Quantifier Float and Structure Dependence in Child Japanese

Abstract

This study investigates experimentally whether Japanese-speaking children around the age of four conform to a structural condition on Quantifier Float. After pointing out a potential confound in a previous study by Otsu (1994), I report the results of my own experiment, in which this confound in the experimental design is eliminated. The results of this new experiment not only confirm that the relevant structural constraint is indeed in the grammar of Japanese-speaking preschool children as envisioned by Otsu (1994), but also provide cross-linguistic support for preschool children’s adherence to structure dependence.

1. Introduction

It is widely known that in Japanese, a numeral quantifier (NQ) can appear in various syntactic positions. Typically, an NQ immediately precedes the noun phrase it modifies as shown in (1a), with the genitive marker no in between. Alternatively, it can be syntactically separated from the NP it modifies, as illustrated in (1b). The phenomenon exemplified in (1b) is called Quantifier Float, and the separated numeral in (1b) is referred to as a floated numeral quantifier (FNQ).

(1) a. [NP 3-nin-no gakusei-ga ] kinoo kita.  
   3-CL-GEN student-NOM yesterday came  
   ‘Three students came yesterday.’

(2) a. Hito-ga 2-tu-no tiisai mura-kara kita.
    people-NOM 2-CL-GEN small villages-from came
    people-NOM small-villages-from 2-CL came

‘People came from two small villages.’

(Miyagawa 1989:31)

As will be discussed in Section 3, the contrast between the sentence in (1b) and the one in (2b) is argued to follow from the structural difference between the NP followed by a case marker and the NP followed by a postposition.

This study investigates experimentally whether Japanese-speaking children around the age of four are sensitive to the structural condition on Quantifier Float that rules out examples like (2b). After pointing out a potential confound in a previous study by Otsu (1994), I report the results of my own experiment, in which this confound in the experimental design is eliminated. The results of this new experiment not only confirms that the relevant structural restriction is indeed in the grammar of Japanese-speaking preschool children as envisioned by Otsu (1994), but also provide cross-linguistic support for the view that preschool children adhere to structure-dependent constraints.

2. Structure Dependence in Child Language: Some Previous Studies

A number of acquisition studies within the generative framework have demonstrated that children conform to the constraints of UG from the earliest observable stages (see e.g. Otsu 1981, Crain 1991). One major phenomenon in this line of research has been children’s adherence to structure-dependent rules. For example, the seminal work by Crain & Nakayama (1987) investigated the role of structure dependence in the formation of yes/no questions by English-speaking preschool children. They conducted an elicited production task to evoke questions corresponding to sentences containing more than one auxiliary, as in (3). In one experimental trial, children were shown a picture depicting one man who was beating his donkey and a second man who was not beating his donkey. Then children were encouraged to pose a question to a puppet, Jaba the Hutt. The input to children contained two auxiliary verbs: For example, *Ask Jabba if the man who is beating the donkey is mean.* This experiment was designed to see whether children would ask adultlike questions as in (4a), or whether they would ask incorrect questions like (4b), in which children appear to rely on the structure-independent rule of moving the first occurrence of *is* from the corresponding declarative form.

(3) The man who is beating the donkey is mean.
Crain & Nakayama found that, even though some children asked questions differing in form from those licensed by the adult grammar, these incorrect questions never took the form as in (4b). In light of these results, Crain & Nakayama (1987) concluded that English-speaking children employ structure-dependent operations in forming yes/no questions, and never structure-independent ones, despite the lack of overt evidence in the input.

Crain & Nakayama’s (1987) claim based on children’s language production is corroborated by the evidence from children’s language interpretation. For example, Gualmini & Crain (2005) conducted an experiment to determine whether English-speaking children are sensitive to the contrast between (5) and (6) with respect to the interpretation of the disjunction operator or, which receives a conjunctive interpretation only when it is c-commanded by and hence is in the scope of negation.

(5) Winnie the Pooh will not let Eeyore eat the cookie or the cake.
(6) The Karate Man will give the Pooh Bear he cannot lift the honey or the doughnut.

