# Children's Acquisition of Negation and Adjective Scales

Sophie Moracchini (LLING/Nantes Université), Oana Lungu, Hamida Demirdache
(CNRS/LLING/Nantes Université)

Issues. The acquisition of negation in interaction with gradability raises two challenges that have not been investigated to date to our knowledge:

i. Children must grasp two kinds of negation: one forming contrary opposition between gradable antonyms (e.g.; $happy/A^+$ vs. sad/A^-), and another yielding contradictory opposition (e.g., $happy/A^+$ vs. $not\ happy/\neg A^+$).
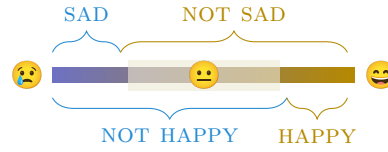
ii. Multiple negatives: Children show a bias for single negation interpretations (a.k.a Negative Concord) when presented with Double Negation environments [5,2], but in interaction with gradable antonyms, they must learn to navigate two double negated environments with distinct semantic interpretations:

- Double Negation (DN): pairing of an adjective with two sentential negations that yields a meaning semantically equivalent to the positive form (e.g., *Anna is not not happy* $[\neg\neg A^+]$, see [4]),
- Duplex Negation (DxN): co-occurrence of sentential negation with a negative adjective that yields a meaning not equivalent to the positive form ((e.g., *Anna is not sad* $[\neg A^-]$).

Design, material. We designed a picture selection task to evaluate children's comprehension of antonyms and their negated forms. Fifty-four French-speaking children, divided into two age groups (mean ages 5;3 and 6;3), as well as sixty adults, were presented with sets of six images featuring animals, objects, or characters exemplifying an adjective's property (*long/small*, *long/short*, *heavy/light*, *rich/poor*, *old/young* and *wide/narrow*) to varying degrees: two pictures depicted the negative end of the scale, two represented a middle gap, and two depicted the positive end of the scale (see Fig. 1, with dogs). The task was framed as a game in which a player provided a descriptive clue, prompting children to select all items they felt matched the description. Fig. 1 provides expected response patterns (color-coded) for each of the four experimental conditions: For negated conditions ($\neg A^+$ and $\neg A^-$), a literal interpretation (complement of the relevant adjective, NOT {POS/NEG}) was anticipated, alongside a stronger {NEG/POS}-STR interpretation known as *Negative Strengthening* ([3,1]). The negative antonym condition (A^-) was expected to receive the NEG-STR interpretation, while the DN condition ($\neg\neg A^+$) was predicted to yield only a positive (POS-STR) interpretation.
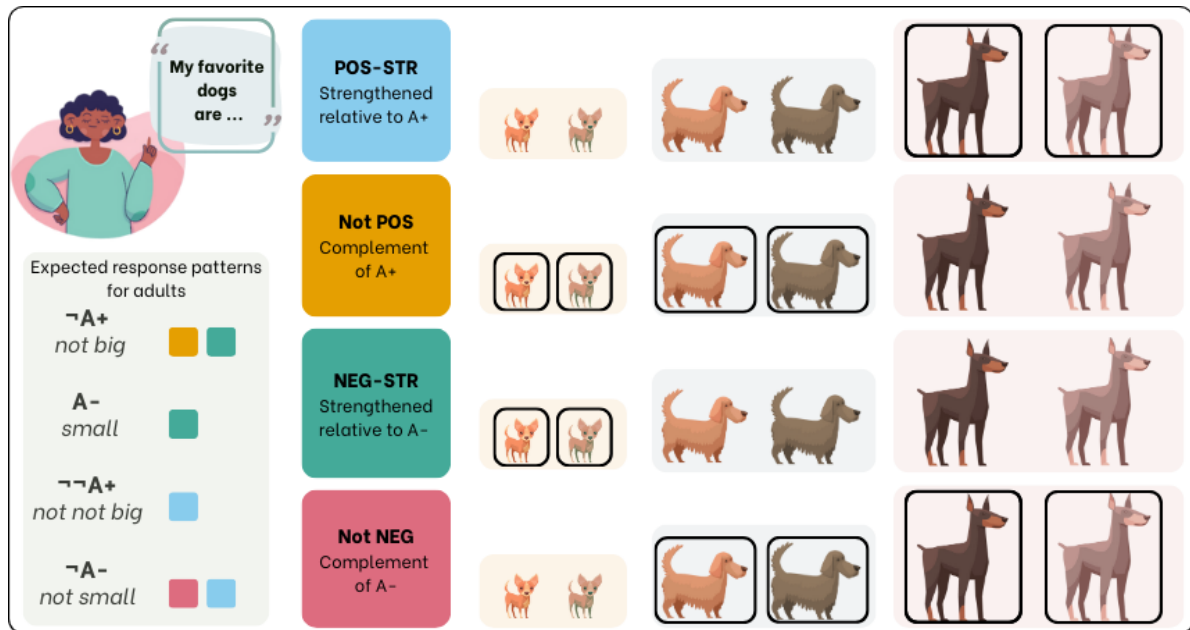

Figure 1: Expected answer patterns for each of the four conditions shown on the left. Black rectangles indicate selected dogs representing each of the four response patterns.

