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ABSTRACT
                Comprehension of reversible active and passive
sentences was studied with 48 Japanese children between the ages of
two and six. Four types of sentences were constructed using passive
and active structures and two word orders: subject-object-verb (SOV)
and object-subject-verb (OSV). The basic order of elements in a
simple sentence in Japanese is SOV; but the order of the subject and
the object can be interchanged to yield OSV. This reversal is
possible because Japanese has postposed particles that mark
grammatical role. To test comprehension with the four types of
sentences, the children were required to act out the sentences using
toy animals. In a production task, which immediately followed the
comprehension task, subjects described what they saw on a slide
viewer. Results suggest that children between the ages of three
years, three months, and four years, two months, require a certain
correlation between particles and their position in a sentence
(particles are position-specific). Only children between five years,
three months, and six years, two months, appear to begin freeing
themselves from the constraints of word order and interpreting
sentences based on the information conveyed by particles alone. A
second experiment was conducted on the comprehension of complex
active sentences, using the act-out procedure, with 39 children
between the ages of three years, three months, and six years, two
months. Findings suggest that the constraints of word order in
comprehension of particles in Japanese children operate
differentially, depending on the construction. (SW)

WORD ORDER AND PARTICLES IN THE ACQUISITION OF JAPANESE[1]

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Several investigators (Bever, 1970, de Villiers & de Villiers, 1973, Maratsos, 1974) have studied the comprehension of reversible active and passive sentences in English-speaking children. Reversible active and passive sentences refer to sentences such as "The horse kissed the cow" and "The horse was kissed by the cow", where the meaning underlying the sentence cannot be determined on the basis of lexical items alone.

For English-speaking children, the following picture of development emerges: up until about age 4, children do well above chance level in acting out reversible active sentences, but only at about chance for passives, suggesting that they perceive the two sentences to be at least different. At about age 4, these children systematically misinterpret passive sentences, choosing the first noun as agent. For example, "The frog was kissed by the snake" is interpreted as the frog kissing the snake. At this point in development, their performance on reversible passives drops below chance. Beyond this point, children begin correctly interpreting the passives.

Presumably, this period of systematic reversals of passives is due to the child overgeneralizing the strategy "Any Noun-Verb-Noun sequence within a potential internal unit in the surface structure corresponds to ['agent-action-patient']" (Bever, 1970). This paper reports a critical test of the generalizability of these results to other languages. Specifically, I will describe an experiment on the comprehension of reversible active and passive sentences in Japanese children. The discussion section of the paper will introduce results from production, as well as some incidental findings from a second experiment which suggest some interesting qualifications on the generality of the first experiment.

Unlike English, where word order is fixed, Japanese is a language with a relatively free word order. The basic order of elements in a simple sentence in Japanese is Subject-Object-Verb (SOV). The order of the subject and the object, however, can be interchanged, to yield Object-Subject-Verb (OSV). This is possible because Japanese has postposed particles that mark grammatical role. The only true constraint as to word order in Japanese is that the main verb of the sentence be in sentence-final position (Kuno, 1973).

Since the SOV and OSV order apply to both active and passive sentences, this results in 4 sentence types: SOV/active, OSV/active, SOV/passive, and OSV/passive. Table 1 lists an example for each of these four sentence types, presented as an amalgam of English content words and Japanese particles. Sentence (1), GIRAFFE-ga TIGER-o LICKED-active, is equivalent to the English sentence "The giraffe licked the tiger". The -ga marking on GIRAFFE indicates that it is the subject of the sentence, and the particle -o on TIGER signals the fact that it is the object of the sentence.

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All markings on verbs are postposed, and there is a marking for the active voice, past tense on the verb. Sentence (2), TIGER-o GIRAFFE-ga LICKED-active, is simply sentence (1) with the two nouns reversed. The two sentences mean the same thing, and which order is preferred appears to be governed by topic of discourse. Sentence (3), TIGER-ga GIRAFFE-ni LICKED-passive, is the SOV/passive form. The particle -ga once again marks the grammatical subject of the sentence, the particle -ni marks the object, and there is a passive marking on the verb. Sentence (4) is sentence (3) reversed. The right hand column of Table 1 indicates the order of the semantic roles of the two nouns in each sentence. Note that the subject marker -ga is the agent in the active sentences, but patient in passives.

