2-year olds derive mutual exclusivity inferences from contrastive focus

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Overview: When children hear a novel term in the context of two potential referents – one familiar or already named, and one novel – they tend to assume that the novel word picks out the unfamiliar referent, an effect dubbed "Mutual Exclusivity" (ME). In a typical study (Markman and Wachtel 1988 et seq.), children are presented with a novel object (e.g. a vacuum tube) and a familiar object (e.g. a car) – and asked which one is the "dax"; children as young as 17 months of age (Halberda 2003) reliably look to the novel object. While there are several competing explanations for why children (and adults) in these tasks treat *dax* and *car* as being mutually exclusive in reference, all of them invoke a bias to avoid applying two labels to the same object. This study tests an alternative hypothesis that the exclusivity inference is a consequence of a well-attested grammatical phenomena present in adult language: **focus structure**.

Theoretical background: A standard assumption within linguistic semantics is that representations of sentences contain markers of *givenness* and *focus*, which trigger distinct discourse requirements (Rooth 1992, Buring 2016, Kratzer and Selkirk 2020). G(ivenness)-marking on an expression indicates that its meaning is salient in and recoverable from the preceding discourse. F(ocus)-marking on an expression indicates that its meaning contrasts with a salient alternative in the preceding discourse. In languages like English, these markers affect the prosodic realization of a sentence, such that differences in prosody correspond to systematic differences in interpretation. G-marked expressions are de-accented (1a); F-marked expressions are accented (1b).

(1) A: How did you like the conference?

    a. I liked the $talks_G$.   → speaker liked the conference (talks ≈ conference)

    b. I liked the $TALKS_F$.   → speaker did not like other salient aspects of the conference

We propose a novel hypothesis that such information-structural cues play a critical role in mutual exclusivity inferences. F-marking on the critical NP (indicated by accenting) should prompt listeners to exclude <u>contrastive</u> alternatives in the context (e.g. the already labeled or familiar object), resulting in an ME inference even if the noun is not novel. But, if the NP is marked as given (indicated by de-accenting), listeners should look for a <u>coreferential</u> salient discourse antecedent, resulting in no ME effect. To test these predictions, we manipulate F- and G-markings on the noun-phrase prompt and test whether children make an ME inference.

Study. <u>Logic and design:</u> Because our study tests whether cues in information structure predict ME effects in a context where the target label could *in principle* apply to both objects, instead of using a novel noun in the carrier phrase, we used "the toy". After a short warm up game,

Figure 1: Two frames of a test trial. Foxy first introduces one of the objects, then asks the participant to "point to the toy", where NP is either F-marked(accented) or G-marked (de-accented).

participants were presented with 6 test trials where they saw two novel objects and an on-screen communicator, Foxy. First, Foxy pointed to and labeled one of these objects with a novel label (e.g. "blicket", which was always F-marked to introduce a new referent). Then in the test phrase, Foxy asked the participant to "point to the toy". Crucially, we manipulated between subjects

whether "the toy" was F-marked (accented) or G-marked (deaccented).

Hypotheses: We predicted that children who hear F-marking on "the toy" should assume that the expression contrasts with a salient alternative. As the only such alternative is "blicket", the child should reason that the blicket is distinct from the toy, so the referent of "the toy" has to be the other object. On the other hand, if children hear G-marking on "the toy", they should assume that its meaning is recoverable from the available discourse. As "blicket" is the only salient antecedent, they should assume that "the toy" refers back to the same object as "blicket".

Participants: We report findings from a 10 participant pilot study (mean age: 2y;9mo) and an in-progress study with 14 participants (mean age: 2y;6mo; pre-registered full sample size = 50).

Results: In both the pilot sample (Figure 1a) and the in-progress sample (Figure 1b), children in the Focus condition are much more likely to choose the new object – i.e. derive an ME inference – than children in the Given condition. For both of these samples we conducted a mixed effects logistic regression (model syntax: *ChoiceOfNew ~ Condition + (1|Participant)*). Both revealed a significant effect of condition (pilot sample (β = -22.122, SE = 9.59, z = -2.59, *p* = .01); in-progress sample (β = -5.1743, SE = 1.41, z = -3.67, *p* < .001))

Discussion. Our findings support the hypothesis that children can use information structure to decide whether the referent of an NP should be recoverable from prior discourse (Given condition) or contrast with previously mentioned referents (Focus condition). This result opens the door to a possible reinterpretation of the ME inference as a result of contrastive focus. While past studies did not systematically manipulate information-structure to our knowledge, we suggest they may have tended to present their linguistic stimuli with prosodic prominence on the novel label, since this is the natural way to introduce new referents, thus marking the expression as focused. The upshot is that the grammar-based model of early ME does not require positing either conceptual or pragmatic biases to derive the inference and can provide principled answers to long-standing questions of when and how ME inferences should be suspended (see Bloom, 2001).
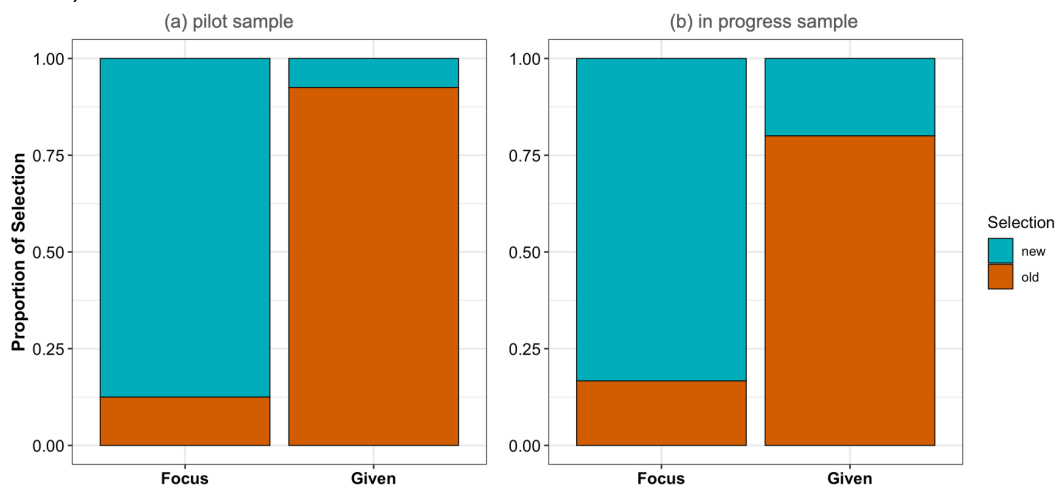
Figure 2: Rate of target selection (new versus old object) in pilot sample (a) and in in-progress sample (b) across Focus and Given conditions

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