Primary results.

i. 5-year-olds show an adult-like understanding of negated adjective ($\neg A^{+/-}$) structures, but they only grasp certain lexical negative antonyms (A^-) (such as *short/small*), while struggling with others (like *narrow/young*). By ages 6, their understanding of these adjectives improves.

ii. Unlike adults, who primarily favor strengthened interpretations for the negative antonym (A^-), children at age 6 accept both NOT POS (12%) and NEG-STR (58%) reading (cumulated proportions of response patterns: 70%).

iii. Adults consistently interpret negated antonyms ($\neg A^+$ and $\neg A^-$) with and without strengthened readings (more frequently for negative antonyms, contra [6]. Both child groups also showed the two answer patterns, but they seem to display a preference for strengthened interpretations.

iv. Children in both age groups differ from adults in their handling of Double Negation ($\neg\neg A^+$), suggesting that this constructions is acquired later in development. When presented with $\neg\neg A^+$ constructions, both age groups show a predominant single-negation interpretation, reaching 62.1% and 55% of negative strategies, respectively, compared to the adult double-negation reading (91.8%).

v. For Duplex Negation ($\neg A^-$), children's two most common response patterns aligned with adults', predominantly using the POS-STR and NOT NEG patterns.

Discussion. These findings offer new insights into the developmental trajectory of negation and gradable adjectives in child language acquisition.

1) Young children initially interpret scales in a simpler manner –as bipartite (A/not A) scales–transitioning to more nuanced, adult-like tripartite scales (with a middle gap) after age 6. On this account, children entertain both NEG-STR and NOT POS response patterns as possible partitions of the scale depending of the cut-off point they assume, and which varies according to the images presented. This bipartite approach may account for children's interpretation of negative antonyms (ii) as well as their greater tendency to favor strengthened readings for $\neg A^-$ compared to adults (iii).

2) Children distinguish between Double Negation (DN) and Dupleix Negation (DxN) environments. In DN cases, they tend to interpret only one negative element (iv); however, in DxN cases, their interpretations mirror adults', favoring POS-STR and NOT NEG over the single negation patterns NOT POS and NEG-STR (v). This suggests that children's challenges are not due to processing multiple negatives *per se* but rather to inconsistently applying the law of double negation, a skill that appears to mature beyond age 6.
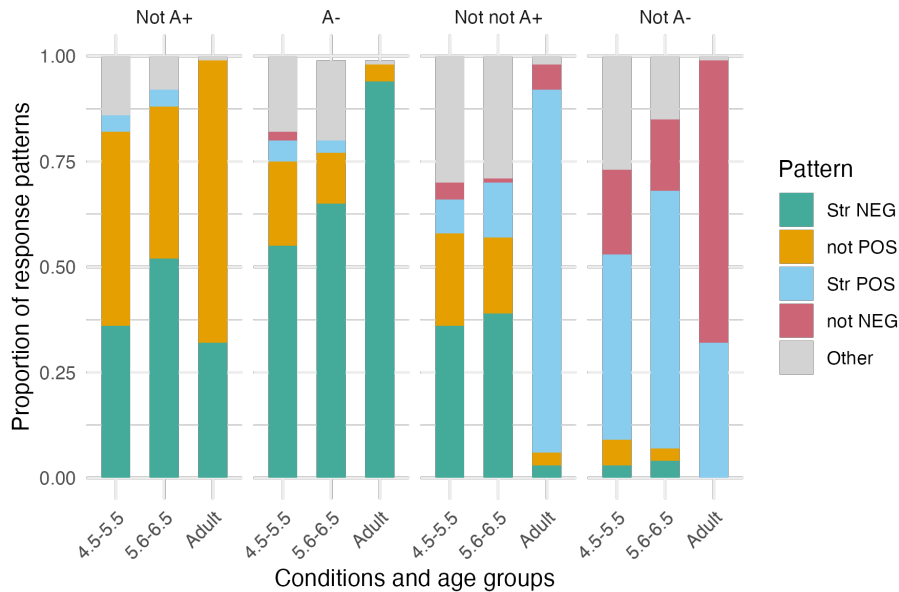

Figure 2: Proportion of Response Patterns by Age Group and Condition

Reference

[1] Gotzner et al. Adjectival scales and three types of implicature 2018. [2] Nicolae et al. Not eating kein veggies: negative concord in child german. 2020. [3] Ruytenbeek et al. Asymmetric inference towards the antonym: Experiments into the polarity and morphology of negated [4] Tessler et al. Not unreasonable: Why two negatives don't make a positive, 2018. [5] Thornton et al. Two negations for the price of one. 2016 [6] Mazzarella et al. The polarity asymmetry of negative strengthening: Dissociating adjectival polarity from face-threatening potential. 2021. [7] Weicker & Schulz. Not everything needs to be big or small: Evidence from children's interpretation of vague adjectives, 2020.