# Children' sensitivity to some – but not all – Gricean Maxims

When speakers engage in a conversation, they usually follow a Principle of Cooperation, that can be broken down in four Maxims of Conversations regulating the content of what is said (that must be truthful, informative enough and relevant), and also its form (speakers ought to be clear, concise, and orderly, Grice, 1975). Conversational implicatures are drawn under the assumption that the speaker complies with these maxims. Preschool children are known to have trouble in this kind of pragmatic reasoning: they tend to stick to the literal meaning of figurative statements (such as metaphors, metonymies, irony, Winner, 1997), and they do not compute scalar implicatures (Foppolo et al., 2012), even if their difficulty in rejecting underinformative statements might be due to their tolerance to pragmatic violations (Katsos & Bishop, 2011). Surian and collaborators (Surian et al., 1996) designed a task, the Conversational Violations Test (CVT), to verify whether children are sensitive to unmotivated violations of Gricean Maxims: children were presented with two puppets that answered to various questions, and the child's task was to identify who was giving silly answers. For instance, when asked "What did you get for your birthday?", one puppet answered "A bike" (answer that complies with the maxims), and the other "A present" (violating the Maxim of Quantity). The CVT has been used to test atypical populations (children with ASD and SLI, Surian et al, 1996; hearing impaired children, Surian et al., 2010) and bilingual children (Siegal et al, 2009, 2010), with typically developing (TD) monolingual children serving solely as control group. As a consequence of this, the evolutionary trajectory of TD children in mastering Gricean Maxims has not been attested yet. Moreover, the CVT faces some problems: first of all, the child is presented with two alternatives, one that violates, and one that complies with, the maxims. Choosing the correct answer does not necessarily indicate that the child is aware that an answer that violates a maxim is pragmatically inadequate, since the child could have simply identified the (more) appropriate answer. Moreover, the child is required to evaluate the correctness of the puppets' answers in the absence of context: in the above example, the child cannot be sure that the puppet did receive a bike for his birthday, and so she might think that "a present" is a safer response.

We designed a new task that aims at testing children's sensitivity to Gricean Maxims violations with three main modifications with respect to the CVT: (i) the context is given to the child, so that she can assess the sentence relative to the situation it refers to; (ii) the child is presented with one item at a time, and (iii) she has to judge its appropriateness by choosing one of three medals: gold medal/smiley face for true, appropriate answers; bronze medal/sad face for false answers; silver medal/neutral face for true but pragmatically inappropriate answers. We tested 45 preschool Italian children so far (22 female, MA: 5;2; age range: 3;7-6;2 months); 38 school-aged children, enrolled in the first three years of primary schools (21 female, MA: 7;1; age range: 6-8;9) and 36 Italian adults as controls. In the task, children are introduced to Bruno, a boy who does many things, and to Elmo, a puppet who is very curious, but who is blind-folded, so he cannot see what happens, and therefore he poses a lot of questions to Bruno. Children are told that Bruno always answers to Elmo, but that they should be careful, because sometimes Bruno gives answers that are wrong, or at least not completely adequate: in those cases, children should warn Elmo, and tell him what has really happened, since they are presented with the actual situation. An item is illustrated in Figure 1.
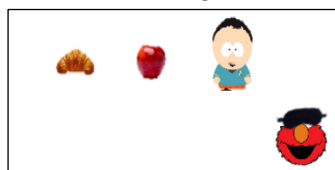

Figure 1. Example of Violation of the Maxim of Quantity: the child is first presented with the image of Bruno, next to an apple and a croissant. The narrator's voice says: "This is what Bruno ate for breakfast". Then Elmo asks: "What did you eat?". Bruno answers: "I've eaten an apple".

