

# The Relative Scope of Connectives and Negation in Japanese Children

Shuki Otani, Andreea C. Nicolae, Mana Asano,  
Yoichi Miyamoto, and Kazuko Yatsushiro

## 1. Introduction

Japanese disjunction (*ka*) has been claimed to take obligatory wide scope with respect to negation (Szabolcsi 2002, Goro 2007). Goro and Akiba (2004) have observed, however, that children appear to interpret disjunction below negation, unlike adults. Tieu et al. (2017) presented evidence suggesting that in positive sentences children assign disjunction a conjunction-like interpretation when two alternatives are presented in the context, whereas a follow-up experiment by Skordos et al. (2018) has shown that when a third alternative is introduced, the inclusive reading becomes more accessible.

In this paper, we present a follow-up experiment to Goro and Akiba (2004), providing three rather than two alternatives in the context, per Skordos et al.'s approach. The goal of this experiment is to investigate whether an alternative analysis of the results found by Goro and Akiba is possible, namely, that children, like adults, assign wide scope interpretation of disjunction over negation, but unlike adults, have the option of strengthening this interpretation into one that is logically equivalent to a narrow scope interpretation of the disjunction. Our results do not support this analysis and make clear the need for further investigations in this area which we discuss in the concluding remarks.

## 2. Background: acquisition of disjunction

### 2.1. Disjunction in positive sentences

An English sentence containing the disjunction *or* in a positive sentence can be used in three distinct contexts. Using the disjunctive sentence in (1) as an ex-

---

\*We thank the audiences at the 44th *BU Conference on Child Language Development* (BUCLD 44). We are grateful to the children, staff, and administrators of the daycare centers that made this research possible. The study was funded in part by the German Federal Ministry for Education and Research (BMBF, grant 01UG1411) and the bilateral joint research project grant, Osaka University (grant J161213001).

**Author affiliations:** Otani, Asano and Miyamoto – Osaka University;  
Nicolae and Yatsushiro – Leibniz-Zentrum Allgemeine Sprachwissenschaft (ZAS).

**Contact emails:** otani.tog@gmail.com and nicolae@leibniz-zas.de

ample, we describe the different scenarios in (1a-c) and represent them visually using Venn-Diagrams in Figure 1.

- (1) The frog put the green or blue ball in the box.
- a. The frog put the green or blue ball or both in the box.
  - b. The frog put the green or blue ball but not both in the box.
  - c. The frog put the green and blue balls in the box.

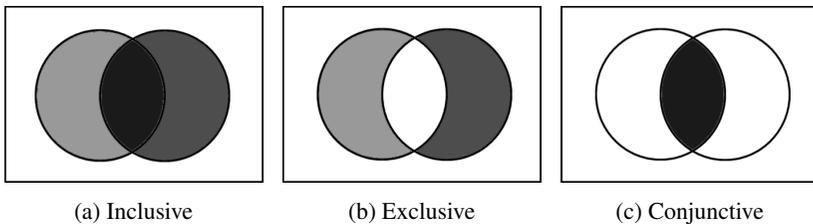


Figure 1: Possible interpretations of disjunction in positive contexts

In Figure 1, the gray areas correspond to situations where each disjunct is true. For instance, the light gray circle corresponds to the situation where the frog put the green ball in the box, and the dark gray circle corresponds to the situations where the frog put the blue ball in the box. The black area corresponds to the intersection of the two circles, namely those situations where the frog put both balls in the box.

