*-extraction.
Let us finally consider what the findings of this study might suggest. There was a clear difference between the \textit{w}h\textit{r}-interrogative construction and the relative clause construction in terms of the acquisition of these by Japanese EFL learners. They showed two types of subject/object asymmetries in acquisition of \textit{w}h\textit{r}-interrogatives. It was more difficult to generate \textit{w}h\textit{r}-interrogatives with object extraction than subject extraction for the beginner learners. On the other hand, for the intermediate level learners, it was more difficult to generate \textit{w}h\textit{r}-interrogatives with subject extraction than object extraction. Furthermore, the advanced learners did not show the asymmetry. Thus, the three groups of Japanese EFL learners showed different tendencies in terms of the acquisition of the \textit{w}h\textit{r}-interrogative construction. However, there was no difference in the level of acquisition of the relative clause construction among the three EFL groups, as they consistently showed a subject/object asymmetry: for them, object \textit{w}h\textit{r}-extraction was more difficult than subject \textit{w}h\textit{r}-extraction in relative clause formation. These results seem to indicate that if the construction does not involve the \textit{do} support operation, as in relative clause formation, subject extraction is easier than object extraction due to the distance of the movement involved.

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References