

Another Look at Children’s Conjunctive Interpretation of Disjunction:

Evidence from a Picture Selection Task with PPI Disjunction

Synopsis. This study reports findings from an experiment on Japanese-speaking children’s acquisition of disjunction in negative sentences. Ever since [Goro and Akiba \(2004\)](#), there has been much discussion on children’s preference for the non-adultlike conjunctive (*neither nor*) interpretation. Our findings are that (i) children converged to a conjunctive interpretation in a novel, picture selection task, and that (ii) adults with the same design did not compute scalar implicatures (SI henceforth). We argue that our findings suggest children’s conjunctive interpretation is not due to a higher-order scalar implicature (i.e. double-exhaustification), but it is in line with scope-based accounts (see [Bleotu et al. \(2025\)](#) for a similar discussion).

Background. Typically, an adult speaker of Japanese deems (1) "good", only if Hanako failed to drink one of the two mentioned drinks.

- (1) *Hanako-ga ocha-ka kōhī-o noma-nakat-ta*
 Hanako-NOM tea-OR coffee-ACC eat-NEG-PST
 (lit.) ‘Hanako didn’t drink tea or coffee.’

This is commonly explained by assuming that (i) Japanese only allows the "disjunctive reading" ($\neg P \vee \neg Q$), and that (ii) speakers compute an SI, negating the stronger, "conjunctive reading" ($\neg P \wedge \neg Q$) (see table 1).

$\neg P$	$\neg Q$	Disjunctive ($\neg P \vee \neg Q$)	Conjunctive ($\neg P \wedge \neg Q$)	Disjunctive with SI
1	1	1	1	#
1	0	1	0	1
0	1	1	0	1
0	0	0	0	0

Table 1:
The different readings

There is a rich literature ([Goro, 2007](#); [Komine, 2012](#); [Caley-Komine, 2018](#), i.a.) discussing the fact that Japanese-speaking children seemingly converge to a non-adultlike, conjunctive interpretation (but see ([Sano et al., 2024, 2025](#))). A predominant view on this is that disjunction is a Positive Polarity Item (PPI) in adult Japanese, but not child Japanese ([Goro, 2007](#), i.a.). This approach thus attributes the non-adultlike behavior to a **non-adultlike scope assignment**.

A strengthening account. Some recent studies ([Otani et al., 2019](#); [Shimada and Goro, 2021](#)) discuss a conceivable alternative possibility to the scope-based approach; children might have an adult-like scope interpretation, but be converging to a conjunctive interpretation through double-exhaustification (see [Cocharde et al. \(2023\)](#) and [Bleotu et al. \(2025\)](#) for a similar discussion on languages other than Japanese). Similarly to negative cases, children speaking different languages have been observed to converge to a conjunctive interpretation with disjunctive, affirmative sentences ([Paris, 1973](#); [Singh et al., 2016](#); [Tieu et al., 2017](#), i.a.). The double-exhaustification approach ([Singh et al., 2016](#), i.a.) attributes this non-adultlike behavior (in positive environments) to non-adultlike scalar strengthening (non-adultlike SIs). The key assumption is that children do not have access to conjunction as a scalar alternative when computing the strengthening. Because of this, children either interpret disjunction inclusively ([Noveck, 2001](#), i.a.), or compute a recursive exhaustification. In the latter case, the alternatives to be negated are the exhaustified disjuncts (*only p*, and *only q* in the positive cases). As shown in (2b), negating the pre-exhaustified alternatives, together with the disjunctive preajacent, derives the conjunctive interpretation ([Singh et al., 2016](#), i.a.). The same rationale can be extended to negative cases (3b); if we assume that children lack access to the conjunctive alternative (*not p and not q*), a strengthening over the pre-exhaustified alternatives (*only not p* and *only not q*) derives the conjunctive interpretation (3b).

