Children's Sensitivity to the Island Effects in Japanese Cleft Constructions*

AYUMI MATSUMOTO
Ochanomizu University

KYOKO YAMAKOSHI
Ochanomizu University

KOJI SUGISAKI
Kwansei Gakuin University

YOICHI MIYAMOTO
Osaka University

AYAKA SUGAWARA
Waseda University

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1 Introduction

This paper presents the results of our own experiment, which examined whether preschool children are sensitive to the island effects in Japanese cleft constructions. Cleft constructions have been one of the major issues in acquisition literature, and previous experimental studies on the acquisition of Japanese clefts have reported that children show difficulty when comprehending cleft sentences (Sano 1977, Dansako & Mizumoto 2007, Ohba, Sano, & Yamakoshi 2019, etc.) These findings lead to the broader question of which aspects of Japanese clefts are acquired late, and which aspects are acquired early. In an attempt to answer these questions, we investigated experimentally whether Japanese-speaking preschool children are aware of the island effects in Japanese cleft sentences. The results of our experiment show that the answer to this question is positive, which in turn suggests that certain aspects of the formation of cleft constructions are adult-like from the earliest observable stages.

The organization of this paper is as follows. Section 2 presents our theoretical assumptions regarding clefts in Japanese; this section introduces Hiraiwa and Ishihara's (2012) proposal on Japanese clefts, based on Focus and Topic movement. In Section 3, we review some previous acquisition studies that deal with Japanese cleft constructions and island effects and clarify the goal of the present study. Section 4 and 5 discuss the design and the results of our experiment, respectively. Section 6 is the conclusion.

2 Background on Japanese Clefts

An example of a Japanese cleft construction is presented in (1):

(1) [Zousan-ga oikakete-iru no] -wa usisan da.
Elephant-Nom chase-Prog Comp -Top cow Cop
'It is a cow that the elephant is chasing.'

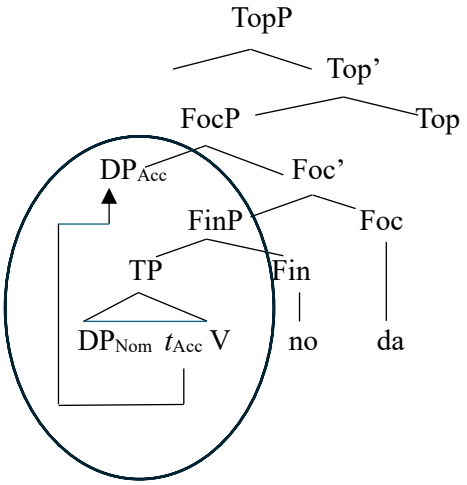
In the Japanese cleft construction, as shown in the bracket in (1), the presuppositional clause appears in the sentence-initial position, with the complementizer *no* and the topic marker *wa*. The presuppositional clause is followed by the focus phrase (*usisan* 'the cow' in (1)) and the copula *da*.

According to Hiraiwa and Ishihara (2012; hereafter H&I), Japanese clefts are derived from in-situ focus constructions illustrated in (2):

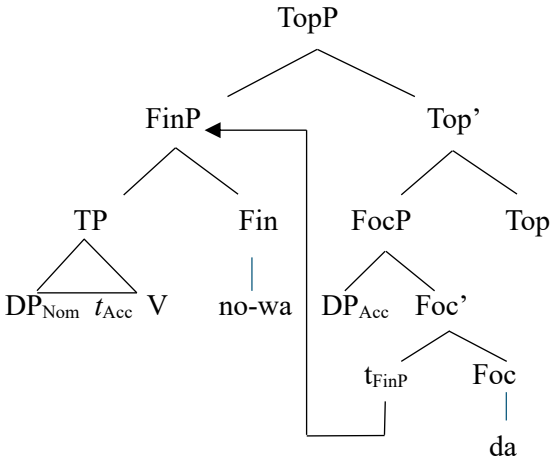
(2) Zousan-ga **usisan-o** oikakete-iru no da.
Elephant-Nom cow-Acc chase-Prog Comp Cop
'(Lit.) It was **the cow** that the elephant chased.'

