

Structure Dependence in the Acquisition of Japanese*

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1. Introduction

It has been observed at least since Otsu (1981) that the course of child language acquisition is constrained by genetically endowed Universal Grammar (UG) from virtually the very beginning of life (see Crain and Thornton 1998 for a detailed summary). One of the clearest examples of this acquisitional observation is the seminal work by Crain and Nakayama (1987), which revealed that young English-speaking children adhere to structure-dependent linguistic principles when forming complex yes/no-questions. Recently, however, the relevance of Crain and Nakayama's findings to innate, structure-dependent principles of UG has been challenged in several studies (e.g. Lewis and Elman 2002, Pullum and Scholz 2002). To overcome these critiques, new experimental investigations have already been started that attempt to demonstrate children's adherence to structure-dependent constraints in other linguistic phenomena (e.g. Gualmini 2005, Gualmini and Crain 2005).

In light of this background, this study attempts to demonstrate that Japanese-speaking children rely on the structure-dependent notion of c-command when interpreting complex *wh*-questions. The results of our experiment add a new piece of evidence that children conform to structure-dependent principles across different linguistic phenomena in a variety of languages, thereby expanding our understanding of children's knowledge of linguistic structures.

2. Structure Dependence in Japanese *Wh*-Questions

In Japanese, a sentence is interpreted as a question when the sentence is accompanied with a question-marker (QM) at its final position.¹ Following Harada

(1972:187), let us refer to this sentence-final occurrence of QM as the “defining” QM. As is widely known, Japanese is a *wh*-in-situ language. When a sentence contains a *wh*-phrase that is associated with the defining QM, the sentence is interpreted as a *wh*-question. Otherwise, a sentence with a defining QM is interpreted as a yes/no-question. The simple sentences in (1) illustrate this interpretive rule in Japanese.

- (1) a. Ken-ga kono hon-o yomi-mashi-ta ka?
 Ken-NOM this book-ACC read-POL-PAST QM
 ‘Did Ken read this book?’
- b. Ken-ga nani-o yomi-mashi-ta ka?
 Ken- NOM what-ACC read-POL-PAST QM
 ‘What did Ken read?’
- c. Ken-ga dokode kono hon-o yomi-mashi-ta ka?
 Ken-NOM where this book-ACC read-POL-PAST QM
 ‘Where did Ken read this book?’

Let us now turn to a more complex example given in (2).

- (2) Eri-wa Ken-ni kaigi-ga dokode aru ka
 Eri-TOP Ken-DAT meeting-NOM where be-held QM₁
 kiki-mashi-ta ka?
 ask- POL-PAST QM₂
 ‘Did Eri ask Ken where the meeting would be held?’

As the translation shows, the Japanese example in (2) is a yes/no-question, which suggests that the in-situ *wh*-phrase *dokode* ‘where’ is not associated with the defining QM (QM₂) in the matrix clause but with the QM in the embedded clause (QM₁). There are at least two possible analyses for the association between the QM and the *wh*-phrase in this sentence.

(3) *Hypothesis A* (Structure-Independent Hypothesis):

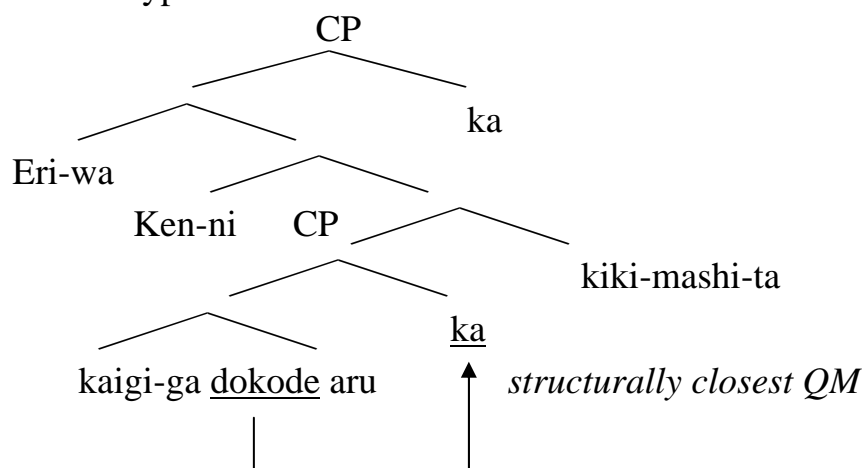
- a. A *wh*-phrase is associated with the QM that is “linearly closest” to it.