Chierchia, Crain, Guasti, Gualmini, and Meroni (2001) observed experimentally that English-speaking adults judge (1) to be true only in scenarios like (1b), that is, they assigned an exclusive interpretation to the disjunction. The authors argue that the exclusive interpretation is simply a matter of deriving a scalar implicature for the disjunction (see, e.g. Nicolae and Sauerland (to appear) for a recent overview of quantity implicatures more generally and scalar implicatures in particular).<sup>1</sup> Couched in the grammatical approach to scalar implicatures (Chierchia, Fox, and Spector, 2012), the exclusive interpretation of disjunction is the result of strengthening with respect to stronger alternatives; in the case of disjunction, one such stronger alternative is the proposition obtained by replacing the disjunction with a conjunction. Strengthening, also referred to as exhaustification, amounts to negating stronger alternatives and conjoining them with the initial proposition, thereby deriving the exclusive interpretation of disjunction.

<sup>1</sup>The Gricean reasoning underlying this mechanism is as follows: assuming a cooperative speaker, the use of a sentence with disjunction rather than the stronger alternative sentence with conjunctive implies that the stronger alternative (1c) must be false (Grice, 1975).

- (2) The frog put the green or blue ball in the box.
- a. *Alt*(The frog put the green or blue ball in the box) =  
 {The frog put the green and the blue ball in the box}
  - b. *exh*[The frog put the green or blue ball in the box] =  
 The frog put the green or blue ball in the box and  
 The frog didn't put the green and the blue ball in the box  
 = The frog put the green or blue ball but not both in the box.

Turning now to children's interpretation of disjunction, we note that this has been a hotly discussed topic in recent literature. Singh, Wexler, Astle-Rahim, Kamawar, and Fox (2016) conducted a Truth Value Judgment Task (Crain and Thornton, 1998) in order to examine what interpretations children assign to disjunction. Child participants were shown either of two pictures. In one of the pictures, a boy was holding a banana and an apple and in the other picture, the boy was holding only the banana. A puppet, who could see the picture as well, uttered a disjunctive test sentence: *The boy is holding an apple or a banana*. The children were asked to judge the truth of what the puppet said. The results of this experiment suggest that English-speaking children assign a conjunctive interpretation to disjunction, as in (1c). Couched in the grammatical approach to scalar implicatures, Singh et al. argue that children reach the conjunctive interpretation via strengthening with respect to the pre-exhaustified alternatives built off the individual disjuncts. That is, children consider relevant alternatives of the form "the frog only put x in the box", the exhaustified versions of the individual disjuncts, as in (3a). Since the alternative statements are more informative than the initial utterance, the result of exhaustification will be as in (3b), namely that the frog put both balls in the box.<sup>2</sup> Intuitively, the strengthening proceeds as follows: The speaker uttered *p or q*. If he had meant to convey that *only p* is the case, or *only q* is the case, he would have said so. Given that he didn't, the hearer concludes that *only p* and *only q* are both false. In conjunction with the assertion, the hearer can derive the strong inference that both *p* and *q* are true: *p or q but not only p and not only q*.<sup>3</sup>

- (3) The frog put the green or blue ball in the box.
- a. *Alt*(The frog put the green or blue ball in the box) = {The frog only put the green ball in, The frog only put the blue ball in}
  - b. *exh*[The frog put the green or blue ball in the box] =  
 The frog put the green or blue ball in the box and The frog didn't only put the green ball in and the frog didn't only put the blue ball in  
 = The frog put the green and blue balls in the box.

---

<sup>2</sup>A crucial stipulation underlying this mechanism is that children do not consider the conjunction to be an alternative to the disjunction. This finds support from previous work showing that children compute fewer exclusivity inferences than adults (Noveck 2001, Chierchia et al. 2001).

<sup>3</sup>This mechanism is reminiscent of the one employed by Fox (2007) to derive the free choice inference of disjunctions embedded under modals.

Extending this experimental paradigm to other languages, Tieu, Yatsushiro, Cremers, Romoli, Sauerland, and Chemla (2017) looked at French Japanese-speaking children. Tieu et al. (2017) redesigned the experiment so as to account for the ignorance effects generally associated with the use of disjunction.<sup>4</sup> Their experiment was designed as a guessing game where a puppet described an event that had not yet occurred. Children were classified as inclusive if they accepted at least a quarter 1-Disjunct-True and 2-Disjunct-True trials, and as conjunctive if they rejected at least a quarter 1-Disjunct-True trials and accepted at least a quarter 2-Disjunct-True trials, as per Table 1. The results showed that French- and Japanese-speaking children assign a conjunctive interpretation to disjunction in positive sentences, in line with the results reported by Singh et al. for English-speaking children.

