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Word Order Preferences for Direct and Indirect Objects in Children Learning Japanese*

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1. Introduction

Japanese is often called a 'free word order' language because of the variation that it permits in the ordering of a verb's arguments. For example, thanks to the presence of case markers, the (a) and (b) versions of the sentence in (1) have the same interpretation, with the girl as the one who does the pushing (the subject) and the boy as the one who is pushed (the direct object).

(1)a. Subject-direct object order:

Onnanoko-ga otokonoko-o osi-ta.
girl -Nom boy -Ac push-Pst
'The girl pushed the boy.'

b. Direct object-subject order:

Otokonoko-o onnanoko-ga osi-ta.
boy -Ac girl -Nom push-Pst
'The girl pushed the boy.'

Work on the acquisition of Japanese as a first language suggests that children growing up in a monolingual setting are able to use case markers to interpret sentences with a variable order by age 4 or so (e.g., Hayashibe 1975, Sano 1977, Hakuta 1982), if not earlier (e.g. Otsu 1994). Prior to that time, there is a tendency to interpret the first NP as the subject and the second NP as the direct object. This gives the correct interpretation for SOV sentences such as (1a), but yields the wrong result for their OSV counterparts. Thus, patterns such as (1b) are incorrectly taken to mean 'The boy pushed the girl'.

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There are at least three hypotheses that can account for this. The first, which we will refer to as the 'Input Hypothesis', predicts a preference for SOV order simply because this is the canonical structural pattern found in the input.

(2) The Input Hypothesis:

Children prefer the word order encountered most frequently in the input.

Kuno (1973) reports that the canonical SOV order is 17 times more likely than the scrambled order in adult Japanese speech, and Yamashita & Suzuki (1995) found that the frequency of any type of scrambled sentences in informal Japanese speech was less than 1%. The Input Hypothesis attributes children's early word order preferences to this asymmetry.

A second hypothesis takes as its starting point the fact that the referent of the subject in an active transitive sentence is typically the initiator of an action that is directed toward the referent of the direct object (e.g. Talmy 1988, Pinker 1989:193, Croft 1991:262, Langacker 1995:18-20). On this view, the preference for the subject-direct object order is attributed to the fact that this pattern presents an event's participants in a conceptually advantageous manner, with the initiator of the action being mentioned before the entity to which the action is directed. Let us refer to this as the 'Matching Hypothesis'. (An idea along these lines is also implicit in Bever's (1970) Canonical Sentence Strategy,¹ which was formulated to account for children's preference for patterns in which agents precede themes.)

(3) The Matching Hypothesis:

Children prefer sentences whose words order is isomorphic with the corresponding situation.

Still another hypothesis has its roots in the literature on syntactic typology, which makes frequent reference to the existence of a relational hierarchy that helps define the accessibility of NPs to

¹See also McNeill (1970:124).

a variety of syntactic processes such as relativization, topicalization, agreement, anaphor binding, and so forth (Keenan & Comrie 1976, Johnston 1977, Croft 1990, Pollard & Sag 1992).

- (4) The relational hierarchy
subject > direct object > indirect object > ...

It is conceivable that children initially exhibit a preference for word order patterns that respect the relative prominence of grammatical relations stipulated in this typological hierarchy. Let us refer to this as 'the Hierarchy Hypothesis'.

- (5) The Hierarchy Hypothesis:
Children prefer sentences whose word order reflects the relative prominence of grammatical relations.

Because all three hypotheses predict that SOV patterns will be preferred to their OSV counterparts, the study of simple transitive constructions alone cannot reveal which factor (or factors) is responsible for early word order preferences in active sentences. However, as we will attempt to demonstrate in this paper, significant new light can be shed on this question by investigating sentences that include both direct and indirect objects.

As shown in the following examples, direct and indirect objects can be freely ordered with respect to each other in Japanese—thanks to the presence of dative and accusative markers that signal their grammatical role independent of linear position.

