

Linguistic packaging affects information recall in children and adults

Background: Studies conducted with adults suggest that linguistic information is parsed differently depending on how it is conveyed (e.g., asserted, conventionally implicated, presupposed), but that the way the information is packaged does not affect memory recall [1]. Yet other studies report that recall of presupposed information differs across triggers, e.g., the presuppositions of definite descriptions are processed more shallowly than those of change-of-state verbs [2]. The present study investigates whether children treat and recall information differently depending on how it is packaged, focusing specifically on content that is asserted, presupposed, conventionally implicated, and conversationally implicated.

Experiments: We tested a group of English native speaker adults and a group of English-acquiring children using two question-answer tasks implemented on Qualtrics. Each trial consisted of two screens. On the first screen, participants saw a cartoon alien and were presented with a fact about it (e.g., *This alien, who is from France, likes to surf*) (see pairs (1a,b)-(4a,b), Fig.1). On the next screen, they were then asked if the provided description had contained a certain piece of information (e.g., *The alien is from France*) ((1c)-(4c)). Exp.1 manipulated Information type (Presupposed vs. Asserted) and included two triggers (*continue*, possessive pronouns *his/her*). Exp.2 manipulated Information type (Implicated vs. Asserted) and included two implicature types (conventional implicatures of parentheticals, scalar implicature of *some*).

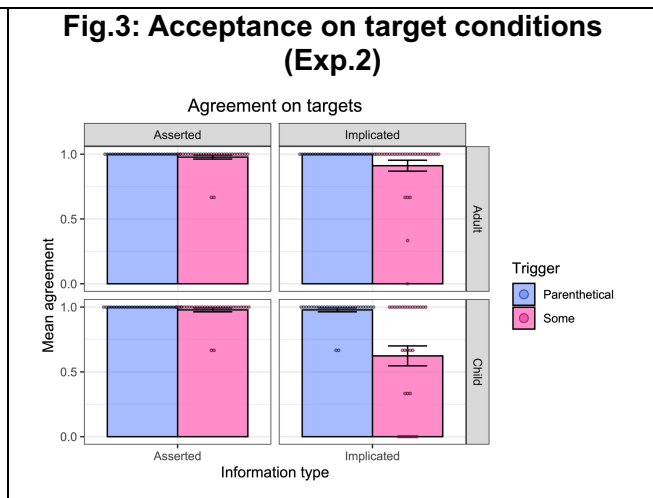
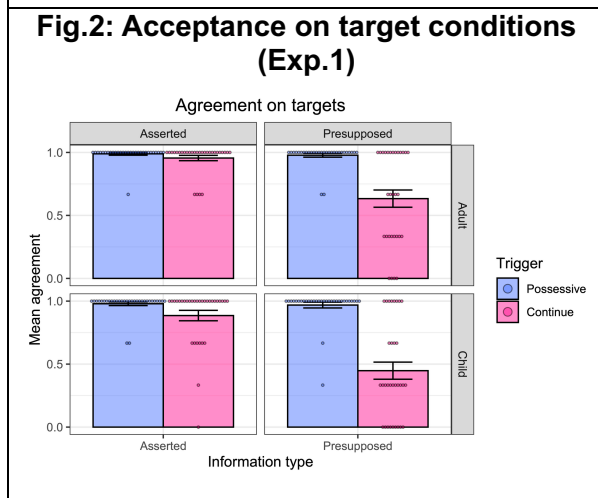
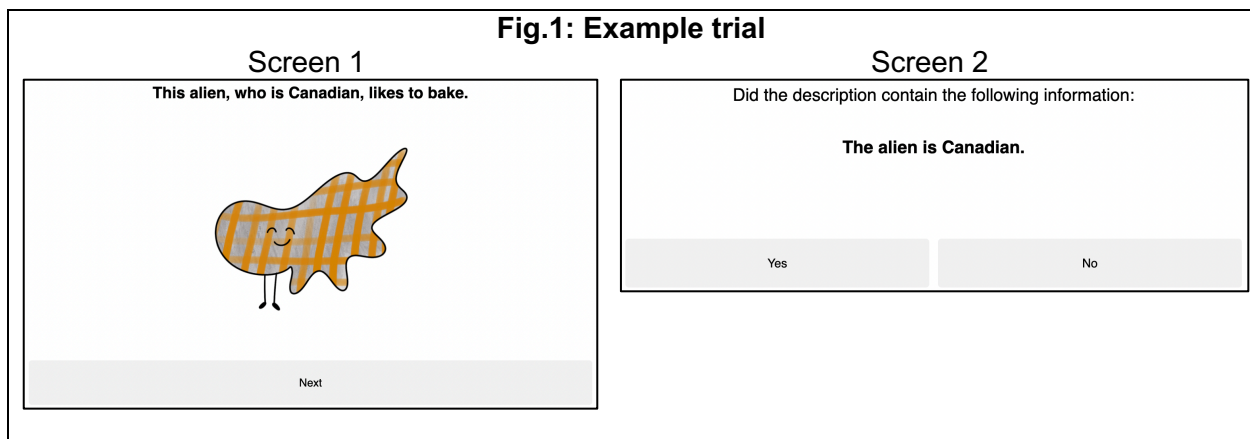
Experiment 1: 32 children (5;04-7;04, M=6;05) and 30 adults completed Exp.1. They received 4 training trials, followed by 6 *continue* targets (3 presupposed, 3 asserted), 6 possessive targets (3 presupposed, 3 asserted), and 12 fillers in randomized order. There were two lists, such that each item was seen in both presupposed and asserted forms but not by the same participants. For both groups, accuracy on fillers was above 99%. A mixed effect logistic regression model was fitted to the targets (Fig.2) with Group, Information type (Asserted vs. Presupposed), Trigger (Continue vs. Possessive), and their interaction as fixed effects, and random by-participant intercepts. Model comparisons revealed no effect of Group, but significant effects of Information Type ($\chi^2(1)=15$, $p<.001$), Trigger ($\chi^2(1)=53$, $p<.001$), and interaction between Information Type and Trigger ($\chi^2(1)=5.4$, $p<.05$), with *continue* showing a larger difference between information packaging types compared to the possessive determiner.