	1-Disjunct-True	2-Disjunct-True
inclusive	✓	✓
conjunctive	✗	✓

Table 1: Possible interpretations of disjunction in positive contexts

In a follow-up experiment, Skordos, Feiman, Bale, and Barner (2018) augmented Tieu et al.’s experiment by including a third alternative. Specifically, while in Tieu et al.’s experiment there were two objects on the screen, such as the green and blue balls, when children heard the statement in (3), in Skordos et al.’s experiment there were three objects, a green, blue and red ball. The reason behind introducing a third alternative in the context is that, according to Skordos et al., a context with more than two alternatives increases naturalness. Their consideration is based on a situation like the following. There are two teams in a baseball event, and they play a game against each other. The game continues until either team A or team B wins. In this situation, uttering “Either team A or team B will win” seems infelicitous. Presumably, this is because the use of disjunction does not exclude any possible future worlds from consideration. In order to remove the infelicity of the use of disjunction, Skordos et al. added a third alternative object in the Tieu et al. design, so as to make it possible to imagine a scenario in which the use of disjunction might be false. Using the same classification used by Tieu et al., Skordos et al. observed that the number of inclusive children increased while the number of conjunctive children decreased in the three-alternative condition when compared to the two-alternative condition.

Next we turn to the interpretation of disjunction in negative contexts.

---

<sup>4</sup>Note that an ignorance effect arises in situations where the speaker does not know which of the two disjuncts is true, that is, when he is ignorant about the truth of the sentences corresponding to the individual disjuncts. This effect is required for a disjunction to be uttered felicitously.

## 2.2. Disjunction in negative sentences

A negative English sentence such as (4) containing the disjunction *or* can in principle be judged as true in any of three distinct scenarios, which we describe in words below in (4a-c) and we represent visually in Figure 2.<sup>5</sup>

- (4) The frog didn't put the green or blue ball in the box.
- a. The frog put neither ball in the box.
  - b. The frog didn't put both the green and the blue ball in the box; he put neither or only one.
  - c. The frog didn't put the green ball or didn't put the blue ball in the box; he put only one ball in the box.

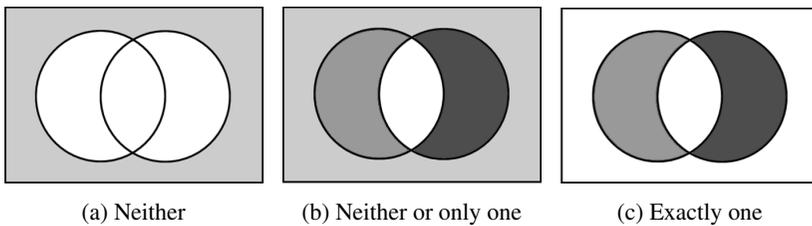


Figure 2: Possible interpretations of disjunction in negative contexts

English-speaking adults and children interpret (4) as true only in situations corresponding to (4a), namely when neither disjunct is true (Goro, 2007).

Turning now to Japanese, consider the reported facts regarding a sentence such as (5) consisting of the disjunction *ka* and sentential negation.

- (5) Kaerusan-wa midori-ka ao-o ire-nakat-ta.  
 Frog-TOP green-OR blue-ACC put-neg-PST  
 'The frog did not put the green or blue (ball).'

Japanese-speaking adults judge (5) as true predominantly in situations corresponding to (4c), although some also accept its use in situations like (4a). On the other hand, according to a study by Goro and Akiba (2004), Japanese-speaking children judge (5) to be true only in situations like (4a), namely when neither disjunct is true; in this sense they behave like English-speaking children and adults.