- (2) a. $\text{Alt}(\text{exh}(p \vee q)) = \{\text{exh}(p), \text{exh}(q)\}$
 b. $\llbracket \text{exh}(\text{exh}(p \vee q)) \rrbracket$
 $\Leftrightarrow \llbracket \text{exh}(p \vee q) \rrbracket \wedge \neg \llbracket \text{exh}(p) \rrbracket \wedge \neg \llbracket \text{exh}(q) \rrbracket$
 $\Leftrightarrow p \vee q \wedge \neg(p \wedge \neg q) \wedge \neg(q \wedge \neg p)$
 $\Leftrightarrow p \vee q \wedge (p \rightarrow q) \wedge (q \rightarrow p) \Leftrightarrow p \wedge q$
- (3) a. $\text{Alt}(\text{exh}(\neg p \vee \neg q)) = \{\text{exh}(\neg p), \text{exh}(\neg q)\}$
 b. $\llbracket \text{exh}(\text{exh}(\neg p \vee \neg q)) \rrbracket$
 $\Leftrightarrow \llbracket \text{exh}(\neg p \vee \neg q) \rrbracket \wedge \neg \llbracket \text{exh}(\neg p) \rrbracket \wedge \neg \llbracket \text{exh}(\neg q) \rrbracket$
 $\Leftrightarrow \neg p \vee \neg q \wedge \neg(\neg p \wedge \neg(\neg q)) \wedge \neg(\neg q \wedge \neg(\neg p))$
 $\Leftrightarrow \neg p \vee \neg q \wedge (\neg p \rightarrow \neg q) \wedge (\neg q \rightarrow \neg p) \Leftrightarrow \neg p \wedge \neg q$

There has been recent discussion on the possibility of this being the cause of children’s conjunctive interpretation in negative sentences (Otani et al., 2019; Shimada and Goro, 2021, i.a.). In this scenario, the conjunctive interpretation is due to a (higher-order) implicature. And crucially, this same operation leads to the exclusive interpretation with adult grammar, but to the conjunctive interpretation with child grammar. If this was the case, we would expect scalar implicatures of adults and the conjunctive interpretations of children to go hand-in-hand; in scenarios where adults compute more SIs, children are expected to converge to the conjunctive interpretation more heavily. On the other hand, if the conjunctive interpretation is due to non-adultlike scope, it should be independent of implicatures.

Experiment. We designed a study employing a picture selection task, and recruited 30 Japanese monolingual children (Age range of 04;05–6;04), and 21 adult speakers. In the experiment setup, three animals on the screen are each given four vegetables, but the only eat two of them. This is followed with the test sentence, which asks the participant to choose the animal(s) who didn’t eat certain vegetables (4a). The story included a blind-folded frog, who was only allowed to eat the vegetables other animals left behind. This made the use of disjunction and negation in the test sentence felicitous. The three animals in test items consisted of one ‘disjunctive animal’, one ‘conjunctive animal’, and one distractor (4b).



Figure 1: Sample test item

- (4) a. [Test sentence]
Dareka ninjin-ka tomato-o tabenakattane.
Dare kana?
 (lit.) ‘Someone didn’t eat the carrot or the tomato. Who is it?’
 b. panda→conjunctive animal (ate neither),
 horse→disjunctive animal (ate one),
 tiger→distractor (ate both)

Through training and filler items, it was made clear that the correct answer could consist of one, or more than one animal. Furthermore, Japanese does not mark number on nouns or verbs, so the test sentence bore no information on the possible number of correct animals. Participants were also instructed to name all the correct animals for each item. The expected answer patterns are thus as follows. An exclusive speaker (adultlike scope (=disjunctive) with an SI) would choose only the disjunctive animal, an inclusive speaker (adultlike scope without an SI) would choose both the disjunctive and conjunctive animal. A conjunctive speaker (non-adultlike scope) would choose only the conjunctive speaker.

Findings. We found that predominantly, adults gave inclusive answers, while children gave conjunctive answers. The speaker groups in table 2 below consist of speakers with at least five answers of the same type out of the six test items ($P < 0.01$, by Binomial test).

	exclusive speakers	inclusive speakers	conjunctive speakers	mixed	Other
children (n=30)	1	2	17	2	8
adults (n=21)	1	19	0	0	1

Table 2: Participant groups

We argue adults’ answer patterns suggest that the instructions to name all the animals discouraged participants from computing an SI. However, children nonetheless predominantly converged to the conjunctive interpretation. This is not in line with the idea that the conjunctive interpretation is due to a (higher-order) SI. Our results are more in line with a scope-based account (Goro and Akiba, 2004). In the presentation, we will discuss our results in light of recent criticisms on the scope account (Sano et al., 2024, 2025).

Selected References. Bletou et al. (2025). *SuB 30*. Cochard (2023). *BUCLD 47 Proceedings*. Goro, T. (2007). Ph.D. dissertation. Otani et al. (2019). *BUCLD 44 Proceedings*. Sano et al. (2024). *BUCLD 48 Proceedings*. Singh et al. (2016). *Natural Language Semantics*. Shimada and Goro (2021). *Language Acquisition*. Tieu et al. (2017). *Journal of Semantics*.