Scrambling and its locality constraints in child Japanese

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Scrambling has been one of the central issues in the theoretical studies of Japanese syntax. Yet, there is still limited research that investigates children’s knowledge of this movement phenomenon, and further research is needed to obtain a deeper understanding of when and how children acquire various properties of Japanese scrambling. In this study, we conduct an experiment with Japanese-speaking preschool children to determine whether these children are sensitive to the locality constraints on long-distance scrambling. The results of our experiment confirm the findings from previous studies on short-distance scrambling that preschool children have adult-like knowledge of this movement phenomenon. More importantly, our findings add a new piece of evidence from Japanese for the hypothesis that properties of UG constrain the course of acquisition from the earliest observable stages (e.g. Crain 1991).

1. Introduction

One of the major properties that distinguishes Japanese from languages like English is the availability of free word order. For example, argument DPs and PPs can freely appear in the sentence-initial position without significantly changing the meaning of the sentence, as illustrated in (1b,c) and (2b,c).

(1) a. Ken-ga aka-iro-de sono kabe-o nutta.
    Ken-NOM red-color-with that wall-ACC painted
    ‘Ken painted that wall with a red color.’

b. Sono kabe-o Ken-ga aka-iro-de ______ nutta.
   that wall-ACC Ken-NOM red-color-with ______ painted

c. Aka-iro-de Ken-ga ______ sono kabe-o nutta.
   red-color-with Ken-NOM ______ that wall-ACC painted

* We would like to thank Mamoru Saito, who suggested to us the fundamental idea behind this study. We are also grateful to Narumi Otaki, Ayaka Kato, and Sachiko Saito for their help in conducting the experiment reported in this study, and to Feleisha Reiter for her editorial contributions. The usual disclaimers apply. The research reported here was supported in part by a JSPS Grant-in-Aid for Scientific Research (C) (Sugisaki: #25370550, Murasugi: #26370515) and a Nanzan University Pache Research Grant (I-A 2013, 2014: Murasugi).
(2) a. Hanako-wa [ Ken-ga aka-iro-de sono kabe-o
Hanako-TOP Ken-NOM red-color-with that wall-ACC
nutta to ] omotta.
painted that thought
‘Hanako thought that Ken painted that wall with a red color.’

b. Sono kabe-o Hanako-wa [ Ken-ga aka-iro-de
that wall-ACC Hanako-TOP Ken-NOM red-color-with
_________ nutta to ] omotta.
painted that thought

c. Aka-iro-de Hanako-wa [ Ken-ga _________
red-color-with Hanako-TOP Ken-NOM
sono kabe-o nutta to ] omotta.
that wall-ACC painted that thought

It has been widely assumed at least since Harada (1977) and Saito (1985) that this flexibility of word order in Japanese is due to movement called *scrambling* (Ross 1967). Scrambling has at least two varieties: short-distance scrambling and long-distance scrambling. The former refers to the preposing of argument DPs and PPs within a single clause as in (1b,c), and the latter refers to the preposing of these arguments across a clause boundary as in (2b,c).

Scrambling is the most widely studied topic in theoretical studies on Japanese syntax. This is due primarily to the fact that this movement phenomenon provides important insight on a number of fundamental properties of human language. These properties include the classification of movement types (e.g. Saito 1992, 2003a; Tada 1993), trigger for movement operations (e.g. Bošković & Takahashi 1998, Fukui 1993, Miyagawa 1997, Saito & Fukui 1998), locality constraints on movement (e.g. Fukui 1991, Saito 1985), interaction between movement and interpretation (such as binding and quantifier scope) (e.g. Hayashishita 2000, Saito & Hoji 1983, Ueyama 1998), the role of Case (e.g. Nemoto 1993), and the formulation of the Configurationality Parameter (e.g. Saito 2003b), as well as many others. In sharp contrast to these theoretical studies, there are still few studies which examined Japanese-speaking children’s knowledge of scrambling. Furthermore, these limited studies focus on short-distance scrambling. Thus, further research, especially with a focus on long-distance scrambling is needed to better understand when and how children acquire various properties of Japanese scrambling.