What is the difference between Japanese-speaking adults and children with respect to their interpretation of disjunction in negative sentences? Following Szabolcsi (2002), Goro and Akiba take Japanese disjunction *ka* to be a positive polarity item, namely an element which, for whatever reason, cannot be interpreted

<sup>5</sup>The outside area corresponds to situations where neither disjunct is true.

under the scope of negation. As such, the disjunction must take wide scope over the negation. However, this only delivers the weaker interpretation in (4b). The stronger interpretation in (4c) is derived via strengthening, akin to how the exclusive interpretation of disjunction is obtained via strengthening from the inclusive interpretation. Intuitively, the strengthening proceeds as follows: The speaker uttered *not p or (not) q*. If he had meant to convey the stronger *not p and (not) q* he would have said so. Given that he didn't, the hearer concludes that *not p and (not) q* is false, which, in conjunction with the assertion *not p or (not) q* amounts to saying that exactly one of *p* and *q* is true.

As for Japanese-speaking children, Goro and Akiba claim that unlike adults, they have not yet acquired the positive polarity status of disjunction, so they continue to assign the disjunction narrow scope with respect to negation, (4a).

### 3. A different take on Goro and Akiba's Japanese children data

#### 3.1. Hypothesis

Goro and Akiba (2004) reported that children accept the use of negative sentences with disjunction only in scenarios where neither disjunct is true. Adults, on the other hand, were shown to accept negative sentences with disjunction in scenarios where only one of the disjuncts is true. Goro and Akiba describe this difference in terms of adults but not children assigning obligatory wide scope to the disjunction. In this paper we put forward and test an alternative hypothesis, namely one which takes both children and adults to assign wide scope to disjunction. This means that the baseline interpretation will be that of an inclusive interpretation of the disjunction of two negated propositions, as in (6).

$$(6) \quad \neg p \vee \neg q$$

Under this hypothesis, the difference between children and adults lies in how the two groups strengthen this basic interpretation. We follow Goro and Akiba in taking adults to strengthen this inclusive interpretation into an exclusive one via the aforementioned steps, repeated below in (7).

$$(7) \quad \neg p \vee \neg q$$

- a.  $Alt(\neg p \vee \neg q) = \{\neg p \wedge \neg q\}$
- b.  $exh[\neg p \vee \neg q] = (\neg p \vee \neg q) \wedge \neg(\neg p \wedge \neg q)$   
 $= (\neg p \wedge q) \vee (\neg q \wedge p)$

As for children's interpretation, we hypothesize that they strengthen this inclusive interpretation with respect to pre-exhaustified alternatives built off the individual disjuncts, which delivers the strong interpretation of the conjunction of the two negated disjuncts. In essence, we propose precisely the same strengthening

mechanism that has been proposed to account for the conjunctive interpretation of disjunction in positive sentences (Singh et al., 2016; Tieu et al., 2017).

$$(8) \quad \neg p \vee \neg q$$

- a.  $Alt(\neg p \vee \neg q) = \{\neg p \wedge q, \neg q \wedge p\}$
- b.  $exh[\neg p \vee \neg q] = (\neg p \vee \neg q) \wedge \neg(\neg p \wedge q) \wedge \neg(\neg q \wedge p)$   
 $= \neg p \wedge \neg q$

Under this view, the interpretation of negative sentences with disjunction parallels that of positive sentences with disjunction for both children and adults. The difference in interpretation is driven by which alternatives are employed: the conjunctive alternative for adults, and the pre-exhaustified domain alternatives for children.

### 3.2. Prediction

According to Goro and Akiba (2004) children understand the use of disjunction under negation conjunctively: they accept a sentence like (5) in 2-Disjunct-False contexts, those scenarios where neither disjunct is true, but reject it in 1-Disjunct-False contexts. This stands in stark contrast to the adult results, which show that they accept the use of disjunction under negation in 1-Disjunct-False scenarios, unlike children. Consider Table 2 for a visual representation of these possible interpretations of disjunction in negative contexts.