In (5), negation precedes and c-commands disjunction, and the preferred interpretation for adults is that Winnie the Pooh would not let Eeyore eat the cookie and he would not let Eeyore eat the cake. In contrast, such c-command relation does not hold between negation and disjunction in (6), and thus adults refrain from assigning the conjunctive interpretation of disjunction. Using the truth-value judgment task (Crain & Thornton 1998), Gualmini & Crain (2005) revealed that children assigned the conjunctive interpretation of disjunction to sentences like (5) 51 out of 60 trials (85%), while they avoided assigning such an interpretation to sentences like (6) 56 out of 70 trials (80%). Gualmini & Crain (2005) interpreted these results as evidence that English-speaking children base their interpretation of disjunction operator on the abstract structural relation of c-command.

Since hierarchical structures and the associated structural relation of c-command are not directly detectable in the primary linguistic data, children’s adherence to structure-dependent rules continues to an important role to argue for the postulation of UG. In light of the importance of such a line of research, it would be desirable to see whether children’s sensitivity to abstract structural relations can also be observed in languages other than English. This study attempts to investigate the role of structure dependence in child Japanese, by focusing on the phenomenon of Quantifier Float.
3. **Structural Constraints on Quantifier Float in Japanese**

Theoretical investigations into Quantifier Float in Japanese have revealed that FNQs exhibit certain distributional restrictions. One well-known restriction is that the subject and its associated FNQ need to be adjacent, whereas the object and its FNQ need not be, as illustrated by the contrast between (7b) and (8b) (Haig 1980; Kuroda 1980, 1983).

\[
\begin{align*}
\text{(7)} & \quad \text{a. Gakusee-ga san-nin hon-o katta.} \\
& \quad \text{student-NOM three-CL book-ACC bought} \\
& \quad \text{b. * Gakusee-ga hon-o san-nin katta.} \\
& \quad \text{student-NOM book-ACC three-CL bought} \\
& \quad \text{‘Three students bought a book.’}
\end{align*}
\]

\[
\begin{align*}
\text{(8)} & \quad \text{a. Gakusee-ga hon-o san-satu katta.} \\
& \quad \text{student-NOM book-ACC three-CL bought} \\
& \quad \text{b. Hon-o gakusee-ga san-satu katta.} \\
& \quad \text{book-ACC student-NOM three-CL bought} \\
& \quad \text{‘A student bought three books.’}
\end{align*}
\]

Miyagawa (1989:30) suggests that the above contrast follows from the structural constraint on FNQs stated in (9).\(^1\)

\(\text{(9) Mutual C-command Requirement:} \)

The NP or its trace and the numeral or its trace must c-command each other.

The structure for the sentence in (7b) does not satisfy this constraint, since the surface position of the subject is not in the c-command domain of the FNQ, as shown in the simplified structure in (10a). In addition, the subject is not base-generated in a position which immediately follows the object within VP (the position occupied by the FNQ in (10a)), and hence there is no subject trace that mutually c-commands the FNQ, as we can see in (10a). In contrast, the structure for the sentence in (8b) conforms to this requirement. According to a more recent study by Miyagawa & Arikawa (2007), the FNQ and its host NP form a nominal constituent (such as Num[ber] Phrase). In (8b), the object is base-generated within VP (as part of NumP) and has undergone scrambling, leaving the trace that mutually c-commands the FNQ, as shown in (10b).

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\(\text{1. This is a simplified version of Miyagawa’s (1989) constraint, taken from Nakanishi (2008:290).}\)
Miyagawa (1989:31-34) argues that the mutual c-command requirement is also capable of accounting for another well-known distributional restriction on Japanese FNQs: While an NP accompanied by a case marker can be associated with a FNQ, an NP accompanied by a postposition is incapable of functioning as a host of FNQs. The relevant contrast is exemplified in (11)-(14): The sentences in (11) and (12) are examples with case markers, while those in (13) and (14) are examples with postpositions.

(11) a. 3-nin-no gakusei-ga kinoo hon-o katta.
    3-CL-GEN student-NOM yesterday book-ACC bought
    ‘Three students bought a book yesterday.’

    b. Gakusei-ga kinoo 3-nin hon-o katta.
    student-NOM yesterday 3-CL book-ACC bought
    ‘Hanako bought three books yesterday.’

(12) a. Hanako-ga 3-satu-no hon-o kinoo katta.
    Hanako-NOM 3-CL-GEN book-ACC yesterday bought
    ‘Hanako bought three books yesterday.’

    b. Hanako-ga hon-o kinoo 3-satu katta.
    Hanako-NOM book-ACC yesterday 3-CL bought
    ‘Hanako bought three books yesterday.’