In light of this background, this study attempts to determine whether Japanese-speaking preschool children are sensitive to the locality constraints on long-distance scrambling, focusing on the ban on extraction out of a relative clause
(the Complex NP Constraint of Ross 1967). The results of our experiment suggest that these children conform to this type of island conditions. Our findings are consistent with the findings from the previous studies on the acquisition of short-distance scrambling that preschool children have adult-like knowledge of scrambling in Japanese.

In the next section, we review evidence that scrambling in Japanese is indeed an instance of movement. In Section 3, we summarizes previous studies on the acquisition of Japanese scrambling. In Section 4, we discuss the design and the results of our new experiment on children’s knowledge of the locality constraints on long-distance scrambling. In Section 5, we conclude the discussion.

2. Japanese Scrambling as Movement

Since the seminal work on Japanese scrambling by Saito (1985), studies on Japanese syntax have accumulated evidence that scrambling in Japanese shares typical properties of movement. In this section, we review two types of evidence that have a significant bearing on the previous acquisition studies as well as our new experiment. One type of evidence comes from the phenomena that necessitate the postulation of a trace/copy of the preposed phrase in its original position. The other type of evidence is the observation that long-distance scrambling obeys locality conditions on movement.

2.1. Scrambling Leaves a Trace/Copy

One piece of evidence that scrambling leaves a trace/copy is based on the observation by Kuroda (1980) and Haig (1980) that a subject-object asymmetry can be found in quantifier float: While a numeral quantifier that modifies an object DP can be separated from that object by an intervening subject, a numeral quantifier that modifies a subject DP cannot be separated from that subject by an intervening object, as illustrated by the contrast between (3b) and (4b).


b. Utide-no kozuti-o Igirisuzin-ga hutatu katta. striking-GEN mallet-ACC Englishman-NOM 2.objects bought
(4) a. Igirisuzin-ga sannin utide-no kozuti-o katta.
   Englishman-NOM 3.people striking GEN mallet-ACC bought
   ‘Three Englishman bough the mallet of luck.’
b. * Igirisuzin-ga utide-no kozuti-o sannin katta.
   Englishman-NOM striking GEN mallet-ACC 3.people bought

Adopting the assumption that a floated numeral quantifier and its host DP must be adjacent, Kuroda (1980) argues that the above contrast between (3b) and (4b) suggests that the Object-Subject-Verb order in (3b) is derived from the Subject-Object-Verb order in (3a) via movement operation. Refining Kuroda’s (1980) analysis, Saito (1985) claims that scrambling is an instance of movement and hence leaves a trace, and that the trace left by scrambling satisfies the adjacency condition on quantifier float. Under this analysis, the structure of (3b) should be as in (5).

(5) [ Utide-no kozuti-o ]: Igirisuzin-ga t1 hutatu katta.
   striking-GEN mallet-ACC Englishman-NOM 2.objects bought

Another piece of evidence that scrambling leaves a trace/copy comes from the phenomenon known as reconstruction. As the example in (6b) from Saito (1992:76) illustrates, an anaphor in the object position can appear sentence-initially without degrading the grammaticality of the sentence.

(6) a. Hanako-ga zibunzisin-o hihansita (koto)
    Hanako-NOM self-ACC criticized (fact)
    ‘Hanako criticized herself.’
b. Zibunzisin-o Hanako-ga hihansita (koto)
    self-ACC Hanako-NOM criticized (fact)

The well-formed status of (6b) can be immediately accounted for if we assume that the object DP in the sentence-initial position has undergone movement and has left a trace in its original position, and that this trace makes it possible for the preposed anaphor to satisfy Condition A of the Binding Theory (e.g. Chomsky 1981) in that position.

