Children's Interpretation of Sentences with Multiple Scalar Terms

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Background

- Sentences like (1) give rise to the the scalar implicature (SI) in (2).
  (1) The lion ate some of his cookies.
  (2) ⇝The lion did not eat all of his cookies.
- Sentences containing multiple scalar terms, like (3), give rise to the scalar implicatures in (4) and (5) (Chemla & Spector, 2011).
  (3) Every lion ate some of his cookies.
  (4) ⇝ Not every lion ate every one of his cookies. *(weak SI (WSI))*
  (5) ⇝ No lion ate every one of his cookies. *(strong SI (SSI))*
- Children are reported to be less likely than adults to compute the SIs associated with sentences like (1) (Noveck, 2001). As far as we know, children have not been tested on sentences like (3).
- One explanation for children's behaviour with sentences like (1) (known as the Restricted Alternatives Hypothesis (RAH)), is that children experience difficulties retrieving the required alternatives from the lexicon (Chierchia et al., 2001; Barner et al., 2011; Tieu et al., 2015).
- In the case of sentences containing multiple scalar terms, like (3), the assertion contains the relevant scalar alternatives ('Every' & 'Some') as subparts of the assertion. According to the RAH, children are therefore expected to compute the corresponding SIs in (4) and (5) more readily than they do the traditional SI in (2).
- **Research Question:** Will children compute SIs more readily when presented with sentences containing the relevant scalar terms, as predicted by the RAH?

Experiment

- **Paradigm:** Truth Value Judgment Task (TVJT) (Crain and Thornton, 1998).
- **Design:** 2 x 4
  – *Group:* Adults vs. Children
  – *Condition:* False vs. Literal vs. Weak vs. Strong (within subject)

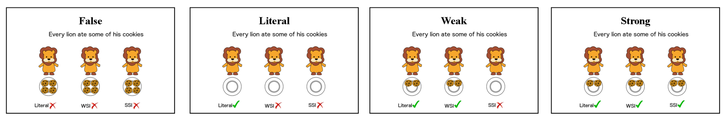

Fig. 1: Illustration of the contexts in each test condition.

- **Participants:**
  – *Children:* 13 (4;01-5;07, M=4;06)
  – *Adults:* 18 Macquarie University undergraduates
- **Procedure:** Two sessions (7-9 days apart) including:
  – 8 test items (Strong & Literal | Weak & False)
  – 2 control items (testing basic understanding of 'Every')
  – 2 filler items (balancing the number of 'Yes'/'No' responses)

Results

- **Analysis (Mixed Models Logistic Regression):**
  – Main effect of group in the WEAK condition ($p<.001$)
  – Main effect of condition, with the LITERAL condition differing from the other conditions ($p<.05$)
  – Significant interaction between Group and Condition (LITERAL vs. WEAK | LITERAL vs. STRONG) ($p<.05$).

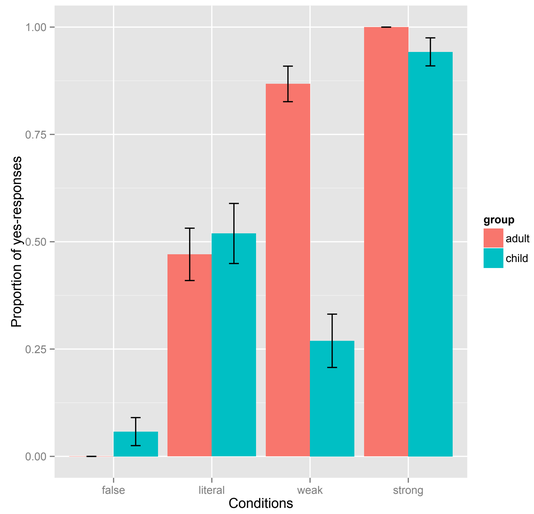

Fig. 2: Results

- **Children's justifications in the weak condition:**
  – "This one ate all of them."
  – "This one lit all of them."
  – "Those two didn't really finish them, and that one finished."

Discussion

- **RAH Prediction:** Children should compute WSIs and SSIs on a par with adults.
- LITERAL condition responses are consistent with this prediction.
- WEAK condition results are a bit more surprising.
  – **Differing end-states:** Characters had differing 'end-states'; perhaps children rejected because of the inconsistency.
  Why didn't children also reject the 'Every_True' control?

Fig. 3: Different outcomes between characters

  – **Visual contrast:** The contrast presented in this condition (Some vs. All) increases the saliency of the relevant alternatives, which may have facilitated SI computation (Gotzner et al., 2015).
  But why did children compute the strong SI?

Conclusion

- **In Sum**
  – Children generated SIs on a par with adults in the LITERAL condition.
  – Children generated SIs at a higher rate than adults in the WEAK condition.
  – Children seem to generate more SIs from sentences containing multiple scalar terms, as predicted by the RAH.
- **Next Steps**
  – Re-do LITERAL and WEAK conditions with unembedded sentences, like (1), to compare current results with a more traditional SI, and to further investigate the influence of the visual contrast.

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