

The role of prosody in preschoolers' interpretation of negated disjunctive sentences

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Introduction Negated disjunctive sentences like (1) are potentially logically ambiguous between readings (1a) and (1b), which have been described as arising from a narrow scope (NEG>OR) versus a wide scope interpretation (OR>NEG) of disjunction with respect to clausal negation.

(1) *Mary doesn't like peppers or tomatoes.*

a. Mary doesn't like peppers and Mary doesn't like tomatoes. (“neither”)

b. Mary doesn't like peppers or Mary doesn't like tomatoes. (“one or the other not”)

There is apparent cross-linguistic variation as to whether or not both of these readings are available in a language: while some languages seem to license both, others seem to only permit the OR>NEG interpretation. Szabolcsi (2002) ascribes this variation to a difference in the lexical status of disjunction: in the latter group of languages (e.g. Japanese, Mandarin, Turkish, Russian, Italian, Catalan, French, Hungarian; so-called +PPI languages, Goro 2004), but not in the former group (e.g. English, Dutch, German, Greek; dubbed –PPI languages), disjunction is a Positive Polarity Item. As PPIs cannot occur in the direct scope of clausemate negation, +PPI languages disallow the NEG>OR reading.

Initial experiments with pre-school children found that they access the NEG>OR interpretation not only in –PPI languages, in which the NEG>OR reading is acceptable for adults (e.g. English: Crain et al 2002, Gualmini & Crain 2002), but also in +PPI languages, in which this reading is unlicensed in adult competence (e.g. Japanese: Goro & Akiba 2004a,b, Mandarin: Jing et al. 2005, Russian: Verbuk 2006). An influential account explains this pattern in terms of the Semantic Subset Principle (SSP, Crain et al. 1994), according to which in general children prefer the logically stronger reading of logically potentially ambiguous sentences in the initial phase of language acquisition. Since from a logical perspective the NEG>OR reading is stronger than the OR>NEG reading, the SSP correctly predicts that initially children will have difficulty accessing the weaker OR>NEG reading.

The problem Subsequent experiments, however, uncovered a hitherto unexplained range of variation in terms of pre-school children's acceptance of OR>NEG interpretations in +PPI languages (Mandarin: 5%, Jing et al. 2005; Turkish: 1%, Geckin et al. 2015; Turkish: 13%, Geckin et al. 2017; Japanese: 25%, Goro & Akiba 2004a,b; Hungarian: 25%, Pagliarini et al. 2022; French: 34%, Pagliarini et al. 2022; Catalan: 43% Pagliarini et al. 2021; Japanese: 47%, Shimada & Goro 2020; Italian: 54%, Pagliarini et al. 2018). This is so despite the fact that most of these studies employed the same experimental task (introduced by Goro & Akiba 2004a,b) and involved children of the same age range. Pagliarini et al. (2018) propose to explain Italian children's relatively high acceptance rate of the OR>NEG reading by hypothesizing that in Italian the NEG>OR reading is expressed by a negative concord form (NEG...*né*...*né*), which blocks the NEG>OR reading of negated disjunctive sentences. In order to account for the variation seen across Italian, French, Hungarian and Turkish, Pagliarini et al. (2022) speculate that the strength of this blocking effect is modulated by the complexity of the grammatical system of negative concord in each language. Even this supplemented version of the blocking hypothesis leaves unexplained a substantial amount of variation, however. This includes (i) discrepancies between languages with non-complex NC systems, like Italian (54%) and Catalan (43%), as well as Russian (17%, Verbuk 2006) and Greek (20%, Tsakali et al. 2022), and (ii) divergences between different experiments on the same language, viz. Japanese (25% vs 47%).

Objectives In this study we explore the plausibility of an alternative source for the attested variation. Specifically, we experimentally test whether sentence prosody, a hidden variable not

controlled in these prior experiments, could have affected children’s acceptance rates of the OR>NEG reading to an extent that could potentially account for the noted discrepancies. Prosody has been shown to exert substantial influence on logical scope reading preferences in adults’ sentence comprehension (e.g. Baltazani 2002, Syrett et al 2014, Luchinka & Ionin 2015). The relevance of prosodic structure and prominence relations for scope interpretation in Hungarian has been systematically investigated by Hunyadi (1981, 1999, 2002).