In (2), the object DP *usisan* 'the cow' is focused. To explain the structure of Japanese cleft constructions, H&I adopt the cartographic structure proposed by Rizzi (1997) as follows:

(3) a. Focus movement



b. Remnant CP (FinP) topicalization



(Hiraiwa & Ishihara 2012: 154)

In the derivation of Japanese cleft constructions, two movements are involved. First, a focus phrase, here an object DP with an accusative case marker, moves to the specifier of FocusP, as shown in (3a). Then, the remnant FiniteP moves from the complement of FocusP to the specifier of TopicP, as illustrated in (3b). The first movement of DP, the focus movement, shown in a circle, is considered to trigger island effects in H&I. (See also Hoji 1987 and Kizu 2005 among others, for island effects in Japanese clefts.). An example of island effects in Japanese cleft constructions is provided in (4).

(4) *[Naoya-ga [[e_i e_j kaita] hito$_i$]-o hihansita no]-wa kono ronbun-o$_j$ da.
Naoya-Nom wrote person-Acc criticized Comp-Top this paper-Acc Cop
'(Lit.) It was this paper that Naoya criticized the person who wrote e_j.'

(Hiraiwa & Ishihara 2012: 147)

In (4), *kono ronbun-o* 'this paper-Acc' is extracted from the complex NP 'the person who wrote the paper' and moved to the specifier of FocusP, as in (3a). This sentence is ungrammatical because the extraction out of the complex NP to FocusP violates the Complex NP Constraint (Ross 1967), according to H&I.

As we mentioned in the introduction section, the current study attempts to investigate children's sensitivity to the island effects in Japanese cleft constructions. Before going into the details of our experiment, the next section briefly reviews previous studies on children's acquisition of cleft constructions and island effects.

3 Previous Studies on the Acquisition of Clefts and Islands

3.1 Children's Acquisition of Clefts

Bever (1970), and Lempert and Kinsbourne (1980) reported that English-speaking children comprehend subject clefts better than object clefts. A more recent study by Aravind, Hackl, and

Wexler (2018) showed that English-speaking children's performance for both subject and object clefts can be greatly improved by adding appropriate discourse context. Yet, Ohba, Sano, and Yamakoshi (2019) suggest that this improvement could have been an experimental artifact, and that the subject-object asymmetry in the comprehension of English cleft constructions is still there.

As for children's comprehension of Japanese clefts, the existence of the subject-object asymmetry is not so clear. Sano (1977), and Dansako and Mizumoto (2007) showed that children comprehended subject clefts better than object clefts.[1] However, Ohba et al. (2019) found children's better performance with object clefts compared to subject clefts. Performance with subject clefts was much lower than that of object clefts among four- and five-year-olds. Here are more details of Ohba et al. (2019).

Ohba et al. (2019) followed the experimental design of Aravind et al. (2018) and adopted the Truth-Value Judgment Task (Crain & Thornton 1998). A child listened to stories with pictures on a computer screen, and they were asked to judge whether the test sentences were true or false based on the contents of the stories. The test sentences, which were recorded by one of the experimenters, were given as the utterances of the anime character shown on the screen.

Given that the presuppositional clause appears at the beginning of cleft sentences in Japanese, in the first picture presented with the discourse context, the animals that could be the foci in the cleft test sentences were covered with masking boxes, following Aravind et al.'s (2018) design.

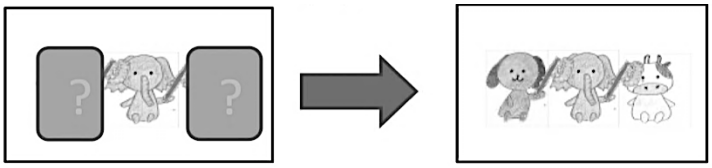


Figure 1: Pictures used in Ohba et al. (2019: 487)

A sample context and a sample test sentence are given in (5):

(5) Example of a context and a subject cleft (false condition)

a. Context: Mite! Dareka-ga zousan-o arat-tei te,
Look someone-Nom elephant-Acc wash-Prog and
zousan-ga dareka-o arat-teiru yo.
elephant-Nom someone-Acc wash-Prog SFP[2]
'Look! Someone is washing the elephant and the elephant is washing someone.'

b. Subject cleft test sentence:
[Zousan-o arat-teiru no] -wa usisan da yo. (False)
Elephant-Acc wash-Prog Comp-Top cow Cop SFP
'It is a cow that is washing the elephant.' (Ohba et al. 2019: 487)

[1] The opposite results obtained by Dansako and Mizumoto (2007) and Ohba et al. (2019) may be due to the difference in their experimental methods. Dansako and Mizumoto (2007) used a picture-selection task, in which the context was orally given without a picture and the children were asked to choose one of two pictures, each with two animals, after a test sentence was given. On the other hand, in Ohba et al. (2019), three animals were presented with two masking boxes in the first picture, and the method was a Truth-Value Judgment Task. Further investigation is necessary to determine whether the differences between these two experimental tasks indeed affected the results obtained.