What sorts of predictions might be made about Japanese children's comprehension of these four sentence types? One possibility is that word order is what the children pay attention to, and that they follow a strategy similar to the one proposed by Bever for English, except that in the case of Japanese, the strategy should read "Any Noun-Noun-Verb sequence within a potential unit in the surface structure corresponds to Agent-Patient-Action". This would predict that sentences (1) and (4), that is, SOV/active and OSV/passive, should be easy, since they both have Agent-Patient-Verb order. It would also predict that sentences (2) and (3), namely, OSV/active and SOV/passive, should be difficult, since they both have Patient-Agent-Action order. We might also expect a period of systematic reversals, as in the English findings.

Another possibility is that word order plays no role at all, but rather that what the children pay attention to is the information signalled by the particles. If this were the case, there should be no difference between the two active sentences, nor would there be any difference between the two passive sentences. These pairs are identical with respect to particles, and differ only with respect to order.

There are several studies which have been conducted in Japanese along similar lines, but none of them has explicitly compared the four logically possible types mentioned above. Yamanaka (1972, reported in Murata, 1972) used a picture-cued comprehension procedure and tested comprehension of reversible and non-reversible actives and passives, but only in the SOV order. Her results are somewhat puzzling. Only at age 5 did her subjects perform better than chance on any of the syntactic types. Her conclusion was that particles seem to confront the Japanese child with a rather difficult learning task. Hayashibe (1975), however, obtained somewhat more encouraging results. Using an act-out comprehension procedure, he looked at SOV and OSV orders, but only for actives. His subjects were between 3 and 6 years old. He grouped his subjects according to error rates, and showed that the group with the lowest error rate had the highest mean age. Nevertheless, from his tables it is possible to infer that from about age 4 on, the children appear to be responding to the contrast contained in particles.

SUBJECTS: Subjects were 48 children, 24 boys and 24 girls, between the ages of 2;3 and 6;2, from a public day care center in Tokyo. Subjects were initially selected by age group (2;3-3;2, 3;3-4;2, 4;3-5;2, 5;3-6;2),

TABLE 1. Active and passive sentences in SOV and OSV orders.

(1) SOV/active   GIRAFFE-<u>ga</u> TIGER-<u>o</u> LICKED-active.   Agent-Patient-Action

(2) OSV/active   TIGER-<u>o</u> GIRAFFE-<u>ga</u> LICKED-active.   Patient-Agent-Action

(3) SOV/passive   TIGER-<u>ga</u> GIRAFFE-<u>ni</u> LICKED-passive.   Patient-Agent-Action

(4) OSV/passive   GIRAFFE-<u>ni</u> TIGER-<u>ga</u> LICKED-passive.   Agent-Patient-Action

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FIGURE 1. Performance of subjects in comprehension of active and passive
sentences, in both SOV and OSV orders. White bar indicates
correct responses, dark bar indicates reversal of roles.