The above discussion concerning quantifier float and reconstruction is based on the examples involving short-distance scrambling. The same observations hold true for the examples involving long-distance scrambling: The example in (7b) shows that an object DP that has undergone preposing across clause-boundary still licenses a floated quantifier in the embedded clause, and the example in (8b) suggests that an
anaphor that corresponds to the object of the embedded clause can occupy the sentence-initial position of the matrix clause.

(7) a. Ken-wa [ Hanako-ga sono biiru-o sanbon nonda to ] omotta

Ken-TOP Hanako-NOM that beer-ACC 3.bottle drank that thought

‘Ken thought that Hanako drank three bottles of that beer.’

b. Sono biiru-o Ken-wa [ Hanako-ga sanbon nonda to ] omotta

that beer-ACC Ken-TOP Hanako-NOM 3.bottle drank that thought

(8) a. Ken-wa [ Hanako-ga zibunzisin-o hihansita to ] omotta.

Ken-TOP Hanako-NOM self-ACC criticized that thought

‘Ken thought that Hanako criticized herself.’

b. Zibunzisin-o Ken-wa [ Hanako-ga hihansita to ] omotta.

self-ACC Ken-TOP Hanako-NOM criticized that thought

These observations suggest that scrambling in Japanese, both of short-distance and of long-distance types, is an instance of movement and hence leaves a trace/copy in the original position of the preposed phrases.

2.2. **Scrambling Obey s Locality Conditions**

As was mentioned in the previous sections, Japanese allows the word order in which an argument DP or PP in the embedded complement clause appears in the initial position of the matrix clause. The relevant examples are given in (2), repeated here in (9).

(9) a. Hanako-wa [ Ken-ga aka-iro-de sono kabe-o nutta to ] omotta.

Hanako-TOP Ken-NOM red-color-with that wall-ACC painted that thought

‘Hanako thought that Ken painted that wall with a red color.’
b. Sono kabe-o Hanako-wa [ Ken-ga aka-iro-de
that wall-ACC Hanako-TOP Ken-NOM red-color-with
 nutta to ] omotta.
painted that thought

c. Aka-iro-de Hanako-wa [ Ken-ga
red-color-with Hanako-TOP Ken-NOM
sono kabe-o nutta to ] omotta.
that wall-ACC painted that thought

It has been observed at least since Haig (1976) and Harada (1977) that the
distance between the preposed phrase and its original position is constrained by the
Complex NP Constraint (Ross 1967), which prohibits extraction out of a relative clause.
The relevant examples are given in (10) (Saito 1985:246).

(10) a. John-ga [[ ano hon-o katta ] hito ]-o
John-NOM that book-ACC bought person-ACC
sagasiteiru rasii.
looking.for seem
‘It seems that John is looking for the person who bought that book.’
b. ?* Ano hon-o John-ga [[ _____ katta ] hito ]-o
that book-ACC John-NOM bought person-ACC
sagasiteiru rasii.
looking.for seem

In addition, Saito (1985) and Yoshimura (1984) observed that the distance between
the preposed phrase and its original position is regulated by the Adjunct Condition,
which is illustrated in (11) (Saito 1985:247).

(11) a. John-ga [ minna-ga sono hon-o kau node ]
John-NOM all-NOM that book-ACC bought because
tigau hon-o katta.
different book-ACC bought
‘Because everyone buys that book, John bought a different one.’
b. * Sono hon-o John-ga [ minna-ga _____ kau
that book-ACC John-NOM all-NOM bought
node ] tigau hon-o katta.
because different book-ACC bought
Building on Chomsky’s (1973) proposal that the Complex NP Constraint should be subsumed under the UG principle of Subjacency Condition, as well as on Huang’s (1982) proposal that the Adjunct Condition should follow from a more general UG principle of Condition on Extraction Domain (CED), Saito (1985) concluded that long-distance scrambling is constrained by the UG constraints on movement, which in turn constitutes evidence that it is indeed an instance of movement.