[2] SFP stands for Sentence Final Particle.

In the context (5a), the animals other than the elephant were hidden by masking boxes. In the subject cleft test sentence in (5b), the object DP appears at the beginning of the sentence because the subject DP is focused and appears at the end in the focus position. Consequently, the word order in this sentence becomes non-canonical (i.e. OVS). After the first picture and the context were given, the animals behind the masking boxes appeared in the second picture. In the second picture shown in Figure 1, the animal that washed the elephant was not the cow but the dog. Therefore, sentence (5b) should be judged as false.

The participants of Ohba et al.'s (2019) experiment were 23 Japanese-speaking monolingual children aged from 4;0 (4 years 0 month) to 6;7 (mean = 5;2). The test sentences comprised 4 subject clefts, 4 object clefts, and 8 declarative sentences. The results of their experiment are summarized in Table 1:

Age (Number)	Declarative sentences	Object Clefts	Subject Clefts
4-year-olds (N=11)	96.6% (85/88)	88.6% (39/44)	59.1% (26/44)
5-year-olds (N=8)	96.9% (62/64)	100% (32/32)	56.3% (18/32)
6-year-olds (N=4)	100% (32/32)	93.8% (15/16)	81.3% (13/16)
Total (N=23)	97.3% (179/184)	93.5% (86/92)	62.0% (57/92)

Table 1: The Percentages of Children's Correct Responses (Ohba et al. 2019: 488)

As shown in this table, the children gave correct responses for object clefts 93.5% of the time, whereas they gave correct responses for subject clefts only 62% of the time on average. Ohba et al. (2019) suggested that this subject-object asymmetry is due to the agent-first strategy: Children tend to misinterpret the first noun phrase at the beginning of sentences as agents when they comprehend sentences with noncanonical word order (Bever 1970). Although previous acquisition studies differ in their results concerning the subject-object asymmetry, it seems to be the case that Japanese children have certain problems with the comprehension of Japanese clefts. Next, in Section 3.2, we turn to previous studies that dealt with children's acquisition of island effects.

3.2 Children's Acquisition of Islands

Children's sensitivity to island effects in English has been examined in various studies. Otsu's (1981) experimental study has shown that English-speaking children conform to the Complex NP Constraint (hereafter the CNPC) from the earliest observable stages. DeVilliers, Roeper, and Vainikka (1990) have also revealed that English-speaking children obey the *wh*-island constraint from very early on.

In Japanese, although it is a *wh*-in-situ language, island sensitivity can be detected with *naze* 'why', which in turn suggests that the covert movement of *naze* is constrained by islands. Sugisaki (2012) investigated whether children are aware of an adjunct island by examining test sentences as follows:

(6) Naze [gohan-o taberu maeni] kaerusan-wa ohuro-ni hairimasita ka?
Why meal-Acc eat before frog-Top bath-Dat entered Q
'Why did the frog take a bath before having dinner?'

(7) [Naze [kaerusan-ga kaettekita to]] okaasan-wa omoimasita ka?
Why frog-Nom came-back Comp mother-Top thought Q
'Why did the mother think that the frog had come back home?' (Sugisaki 2012: 178)

In (6), the reason *wh*-phrase *naze* can be interpreted as questioning why the frog took a bath, but it cannot be interpreted as questioning the reason why the frog ate the meal because *naze* cannot be extracted out of the adjunct phrase *naze gohan-o taberu maeni* 'before (the frog) having dinner'. In contrast, in (7), since *naze* can modify either the embedded clause or the main clause, the reason why the frog came back and the reason why the mother thought that the frog came back are both possible answers.

