Children's derivation of scalar inference from *or*-sentences: Evidence from varying the degree of relevance

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Motivation

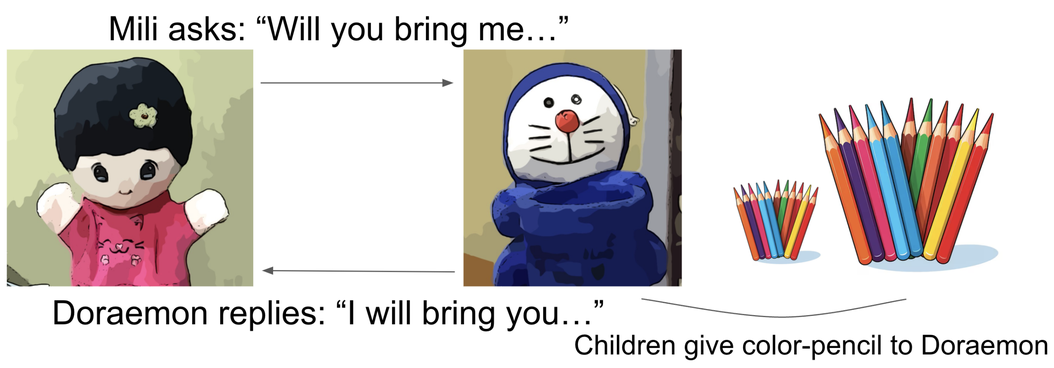
- It is widely argued that children's difficulty deriving scalar implicature (SI) from *or*-sentences stems from their difficulty accessing the scalar alternative, *and* (e.g. Chierchia et al. 2001; Tieu et al., 2016; Gotzner et al. 2020). However, it remains unexplored how children would perform if the alternative is available in the context.
- In light of the recent discussions on the constraint of relevance (e.g., Skordos and Papafragou, 2016), the present study investigates whether children's pragmatic difficulty with *or*-sentences stems from their problem accessing the alternative or from discerning the relevance of the SI.

Method

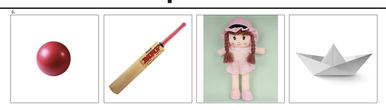
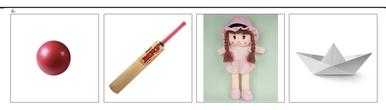
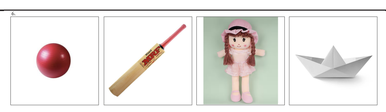
- *Participants:* Bengali-speaking 4- to 5-year-olds (N=74), 8- to 9-year-olds (N=48), adults (N=48)

Age group	C1	C2	C3	C4
Young children	19 4;2-5;10, M=5;2	18 3;8-5;6, M=4;10	19 4;2-5;10, M=5;2	18 4;1-5;7, M=4;10
Older children	12 8;2-9;0, M=8;6	12 8;2-8;11, M=8;6	12 8;1-8;11, M=8;4	12 8;2-9;0, M=8;5
Adults	12	11	12	13

- *Materials and procedure:*



Task:
If Doraemon promises to bring two objects, give him a big color-pencil.
If Doraemon promises to bring only one object, give him a small color-pencil.

Condition	Mili's question	picture card
C1	Will you bring me a doll **and** a boat?	
C2	Will you bring me those two things?	
C3	Will you bring me a doll **and** a boat and the other two things?	
C4	Will you bring me those four things?	

Trial types in each of the four conditions: Total trials = 19 [Practice = 3, Main = 15]

Doraemon's reply in **Test** [5]	Doraemon's reply in **Control1** [5]	Doraemon's reply in **Control2** [5]
I will bring you a doll or a boat	I will bring you only a doll	I will bring you a doll and a boat

Discussion

- There were no significant differences in children's performance between the +alternative and -alternative conditions. Alternative hypothesis cannot explain this result (Barner et al. 2011; Chierchia et al. 2001; Tieu et al. 2016; Gotzner et al. 2020).
- Degree of relevance affects children's implicature derivation (Skordos & Papafragou, 2016). However, in low-relevance condition, availability of the alternative seems to improve performance. Possible explanation: utterance of the alternative helps in hypothesizing that the speaker is considering the alternative, and hence, the degree of informativeness is relevant.
- Implicature derivation in Bengali-speaking children shows a clear developmental pattern, aligning with trends seen in other widely researched languages.The explicit exclusivity in Bengali disjunction word 'naile' (if-not) does not aid in exclusive meaning derivation. [*nai* is NEG and *-le* is a conditional marker]