- b. QM₁ is linearly closest to a *wh*-phrase when
 - (i) QM₁ follows the *wh*-phrase, and
 - (ii) there is no other QM that follows the *wh*-phrase but still precedes QM₁.
- (4) *Hypothesis B* (Structure-Dependent Hypothesis):²
- a. A *wh*-phrase is associated with the QM that is “structurally closest” to it.
 - b. QM₁ is structurally closest to a *wh*-phrase when
 - (i) QM₁ c-commands the *wh*-phrase, and
 - (ii) there is no other QM that c-commands the *wh*-phrase but is c-commanded by QM₁.

Hypothesis A is structure-independent in that it is solely based on linear notions such as “follow”/“precede”. In contrast, Hypothesis B is based on the structural notion of “c-command” and hence is structure-dependent. Both of these analyses can successfully account for the interpretation of (2) as a yes/no-question. Under Hypothesis A in (3), the *wh*-phrase *dare-ga* associates with QM₁, since this is the QM that is “linearly closest” to it, as shown in (5). On the other hand, under Hypothesis B in (4), the *wh*-phrase *dare-ga* associates with QM₁ since this is the QM that is “structurally closest” to it, as the structure in (6) shows. Either way, the sentence in (2) contains no *wh*-phrase that is associated with the defining QM (QM₂), and hence is interpreted as a yes/no-question.

- (5) Under Hypothesis A:
- | | | | | |
|---------------|-----------------|-------------|-------------------|-------------------------|
| Eri-wa | Ken-ni | kaigi-ga | <u>dokode</u> aru | <u>ka</u> |
| Eri-TOP | Ken-DAT | meeting-NOM | where | be-held QM ₁ |
| kiki-mashi-ta | ka? | | | |
| ask- POL-PAST | QM ₂ | | | |
- linearly closest QM*

(6) Under Hypothesis B:



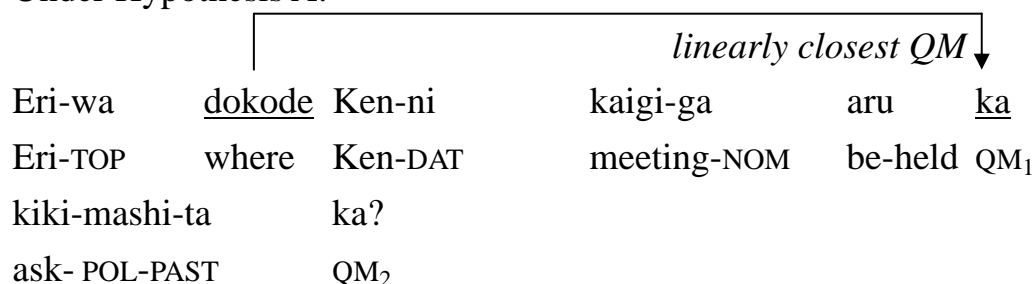
Yet, a sentence like (7) argues against the structure-independent analysis in (4).

(7)	Eri-wa	dokode	Ken-ni	kaigi-ga	aru	ka
	Eri-TOP	where	Ken-DAT	meeting-NOM	be-held	QM ₁
	kiki-mashi-ta		ka?			
	ask- POL-PAST		QM ₂			