	1-Disjunct-False	2-Disjunct-False
inclusive	✓	✓
exclusive	✓	✗
conjunctive	✗	✓

Table 2: Possible interpretations of disjunction in negative contexts

Recall that in positive contexts, Skordos et al. found children to be sensitive to the presence of a third alternative such that they judged disjunctive utterances as false in 1-Disjunct-True contexts when they were presented with only two alternatives (hence a conjunctive interpretation), but as true when they were presented with three alternatives (hence an inclusive interpretation). The goal of our study is to see whether the inclusion of a third alternative will influence the results in the way Skordos et al. found to be the case for positive uses of disjunction. We make the following prediction:

**Prediction:** In the presence of a third alternative, children will understand the use of disjunction under negation inclusively: they will accept the use of disjunction in both 1-Disjunct-False and 2-Disjunct-False contexts.

In the remainder of this paper we present a follow-up experiment to Goro and Akiba's 2004 study providing three rather than two alternatives in the context, per the approach in Skordos et al.

## **4. Experiment**

### **4.1. Participants**

We tested 24 monolingual Japanese-speaking children (5;3-6;5,  $M=5;9$ ) in a preschool in Osaka, Japan. The participants were tested individually in a quiet room at the daycare center that they normally attend. We also tested 16 adult Japanese native speakers at the University of Osaka, using the same materials and procedure.

### **4.2. Procedure**

We conducted a Truth Value Judgment Task that was closely modeled after Goro and Akiba (2004). The experiment was conducted with three experimenters, who were acting as an instructor, a frog, and a monkey (a puppet, which was manipulated by the third experimenter). The experiment consisted of two phases. During the first phase (Introduction phase), the instructor explained to the participant and the monkey what happens in the game. The second phase was the actual experimental phase (Testing phase). During the second phase, participants heard different sentences uttered by the monkey describing what the frog must have done, judging from the prize that the instructor gave to the frog. They were then asked to judge whether the statement made by the monkey was right or wrong.

***Introduction Phase*** The participant and the monkey were seated on one end of a table. The frog was seated at the other end with a box with balls and an empty box in front of him. The frog's task was to move the balls from one box to the other.

To explain how the prizes were distributed, the instructor showed the frog a picture of different balls, and asked him to move the balls from one box to the other, according to the balls in the picture. The choice of prize was dependent on which balls the frog moved. For example, when the frog saw a picture of yellow, blue, and green balls, he moved the yellow, the blue, and the green balls, and received a double circle as the prize. There were 4 possible prizes (Double circle, Single circle, Black circle and Triangle), and the procedure above was repeated for each prize.

After all four prizes were introduced to the participant, the instructor checked to see whether the participant understood how the frog receives each prize. This was done by the instructor showing the participant a double circle, and the participant's task was to say which balls the frog might/must have moved.

**Testing Phase** During the second phase, the participant and the monkey were instructed to turn away while the frog moved the balls.<sup>6</sup> After the balls were moved, the instructor gave a prize to the frog and the participant and the monkey turned around to see the prize. The instructor asked the monkey to guess which balls the frog had moved. The monkey answered with a test sentence which the child then had to judge as true or false.

### 4.3. Materials

There were always 4 possible balls for the frog to move: blue, green, yellow and red. The yellow ball was always moved, which we justify below. The red ball was meant to control for the Skordos et al. effect, namely to count as the third alternative. In addition to the moved yellow ball, depending on the situation, one or two other balls were also moved. We describe these possible situations below.

- **Triangle:** neither the green nor the blue ball is moved.
- **Single circle:** only the green or only the blue ball is moved.
- **Double circle:** both the green and the blue ball are moved.

We tested negative sentences with the disjunction particle *ka*, like (9), in all three of these situations.