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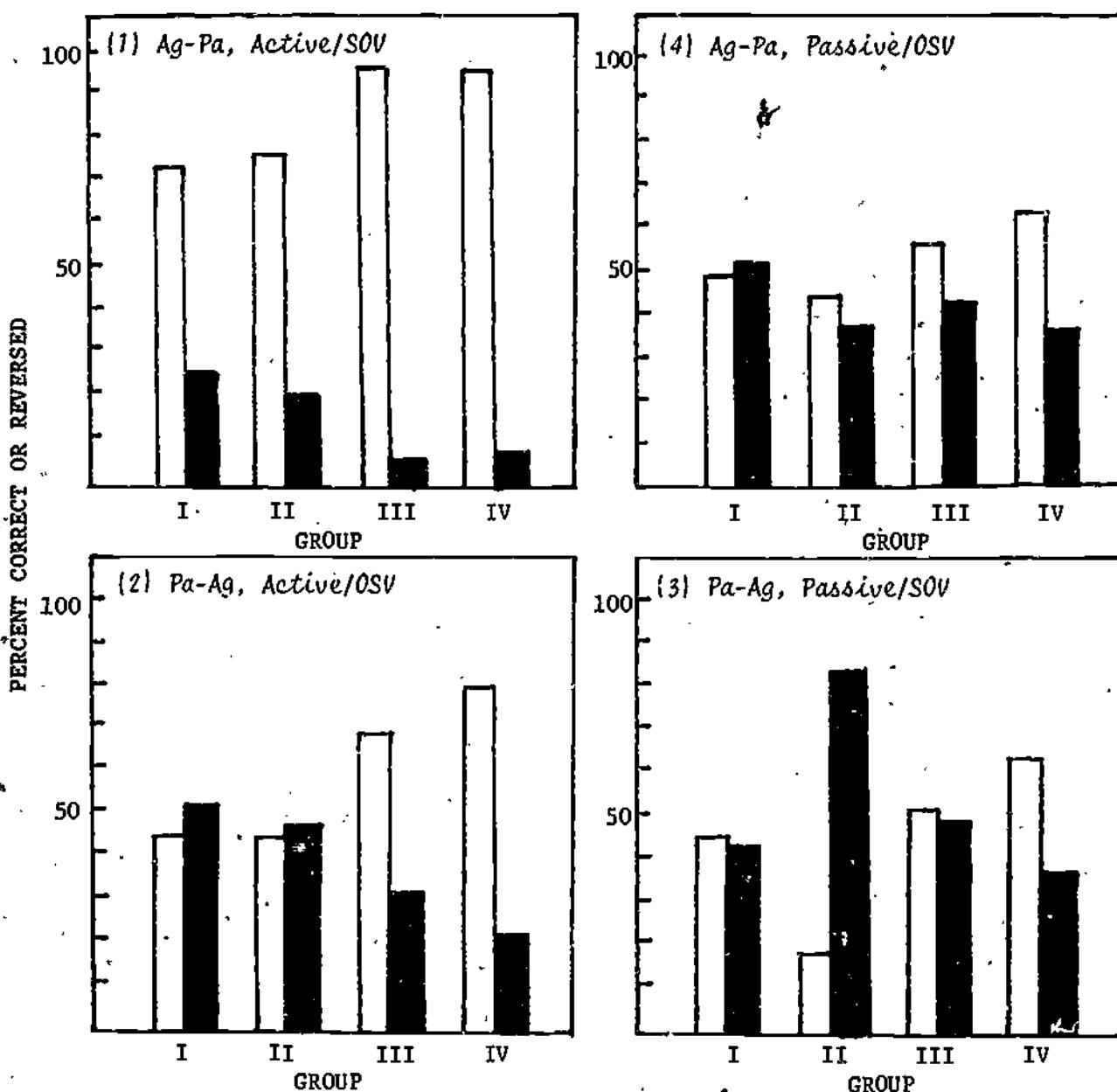
with 6 boys and 6 girls for each group. For purposes of analysis, subjects
were later grouped according to their mean length in morphemes of their
utterances in an elicited production task (see below). They will be
called Group I-IV (Group I: less than 6.9; Group II: 7.0-7.9; Group III:
8.0-8.9; Group IV: 9.0+). Number of subjects was 15, 12, 13, and 8 for
Groups I through IV, respectively. Mean ages for these groups were 3;6,
3;9, 5;1, and 5;4. Spearman rank order correlation, corrected for ties,
between age and mean length of production was +.64.

MATERIALS AND PROCEDURE: Two sets of sentences, each set containing
3 replications of each of the four sentence types from Table 1, were
created. The second set contained the same lexical items as the first
set, but with the two nouns reversed. Subjects were randomly assigned
to either set. Within each set, order of presentation of the 12 sentences
was randomized. To test for comprehension, subjects were required to
act out the sentences using toy animals. The animals were: alligator,
gorilla, camel, panda, bear, cow, pig, horse, elephant, giraffe, tiger,
frog, and turtle. The verbs used were: <u>ketta</u> (kicked), <u>nameta</u> (licked),
<u>butta</u> (hit), <u>kisushita</u> (kissed), and <u>kusugutta</u> (tickled). Each subject
was tested individually in a separate room in the day care center. One
experimenter presented the sentences and was the primary interactor with
the subject, while a second experimenter coded the child's response. In
order to familiarize the subject with materials, each animal was intro-
duced individually and the child was asked to name it. A puppet was then
introduced. The subject was told that the game was to act out on a wooden
"stage" what the puppet said. Three simple warm-up sentences were given.
None of the subjects tested could not understand the directions. The 12
sentences immediately followed. Only the relevant animals were placed
on the stage for each sentence. The entire procedure lasted about 15 minutes.