(13) a. Gakuseitati-wa 2-dai-no kuruma-de kita.
    students-TOP 2-CL-GEN car-in came
    ‘Students came in two cars.’

    b. * Gakuseitati-wa kuruma-de 2-dai kita.
    Students-TOP car-in 2-CL came
    ‘Students came in two cars.’

(14) a. Hanako-wa 2-tu-no kooen-e itta.
    Hanako-TOP 2-CL-GEN park-to went
    ‘Hanako went to two parks.’

    b. * Hanako-wa kooen-e 2-tu itta.
    Hanako-TOP park-to 2-CL went
    ‘Hanako went to two parks.’

(based on Miyagawa 1989:28-31)

Miyagawa (1989) argues that the contrast illustrated above follows from the structural difference between these two types of particles: Postpositions project a PP node, while case markers directly cliticize onto NPs and hence do not create any additional projection. The relevant parts of the structures for (12b) and (13b) under Miyagawa & Arikawa’s (2007) analysis would look like (15a) and (15b).
Given these structures, while the trace of the NP accompanied by a case marker in (15a) conforms to the mutual c-command requirement, the PP projection in (15b) prevents the NP inside it from c-commanding or c-commanded by the FNQ, thereby inducing a violation of the structural constraint in (9).

If Miyagawa's (1989) structural approach to the distributional restrictions on FNQ is basically on the right track, investigations into Japanese-speaking children's knowledge about these restrictions have the potential of providing cross-linguistic evidence that preschool children adhere to structure-dependent rules. In light of such potential theoretical significance, relevant experimental studies have already been conducted, which we will briefly review in the next section.

4. Quantifier Float and Structure Dependence in Child Japanese: Previous Studies
4.1. The Asymmetry between Subjects and Objects

As we have discussed in the previous section, the mutual c-command requirement in (9) that Miyagawa (1989) proposed is capable of accounting for the following two asymmetries concerning the distribution of the FNQ: (i) the asymmetry between the subject NP and the object NP illustrated by the contrast between (7b) and (8b), and (ii) the asymmetry between the NP accompanied by a case marker and the NP accompanied by a postposition illustrated by the contrast between (12b) and (13b). Previous acquisition studies addressed the question of whether Japanese-speaking children are sensitive to these asymmetries. For example, Suzuki & Yoshinaga (2013) investigated experimentally Japanese-speaking children’s knowledge about the subject-object asymmetry on the FNQs, using a picture-selection task. In one of their two experiments, 33 children were tested, ranging in age from 4;02 to 6;11 (mean age, 5;06). 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 given in (16) and in (17).
The results of their experiment showed that children were able to correctly identify the direct object as a referent of the FNQ not only in SOV as in (16) but also in OSV as in (17): The percentage of correct responses for the former was 91.4%, and the one for the latter was 86.4%. Suzuki & Yoshinaga argue that, if children had followed the linear-proximity strategy of associating the FNQ to the linearly-closest NP, their responses would have been correct on all SOV sentences and wrong on all OSV sentences. The actual results did not show such a pattern. Based on this finding, Suzuki & Yoshinaga conclude that the interpretation of FNQs by Japanese-speaking children is structurally dependent on hierarchical phrase structure.2

4.2. The Asymmetry between NPs with Case-markers and NPs with Postpositions

Otsu (1994) investigated experimentally whether Japanese-speaking children are sensitive to another structural asymmetry of FNQs, specifically the asymmetry between the NP accompanied by a case marker and the NP accompanied by a postposition. The subjects of his experiment were five three-year-olds and five four-year-olds. In this experiment, each child was presented with the following target sentences, along with three practice sentences.

(18) a. Kirinsan-ga san-biki ositeimasu.
   giraffe-NOM three-CL is-pushing
   ‘Three giraffes are pushing someone.’

   b. Raionsan-o san-biki ositeimasu.
      lion-ACC three-CL is-pushing
      ‘Someone is pushing three lions.’

    giraffe-from three-CL kiss-ACC is-receiving
    ‘Three (unspecified animals) received a kiss from a/the giraffe(s).’

   b. Raionsan-no-mae-ni san-biki tatteimasu.
      lion-GEN-front-at three-CL is-standing
      ‘Three (unspecified animals) are standing in front of a/the lion(s).’