According to Sugisaki (2012), the results were as follows. As for (6), the children interpreted *naze* 'why' in the matrix clause 98.6% of the time (73/74). This means that the children's answers were 'because the frog got very dirty' almost all the time for (6), and this finding suggests that the children avoided the embedded interpretation because they are aware of the adjunct island. In contrast, in (7), the children interpreted *naze* 'why' either in the matrix clause 36.5% of the time (27/74) (i.e. 'because the mother found the baseball equipment at the front door') or in the embedded clause 44.6% of the time (33/74) (i.e. 'because the frog was very hungry'). These results clearly show that the children did not prefer the matrix interpretation all of the time, but that they only avoided the embedded interpretation for (6) because of the adjunct island.

Let us now move onto previous studies on the acquisition of the CNPC in Japanese. There are several previous studies which have examined the acquisition of the CNPC in Japanese, such as Kato (1996), Hirano (2003), and Ikeda and Yamakoshi (2018).

Ikeda and Yamakoshi (2018) investigated children's sensitivity to the contrast between *naze* and other *wh*-phrases. In Japanese, the covert movement of the reason *wh*-phrase *naze* is sensitive to the CNPC, while other *wh*-phrases, such as *dare* 'who', *doko* 'where', and *itsu* 'when', are exempted from the CNPC (e.g. Nishigauchi 1990, Lasnik & Saito 1992). Ikeda and Yamakoshi (2018) examined whether Japanese-speaking children have the knowledge that *naze* is constrained by the CNPC while other *wh*-phrases are not. Sample test sentences are shown in (8)–(10). In (8), *naze* 'why' cannot be interpreted within the complex NP, and thus we expected that the reason for washing the dress would not be given by children if they have knowledge of the CNPC with *naze*. In contrast, the *wh*-phrases such as *dare* 'who' and *doko* 'where' are not sensitive to the CNPC. Therefore, in (9) and (10), we expected that two interpretations would be possible for the children: *dare* 'who' and *doko* 'where' can be interpreted either as an element of the complex NP, like (9b) and (10b), or as an element of the matrix clause, like (9c) and (10c).

(8) Naze [aratta wanpiisu]-o nekosan-ga kakusita no?
Why washed dress-Acc cat-Nom hided Q
'Why did the cat hide the dress that she washed?'

(9) a. Dare-ga [hakonda penki]-o nutta no?
Who-Nom carried paint-Acc painted Q
b. '(Lit.) (The dog) painted with the paint who carried?' (Embedded interpretation)
c. 'Who painted with the paint that (the cat) carried?' (Matrix interpretation)

(10) a. Doko-ni [otosita boushi]-o kumakun-ga hosita no?
Where-at dropped hat-Acc bear-Nom dried Q
b. '(Lit.) The bear dried the hat that he dropped where?' (Embedded interpretation)
c. 'Where did the bear dry the hat that he dropped?' (Matrix interpretation)
(Ikeda & Yamakoshi 2018: 336–7)

The results of their experiment are presented in the table below:

Age	*Dare* 'who'	*Doko* 'where'	Itsu 'when'	*Naze* 'why'
4	56.2% (9/16)	42.9% (6/14)	33.3% (2/6)	0% (0/18)
5	45.8% (11/24)	50.0% (7/14)	60.0% (6/10)	0% (0/26)
6	62.5% (10/16)	66.7% (2/3)	60.0% (3/5)	0% (0/14)
Total	53.6% (30/56)	48.4% (15/31)	52.4% (11/21)	0% (0/58)
Adults	58.3% (14/24)	79.4% (27/34)	52.9% (18/34)	1.7% (1/58)

Table 2: Percentages of Children's Embedded Interpretations in Each Age Group
(Ikeda & Yamakoshi 2018: 337)

As predicted above, Japanese-speaking children never interpreted *naze* 'why' as an element of the complex NP (0%; 0/58), whereas they interpreted *dare* 'who', *doko* 'where', and *itsu* 'when' as an element of the complex NP around 40–60% of the time. These results suggested that Japanese-speaking children are aware of the CNPC with the reason *wh*-phrase *naze*.

To summarize, we have reviewed in this subsection that children are sensitive to the adjunct island effect and the CNPC in Japanese. In Section 3.1, we saw that Japanese-speaking children have some difficulties comprehending cleft constructions, and to our knowledge, children's sensitivity to the CNPC in cleft constructions has not been previously investigated. In light of this background, the next section reports the design of our experiment, which investigates whether children are sensitive to the CNPC in Japanese cleft constructions.