- (6)a. Direct object–indirect object order
Kodomo-ga isi-o inu-ni nage-ta.
child-Nom stone-Ac dog-Dat throw-Pst
'The child threw a stone to the dog.'
- b. Indirect object–direct object order
Kodomo-ga inu-ni isi-o nage-ta.
child-Nom dog-Dat stone-Ac throw-Pst
'The child threw a stone to the dog.'

In considering the relevance of these sentences for the study of early word order preferences, we will begin by outlining a comprehension experiment designed to determine whether children are able to use case markers to interpret sentences containing triadic verbs and whether they exhibit a preference for one order over the other. As we will explain in the next section, the results of this experiment together with information about the type of patterns most prevalent in maternal speech allow us to rule out the Input Hypothesis as the sole explanation for early word order preferences. This leaves us with the problem of determining the possible effects on word order preferences of sentence-situation isomorphism (the Matching Hypothesis) and the relational

hierarchy (the Hierarchy Hypothesis). Section 3 reports on an experiment designed to investigate these matters.

2. Experiment 1

Our first experiment involved a comprehension task, in which an act-out procedure was used to assess children's ability to comprehend the dative–accusative and accusative–dative orders.

2.1 Subjects

Thirty Japanese-speaking subjects participated in this experiment—10 four-year olds (mean age = 4;7), 10 five-year olds (mean age = 5;4), and 10 six-year olds (mean age = 6;1); the children were residents of Chiba and Aomori, Japan. The socio-economic status of all families places them in the middle class.

2.2 Procedure

The comprehension experiment made use of an act-out task: children were asked to respond to requests with the help of stuffed toys and other props provided by the experimenter. All subjects were tested individually in a quiet place.

2.3 Sentence types

There were 20 test sentences, with five tokens of each of the four types exemplified below. In order to guard against interpretation based on semantic clues, all test sentences were semantically reversible. The test sentences were presented in random order. (Req = 'request')

- (7)a. Animate direct object; animate indirect object
DATIVE-ACCUSATIVE ORDER
Tora-ni inu-o mise-te.
tiger-Dat dog-Ac show-Req
'Show the dog to the tiger.'
- ACCUSATIVE-DATIVE ORDER
Inu-o tora-ni mise-te.
dog-Ac tiger-Dat show-Req
'Show the dog to the tiger.'
- b. Inanimate dir. object; inanimate indirect object
DATIVE-ACCUSATIVE ORDER
Siiru-ni kitte-o hat-te.
sticker-Dat stamp-Ac attach-Req
'Attach the stamp to the sticker.'
- ACCUSATIVE-DATIVE ORDER
Kitte-o siiru-ni hat-te.
stamp-Ac sticker-Dat attach-Req
'Attach the stamp to the sticker.'

2.4 Results

As shown in Table 1, the Japanese children showed a strong tendency to interpret the test sentences as if the first NP was the direct object and the second the indirect object. (On all patterns, errors involved reversals—i.e., interpreting a dative-accusative pattern as if it were an accusative-dative pattern and vice versa).

Table 1 Results on the comprehension task (percentage correct)

Age	Animate-Animate		Inanimate-Inanimate	
	Acc-Dat	Dat-Acc	Acc-Dat	Dat-Acc
4-yr-olds	76%	66%	84%	70%
5-yr-olds	86	66	74	74
6-yr-olds	92	72	94	82
overall	84.7	68	84	75/3

Tests of within-subject effects revealed that children's performance was significantly better on the accusative-dative order than on the dative-accusative ($F(1,27) = 13.826, p = 0.001$). A repeated measures 3-way ANOVA revealed no significant effect for age ($F(1,27) = 3.083, p = 0.062$) and no significant order-age interaction ($F(2,27) = .268, p = .767$).