The task was an act-out: Each child was given five toy giraffes and five toy lions, and was told to act out what the sentences in (18) and (19) mean by picking up appropriate toy animals and manipulating them.

The results showed that children made no mistake when interpreting any of the four test sentences. When presented with the sentences in (18), children chose as the agent of *push* three giraffes for (18a) and as the patient three lions for (18b). Similarly, when presented with the sentences in (19), children chose as the recipient of *kiss* three lions for (19a) and as the agent of *stand* three giraffes for (19b). These results suggest that while Japanese-speaking three- and four-year-olds associate FNQs with the NPs that are accompanied by case markers, they do not establish such an association between FNQs and the NPs which are immediately followed by a postposition. In light of this finding, Otsu (1994) concludes Japanese-speaking children are able to make the subtle structural distinction between case markers and postpositions.

The findings from Otsu’s (1994) experiment, if correct, would also provide evidence for children’s adherence to structure-dependent constraints, as well as Suzuki & Yoshinaga’s (2013) study. In order for children to make the fine distinction between case markers and postpositions concerning the possibility of Quantifier Float, they must have the knowledge of the mutual c-command requirement in (9), which crucially relies on the structure-dependent notion of c-command. Then, the results of Otsu’s experiment would corroborate the findings of previous research on child English (e.g. Crain & Nakayama 1987, Gualimini & Crain 2005), which demonstrated children’s sensitivity to abstract structural dependencies.

That being said, however, I argue that the experiment by Otsu (1994) contains a potential confound, which obscures children’s knowledge of the structural distinction between case markers and postpositions. Recall the target sentences in his experiment, repeated below.

(18) a. Kirinsan-ga san-biki ositeimasu.
    giraffe-NOM three-CL is-pushing
    ‘Three giraffes are pushing someone.’

b. Raionsan-o san-biki ositeimasu.
    lion-ACC three-CL is-pushing
    ‘Someone is pushing three lions.’

    giraffe-from three-CL kiss-ACC is-receiving
    ‘Three (unspecified animals) received a kiss from a/the giraffe(s).’

b. Raionsan-no-mae-ni san-biki tatteimasu.
    lion-GEN-front-at three-CL is-standing
    ‘Three (unspecified animals) are standing in front of a/the lion(s).’
As Otsu correctly assumed, these sentences differ with respect to the structural relationship between the floated quantifier and the NP it modifies. This is not the only difference between (18) and (19), however. Crucially, the sentences in (18) and those in (19) differ in the phonological distance between the floated quantifier and the NP it is associated with: While the case markers -ga and -o in (18) are one-mora long, the postposition -kara ‘from’ in (19a) has two morae, and the postposition -no mae ni ‘in front of’ in (19b) is a complex one that has four morae. Then, the distance between the floated quantifier and its associated NP is larger in (19) than in (18), which may be the source for children’s rejection of the association between the numeral quantifier and its antecedent NP in (19). More specifically, children might have relied on the following strategy, which is based solely on linear proximity:

(20) FNQs cannot be associated with an NP when the NP is accompanied by a particle whose phonological length is more than one mora.

In other words, in Otsu’s (1994) experiment, linear proximity (rather than the structural distinction) might have played a crucial role in children’s responses. In order to eliminate this possibility, we have to show that children still exhibit the same contrast even when case markers and postpositions have the same phonological length. The next section reports the results of my own experiment, which has incorporated this small but important modification in its design.

3. Basically the same consideration motivated the experimental study by Gualmini & Crain (2005). In their previous study that investigated the role of c-command in constraining children’s assignment of the conjunctive interpretation to sentences containing the disjunction operator or (Crain, Gardner, Gualmini & Rabbin 2002), English-speaking children were asked to interpret sentences like the following.

(i) a. I said that the girl who stayed up late would not get a dime or a jewel.
   b. I said that the girl who didn’t go to sleep would get a dime or a jewel.