For the production task, which always followed immediately after the
comprehension task, subjects were introduced to a puppet with red eyes,
who could not see. Then the subject was shown a "television", a portable
slide viewer, and asked to describe for the puppet what s/he saw. There
were two warm-up slides, followed by 16 slides of animals performing
various actions. The child's utterances were recorded and later transcribed.
The procedure lasted about 10 minutes.

SCORING: Subjects' responses to the comprehension task was scored
as either correct or wrong, and reversals were noted. Production was
originally for the purpose of obtaining utterance length alone, but the
data were later scored for whether -<u>ga</u> or -<u>o</u> were supplied. Furthermore,
the ordering of subject and object was scored.

RESULTS: The results are depicted graphically in Figure 1. A five-
way analysis of variance was carried out on the data. Of the two between
subject variables (Group, Sex), only Group was significant, $F(3,40)=10.549$,
$p<.001$, indicating that performance improved significantly with linguistic
level as determined by the production task. A third between subject
variable in the original design, Set, could not be tested because of the
existence of an empty cell. The two repeated measures factors, Semantic
Word Order and Voice, were both significant. For Semantic Word Order, .

$F(1,40)=19.862$, p<.001, and for Voice, $F(1,40)=11.814$, p<.001. The inter-
action between Voice and Semantic Word Order approached a respectable
level of significance, $F(1,40)=3.924$, p=.055, suggesting that both factors
must be taken into account.

DISCUSSION: Looking at Figure 1, there are several points to be
made. First, children do quite well on SOV/actives from Group I. That
this cannot be due to word order alone is shown by their poor performance
on OSV/passives, which also share the Agent-Patient-Action order. Second,
for the OSV/actives, only at Group III do children perform better than
chance. When this is compared to their performance on the SOV/actives,
it becomes clear that particles alone cannot be playing the entire role.
Third, and most striking among the results, is the systematic reversal
for the SOV/passives in children in Group II. They made significantly
more reversals than Group I children $(t(25)=4.73$, p<.005). This finding
is similar to the findings in English. However, again, it is not just
the word order, since if that were the case, we would also expect a similar
reversal on the OSV/actives, which also have the Patient-Agent-Action order.
A proper explanation seems to lie in the fact that both the SOV/active and
the SOV/passive have the initial noun marked by the subject-marker -ga.
However, in the case of the SOV/active, the noun is agent, while in the
SOV/passive, it is the patient. The strategy that the children are using,
at Group II, appears to be something of the sort:"If the first noun is
marked by -ga, it is the agent". Although -ga in Japanese can mark both
agenthood and patienthood, the fact that children tend to give it a con-
sistent interpretation as agent-marker is in agreement with Slobin's (1971)
principle that "the use of grammatical markers should make semantic sense".
The -ga marking, since it signals grammatical role, not semantic role,
essentially violates this principle, insofar as it can be used to convey
two semantic roles. The children who systematically reversed the SOV/
passives were overgeneralizing the statistically predominant -ga/agent-
hood correlation for the actives to the case of the passives.

The production data fit the results from the comprehension task quite
well. The data reported here actually come from 87 children, of whom 48
participated in the present experiment. Of the approximately 1,200 utter-
ances collected, only 2 instances of the passive occur. Furthermore,
with only 3 exceptions, the order for actives is subject-object. This is
consistent with the finding that SOV/actives were easy to comprehend even
for Group I subjects.