2.3. **Summary**

In this section, we have reviewed evidence that scrambling in Japanese, both short-distance and long distance types, exhibit typical properties of movement. One type of evidence showed that the preposed phrase leaves a trace/copy in its original position, and the other type of evidence demonstrated that long-distance scrambling obeys UG constraints on movement. In the next section, we summarize previous acquisition studies to determine which properties of Japanese scrambling are already present in the grammar of Japanese-speaking preschool children.

3. **Scrambling in Child Japanese: Previous Studies**

3.1. **Early Acquisition of Scrambling in Japanese**

Studies on scrambling in child Japanese date back at least to the late 1970s. Hayashibe (1975) and Sano (1977) investigated whether Japanese-speaking children can correctly interpret scrambled sentences as in (12b), which have the order of Object-Subject-Verb.

(12) a. Kamesan-ga ahirusan-o osimasita.  
    turtle-NOM duck-ACC pushed  
    ‘A/The duck pushed a/the turtle.’

b. Ahirusan-o kamesan-ga osimasita.  
    duck-ACC turtle-NOM pushed

The task for children was acting-out: Children were asked to act out what the test sentence meant by manipulating toy animals placed in front of them.

The results of these studies demonstrated that some children (up to five years old) had difficulty with interpreting the scrambled sentences. Typically, these children tended to interpret the first NP (ahirusan-o ‘duck-ACC’ in the case of (12b)) as the agent of the action denoted by the verb, and the second NP (kamesan-ga ‘turtle-NOM’ in the case of (12b)) as the theme. Consequently, these results led
researchers to believe that scrambling is acquired as late as a child’s fifth year.

The experimental study by Otsu (1994), however, revealed that the purported difficulty children have when comprehending scrambled sentences must have been due to an experimental artifact. Building on the observation by Masunaga (1983), Otsu pointed out that the scrambled DP must have been established as a discourse topic in order to make the use of scrambled sentences natural. In the previous studies, test sentences were given without any discourse context as illustrated in (12b). This resulted in the scrambled sentence sounding slightly awkward. If a context sentence is added as in (13), the use of scrambled sentence becomes perfectly natural.

(13) Kooen-ni ahirusan-ga imasita.
    park-in duck-NOM was
    Sono ahirusan-o kamesan-ga osimasita.
    the duck-ACC turtle-NOM pushed
    ‘There was a duck in a park. A turtle pushed the duck.’

In Otsu’s (1994) study, children in the experimental group were presented with a test sentence along with another sentence designed to establish the first DP of the test sentence as the discourse topic, as exemplified in (13). Similar to previous studies, children in the control group received test sentences without any discourse context. As summarized in Table 1, the results obtained from 24 three- and four-year-olds revealed that the children in the experimental group had virtually no difficulty in interpreting scrambled sentences, while many children in the control group exhibited the same error pattern as noted in the previous experiments. These findings suggest that children’s errors observed in the previous studies are in fact due to an experimental artifact, and that the knowledge of scrambling is already present in the grammar of Japanese-speaking three-year-olds.

<table>
<thead>
<tr>
<th></th>
<th>Number of Correct Responses</th>
<th>% of Correct Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Group</td>
<td>54 / 60</td>
<td>90%</td>
</tr>
<tr>
<td>Control Group</td>
<td>33 / 60</td>
<td>55%</td>
</tr>
</tbody>
</table>

Table 1: Results of the Experiment by Otsu (1994)

3.2. Scrambling and Quantifier Float in Child Japanese

In light of Otsu’s (1994) finding that Japanese-speaking children as young as three can correctly comprehend scrambled sentences, studies have been conducted to examine whether children are also sensitive to the movement properties of
scrambling. For example, Sano (2007) and Suzuki & Yoshinaga (2013) attempted to demonstrate that children are able to access the trace/copy left by the scrambling, using the phenomenon of quantifier float discussed in Section 2.1.