4 Experiment

As we discussed in the previous section, children's knowledge of island effects has already been examined both in English and in Japanese. In English, the relevant constructions were relative clauses and *wh*-questions, and in Japanese, the relevant constructions were questions with *naze* 'why' in adjuncts and relative clauses. These previous studies showed that children are sensitive to island effects. However, children seem to have difficulty comprehending Japanese clefts, and to our knowledge, children's knowledge of island effects in Japanese clefts has not been examined yet. In light of this background, this study attempts to examine children's knowledge about island effects in Japanese clefts. The results would deepen our understanding concerning the acquisition of cleft constructions by revealing which aspects of the cleft constructions are (or are not) difficult for children.

In our experiment, the participants were 43 Japanese-speaking monolingual children, ranging in age from 4;7 to 6;10 (mean = 5;7). We divided the children into two groups. With Group A, we tested the children's interpretation of cleft sentences containing a complex NP, and with Group B,

we tested the children's interpretation of scrambling out of a complex NP. The same test stories were used for both groups. We will explain why we used scrambling with Group B later. Group A (the cleft group) consisted of 21 children (4;6–6;10, mean = 5;9), and Group B (the scrambling group) consisted of 22 children (4;7–6;10, mean = 5;7). We conducted the experiment in daycare centers in Tokyo and Osaka, and we also included several online interviews via Zoom.

The method employed in this experiment was a question-answering task. Children were tested individually in a quiet room. Children listened to short stories which were accompanied by pictures presented on a laptop computer. At the end of each story, the popular anime character Anpanman appeared next to the picture on the screen, and Anpanman asked the child a *wh*-question either in a cleft or with scrambling.

A sample story is as follows. A rabbit and a cat came to the park together. The cat said, 'There are nice butterflies in this park. Let's see who can catch a more beautiful butterfly.' The rabbit said, 'OK!!' The cat caught a butterfly near the slide. The rabbit caught a butterfly near the swing. The rabbit and the cat showed each other the butterflies they had caught. They thought that both butterflies were equally beautiful. Before leaving the park, they decided to release the butterflies they had caught. The rabbit released the butterfly she caught near the flower garden. The cat released the butterfly she had caught near the fountain. This is the end of the story. As shown in Figure 2 below, at the end of the story, the second picture of the three, in which the rabbit and the cat caught butterflies, and the last picture, in which they released the butterflies, were again presented to the child as shown below, and the anime character Anpanman appeared to ask the child the test question.

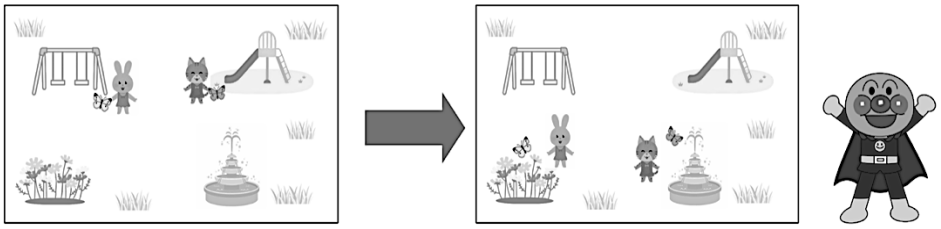


Figure 2: Pictures Used in the Experiment and the Character that Gave the Test Sentences to the Children

All the test questions that Anpanman produced were recorded in advance by an experimenter so that all the children heard the questions with the same intonations. With Group A, we tested four clefts with *wh*-phrases, and with Group B, we tested four scrambled *wh*-questions.

Let us now discuss the types of test questions. The sample test question given in (11) is a cleft sentence that include a complex NP:

(11) Usagi-ga [tukamaeta tyoutyo]-o nigasita no wa doko-de kana?
Rabbit-Nom caught butterfly-Acc released Comp Top where-at Q
'Where is it that the rabbit released the butterfly that she caught?'

In this question, *tukamaeta tyoutyo* 'the butterfly which she caught' is a complex NP and the *wh*-phrase *doko-de* 'where' cannot be extracted out of this complex NP. Thus, the expected answer is the place where the rabbit released the butterfly, not the place where the rabbit caught the butterfly.

Note that the focused *wh*-phrase was *doko-de* 'where' in all the test sentences in our experiment. In Section 2, we saw that children have difficulty when either an object or a subject becomes the focus of clefts. By using *doko-de* 'where' in the focus position, we expected that we could avoid the problem children might have regarding the subject-object asymmetry in their comprehension of cleft constructions.