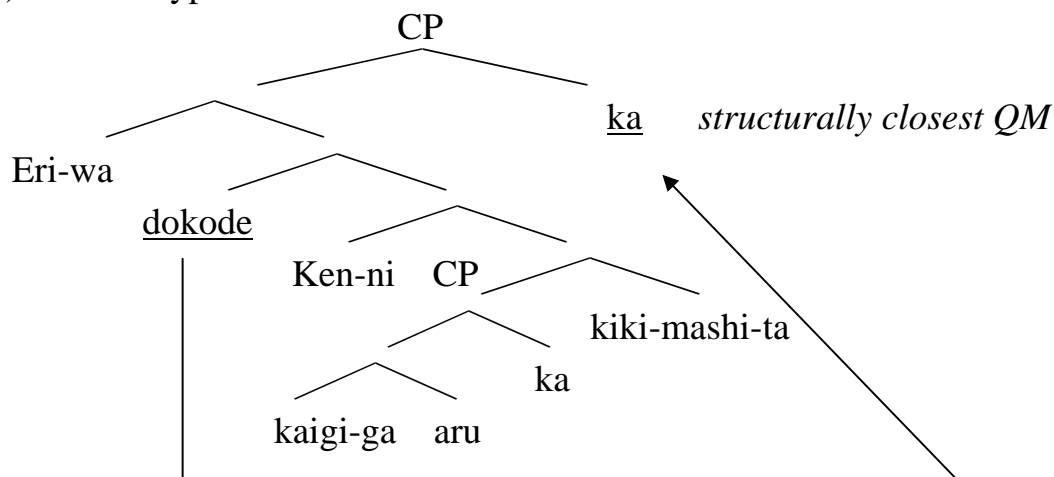
‘Where did Eri ask Ken whether the meeting would be held?’

Under the analysis in (3), the *wh*-phrase *dokode* should associate with QM₁ since this is the QM that is “linearly closest” to it, as shown in (8). Then, this structure-independent hypothesis makes the prediction that the sentence in (7) is a yes/no-question, which is flatly false as the translation indicates. In contrast, under the hypothesis in (4), the *wh*-phrase *dokode* should associate with QM₂, since this is the only QM that c-commands this *wh*-phrase, as shown by the structure in (9). Thus, only the structure-dependent analysis in (4) correctly accounts for the interpretation of (7) as a *wh*-question.

(8) Under Hypothesis A:



(9) Under Hypothesis B:



In light of the above discussion, our experiment reported in the next section examines Japanese-speaking children’s adherence to structure-dependence by making use of the interpretive contrast between (10) and (11). The only difference between these two sentences is the case-marker attached to the noun *Ken*. In (10), that noun is accompanied by a nominative case-marker and hence is the subject of the embedded clause, and the adjunct *wh*-phrase *dokode* preceding that NP can be either an element of the matrix clause or an element of the embedded clause. Thus, the sentence is structurally ambiguous and has both an interpretation as a yes/no-question and an interpretation as a *wh*-question. In contrast, the noun *Ken* in (11) is accompanied by a dative case-marker, and hence is an argument of the matrix verb ‘ask’. Thus, the adjunct *wh*-phrase preceding that NP is unambiguously located in the matrix clause, and the sentence can only be interpreted as a *wh*-question.³

(10) Eri-wa dokode Ken-ga oyoida ka kiki-mashi-ta ka?
 Eri-TOP where Ken-NOM swam QM₁ ask-POL-PAST QM₂
 ‘Did Eri ask where Ken swam?’ or ‘Where did Eri ask whether Ken swam?’

(11) Eri-wa dokode Ken-ni oyoida ka kiki-mashi-ta ka?
 Eri-TOP where Ken-DAT swam QM₁ ask-POL-PAST QM₂
 ‘Where did Eri ask Ken whether (he) swam?’

If innate principles of UG in fact constrain children to formulate only the

structure-dependent hypotheses such as (4) and to exclude structure-independent ones as in (3), then children should be able to distinguish (11) from (10), and should never interpret (11) as a yes/no-question. On the other hand, if children were to formulate the structure-independent hypothesis in (3), they would incorrectly interpret (11) as a yes/no-question. The experiment reported in the next section investigates which of these two possibilities is the correct one.

3. Experiment

An experiment was designed to determine whether the structural notion of c-command plays a role in Japanese-speaking children's interpretation of complex questions. The subjects were 18 monolingual Japanese-speaking children, ranging in age from 3;10 (three years; ten months) to 6;0 (mean age, 5;0). Each subject was presented with two target trials, one warm-up, and one filler trial. In each trial, a child was told a story, which was accompanied by a series of pictures presented on a laptop computer. At the end of each story, a puppet posed two questions about the story to the child. The task for the child was to answer these questions.