In one of their two experiments, Suzuki & Yoshinaga (2013) tested 33 children ranging in age from 4;02 to 6;11 (mean age, 5;06), using a picture-selection task. In this task, each child was presented with a test sentence verbally, along with two pictures depicting different potential interpretations for the test sentence. The children were then asked to select the picture that corresponded to the given sentence. Sample test sentences of their experiment are provided in (14).

(14) a. Inu-ga maeasi-de hebi-o ni-hiki tatakimasita.
   dog-NOM forepaw-with snake-ACC two-CL hit
   ‘A dog hit two snakes with its forepaw.’

   b. Hebi-o1 inu-ga maeasi-de t1 ni-hiki tatakimasita.
   snake-ACC dog-NOM forepaw-with two-CL hit

The results of their experiment showed that children were able to correctly identify the direct object as a referent of the floated numeral quantifier not only in the sentences with the basic Subject-Object-Verb order as in (14a) but also in the sentences with the scrambled Object-Subject-Verb order as in (14b). The percentage of correct responses for the former was 91.4%, and the percentage of correct responses for the latter was 86.4%. These findings suggest that Japanese-speaking children have access to the trace/copy left by the scrambled phrase, which in turn indicates that movement is in fact involved in the derivation of scrambled sentences even in child Japanese.

3.3. Scrambling and Reconstruction in Child Japanese

Murasugi & Kawamura (2005) also attempted to show that children are able to access the trace/copy of the scrambled phrase, by making use of a different property of scrambling: the property of reconstruction discussed in Section 2.1. The test sentences they used are exemplified in (15).

(15) a. Ahiru-ga1 usi-o [ zibun-no1 niwa-de ] oikaketa.
   duck-NOM cow-ACC self-GEN garden-at chased
   ‘The duck chased the cow at the garden of himself.’
b. Usi –ō1 [ zibun-no2 niwa-de ]3 ahiru-ga2 t1 t3 oikaketa.  

cow-ACC self-GEN garden-at duck-NOM chased  

‘The cow, at the garden of himself, the duck chased.’

In (15a), the subject-oriented anaphor zibun is c-commanded and hence is bound by the subject DP ahiru ‘duck-NOM’. In (15b), this c-commanding requirement is satisfied through reconstruction: The anaphor in the locative PP zibun-no niwa-de ‘at the garden of himself’ is properly licensed at the trace position of this scrambled PP.

Murasugi & Kawamura (2005) tested 22 children between the age of two and six, using an act-out task: Toy animals, as well as a house and a garden for each toy animal were prepared, and the children were asked to demonstrate the meaning of the test sentence by manipulating the toy animals in the appropriate house or garden.

The results of their experiment showed that 15 children out of 22 were able to correctly interpret the scrambled sentences with zibun, and that these children were those who correctly comprehended simple scrambled sentences without zibun. These findings suggested that Japanese-speaking preschoolers who have the knowledge of scrambling also have the knowledge of its reconstruction property. Thus, the findings from Murasugi & Kawamura’s study indicate that scrambling is in fact a movement operation from the earliest observable stages.

3.4. Summary

Previous studies on the acquisition of scrambling, even though limited, have demonstrated that Japanese-speaking preschool children can not only comprehend scrambled sentences in an adult-like way, but also can access the trace/copy left by the scrambled phrases. These findings provide convincing evidence that scrambling in child Japanese is an instance of movement, as well as in adult Japanese. It must be noted that these studies focused on short-distance scrambling (scrambling within a single clause). Thus, an important question remains as to whether Japanese-speaking preschool children are sensitive to the locality constraints on scrambling, a question that necessitates investigations into children’s knowledge of long-distance scrambling. In the next section, we report the design and the results of our new experiment, which attempts to determine whether long-distance scrambling in child Japanese conforms to the Subjacency Condition.
4. **Locality Constraints on Scrambling in Child Japanese: A New Experiment**