The particles -ga and -o were scored for presence/absence as markings
on subjects and objects. Particles in Japanese are in general obligatory,
but in discourse one often omits them depending on context. It is a general
concensus among native speakers of Japanese that -o can be more readily
omitted than -ga. The data from the scoring appear in Table 2, and it is
consistent with this intuition; -ga is always more frequently supplied
than -o. We might consider the "acquisition point" for these particles
to be the point where asymptote is reached, since that percentage reflects
the general agreement among the more developed children on when particles
should be supplied for the sentences used in the description of the parti-
cular events in the production task. The asymptote for -ga is attained at

Table 2. Percent -ga and -o supplied by children in four groups in production task.

	GROUP I	GROUP II	GROUP III	GROUP IV
-ga	68%	94%	97%	92%
-o	17%	32%	43%	44%

Table 3. Complex sentences in SOV and OSV orders.

(A)	[SOV]	[LAUGHED ELEPHANT]-ga FROG-o KICKED.	The elephant that laughed kicked the frog.
(B)	[OSV]	[LAUGHED ELEPHANT]-o FROG-ga KICKED.	The frog kicked the elephant that laughed.
(C)	[SOV]	ELEPHANT-ga [LAUGHED FROG]-o KICKED.	The elephant kicked the frog that laughed.
(D)	[OSV]	ELEPHANT-o [LAUGHED FROG]-ga KICKED.	The frog that laughed kicked the elephant.
(E)	[SVO]	[ELEPHANT-ga KICKED FROG]-ga LAUGHED.	The frog that the elephant kicked laughed.
(F)	[OVS]	[ELEPHANT-o KICKED FROG]-ga LAUGHED.	The frog that kicked the elephant laughed.

Figure 2. Percentage of correct responses on just the transitive relations (subject and object) for sentences in Table 3.

PERCENT CORRECT

I   II   III   IV   I   II   III   IV   I   II   III   IV
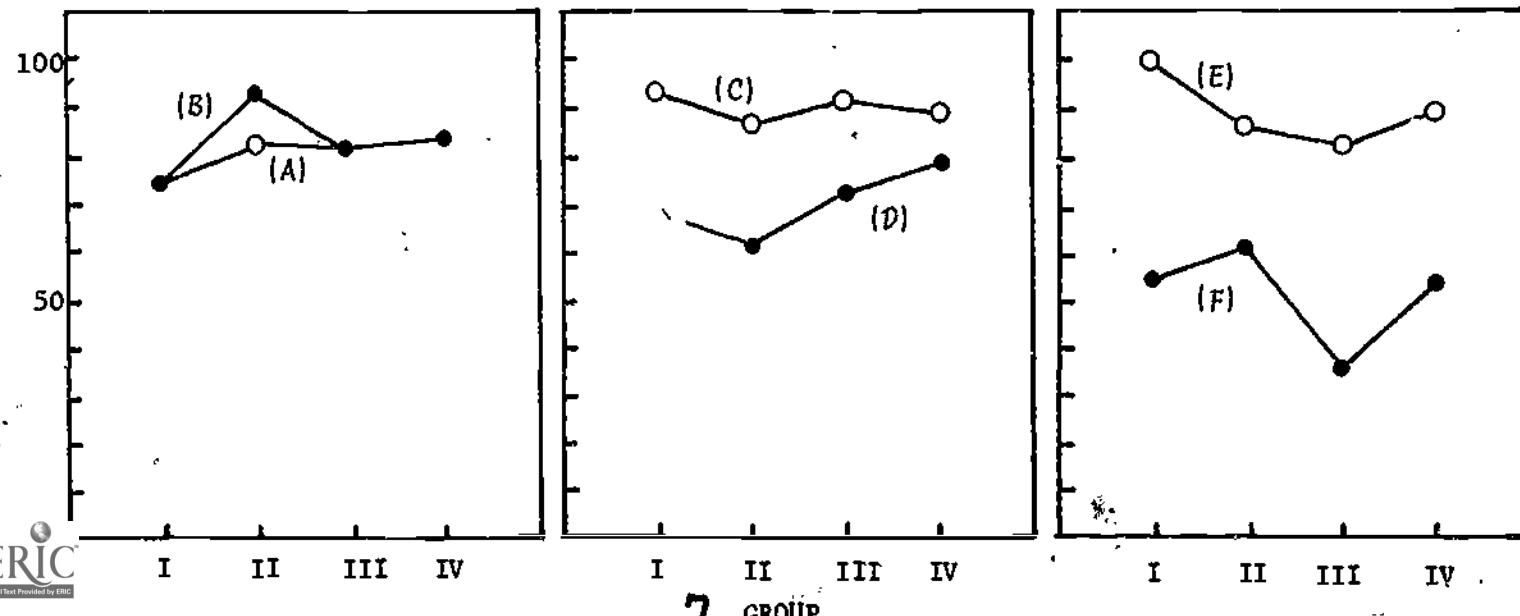
7   GROUP

