Find a friend or a scale mate: comparing ad hoc and scalar implicatures

Francesca Foppolo[a], Francesca Panzeri[a], Greta Mazzaggio[b] & Luca Surian[b]
[a]University of Milano-Bicocca & [b]University of Trento

Children's pragmatic abilities have been the matter of a vivid debate since at least Chierchia et al. (2001) and Noveck (2001). Several studies in the past years investigated children's derivation of pragmatic inferences by testing different items in different languages and populations and by means of different tasks. Overall, differences have been found across ages, types of items and tasks (cf. Skordos & Papafragou, 2016 for a review). In general, pre-schoolers have difficulties in the computation of the scalar implicature (SI) related to *some*, while a better performance has been documented in the case of non scalar or ad hoc scales, even in younger kids (Katsos & Bishop, 2011; Stiller, Goodman & Frank, 2015). Children's difficulty have been explained by different hypotheses: children are more tolerant of pragmatic violations than adults (Katsos & Bishop, 2011); children have difficulties in lexicalizing the scale and/or retrieving the lexical alternatives (Barner et al., 2011; Foppolo et al., 2012; Tieu et al., 2015); children do not (always) recognize what is conversationally relevant (Skordos & Papafragou, 2016).

Our study. In our experimental study, we tested 58 pre-school children (age range (in months): 45-72, MA = 60,58) split in two age groups (29 5-6 year olds, labelled "old"; 29 3-4 year olds, labelled "young"). Participants were administered three tasks:
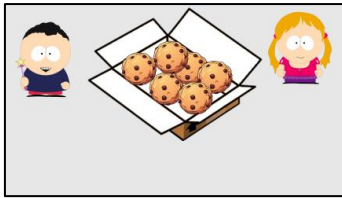
- a classic Truth Value Judgment task in which children had to judge sentences like *"He put some of the cookies in the box"* in a situation in which all the cookies are in the box (Figure 1). We also assessed children's competence with scalar quantifiers *some* and *all* in true and false situations.

- a novel task for scalar implicature computation in which participants had to find the correct target (among 4 pictures) by exploiting a sentential cue (Figure 2). The task is a classical picture selection (PST), with the novelty that the relevant *all*-alternative was provided as a visual contrast (Figure 2).

- a PST for Ad Hoc scales modelled after Surian & Job (1987) and Stiller, Goodman & Frank (2015) in which participants had to find the correct target (among 4 pictures) by exploiting a sentential cue (Figure 3). The paradigm was analogous to that employed for *some*.

Results. Main results are plotted in Figure 4. Data were analysed by means of mixed models in which children's performance was modelled after Age and Task. We found: (i) a significant effect of age in the derivation of the scalar implicature connected to *some*, both in the TVJT (accuracy (old vs. young): 71% vs. 36%, p = .0135), and in the PST (accuracy (old vs. young): 66% vs. 38%, p = .0059), but not in the case of Ad Hoc implicatures, in which the two age groups did not differ (old = 81%, young = 77%, p = .3566); (ii) a significant difference between scalar and ad hoc implicatures when using the same task (PST): while overall accuracy was 52% in the case of *some*, it was 79% in the Ad Hoc scales (p = .0051). Interestingly, children's performance with the scalar item *some* did not improved in the PST compared to the classical TVJT (53% vs. 52%, p = .542).
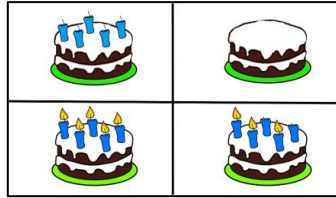
Discussion. Our findings add an additional piece to the understanding of children's failure and success with scalar inferencing. In particular, we show that, in a task that is designed to enhance contextual relevance of the alternatives, children succeed with ad hoc implicatures but fail with scalar implicatures. We interpret these results in light of a lexical hypothesis to SI: children are able to derive the *some but not all* implicature only at a developmental stage in which they have lexicalized the scale <some, all>, i.e. they know that *some* and *all* are scale mates ordered on an informativeness scale. Before that stage, their performance is equivocal. In the case of ad hoc implicatures, in which a lexicalization is not required, their performance is good even at a young age. This, in turn, demonstrates that children are not, in general, more logical or more tolerant than adults; indeed, they are capable of generating alternatives, are sensitive to informativeness and are capable of deriving pragmatic inferences, provided that they can match scale mates in a scale, an operation that takes more time for scalar quantifiers.

Figure 1. Scalar Implicatures – Truth Value Judgment Task

Target sentence
He put some of the cookies in the box.

Figure 2. Scalar Implicatures – Picture Selection Task
Lead-in sentence
Guess which one is my birthday cake, I give you a cue.
Target sentence
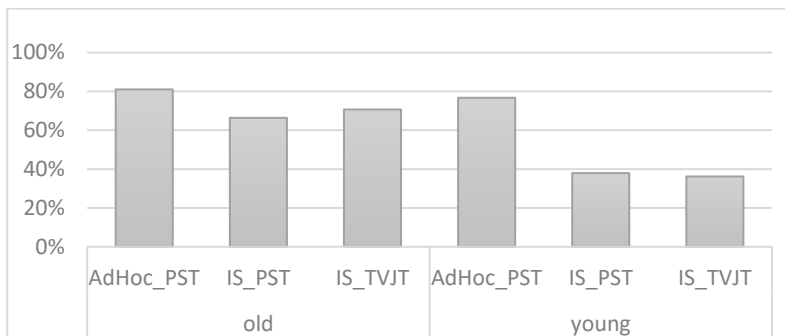**On my birthday cake, some of the candles are burning.**

Figure 3. Ad Hoc Implicatures – Picture Selection Task
Lead-in sentence
Guess who is my friend, I give you a cue.
Target sentence
My friend wears glasses.

Figure 4. Children's accuracy
(by age group and type of task)

References

Barner, D., Brooks, N., & Bale, A. (2011). Accessing the unsaid: The role of scalar alternatives in children's pragmatic inference. *Cognition*, 118(1), 84-93.

Chierchia, G., Crain, S., Guasti, M. T., Gualmini, A., & Meroni, L. (2001). The acquisition of disjunction: Evidence for a grammatical view of scalar implicatures. In *Proceedings of the 25th Boston University conference on language development* (pp. 157-168). Somerville, MA: Cascadilla Press.

Foppolo, F., Guasti, M. T., & Chierchia, G. (2012). Scalar implicatures in child language: Give children a chance. *Language learning and development*, 8(4), 365-394.

Katsos, N., & Bishop, D. V. (2011). Pragmatic tolerance: Implications for the acquisition of informativeness and implicature. *Cognition*, 120(1), 67-81.

Noveck, I. A. (2001). When children are more logical than adults: Experimental investigations of scalar implicature. *Cognition*, 78(2), 165-188.

Skordos, D., & Papafragou, A. (2016). Children's derivation of scalar implicatures: Alternatives and relevance. *Cognition*, 153, 6-18.

Stiller, A. J., Goodman, N. D., & Frank, M. C. (2015). Ad-hoc implicature in preschool children. *Language Learning and Development*, 11(2), 176-190.

Surian, L., & Job, R. (1987). Children's use of conversational rules in a referential communication task. *Journal of Psycholinguistic Research*, 16(4), 369-382.

Tieu, L., Romoli, J., Zhou, P., & Crain, S. (2015). Children's knowledge of free choice inferences and scalar implicatures. *Journal of Semantics*.