As expected, children assigned the conjunctive interpretation of disjunction to sentences as in (ia) (in which negation c-commands the disjunction) but not to sentences like (1b) (which do not involve such c-command relation). Gualmini & Crain (2005) observed, however, that these target sentences differ not only with respect to the structural relationship between negation and disjunction, but also in the number of words that intervene between them: More specifically, negation and disjunction are closer in (ia) than they are in (ib). In light of this confound, Gualmini & Crain (2005) conducted a new experiment to demonstrate that children refrain from assigning the conjunctive interpretation to disjunction if this is merely preceded by negation, even if the two operators are very close to each other.
5. Quantifier Float and Structure Dependence in Child Japanese: New Experiment

5.1. Subjects

The subjects of this experiment were 31 Japanese-speaking children, ranging in age from 3;07 to 5;05 (mean age, 4;07). These subjects consisted of 5 three-year-olds, 19 four-year-olds, and 7 five-year-olds. Each subject was tested individually. As a control group, three adult native speakers of Japanese were also tested, who were graduate students with little background in linguistics.

5.2. Method and Test Sentences

Following Suzuki & Yoshinaga (2013), we employed a picture-selection task. In this task, pairs of pictures were presented on a laptop computer, and for each pair of pictures, a puppet asked a question to the child. Children were encouraged to answer these questions by selecting an appropriate picture.

The test sentences used in this experiment contained a case marker and a postposition with the same phonological length, in order to make sure that children rely not on the linear strategy in (20) but on the structural distinction between case markers and postpositions. More specifically, this experiment made use of the following contrast.

(21) Usagisan-ga 2-hiki nokkatte-iru.
    rabbit-NOM 2-CL on.top.of-be
    ‘Two rabbits are on top of unspecified animals.’

(22) Usagisan-ni 2-hiki nokkatte-iru.
    rabbit-on 2-CL on.top.of-be
    ‘Two unspecified animals are on top of rabbits.’

While the sentence in (21) contains the nominative case marker -ga, the one in (22) involves the “dative” particle -ni. Even though these particles are both one-mora long, they show different behavior with respect to Quantifier Float: While the NP *usagisan* “rabbit” can be the associated with the FNQ in (21), such an association is disallowed in (22), which results in the interpretation that the NQ modifies the phonologically-empty subject.

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4. Our choice of the predicate and the number of the animals used in the test sentences made it hard for us to adopt an act-out task, which Otsu (1994) employed in his experiment: We decided to use the predicate *nokkatte-iru* ‘be on top of’, and it turned out to be quite difficult for children to act out sentences like ‘Three lions are on top of unspecified animals’, which requires children to put three animals (e.g. lions) on the back of the two animals of a different kind (e.g. elephants).
As Sadakane & Koizumi (1995) discuss in detail, the “dative” particle *ni* has (at least) four uses, including the use as a case-marker and the use as a postposition. When used with the predicate *nokkatte-iru* “be on top of” as in (21) and (22), however, this “dative” particle behaves unambiguously as a postposition, as indicated more clearly by the contrast between (23) and (24).

5. In light of this potential ambiguity, one may wonder why this particle was chosen in my experiment, rather than other one-mora postpositions. Other candidates are -*de* ‘with (something)’, -*e* ‘to’, -*to* ‘with (someone)’. The postpositions -*de* and -*e* typically take inanimate NPs in their complement position (as illustrated in (13) and (14)), and hence it is quite difficult to create a test sentence in which the antecedent of a floated quantifier is potentially ambiguous between the NP followed by a case marker and the NP followed by -*de* or -*e*: While the former is typically animate, the latter is not.

In a pilot stage of this experiment, I tested children with sentences involving -*to* ‘with (someone)’, as in (i).

(i) Usagisan-ga  kamesan-to 3-biki  odotte-iru.  
    rabbit-NOM  turtle-with 3-CL  dancing-be
    ‘Three rabbits are dancing with turtles.’

It turned out that children (as well as adults) had difficulty determining whether the numeral quantifier *3-biki* refers to the number of rabbits, or to the sum of rabbits and turtles. Whether the latter interpretation is in fact possible, and if yes, how this interpretation is derived from (i) are interesting issues that go beyond the scope of this study. Since it is apparent that the use of the postposition *to* ‘with’ puts an extra burden on children, I decided to avoid the use of this postposition in the target sentences.

6. Sadakane & Koizumi (1995:12) observe that in the following sentence, which contain an intransitive verb expressing change of position, Quantifier Float over *ni* is possible:

(i) Kanta-wa  yuuenti-de  uma-ni  3-too  notta.  
    Kanta-TOP  amusement.park-at horses-NI 3-CL  rode
    ‘Kanta rode three horses at the amusement park.’