One of the target trials is presented in (12). After the story, the puppet asked the questions given in (14) and (13).

(12) Sample Story:

“This is a story about a penguin and his father. When the father came back home, he found a soccer ball in his son's room, but his son was not there. The father found his son in the bath, where the little penguin was washing his legs. The father asked the penguin in the bathroom, “Did you play soccer today?” The penguin replied, “Yes, I enjoyed playing soccer with my friends.” The father continued, “Where did you play soccer with your friends?” The penguin answered, “We played it in the park!” The father said to his son, “Let's have dinner when you finish washing your legs in the bath.”

(13) Otousan-wa dokode penginsan-ga sakkaa-o shitekita ka
 father-TOP where penguin-NOM soccer-ACC played QM₁
 kiki-mashi-ta ka?
 ask-POL-PAST QM₂

‘Did the father ask where the penguin played soccer?’

(Expected Answer: Yes.)

or

‘Where did the father ask whether the penguin played soccer?’

(Expected Answer: In the bath.)

(14) Otousan-wa dokode penginsan-ni sakkaa-o shitekita ka
 father-TOP where penguin-DAT soccer-ACC played QM₁
 kiki-mashi-ta ka?
 ask-POL-PAST QM₂

‘Where did the father ask the penguin whether (he) played soccer?’

(Expected Answer: In the bath.)

The question in (13) is of the type given in (10) and can be interpreted as a yes/no-question, while the question in (14) is of the type given in (11) and must be interpreted as a *wh*-question. If Japanese-speaking children rely on linear proximity in establishing the *wh*-QM association along the lines of the structure-independent hypothesis in (3), they would misanalyze (14), and provide a yes/no answer. On the other hand, if the structural notion of c-command plays a crucial role in establishing the *wh*-QM association along the lines of the structure-dependent hypothesis in (4), children should not interpret sentences like (14) as a yes/no-question.

The results are summarized in (15). Even though children had a strong tendency to interpret examples like (13) as a yes/no-question, they correctly assigned *wh*-question interpretation to sentences like (14) about 90% of the time.⁴ These results suggest that the proximity between a *wh*-phrase and a QM is not relevant for Japanese-speaking children’s interpretation of questions: Their interpretation is constrained by the structural notion of c-command.

(15) Results:

Questions as in (13): Correct Answers	91.7%	(33/36)
‘yes’-answers	83.3%	(30/36)
‘In the bath’-answers	8.3%	(3/36)
Questions as in (14): Correct Answers	88.9%	(32/36)

4. Conclusion

This study explored structure dependence in child Japanese, by examining children’s interpretation of complex *wh*-questions. The results of our experiment have demonstrated that Japanese-speaking children rely on the structure-dependent notion of *c*-command when they establish the association between a *wh*-phrase and a QM. These results corroborate the findings from the previous research on child English (e.g. Crain and Nakayama 1987, Gualmini and Crain 2005), by adding a new piece of evidence from a different language for children’s sensitivity to abstract structural properties. Our findings are consistent with the view that child language acquisition is constrained by biologically-determined UG, and place a further explanatory burden on the accounts that do not postulate innate, structure-dependent principles (e.g. Lewis and Elman 2002, Pullum and Scholz 2002).

Endnotes

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1. The sentence-final QM can be omitted when the sentence is pronounced with an

appropriate question intonation. See Yoshida and Yoshida (1997) and Ko (2005) for a detailed discussion of QM-drop.

2. This hypothesis corresponds to Harada's (1972:186) WH-Q Binding Rule. In later studies, (e.g. Nishigauchi 1990, Watanabe 1992), Harada's rule is reduced to the *Wh*-island Condition.
3. The embedded clause in (11) contains a null pronoun referring to Ken.
4. We found that about 28% of these answers (10/36) were "In the park". We included this answer in the number of "correct" answers, in that this is not a yes/no-answer. I speculate that this is due to the fact that the location where the soccer-playing occurred was too salient for children. I believe that if we modify the experiment and increase the salience of the location where the father asked the question, this "error" would go away. Yet, at this moment I do not have a good idea how to achieve it. I thank William Snyder for discussion on this point.

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