- (9) Kaerusan-wa kiiro-wa ire-ta kedo, midori-ka ao-o  
 frog-TOP yellow-TOP put-PST but, green-OR blue-ACC  
 ire-nakat-ta.  
 put-Neg-PST  
 ‘The frog put the yellow, but not the green or the blue one.’

All test sentences begin with “the frog moved the yellow ball.” This was inserted in order to render the following negated sentence more natural.

In addition, we tested two types of sentences involving the conjunction *... mo ... mo*. Participants saw sentences like (10) in the triangle context, and like (11) in the double circle context. Since children are known to behave like adults with respect to their interpretation of conjunction (Goro and Akiba, 2004), we expected them to accept (10)-(11) in the relevant contexts.

- (10) Kaerusan-wa kiiro-wa ire-ta kedo, midori-mo ao-mo  
 frog-TOP yellow-TOP put-PST but, green-AND blue-AND  
 ire-nakat-ta.  
 put-Neg-PST  
 ‘The frog put the yellow, but not the green and the blue ball inside.’

---

<sup>6</sup>The participant and the monkey were asked to turn away, so that they were ignorant about which balls were moved.

- (11) Kaerusan-wa kiiro-no-hoka-ni, midori-mo ao-mo ire-ta.  
 frog-TOP yellow-GEN-other-DAT, green-AND blue-AND put-PST  
 ‘In addition to the yellow one, the frog put the green and the blue ball inside.’

Lastly, there were also fillers as in (12) and (13), used in a situation where both the yellow and the red ball were moved.

- (12) Kaerusan-wa kiiro-wa ire-ta kedo, aka-o ire-nakat-ta.  
 frog-TOP yellow-TOP put-PST but, red-ACC put-Neg-PST  
 ‘The frog put the yellow ball, but didn’t put the red ball.’
- (13) Kaerusan-wa kiiro-no hoka-ni, aka-o ire-ta.  
 frog-TOP yellow-GEN aside-to, red-ACC put-PST  
 ‘The frog put aside from the yellow ball, a red ball.’

Each participant heard 19 sentences in total. 6 were critical trials, using the sentence in (9): 3 items in the triangle context, and 3 items in the single circle context. There were 9 controls: 3 items like (9) in the double circle context, 3 items like (10) in the triangle context and 3 items like (11) in the double circle context. Finally, there were 4 fillers like (12) and (13) tested in the black circle context. In Table 3 we present a breakdown of the items.

Context	Structure	Item type	Ex. (#)
triangle	ka + neg	critical	(9)
	mo + neg	control	(10)
single circle	ka + neg	critical	(9)
double circle	ka + neg	control	(9)
	mo + pos	control	(11)
black circle	na + neg	filler	(12)
	NA	filler	(13)

Table 3: Summary of test sentences

#### 4.4. Results

Among the 24 children who were tested, 11 children failed during the first phase of the experiment. An additional 6 children responded only partially, and we excluded their responses from the analysis, leaving us with 7 children. Among the remaining 7 children, two of them failed to respond accurately for sentences that did not contain any connectives (disjunction or conjunction). We present data from the remaining 5 children. Among the 16 adult speakers, one showed irregular responses to filler items, and two rejected the use of *ka* in both critical conditions; we exclude all three participants from the analysis and report the data from the remaining 13 adult participants.

For our experiment, the critical sentence was the one shown in (9), repeated below in (14).

- (14) Kaerusan-wa kiiro-wa ire-ta kedo, midori-ka ao-o  
 frog-TOP yellow-TOP put-PST but, green-OR blue-ACC  
 ire-nakat-ta.  
 put-Neg-PST  
 ‘The frog put the yellow, but not the green or the blue one.

The sentence was presented in two critical situations: (i) 1-Disjunct-False: one of the blue or green balls (but not both) was moved, corresponding to the single circle situation, and (ii) 2-Disjunct-False: neither ball was moved, corresponding to the triangle situation. Overall acceptance rate for each condition and group are shown below.