Group II, and for -o at Group III. Thus, in production, these results suggest that -ga is acquired before -o. This is generally in accord with the comprehension results where -ga seems to play the more important role, such as in the systematic reversals of SOV/passives.

To recapitulate the comprehension results, these Japanese children assigned the role of agent to the first noun in the sentence if it was marked by -ga. This tendency was particularly strong at Group II (mean age 3;9). Even if the first noun were agent, if it is marked by -ni, as in the case of the OSV/passive, the children did not seem to pick up on it. This suggests that children at this point in development require a certain correlation between particles and their position in a sentence. In other words, particles are position-specific. The Group III children show significantly fewer reversals of the SOV/passives, and are doing almost perfectly on SOV/actives. Also, between Groups III and IV, performance is improving on the OSV/actives and OSV/passives. This finding might lead us to the conclusion that only at Group III (mean age 5;1) do Japanese children begin freeing themselves from the constraints of word order, and to interpret sentences based on the information conveyed by particles alone.

This clean picture of development, however, is complicated by some unexpected results from a second experiment on the comprehension of complex active sentences using the same act-out procedure. The purpose of the experiment was actually to test some theories of relative clause comprehension on Japanese children, but that is material for a separate paper. I will simply discuss the analysis directly relevant to our present discussion. Six sentence types concern us here, listed in Table 3. In sentences A, B, C, and D, the complex noun phrase contains an intransitive verb and the main verb is transitive, while in sentences E and F, the complex noun phrase contains a transitive verb, and the main verb is intransitive. Notice that the three pairs of sentences, that is, A and B, C and D, and E and F, differ only with respect to particles. From the results of the previous experiment, we would expect that A, C, and E should be easier for children than B, D, and F respectively, for the former all have the first noun in the sentence marked by -ga. We also would not expect children until Group III to perform well on B, D, and F, since they are OSV forms. Subjects were 38 children from the same day care center, between the ages of 3;3 and 6;2, and were grouped in the same way as for the first experiment. Figure 2 shows the percent correct for the three pairs of sentences, scored only as to whether they got the transitive relation correct. For the pairs C-D and E-F, the difference emerges in the expected direction, that is, children perform significantly better on SOV than on OSV (p<.05 for C-D, p<.001 for E-F, Sign Test). However, for the first pair of sentences, A-B, there is no significant difference. The children, even at Group I, appear to be paying attention to the information signalled in the particles. Thus, what this suggests is that under certain conditions, children will free themselves of word order and process the particles, whereas in other conditions, their processing of particles is constrained by word order. What differentiates A-B from the other pairs of sentences, I believe, is that in the first pair the sentences begin with a verb, while the others they begin with a noun.

It is possible that the sentence-initial verb alerts children to pay more attention to the particles, since in Japanese a sentence with a sentence-initial verb is always a complex sentence. Subject to replication, currently under progress, this finding suggests that the constraints of word order in comprehe.sion of particles in Japanese children are not across the board, but rather operate differentially, depending on the construction.

Seen in this light, one development with respect to particles in Japanese children consist. of the increasing flexibility in the range of positions in the sentence in which particular particles may appear. A proper investigation of the role of particles in comprehension, then, should seek to identify the particular, contexts where the child's comprehension of particles appears flexible, and contexts where they do not. The investigation of such contexts should not simply be restricted to word order alone, however. Other important variables, such as event probability, should be well worthwhile investigating, since it would begin relating these findings to the larger picture of discourse constraints where, I believe, the flexibility of word order in Japanese comes to play a particularly active role for adults.

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Footnotes