The comprehension experiment Following Hunyadi’s insights, and also drawing on Han & Romero’s (2004) observations regarding the prosody of negative disjunctive sentences in English, in our experiment we compare the rate of acceptances of the OR>NEG and NEG>OR readings of negated disjunctive sentences like (2a,b) in two (between-subject) prosodic conditions (PROSODY). In the 1INTP condition illustrated in (2a) the sentence constituted as single intonational phrase, with a single intonational contour extending over its comment part containing the two disjuncts. In the 2INTP condition (2b) the sentence was comprised by two intonational phrases, with the contour in the first one ending in a high boundary tone, followed by a short pause, and then a falling contour in the second intonational phrase. A prior experiment with adults (Surányi & Gulás 2022) shows that this type of prosodic manipulation significantly affects adults’ rates of OR>NEG and NEG>OR readings.

- (2) a. *(A majom nem szereti a mandarint vagy a narancsot)*_{IntP} 1INTP
the monkey not likes the tangerine or the orange
- b. *(A majom nem szereti a mandarint)*_{IntP} *(vagy a narancsot)*_{IntP} 2INTP

For comparability with earlier cross-linguistic studies, the experimental task was an adapted version of Goro & Akiba (2004a,b). Participants saw animated images (Fig.1), each of which contained an animal and two plates side by side with a tangerine and an orange on them, respectively. It wasn’t visible which fruit is on which plate. As a within-subject factor (SCOPE), in the critical conditions the animal either ate one of the fruits (making the OR>NEG reading true = the ATE1 condition) or neither of them (making the NEG>OR reading true = the ATE0 condition). Each image was accompanied by a pre-recorded sentence, uttered by a blind-folded elf as a guess about whether the animal likes the two fruits. The participants’ task was to judge whether the elf guessed right. In addition to 5 OR>NEG and 5 NEG>OR trials, 3 clearly false and 3 clearly true fillers were also included. 38 (19+19) pre-school children (ages 4;1-6;10) and a group of adult controls (n=34=17+17) participated.

Results and conclusions The rates of children’s acceptances are summarized in Fig. 2 (the discussion of the adult controls’ responses is omitted here for reasons of space). A mixed binomial logistic model revealed a strong main effect of SCOPE and a strong interaction between PROSODY and SCOPE. Pairwise comparisons show that while PROSODY didn’t have a significant effect on scope readings in the ATE0 (NEG>OR) condition, it did so in the ATE1 (OR>NEG) condition. We draw a range of conclusions. (i) Pre-school children are sensitive to sentence prosody (in particular, to prosodic structure) in the interpretation of logical scope in negated disjunctive sentences (cf. also Larralde et al. 2021). (ii) The asymmetry found between the OR>NEG condition and the NEG>OR condition is in line with the hypothesis that the NEG>OR condition is the initial default in the course of language acquisition: this is reflected in the fact that this interpretation is not significantly affected by prosody. (iii) In view of the size of the difference found in the OR>NEG condition, the unexplained divergences in the rate of OR>NEG acceptances both across and within languages, reviewed above, might have resulted from the lack of control of prosody.

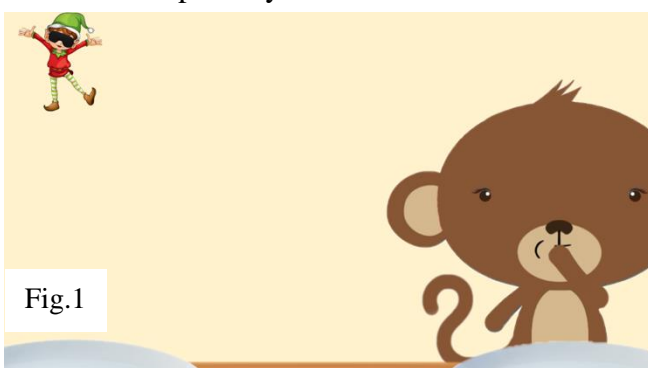


Fig.1

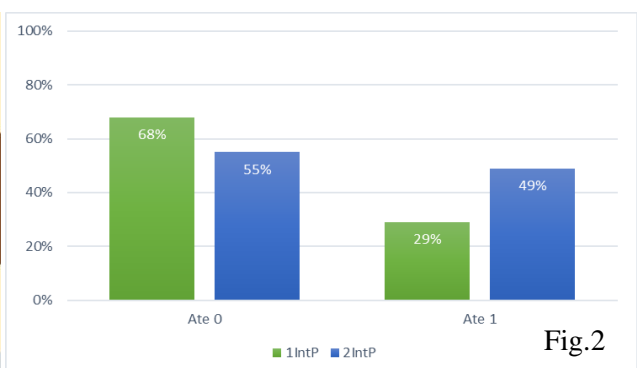


Fig.2