The task comprises 24 items: 12 critical items and 12 control sentences (8 clearly true and 4 false statements – that can be considered also violations of Quality). The critical items constitute

unmotivated violations of the Maxim of Quantity (2 items in which Bruno mentions only one conjunct instead of two, as in Fig. 1, and 2 items in which the underinformative superset property is choosed, e.g. "I've eaten <u>food</u>" instead of "<u>chicken</u>"), Maxim of Relation (2 items in which Bruno provides an irrelevant answer, e.g. saying that he is reading "a book that has the cover and pages you can turn" instead of mentioning the title of the book), Maxim of Manner (2 items in which the order of the events is reversed, and 2 unnecessary lengthy descriptions) and Maximize Presuppositions (2 items with the indefinite "a" instead of the more appropriate definite "the", e.g. "<u>a</u> sun is shining", Schlenker, 2012).

Figure 2. Accuracy by Group and Maxim.
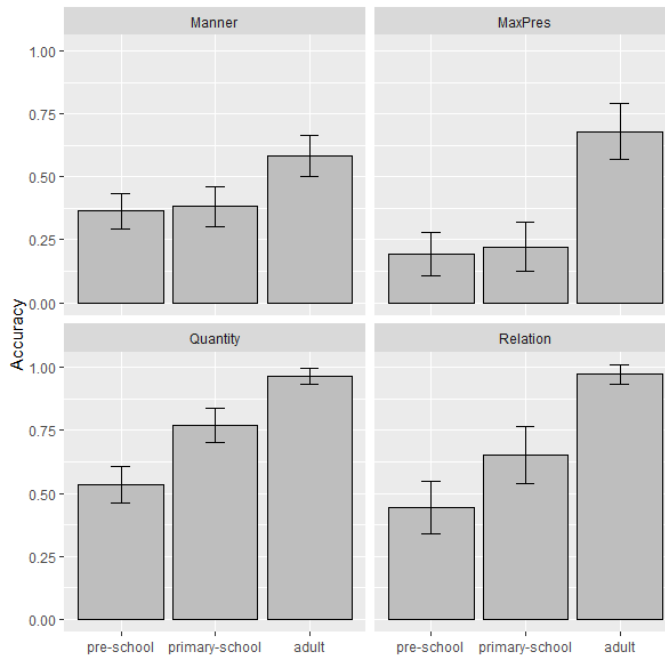
Children and adults were almost at ceiling for control items (above 92%), in which clearly true/false statements were tested. Clear differences emerged for violations of maxims instead (Figure 2): adults always rejected unmotivated violations of the Maxim of Quantity and of Relation, but were more tolerant towards sentences that did not comply with the Maxims of Manner (be brief, and be orderly) or that did not adhere to the Maximize Presupposition principle. Children, in general, tolerated pragmatic violations more, and seemed to be less sensitive to violations of the Maxim of Manner and Maximize Presupposition. An interesting difference seems to emerge between the younger and older children in the rate of rejections of violations of Quantity and Relation, with primary school children approaching adults' behavior.

We performed binomial logistic regression analyses on accuracy as the dependent variable, with Group as predictor and subjects and items as random factor (adults was the reference level). To calculate accuracy as a dichotomous variable, we coded silver/bronze medals as rejections and gold medals as acceptance. The models revealed a significant effect of Group: both pre-school and primary-school children differ from adults (Est.=-2.754, SE=.388, z=-7.104 and Est.=-1.919, SE=.397, z=-4.83 respectively, both ps<.0001), and the primary-school children differ from pre-schoolers (Est.=.836, SE=.367, z=2.274, p=.023).

These results indicate that adults sanction violations of the maxims differently: statements that do not adhere to Quantity and Relation are always penalized, whereas sentences that violate Manner or Maximize Presuppositions are more tolerated. Since the latter maxims regulate only the form, and not the content, of sentences, we conclude that adults are less sensitive to pragmatic violations as long as they can understand what really happened. Children, in general, are not yet sensitive to pragmatic violations, and they seem to be satisfied as long as the answers are literally true. Still older children sanction violations of the Maxims of Quantity and Relation to a higher rate, exhibiting the same pattern displayed by adults.