Based on this observation, they argue that the particle -*ni* in this example is a case marker, not a postposition. Then, a question arises why the particle -*ni* behaves as a postposition in (22) – (24), despite the fact that the verbs in these examples and the verb in (i) are derived from the same verbal root (*nor* ‘ride’). Even though I do not have a definite answer at this point, I suspect that the difference may be related to the distinction between distributive and non-distributive interpretations proposed by Kitagawa & Kuroda (1992:88-89): “the distributive construal necessarily implies the occurrence of multiple events while the non-distributive construal implies the occurrence of only a single event”. Building on this distinction, Ishii (1999) claims that apparent counterexamples to the mutual c-command requirement on floated numeral quantifiers permit a distributive reading but not a non-distributive reading, and that the former interpretation involves an adverb-type numeral quantifier.
(23) Buta-ga torakku-ni 3-biki nokkatte-iru.
pig-NOM truck-NI 3-CL on.top.of-be
‘Three pigs are on a truck.’

(24) * Buta-ga torakku-ni 3-dai nokkatte-iru.
pig-NOM truck-NI 3-CL on.top.of-be
‘Pigs are on three trucks.’

The classifier -hiki (or biki as a result of sequential voicing) in (23) is the one used for animal nouns, while the classifier -dai in (24) is the one typically used for machines. Virtually all of the adult native speakers of Japanese I consulted reported that the example in (24) is fairly degraded, which suggests that -ni in examples like (22)-(24) is not a case marker but a postposition.

Given the difficulty of finding a predicate that can be accompanied by a PP in which (i) the preposition is one-mora long, and (ii) the NP complement of this preposition can be animate (as well as the NP followed by a nominative case marker), all the test sentences involved the same predicate of nokkatte-iru “be on top of”. Sample pictures used in this experiment are given in Figure 1. For each pair of pictures, the puppet asked the child one of the three questions exemplified in (25) – (27).

Ishii’s proposal can account for the grammatical status of (i) even if we assume that -ni in this example is also a postposition as in (22) – (24): Since the example in (i) is forced to have a distributive reading, meaning that Kanta rode three horses one after another, the FNQ in this example is an adverb-type and hence does not need to satisfy the mutual c-command requirement.

I suspect that the stative predicate nokkatte-iru “be on top of” in (22) – (24) is associated with a single event and hence excludes the possibility that the FNQ is an adverb-type, which in turn requires this FNQ to satisfy the structural constraint in (9). Whether this speculation is on the right track is an issue that needs more careful investigation, but I have to leave it for future research.
The question in (25) contains an NP that is accompanied by a nominative case marker, which can be associated with the FNQ. Thus, children are expected to choose the picture with three rabbits, namely the picture (A). In contrast, the overtly-expressed NP in the question in (26) is accompanied by a postpositional ni, which cannot be modified by the FNQ. If children can correctly assign the PP structure to this ni-marked NP, they should associate the quantifier not with this ni-marked NP but with the unexpressed subject NP, and hence they should choose the picture (B) as their answer.

The question in (27) is the non-floated counterpart of (26), in which the numeral quantifier is immediately followed by a genitive case marker and hence is part of the NP headed by kamesan ‘turtle’. This type of questions was included in order to evaluate the possibility that children uniformly rule out the association between the quantifier and the ni-marked noun, no matter whether the two elements appear within the same phrase or are syntactically separated.

The experiment consisted of two target sentences with NP-ga as in (25), two target sentences with NP-ni as in (26), and two target sentences involving a non-floated quantifier as in (27), along with three filler questions. The filler questions were intransitive sentences which contain an overt nominative subject and a FNQ. All the test sentences used in this experiment are listed in the Appendix.

Two orders of presentation of test sentences were prepared: One of them had the order of (i) two target sentences with NP-ga, (ii) two target sentences with NP-ni, and (iii) two target sentences involving a non-floated quantifier, and the other had the order (i) two target sentences with NP-ga, (ii) two target sentences involving a non-floated quantifier, and (iii) two target sentences with NP-ni, with fillers interspersed in between. Thus, target sentences with NP-ga came first in both orders. Since this type of target sentences allow the FNQ to be associated with the overt NP, both of these orders of presentation should tempt children to associate the FNQ with the overt NP even in the case where this NP is accompanied by postposition. Thus, if children rule out the association between the quantifier and the ni-marked noun even under this disadvantageous situation, it should be a clear indication that
these children rely strictly on the structural distinction between case markers and postpositions.