4.1. **Subjects and Method**

In order to examine children's knowledge of the locality constraints on long-distance scrambling, we conducted an experiment with 16 Japanese-speaking children, ranging in age from 4;11 to 6;11 (mean age, 5;10). The task for the children was a combination of (i) Question-after-Story and (ii) a Truth-Value Judgment Task (Crain & Thornton 1998). In this task, each child was told a story, which was accompanied by a series of pictures presented on a laptop computer. At the end of each story, an experimenter asked the child some questions about the story. After the child responded to these questions, the same questions were posed to a puppet, and the child was asked to judge whether each of the puppet's response to the questions was correct or not.

The 16 subjects tested in our study were divided into two groups, each of which contained eight children. Those in the Control Group were presented with test sentences as in (16), and those in the Experimental Group were presented with test sentences as in (17).

(16) Togenyan-wa [Komasan-ga nani-iro-de kaita ]
   Togenyan-TOP Komasan-NOM what-color-with drew
   densya ] -o nutta kana?
   train -ACC painted Q
   ‘With what color did Togenyan paint the train [that Komasan drew t1 ]?’

(17) Nani-iro-de Togenyan-wa [Komasan-ga kaita ]
   what-color-with Togenyan-TOP Komasan-NOM drew
   densya ] -o nutta kana?
   train -ACC painted Q
   ‘With what color did Togenyan paint the train that Komasan drew t2 ?’

In (16), the *wh*-phase *nani-iro-de* ‘with what color’ is contained within a relative clause and hence is structurally unambiguous: Japanese is a *wh*-in-situ language, and the sentence is well-formed as a *wh*-question asking the color of the Komasan’s train which was painted by Togenyan. In contrast, the same *wh*-phrase in (17), which is located in the initial position of the matrix clause, is potentially ambiguous with respect to the syntactic position from which it originated. In one possible structure, the *wh*-phrase belongs to the matrix clause, and it has undergone short-distance scrambling to the sentence-initial position, as shown in (18). This structure should be interpreted as a *wh*-question asking the color with which Togenyan painted...
Komasan’s train.

(18) Nani-iro-de: Togenyan-wa t$$_i$$ [ Komasan-ga kaita ]
what-color-with Togenyan-TOP Komasan-NOM drew
densya ] -o nutta kana?
train -ACC painted Q

Another potential structure for (17) is the one in which the sentence-initial $wh$-phrase has undergone long-distance scrambling from within the relative clause, as in (19). This structure, if it were possible, should be interpreted in the same way as the sentence in (16), which is a $wh$-question asking the color with which Komasan drew the train that was later painted by Togenyan.

(19) Nani-iro-de: Togenyan-wa [ Komasan-ga t$$_i$$ kaita ]
what-color-with Togenyan-TOP Komasan-NOM drew
densya ] -o nutta kana?
train -ACC painted Q

The long-distance scrambling in the structure in (19), however, involves extraction out of a relative clause, which should cause a violation of the Subjacency Condition. Thus, if long-distance scrambling in the grammar of Japanese-speaking children were sensitive to this alleged principle of UG, then children should interpret the sentence in (17) only as a question asking the color of the Komasan’s train which was painted by Togenyan, and never as a question asking the color with which Komasan drew the train that was later painted by Togenyan. The goal of our experiment was to determine whether those children who are presented with a question like (17) (namely, those children in the Experimental Group) in fact only assign the matrix-clause interpretation to the scrambled $wh$-phrase.