3. Experiment 2

The results of our comprehension experiment reveal a strong preference among Japanese children for the accusative-dative order. In fact, this preference can even override the information carried by case markers, leading to the likelihood of comprehension errors when the indirect object precedes the direct object. Can input account for this? This seems unlikely, since there are typically very few sentences in 'pro-drop' language such as Japanese that contain both an overt dative-marked NP and an overt accusative-marked NP. Although we have not yet completed our investigation on this matter in Japanese, we have obtained some suggestive findings for Korean. In the course of examining 18 hours of transcripts of mother-to-child speech for three Korean dyads over a six-month period (beginning when the child's age was 3;2 to 3;10), we found proportionally few examples of sentences containing both an overt direct object and an overt indirect object in maternal speech. Crucially, though, of the 240 examples that we did encounter, 70% employed the dative-accusative order. Yet, Korean children are like Japanese children in preferring the accusative-dative order (Cho et al. 1998).

It is clear at this point, then, that the Input Hypothesis cannot adequately account for the word order preferences observed in sentences containing a direct object and an indirect object. Evidently,

something other than simple experience is responsible for children's preference for the accusative-dative order.

One possibility of course is the Matching Hypothesis, restated here.

(3) The Matching Hypothesis:

Children prefer sentences whose words order is isomorphic with the corresponding situation.

In the case of sentences built around triadic verbs such as 'give' or 'throw', the structure of the corresponding situation is such that the referent of the subject first acts on the referent of the direct object, thereby causing its transfer to the referent of the indirect object. For example in the case of a sentence such as 'The woman threw a ball to the dog', the woman acts on the ball causing it to go to the dog. As noted earlier, it is conceivable that children exhibit an initial preference for sentences whose word order is isomorphic with the corresponding situation in this way.

However, the Hierarchy Hypothesis, repeated below, also allows a straightforward account for the results of our first experiment.

(5) The Hierarchy Hypothesis:

Children prefer sentences whose word order reflects the relative prominence of grammatical relations.

Since direct objects are higher than indirect object in the relational hierarchy, the observed preference for the direct object-indirect object order is in line with the predictions of the Hierarchy Hypothesis.

How can we choose between these two hypotheses? Nothing can be inferred from the investigation of sentences containing plain triadic verbs, since both hypotheses make the same prediction for such patterns (namely that the accusative-dative order will be preferred). The key lies in considering patterns in which the match between a sentence's structure and the situation it describes is not also a reflection of the relational hierarchy. Causative constructions are instances of the structure type we are seeking.

- (8) Hanako-ga inu-ni saru-o os-ase-ta.
Hanako-Nm dog-Dat monkey-Ac push-Caus-Pst
'Hanako made the dog push the monkey.'

Here the referent of the subject acts on the referent of the indirect object, causing that individual to act on the referent of the direct object. (Thus, in (8) Hanako acts on the dog forcing him to push the monkey.) Although both the dative-accusative and accusative-dative orders are acceptable in Japanese, the Matching Hypothesis predicts a preference for the

dative–accusative order since only it reflects an isomorphism between the structure of the sentence and the corresponding situation. In contrast, the Hierarchy Hypothesis predicts the opposite preference since the accusative–dative order reflects the relative prominence of the elements in the relational hierarchy. We thus have the desired state of affairs, with the two hypotheses making different predictions for the causative pattern.²

Table 2 Word order preferences predicted by the two hypotheses

Hypothesis	Structure	Predicted Preference
Matching Hypothesis	plain pattern	accusative–dative
	causative pattern	dative–accusative
Hierarchy Hypothesis	plain pattern	accusative–dative
	causative pattern	accusative–dative

In order to determine which of the two hypotheses makes the correct prediction, we carried out the comprehension experiment described below.

3.1 Subjects

The subjects for this study were twenty 4-year-old Japanese-speaking children living in Chiba, Japan.