5.3. Results and Discussion

The results obtained from 31 children are summarized in Table 1. The three adults we tested behaved exactly in the same way as we expected, and did not make any error in their responses.

<table>
<thead>
<tr>
<th></th>
<th>Number of Correct Responses</th>
<th>% of Correct Responses</th>
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<tbody>
<tr>
<td>NP-\textit{ga} NQ as in (25)</td>
<td>62 / 62</td>
<td>100%</td>
</tr>
<tr>
<td>NP-\textit{ni} NQ as in (26)</td>
<td>54 / 62</td>
<td>87.10%</td>
</tr>
<tr>
<td>NQ-\textit{no}-N as in (27)</td>
<td>58 / 62</td>
<td>93.55%</td>
</tr>
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Table 1: Summary of Children’s Results

As we can see in the table, children’s responses were basically adult-like: When the overtly-expressed NP was accompanied by a nominative case marker as in (25), children permitted the association between this NP and the floated NQ 100% of the time, while they avoided such an association 87% of the time when the overtly-expressed NP was immediately followed by the postpositional \textit{ni} as in (26): Only one child out of 31 tested misinterpreted both of the sentences involving NP-\textit{ni}, and incorrectly associated the \textit{ni}-marked NP with the FNQ. In sharp contrast to NP-\textit{ni} NQ sentences as in (26), when the NQ is marked with the genitive case marker and hence is part of the \textit{ni}-marked NP as in (27), children allowed the quantifier to modify the head noun more than 93% of the time. These results suggest that, even when the linear proximity between the FNQ and its associated NP is controlled, Japanese-speaking preschool children are still able to make the distinction between case markers and postpositions with respect to the possibility of Quantifier Float. This finding indicates that the proximity between the floated NQ and its antecedent NP is not relevant for children’s interpretation; Structural distinction is what matters for children.

However, one might propose an alternative interpretation of the above results, by saying that Japanese-speaking children’s hypothesis about Quantifier Float is lexical-item based: Children simply analyze the input data, and draw the generalization that \textit{ga}-marked NPs can be associated with a FNQ, while \textit{ni}-marked NPs cannot.\footnote{I would like to thank an anonymous reviewer for suggesting this type of alternative account to me.} In order to evaluate the validity of such an account, we analyzed one Japanese corpus available in the CHILDES database (MacWhinney 2000), which is called MiiPro-Tomito corpus (Miyata & Nisisawa 2010). Using the CLAN program KWAL, we picked up all of the mother’s utterances which...
contains a numeral quantifier, and checked by hand to determine how many of these utterances contain both (i) a ga-marked NP or a ni-marked NP, and (ii) a FNQ. The results of this small transcript analysis are summarized in Table 2. Examples for each type of the mother’s utterance are presented in (28).

<table>
<thead>
<tr>
<th>Total Number of Mother’s Utterances</th>
<th>19456</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Number of Mother’s Utterances including both ga-marked NP and a FNQ</td>
<td>11</td>
</tr>
<tr>
<td>The Number of Mother’s Utterances including both ni-marked NP and a FNQ</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 2: Results of the Analysis of Mother’s Utterances

(28) a. Utterance containing ga-marked NP and FNQ:
*MOT:  bideo-ga ni-dai ugoite(i)ru .
VCR-NOM two-CL moving
‘Two VCRs are working.’
(tom20010724.cha: line 4618)

b. Utterance containing ni-marked NP and FNQ:
*MOT:  ja, otoosan-ni-mo hito-tsu .
then father-to-also one-CL
‘Then, one for father, too.’
(tom19991102.cha: line 733)

The above results suggest that the relevant utterances are quite rare in the input. Especially, it appear to be quite hard for children to determine that the NP accompanied by a postpositional –ni cannot be associated with an FNQ, since the potentially relevant utterances are extremely small in number (4/19456, which constitutes 0.0002% of the mother’s utterances). Thus, the analysis of the parental input to Japanese-learning children, even though preliminary, casts serious doubt on an input-based account of children’s distinction between case markers and postpositions with respect to the possibility of Quantifier Float.