There was one factor that we had to worry about with questions like (11). The linear distance between the *wh*-phrase *doko-de* 'where' and the matrix verb *nigasita* 'released' is much shorter than the distance between the *wh*-phrase and the embedded verb *tukamaeta* 'caught'. Thus, even if children gave expected answers, it could be the case that they answered with the place where the butterfly was released just because the verb 'released' is much closer to the *wh*-phrase and not because they are truly aware of the island effect in Japanese clefts.

In order to evaluate the possibility of such a distance-based strategy, we tested sentences including scrambling out of a complex NP (Group B). A sample test sentence is provided in (12). We used the same stories with both Group A and Group B.

(12) Doko-de usagi-wa [tukamaeta tyoutyo]-o nigasita kana?
Where-at rabbit-Top caught butterfly-Acc released Q
'Where did the rabbit release the butterfly which she caught?'

In (12), *doko-de* is scrambled to the sentence-initial position. As we saw in (11), *tukamaeta tyoutyo* 'the butterfly which (she) caught' is a complex NP and the *wh*-phrase *doko-de* 'where' cannot be extracted out of this complex NP. Therefore, the expected answer is the place where the rabbit released the butterfly, and it is not the place where the rabbit caught the butterfly. In (12), the linear distance between *doko-de* 'where' and the matrix verb *nigasita* 'released' is much longer than the distance between the *wh*-phrase and the embedded verb *tukamaeta* 'caught'.

If the children in Group B, the scrambling group, can give adult-like answers in spite of the long distance between the *wh*-phrase and the matrix verb *nigasita* 'released',[3] it would be possible to say that the children in Group A, the cleft group, were not giving correct answers just because the verb *nigasita* 'released' is closer to the *wh*-phrase than the verb 'caught'.

5 Results

The overall results are summarized in Table 3:

Age group	Group A: Clefts		Group B: Scrambling	
	# of Subjects	Correct Reponses	# of Subjects	Correct Reponses
4-year-olds	4	81.3% (13/16)	8	90.6% (29/32)
5-year-olds	7	100% (28/28)	6	91.7% (22/24)
6-year-olds	10	100% (40/40)	8	100% (32/32)
Total	21	96.4% (81/84)	22	94.3% (83/88)

Table 3: Percentages of Children's Correct Responses in Group A (Clefts) and Group B (Scrambling)

[3] Sugisaki and Murasugi (2017) showed that Japanese children are sensitive to island effects in scrambling, and thus we expected good performance from the children in Group B.

Let us first look at the results of Group A, the cleft group. The overall correct response rate for this cleft group was 96.4%, 81 correct answers out of 84 questions. The correct response rate for 4-year-olds in this cleft group was also high: 81.3%, 13 correct answers out of 16 questions.

Now let us consider the results of Group B, the scrambling group. The overall correct response rate for this scrambling group was 94.3%, 83 correct answers out of 88 questions. The correct response rate for 4-year-olds was also quite high: 90.6%, 29 correct answers out of 32 questions.

As we have discussed above, since the focused *wh*-phrase in the cleft test sentences is closer to the matrix verb than to the embedded verb, we were concerned about the possibility of children giving correct answers without being aware of the island effects in Japanese clefts. To evaluate this possibility, we also tested scrambled *wh*-questions. The scrambled *wh*-phrase is moved to the sentence-initial position, and it is closer to the embedded verb than to the matrix verb. If children were giving answers just by associating the *wh*-phrase with the closest verb (i.e. the embedded verb), the children in Group B should have given wrong answers to the scrambled sentences. Since the children performed well in both the Cleft group and the Scrambling group, the results of our experiment suggest that the children are quite sensitive to the island effects in Japanese clefts.

6 Conclusion

To conclude, the results of our experiment revealed that children between the ages of four and six performed quite well both in the cleft group and in the scrambling group. These results show that children are sensitive to the island effect in Japanese clefts, as well as in scrambling. Although previous acquisition studies reported children's difficulty in comprehending Japanese clefts, our results suggest that not all aspects of cleft constructions are difficult for children. Early sensitivity to the island effects in Japanese clefts are in conformity with the view that child language acquisition is supported by an innate faculty of language.

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