Experiment 2: 31 of the 32 children in Exp.1 (5;05-7;05, M=6;06) and the same 30 adults completed Exp.2. Adults (who were recruited via Prolific) completed Exp.2 immediately after Exp.1, while children were tested on Exp.2 in a separate session, to maintain interest and attention. Exp.2 consisted of 4 training trials, followed by 6 parenthetical targets (3 implicated, 3 asserted), 6 *some* targets (3 implicated, 3 asserted), and 12 fillers in randomized order. As in Exp.1, there were two lists, such that each item was seen in its implicated and asserted forms, but not by the same participant. Participants' accuracy on fillers was above 99%. A mixed effect logistic regression model was fitted to the targets (Fig.3), with Group, Information type (Asserted vs. Presupposed), Trigger (Parenthetical vs. Some), and their interaction as fixed effects, and random by-participant intercepts. Model comparisons revealed only an effect of Trigger ($\chi^2(1)=26$, $p<.001$), with *some* being recalled worse than the parenthetical.

Discussion: The findings suggest that children, like adults, treat information differently depending on how it is packaged. They treat asserted information as part of the Common Ground, and are able to subsequently recall it accurately. For presupposed and implicated content, there is variation by trigger/expression: the presuppositions of possessive pronouns and conventional implicatures of parentheticals appear to be as robust in their implicit forms as in their explicit, asserted forms; in contrast, the presupposition of *continue* and the implicature of *some* appear to be less robust in their implicit forms. One possible task-related explanation for the variability might be that since the 'recall' question for each trial immediately followed presentation of the linguistic

description (as opposed to being temporally separated by other content), the results might be reflecting the rate of inference *derivation*, as opposed to *recall*. That is, lower agreement on the *continue* and *some* trials might reflect the weaker status of *continue* as a presupposition trigger, and the weaker (more optional) implicature of *some*, compared to the other triggers/inferences. In follow-up work, we test inference derivation and information recall in two (more clearly distinct) stages, in order to tease apart inference strength and memory recall.

- (1)
 - a. This alien put on his party hat. (*Possessive_Presupposed*)
 - b. This alien got a party hat. He put it on. (*Possessive_Asserted*)
 - c. \sim *The alien has a party hat*
- (2)
 - a. This alien had a piece of cake, then continued dancing. (*Continue_Presupposed*)
 - b. This alien danced, then had a piece of cake, then danced. (*Continue_Asserted*)
 - c. \sim *Before having a piece of cake, the alien was dancing*
- (3)
 - a. This alien, who is from France, likes to surf. (*Parenthetical_Conventionally implicated*)
 - b. This alien is from France and likes to surf. (*Parenthetical_Asserted*)
 - c. \sim *The alien is from France*
- (4)
 - a. This alien drank some of the juice. (*Some_Conversationally implicated*)
 - b. This alien drank some, but not all of the juice. (*Some_Asserted*)
 - c. \sim *The alien didn't drink all of the juice*



References: [1] Miller, E. & Kissine, M. (2023). Suggestibility to presupposed contents. XPRAG10. [2] Masia, V., Garassino, D., Brocca, N. & de Saussure, L. (2023). Recalling presupposed information: Evidence from the online processing of presuppositions in political tweets.