6. Conclusion

In this study, an experiment was conducted to demonstrate that Japanese-speaking preschool children are sensitive to the contrast between case markers and postpositions concerning the possibility of Quantifier Float. The results of this new experiment constitute more convincing evidence than the results of Otsu’s (1994) experiment, since the case marker and the postposition used in this experiment have exactly the same phonological length and hence an alternative interpretation based on linear distance would not be available.
There are at least two limitations, however. First, since the age of the youngest child tested in this study was 3;07, the results of this experiment cannot rule out the possibility that younger children in fact rely on a strategy based on linear proximity as in (20). Second, the test sentences are all based on one type of postposition with one type of predicate, a question certainly remains as to how far the adult-like behavior found in this study can be generalized.

Even though the investigations concerning these remaining issues have to be left for future research, the converging evidence from the current study, the study by Otsu (1994), and the study by Suzuki & Yoshinaga (2013) suggests that the structural notion of c-command must be available for children to interpret floated quantifiers. Thus, evidence from Japanese-speaking children’s interpretation of floated quantifiers corroborates the previous findings from child English (e.g. Crain & Nakayama 1987, Gualmini & Crain 2005), and provides cross-linguistic support for children’s adherence to structure-dependent constraints.

Acknowledgements

(To be added.)

References


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8. I thank an anonymous reviewer for the relevant discussion. This anonymous reviewer pointed out to me that the strongest evidence for children’s knowledge of the contrast between case markers and postpositions would be obtained by investigating whether children can distinguish between -ni as a dative case marker and -ni as a postposition. Since the relevant distinction appears to be quite subtle even for adults, I have to leave this quite intriguing investigation for future research.


Otsu, Yukio. 1981. *Universal Grammar and Syntactic Development in Children: Toward a
Theory of Syntactic Development. Doctoral dissertation, MIT.


Appendix: List of Test Sentences

[1] Practice/Filler Sentences:

(29) Raionsan-ga 2-hiki ohirune-siteiru syasin-wa dotti kana ?
lion-NOM 2-CL nap-doing picture-TOP which Q
‘Which is the picture in which two lions are taking a nap?’

(30) Usagisan-ga 3-hiki ohirune-siteiru syasin-wa dotti kana ?
rabbit-NOM 3-CL nap-doing picture-TOP which Q
‘Which is the picture in which two rabbits are taking a nap?’

(31) Kamesan-ga 2-hiki ohirune-siteiru syasin-wa dotti kana ?
turtle-NOM 2-CL nap-doing picture-TOP which Q
‘Which is the picture in which two turtles are taking a nap?’

[2] Test Sentences with NP-ga NQ:

(32) Zousan-ga 2-hiki nokkatte-iru syasin-wa dotti kana ?
elephant-NOM 2-CL on.top.of-be picture-TOP which Q
‘Which is the picture in which two elephants are on top of unspecified animals?’

(33) Raionsan-ga 3-biki nokkatte-iru syasin-wa dotti kana ?
lion-NOM 3-CL on.top.of-be picture-TOP which Q
‘Which is the picture in which three lions are on top of unspecified animals?’
Test Sentences with NP-\textit{ni} NQ:

(34) Kamesan-ni 3-biki nokkatte-iru syasin-wa dotti kana ?
turtle-on 3-CL on.top.of-be picture-TOP which Q
‘Which is the picture in which three unspecified animals are on top of the turtles?’

(35) Usagisan-ni 2-hiki nokkatte-iru syasin-wa dotti kana ?
rabbit-on 2-CL on.top.of-be picture-TOP which Q
‘Which is the picture in which two unspecified animals are on top of the rabbits?’

Test Sentences with NQ-\textit{no}-N:

(36) 2-hiki-no kamesan-ni nokkatte-iru syasin-wa dotti kana ?
2-CL-GEN turtle-on on.top.of-be picture-TOP which Q
‘Which is the picture in which unspecified animals are on top of two turtles?’

(37) 3-biki-no zousan-ni nokkatte-iru syasin-wa dotti kana ?
3-CL-GEN elephants-on on.top.of-be picture-TOP which Q
‘Which is the picture in which unspecified animals are on top of three elephants?’