Yet, even if it turns out that children disallow the interpretation in which the $wh$-phrase could have moved from within the relative clause, it may simple be the case that children do not have the knowledge of long-distance scrambling itself and hence could only assign the reading that stems from the clause-internal scrambling of the $wh$-phrase. In order to address this possibility, our experiment also included questions like (20).
Much like the question in (17), this sentence is ambiguous with respect to the base position of the sentence-initial wh-phrase dare-ni ‘to whom’. However, there is a crucial difference between the example in (17) and the one in (20): In the latter, the embedded clause is a complement to the matrix verb, and hence both of the structures in (21) are well-formed. Thus, the sentence can not only be interpreted as a wh-question asking the identity of the person to whom Komasan talked about his wish, but also can be interpreted as a wh-question asking the identity of the person to whom Komasan wants to show his drawings. If it were the case that children simply lack the knowledge of long-distance scrambling, they should not be able to access the structure shown in (21b) and hence should never interpret the sentence in (20) as a wh-question asking the person to whom Komasan wants to show his drawings.

The sample story that accompanied the questions in (16), (17), and (20) is presented in (22).

(22) Sample Story:
Komasan and Komajiro were drawing their favorite trains with crayons. Komasan said to his younger brother Komajiro, “Hey, I drew trains with green and aqua crayons.” Then Komajiro said to Komasan, “I drew a train with a brown crayon.” Suddenly, a mischievous boy, Togenyan, came by. He looked at Komasan’s trains and said, “The orange train is much better than the aqua train!” And using an orange crayon, Togenyan painted the aqua train Komasan drew! “Oh! No… well, well, the orange train is actually not so bad,”
said Komasan. Then, the teacher of the Specter Nursery School came to see the boys. Komasan said to the teacher, “Look at this nice picture of trains. I drew it. I want to show this to my friend Fumicyan!”

After the story in (22), the children in the Control Group were presented with the question in (16) (repeated here in (23)) and the one in (20) (repeated here in (25)),


(25) Dare-ni Komasan-wa [ e-o mise-tai to ] who-to Komasan-TOP painting-ACC show-want that itta kana? said Q ‘To whom did Komasan say that he wants to show his painting?’
while those in the Experimental Group were presented with the question in (17) (repeated here in (24)) and the one in (20) (repeated here in (25)). The puppet’s answer both to (23) and to (24) was “Aqua”. This response should be judged as “true” for (23) but as “false” for (24), if it were the case that children’s long-distance scrambling conforms to the Subjacency Condition. In the case of (25), the puppet simply repeated the child’s own answer to the question (and hence is expected to be judged as “true”), given that both the matrix and the embedded interpretations of the \textit{wh}-phrase were possible.

The experiment consisted of two target stories and two filler stories. The order of presentation of these stories was pseudo-randomized.

\textbf{4.2. Results and Discussion}

Children’s responses and judgments in the target trials are summarized in Table 2.

<table>
<thead>
<tr>
<th>Control Group</th>
<th>Test Sentence</th>
<th>(23) ‘Togenyan painted the train [that Komasan drew \textit{with what color}]?’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretation of \textit{Wh}</td>
<td>Within the Matrix Clause</td>
<td>Within the Relative Clause</td>
</tr>
<tr>
<td>Responses to Questions</td>
<td>18.8% (3/16)</td>
<td>81.3% (13/16)</td>
</tr>
<tr>
<td>Judgments (as \textit{TRUE})</td>
<td>-----</td>
<td>81.3% (13/16)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>Test Sentence</th>
<th>(24) ‘With what color Togenyan painted the train \textit{t1} [that Komasan drew \textit{t2}]?’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretation of \textit{Wh}</td>
<td>Within the Matrix Clause (\textit{t1})</td>
<td>Within the Relative Clause (\textit{t2})</td>
</tr>
<tr>
<td>Responses to Questions</td>
<td>93.8% (15/16)</td>
<td>0% (0/16)</td>
</tr>
<tr>
<td>Judgments (as \textit{TRUE})</td>
<td>-----</td>
<td>0% (0/16)</td>
</tr>
</tbody>
</table>

\textbf{Table 2: Children’s Responses and Judgments in the Target Trials (Test Sentences with a Relative Clause)}