3.2 Procedure

The experiment made use of the same act-out task employed in the first experiment described above: children were asked to respond to simple requests consisting of a verb, a direct object and an indirect object. All subjects were tested individually in a quiet place. The test sentences (described below) were presented in random order.

3.3 Sentence types

There were four semantically reversible sentence types—two plain transitive sentences in the dative–accusative and accusative–dative orders and two causative sentences in the same two orders. There were five tokens of each type—for a total of 20 sentences, which were arranged in random order.

(9)a. plain transitive pattern: dative–acc. order:

Neko-ni usagi-o mise-te.
cat-Dat rabbit-Ac show-Req
'Show the rabbit to the cat.'

b. plain transitive pattern: acc.–dative order:

Usagi-o neko-ni mise-te.
rabbit-Ac cat-Dat show-Req
'Show the rabbit to the cat.'

c. causative pattern: dative–acc. order:

Inu-ni usagi-o tatak-ase-te.
dog-Dat rabbit-Ac hit-Caus-Req
'Make the dog hit the rabbit.'

d. causative pattern: acc.–dative order:

Usagi-o inu-ni tatak-ase-te.
rabbit-Ac dog-Dat hit-Caus-Req
'Make the dog hit the rabbit.'

3.4 Results

Table 4 presents the results of this experiment. Errors on both patterns consisted entirely of 'reversals' (i.e., interpreting a dative–accusative pattern as if it were an accusative–dative pattern and vice versa).

Table 3 Results on the second experiment (% correct)

	acc.–dative order	dative–acc. order
plain pattern	64%	49%
causative pattern	36	54

As in our previous experiment, the children showed a preference for the accusative–dative order in the plain transitive patterns. On the causative pattern, however, this preference was reversed: the children exhibited a preference for the dative–accusative order. A repeated measures 2-way ANOVA revealed that the effect of the situation–word order relationship (matching or not) was significant ($F(1,19) = 6.694, p = 0.018$). That is, the preference for accusative–dative order in plain transitive patterns and for dative–accusative order in causative patterns was highly significant.

These results provide strong and unequivocal evidence for the Matching Hypothesis since the children consistently preferred patterns that presented referents in an order isomorphic with the corresponding situation. Crucially, this preference was manifested even in the causative patterns, where it conflicts with the order that respects the prominence relations encoded by the relational hierarchy.

4. Conclusion

It is a well established fact that children learning 'free word order' languages such as Japanese exhibit a strong preference for nominative–accusative (subject–object) order over the reverse pattern. Given the relative predominance of the SOV order in adult speech, the Input Hypothesis provides a simple

²It is unlikely that anything in experience could bias the children in favor of either word order. Miyata's (1990) transcripts of a Japanese child between the ages of 1;5 and 3;0 reveals no examples in maternal or child speech of causative patterns containing both a direct object and an indirect object.

and obvious explanation for this contrast. However, since at least two other explanations (the Matching Hypothesis and the Hierarchy Hypothesis) can also accommodate the facts, it is necessary to investigate a broader range of sentence types if we are to identify the determinants of word order preferences in early child language.

This paper takes a first step in that direction by examining sentences that contain both a direct object and an indirect object. Our principal finding was that children exhibit a strong preference for the accusative-dative order in such sentences even though the reverse order appears to be dominant in experience, contrary to the prediction of the Input Hypothesis but consistent with both the Matching Hypothesis and the Hierarchy Hypothesis.

In order to choose between the latter two hypotheses, we extended our study to include causative patterns. Here, the Hierarchy Hypothesis favors the accusative-dative order (consistent with the relative prominence of direct objects over indirect objects in the relational hierarchy) while the Matching Hypothesis predicts a preference for the dative-accusative order (since the referent of the dative must act on the referent of the accusative). The results of our experiment show a strong preference for the dative-accusative order in causative structures, which points toward the correctness of the Matching Hypothesis. This in turn underlines the relevance of pragmatic factors (particularly the structure of situations) for determining children's word order preferences.

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