

Japanese children exhibit wide scope of disjunction under negation: The role of plausible dissent

Goro & Akiba (2004, GA) famously showed that Japanese children interpret disjunction '*ka*' under negation (1, neg-OR) conjunctively – an option available to English speakers, but not to Japanese adults. In this study, we show GA (and others) failed to consider inferential contextual factors, and when controlled for, young Japanese children indeed evince disjunctive readings.

In some languages (Japanese, Mandarin, Hungarian, Russian, Italian, Turkish), neg-OR is interpreted disjunctively, while in others (English, Korean, German) it is ambiguous, with preference for the conjunctive reading. This follows from disjunction in the former being [+Positive-Polarity, +PPI] and [-PPI] in the latter (Szabolczi, 2002). GA2004 showed that Japanese children accept only 25% of disjunctive-true items (cf. adults = 100%), arguing disjunction in child Japanese is initially [-PPI] (a result oft-replicated in other similar languages), and invoking the Semantic Subset Principle (SSP) (2) – children initially adopt the subset -PPI value and upon encountering direct positive evidence (3), switch to the superset +PPI value. However, such positive evidence is rare/non-existent (zero instances in child-directed speech to 6 children in CHILDES, Sano et.al., 2024), raising serious questions about this account as well as serious learnability questions.

The problem with GA2004's method is one of plausible dissent. Animals are supposed to eat vegetables (green pepper and carrot) and receive a medal indicating how much they ate: gold medal if both veggies were eaten; blue if one was eaten; black cross if none were eaten. In the key condition (blue medal), children directly observe which vegetable was eaten, but the test sentence comments on what was NOT eaten. Children must then indirectly infer the negative statement "X **didn't eat** VegA or VegB" (Jing, 2008). Children naturally attend to the direct observation and the positive inference of the sentence, while the disjunctive reading in the test sentence matches the indirect inference. This negative inference was never under consideration at any point in the story, and therefore flouts the condition on plausible dissent (Wason, 1965; Crain & Thornton, 1998). To make the indirect inference (the negative statement) easily accessible, clear plausible dissent is necessary.

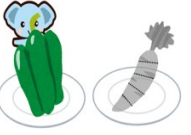
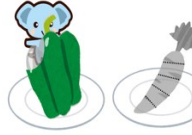
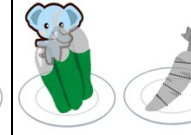
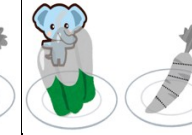
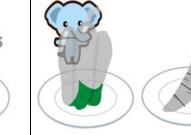

Experiment: An animal eats a vegetable in 5 bites and we use the predicate 'didn't finish eating' in a stimulus sentence (4a). In particular, an animal eats one vegetable (carrot in Table 1A) in five bites, and then takes 4 bites out of the pepper but crucially leaves the last piece uneaten (Table 1A). In this case, the focus is on what was not eaten, and there is no indirect inference necessary. Moreover, there is clear plausible dissent where the positive statement "X finished eating VegA or VegB" is plausibly denied because the elephant did finish eating 80% (4/5) of the vegetable and fails to eat the rest (1/5). To examine the effect of this experimental manipulation and the clarity of plausible dissent in our setup, we divided children into two groups; The target group were provided with eating stories in 5 bites, and a control group were provided with eating stories in 1 bite to replicate GA's finding.

Results: In the blue medal condition, children in the target group ($n = 19$, 5;0–6;3, mean 5;7) showed 97.5% disjunctive readings with disjunction *ka* and only 12.5% disjunctive readings with the conjunctive-only *mo...mo* 'also...also.' Children in the control group ($n = 14$, 5;0–6;3, mean 5;6) showed only 35.7% disjunctive readings with disjunction *ka* and showed 7.1% disjunctive readings with the conjunctive-only *mo...mo*. What we found, therefore, is that replicating GA's methodology replicated children's inability to interpret disjunction under negation as disjunction. But with the manipulation where the focus of the story was on what was NOT eaten, and thereby providing clear plausible dissent for the correct reading, Japanese children showed adult-like knowledge of disjunction under negation, contrary to GA's oft-cited two-decade-old study.

Conclusion: We now see that Japanese children's interpretation of disjunction under negation as conjunctive is a methodological artefact. In fact, once the condition of plausible dissent is correctly satisfied, we see that young Japanese children have correctly acquired the lexical and syntactic properties of negated disjunction by as young as age 5yrs.




- (1) Buta-wa piiman ka ninjin-o tabe-nakat-ta. (disjunctive reading only)
 pig-TOP pepper or carrot-ACC eat-NEG-PST
 ✓ 'The pig did not eat the green pepper OR the pig did not eat the carrot.' (OR > neg)
 * 'The pig did not eat the green pepper AND the pig did not eat the carrot.' (neg > OR)
- (2) **Semantic Subset Principle (SSP):** Learners choose the parametric option with the most restrictive reading, and later expand the range of options on the basis of positive evidence.
- (3) A situation where it is only the green pepper or the carrot that the pig did not eat.

Table 1: Scenes depicting the situation for the sentence “the elephant didn’t finish eating the green pepper” (Target group) vs. the situation for the sentence “the elephant didn’t eat the green pepper” (Control group)

	The carrot was eaten in 5 bites	1/5 of the pepper was eaten	2/5 of the pepper was eaten	3/5 of the pepper was eaten	4/5 was eaten; 1/5 left (didn't finish eating)
A. Target group					
The carrot was eaten in 1 bite; the whole pepper was left uneaten (didn't eat at all)					
B. Control group					

Note: The whole eating scenes were only presented in practice items, and they were hidden by a curtain in critical items as shown in Table 2. The carrot was already eaten in the above scenes.

Table 2: Sample story for critical test sentences (the same for both groups)

The squirrel is going to try to eat the vegetables.	Oh, a curtain appears, and we cannot see what's going on.	When we open the curtain, the squirrel has a blue medal. So, what does this mean? → We proceeded to a test sentence (4) or (5)
		

(4) a. Target group

Risusan-wa piiman ka ninjin-o tabe-*oe*-nakat-ta yo. TRUE
 squirrel-TOP green.pepper or carrot-ACC eat-finish-NEG-PST SFP
 'The squirrel didn't finish eating the green pepper or didn't finish eating the carrot.'

b. Control group

Risusan-wa piiman ka ninjin-o tabe-nakat-ta yo. TRUE
 squirrel-TOP green.pepper or carrot-ACC eat-NEG-PST SFP
 'The squirrel didn't eat the green pepper or didn't eat the carrot.'

Figure 1: Mean acceptance rates by Condition, Group, and Medal type.