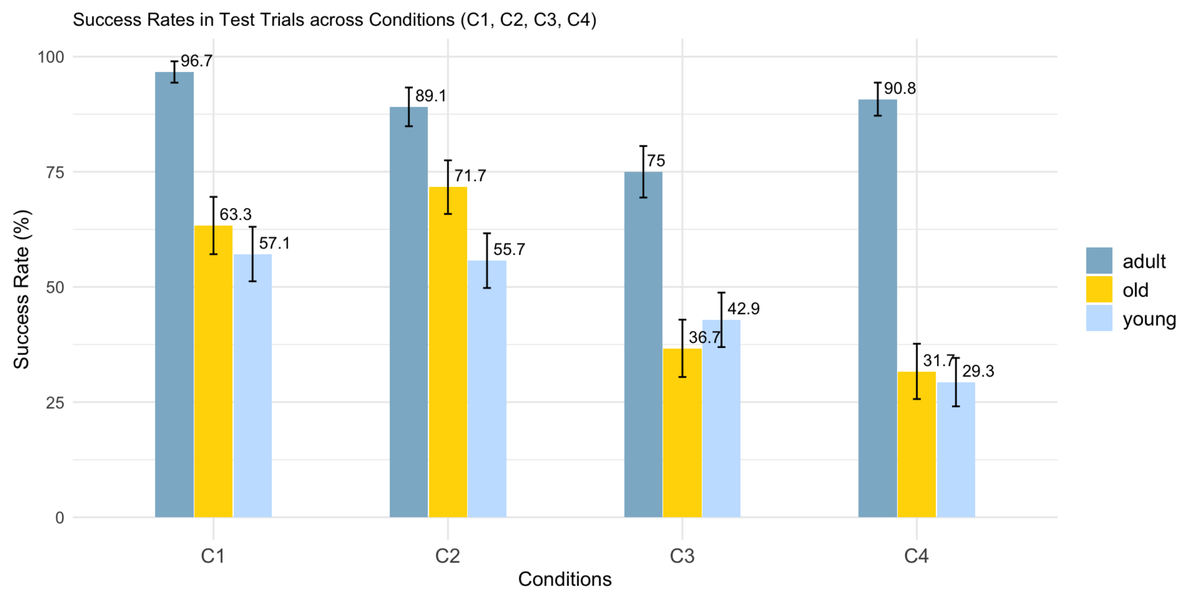
Design

Alternative × Relevance

- 4 between-subject conditions
  - Coniditon 1: [+alternative, high-relevance] aka. C1
  - Coniditon 2: [-alternative, high-relevance] aka. C2
  - Coniditon 3: [+alternative, low-relevance] aka. C3
  - Coniditon 4: [-alternative, low-relevance] aka. C4
- In **+alternative** conditions, alternative is primed before *or*-sentence. In **-alternative** conditions, alternative is not primed before *or*-sentence.
- In **high-relevance** conditions, scalar implicature is the relevant implicature. In **low-relevance** conditions, exhaustivity implicature is the more relevant implicature.

Results

some failed control	remaining **C1**	remaining **C2**	remaining **C3**	remaining **C4**
Young children	14 4;3-5;8, M=5;2	14 3;8-5;6, M=4;10	14 4;6-5;10, M=5;4	15 4;1-5;6, M=4;11



Success in test trials (Binomial test using R):

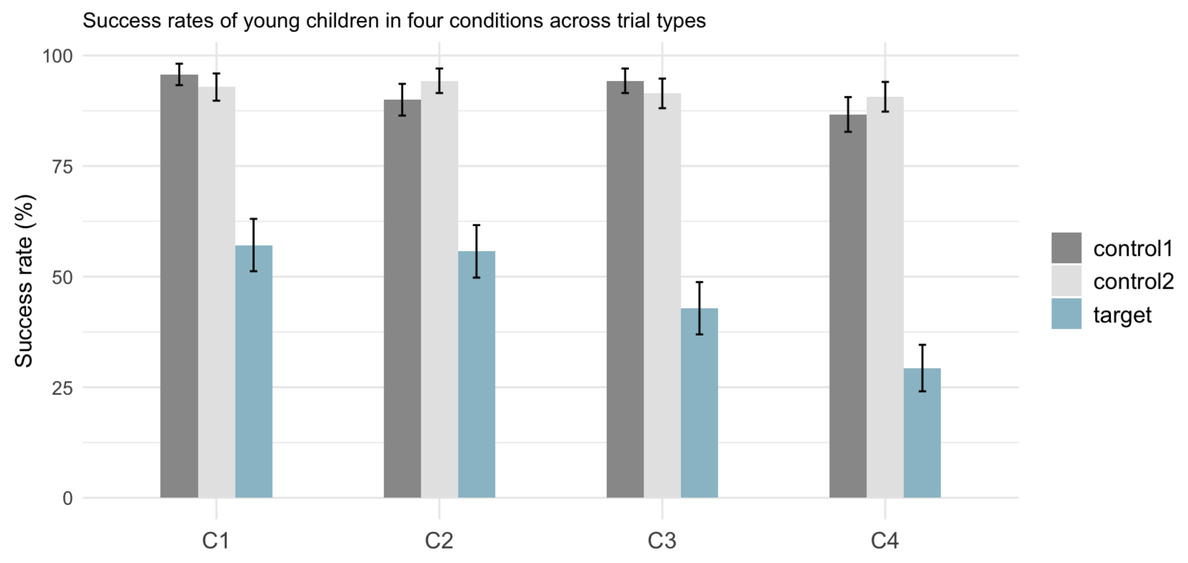
	C1	C2	direction	C3	C4	direction
Adults	<0.0001	<0.0001	greater	<0.001	<0.0001	greater
O.child	0.02	0.0005	greater	0.025	0.003	less
Y.child	0.14	0.2	greater	0.14	0.0002	less

Performance across conditions (Kruskal-Wallis test on mean success rates using R):

Adults	Older children	Young children
χ^2 = 4.5, p = 0.21	χ^2 = 6.99, p = 0.072	χ^2 = 4.94, p = 0.176

Post-hoc comparison (Dunn's test using R):

	Adults	Older children	Young children
C1 vs. C2	0.4	0.277	0.442
C1 vs. C3	0.02	0.07	0.14
C1 vs. C4	0.33	0.056	0.03
C2 vs. C3	0.04	0.019	0.178
C2 vs. C4	0.42	0.014	0.04
C3 vs. C4	0.05	0.45	0.22



KEY REFERENCES

[1] Barner, Brooks, & Bale, 2011. *Cognition*
[2] Chierchia & colleagues, 2001. *25th BUCLD Proceedings*
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[4] Papafragou & Tantalou, 2004. *Language Acquisition*.
[5] Skordos & Papafragou, 2016. *Cognition*.
[6] Tieu & Colleagues, 2016. *Journal of Semantics*.

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