Children in the Control Group gave the correct responses to the \textit{wh}-phrase contained within the relative clause 81.3\% of the time, and successfully judged the puppets responses (“orange” in the case of (23)) as true 81.3\% of the time. As for children in the Experimental Group, when they were presented questions like (24), these children demonstrated a strong tendency (92.9\%) to provide answers that should stem from the matrix interpretation of the preposed \textit{wh}-phrase. In fact, no child gave an answer which should have resulted from scrambling the \textit{wh}-phrase out of the relative clause. (The single error we found in the Experimental Group was simply an irrelevant answer.) In addition, when the puppet provided an answer such an incorrect response, children never judged it as true: They judged it as false 100\%
of the time. These results suggest that children prohibit the association of the preposed \textit{wh}-phrase with the relative clause, which is consistent with the view that long-distance scrambling in child Japanese is constrained by the Subjacency Condition.

However, an alternative interpretation of the above results is available: Children simply lack the knowledge of long-distance scrambling, and hence are not able to move the \textit{wh}-phrase from within the relative clause, even though such movement is permitted in their grammar. Children’s responses to test sentences involving a complement clause as in (25), summarized in Table 3, suggest that this alternative interpretation would be quite difficult to defend.

<table>
<thead>
<tr>
<th>Test Sentence</th>
<th>(25) ‘To whom did Komasan say (t_1) [that he wants to show his painting (t_2)]?’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretation of \textit{Wh}</td>
<td>Within the Matrix Clause ((t_1))</td>
</tr>
<tr>
<td>Responses to Questions</td>
<td>Control Group</td>
</tr>
<tr>
<td></td>
<td>Experimental Group</td>
</tr>
</tbody>
</table>

Table 3: Children’s Responses in the Target Trials
(Test Sentences with a Complement Clause)

As can be seen in Table 3, children showed a very strong preference to interpret the preposed \textit{wh}-phrase as originating from the complement clause. This finding indicates that these children allow movement out of a complement clause, and hence that long-distance scrambling indeed exists in the grammar of these Japanese-speaking preschool children. Then, if we take account of these findings, the results summarized in Table 2 cannot be attributed to the lack of long-distance scrambling. These results can only be interpreted as demonstrating that long-distance scrambling in child Japanese is constrained by the locality conditions that reflect some principles of UG.

5. Conclusion

Language acquisition studies within the generative framework have accumulated evidence that children conform to innate principles of UG as soon as they become able to use relevant lexical items and structures (e.g. Otsu 1981, Crain 1991). Prominent among these are the studies which demonstrated children’s early mastery of the UG principles responsible for the locality of overt movement. For example,
Otsu (1981) demonstrated that English-speaking children are sensitive to the Complex NP Constraint, which is by assumption an instantiation of a more general condition of Subjacency, by showing that these children exclude overt \textit{wh}-movement from within a relative clause as in (26).

(26) * What is Jane drawing a monkey [that is drinking milk with \textit{t}i]? 

Even though it has been widely assumed at least since Saito (1985) that Japanese has an overt movement called scrambling, no attempt has been made to examine children’s knowledge of the locality conditions on this movement. In light of this background, this study aimed to make the first step toward understanding the acquisition of long-distance scrambling and its locality constraints.

The results of our experiment, even though limited in the number of subjects and test sentences, have provided evidence that (i) long-distance scrambling is already in the grammar of Japanese-speaking preschool children, and that (ii) long-distance scrambling in child Japanese obeys the Subjacency Condition. These findings are consistent with the findings from previous studies that Japanese-speaking preschoolers have adult-like knowledge of short-distance scrambling, and suggest that early acquisition of scrambling holds more generally. More importantly, our findings add a new piece of evidence from Japanese for the continuity hypothesis (e.g. Crain & Thornton 1998), which states that properties of UG constrain the course of acquisition from the earliest observable stages.

References