Condition	Children	Adults
2-Disjunct-False	100% (15/15 trials)	38.5% (15/39 trials)
1-Disjunct-False	13.3% (2/15 trials)	94.9% (37/39 trials)

Table 4: Acceptance rate of *ka* in each condition by group

When the critical sentence was given in the 2-Disjunct-False condition, child participants accepted the target sentence 100% of the time, whereas adult participants did so 35.7% of the time. In the 1-Disjunct-False condition, child participant accepted the target sentence 13.3% of the time, whereas adult participants did so 90.5% of the time.

As per the convention in Tieu et al., let us call participants who accepted the critical sentence only in the 1-Disjunct-False condition, exclusive, those who accepted the sentence in both 1-Disjunct-False and 2-Disjunct-False conditions, inclusive, and those who accepted it only in the 2-Disjunct-False condition, conjunctive (see Table 2). Individual data show that there were 4 inclusive and 8 exclusive adult participants. Four child participants could be categorized as conjunctive, and one as inclusive. Table 5 shows the number of participants for each age group that fall into these two categories.

Interpretation	Children	Adults
inclusive	1	4
exclusive	0	8
conjunctive	4	0

Table 5: Distribution of participants

#### 4.5. Discussion

Our results indicate that the presence of a third alternative does not have any effect on children's interpretation of sentences with disjunction and negation when compared to the results reported by Goro and Akiba (2004). Specifically, children can still be classified as conjunctive in their interpretation of disjunction regardless of the presence of a third alternative. If we assume that the Skordos et al. effect can be generalized to uses of disjunction cross-linguistically (Japanese versus English) as well as cross-structurally (negative versus positive sentences), the results of our experiment indicate that the hypothesis we put forward in Section 3.1 cannot be correct. Recall that under that interpretation of the Goro and Akiba results, children, like adults, are taken to assign wide scope to the disjunction and obtain the conjunctive interpretation  $\neg p \wedge \neg q$  via exhaustification with respect to pre-exhaustified domain alternatives, akin to what was proposed to be the case for positive uses of disjunction in child language. If this were the correct approach, a parallel with the Skordos et al. experiment would predict that in the presence of three alternatives, children should behave more inclusively than conjunctively, i.e., that they should accept the use of disjunction even in 1-Disjunct-False contexts, as per the results in Skordos et al.. The fact that they did not suggests that our interpretation of the results is incorrect, namely that the conjunctive-like interpretation of disjunction is arrived at not via exhaustification, as in positive contexts, but via a different method. One such other way, which is not subject to the naturalness constraint discussed by Skordos et al., is that advanced by Goro and Akiba (2004), namely that children assign narrow scope to the disjunction.

Finally, we conclude by briefly discussing the adult data. As per Table 5, there were eight exclusive participants and four inclusive participants. Note that in Goro and Akiba's experiment adult participants accepted the target sentence in the 2-Disjunct-False condition (which is what classifies one as inclusive) in 4 out of 20 trials (20%). Since the difference in average from their data and ours is not significant (Fisher's exact test:  $p=0.3954$ ), we interpret this data to suggest that the availability of a third alternative has no effect on adult interpretation of disjunction.

#### 5. Conclusion and outlook

In this experiment we found that the insertion of a third alternative in the context had no effect on the interpretation children assign to disjunction under negation. We conclude that children and adults must be arriving at their interpretations via different avenues, namely via wide scope of the disjunction coupled with optional exhaustification for adults, and via narrow scope (=surface scope) of the disjunction for children. One of the crucial stipulations we made in order to arrive at this conclusion was that the Skordos et al. effect holds cross-linguistically, even though they only tested English-speaking children. In ongoing work we are

running a follow-up experiment to Tieu et al. where we use three instead of two alternatives, thereby looking to see if Skordos et al.'s results can be replicated in Japanese.

## References

- Chierchia, Gennaro, Stephen Crain, Maria Teresa Guasti, Andrea Gualmini, and Luisa Meroni. 2001. The acquisition of disjunction: Evidence for a grammatical view of scalar implicatures. In *BUCLD 25 Proceedings*, ed. A.H.-J. Do et al., 157–168.
- Chierchia, Gennaro, Danny Fox, and Benjamin Spector. 2012. Scalar implicatures as a grammatical phenomenon. In *Semantics: An International Handbook of Natural Language Meaning*, ed. Claudia Maienborn, Paul Portner, and Klaus von Stechow, volume 3, 2297–2332. New York, NY: Mouton de Gruyter, Berlin & Boston: de Gruyter edition.
- Crain, Stephen, and Rosalind Thornton. 1998. *Investigations in Universal Grammar: A Guide to Experiments on the Acquisition of Syntax and Semantics*. Cambridge, MA: MIT Press.
- Fox, Danny. 2007. Free choice disjunction and the theory of scalar implicatures. In *Pre-supposition and Implicature in Compositional Semantics*, ed. Uli Sauerland and Penka Stateva, 71–120. New York: Palgrave Macmillan.
- Goro, Takuya. 2007. Language-specific constraints on scope interpretation in first language acquisition. Doctoral Dissertation, University of Maryland, College Park.
- Goro, Takuya, and Sachie Akiba. 2004. The acquisition of disjunction and positive polarity in Japanese. In *WCCFL 23: Proceedings of the 23rd West Coast Conference on Formal Linguistics*, ed. V. Chand, A. Kelleher, A. J. Rodríguez, and B. Schmeiser, 251–264. Somerville, MA: Cascadia Press.
- Grice, Paul. 1975. Logic and conversation. In *Syntax and semantics 3: Speech acts*, ed. Peter Cole and Jerry Morgan, 41–58. New York: Academic Press.
- Nicolae, Andreea C., and Uli Sauerland. to appear. Quantity implicatures. In *The Wiley Blackwell Companion to Semantics*.
- Noveck, Ira. 2001. When children are more logical than adults: Experimental investigations of scalar implicature 78:165–188.
- Singh, Raj, Ken Wexler, Andrea Astle-Rahim, Deepthi Kamawar, and Danny Fox. 2016. Children interpret disjunction as conjunction: Consequences for theories of implicature and child development. *Natural Language Semantics* 24:305–352.
- Skordos, Dimitrios, Roman Feiman, Alan Bale, and David Barner. 2018. Do children treat “or” conjunctively? ms.
- Szabolcsi, Anna. 2002. Hungarian disjunctions and positive polarity. In *Approaches to Hungarian 8*, ed. Istvan Kenesei and Peter Siptar, 217–241. Budapest: Akadémiai Kiado.
- Tieu, Lyn, Kazuko Yatsushiro, Alexandre Cremers, Jacopo Romoli, Uli Sauerland, and Emmanuel Chemla. 2017. On the role of alternatives in the acquisition of simple and complex disjunctions in French and Japanese. *Journal of Semantics* 34:127–152.

# Proceedings of the 44th annual Boston University Conference on Language Development

edited by Megan M. Brown  
and Alexandra Kohut

Cascadilla Press    Somerville, MA    2020

## **Copyright information**

Proceedings of the 44th annual Boston University Conference on Language Development  
© 2020 Cascadilla Press. All rights reserved

Copyright notices are located at the bottom of the first page of each paper.  
Reprints for course packs can be authorized by Cascadilla Press.

ISSN 1080-692X  
ISBN 978-1-57473-057-9 (2 volume set, paperback)

## **Ordering information**

To order a copy of the proceedings or to place a standing order, contact:

Cascadilla Press, P.O. Box 440355, Somerville, MA 02144, USA  
phone: 1-617-776-2370, sales@cascadilla.com, www.cascadilla.com