4-year-olds' interpretation of additive *too* in question comprehension

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Introduction: Additive particles like English *too* contribute an additive presupposition to sentence meaning: e.g., in uttering (1), a speaker not only asserts that Mickey ate a banana but also presupposes that Mickey ate something else in addition.

(1) Mickey ate a BANANA too

The previous literature is divided over when children understand this additive presupposition. [1, 3, 6, and 7] report children's difficulty with the additive presupposition in various languages, well into their school years. However, these initial studies tested children's comprehension in contexts where the presupposition was not supported. Later studies address this problem, but again the findings are split: [2] find that German-acquiring children as young as 3 understand the additive presupposition of *auch* 'also', though the study may overestimate children's comprehension, given their high (*auch*-less) baseline; [5] find that English-acquiring 4-year-olds understand the additive presupposition of *also*, but not at the level of German-acquiring children in [2]. Here we adapt [5]'s task with some methodological improvements to test whether 4-year-olds perform better with the English particle *too*, which appears much more frequently in children's input than *also*. We find that they do: 4-year-olds successfully consider *too*'s presupposition and use that information to restrict the range of possible answers to a *wh*-question.

Experiment: Alongside a puppet, participants listen to short stories about Mickey, Minnie, and Donald, who each complete some tasks (e.g., eating fruit as in (2)). After each story, the experimenter asks the puppet a question like *Who ate the most fruit?* in (3). The puppet first responds by recounting the story, as in (4). This plays a crucial role in setting up a natural context in which the additive presupposition of *too* is supported ([4]). Having forgotten some details, the puppet proceeds to ask a target question like *Who ate a BANANA (too)?* in (5), with or without *too* (between participants design). In [5]'s original design, the puppet's recount of the story contained a VP-ellipsis (e.g., *Mickey and Minnie did* <~~*eat an apple*~~>). We eliminated this potential confound as resolving an ellipsis and assessing a presupposition simultaneously could place extra demand on children's processing, hindering their performance.

(2) **Sample story:** Mickey, Minnie, and Donald are going to eat fruit for breakfast. There are apples and bananas to eat. Mickey says, "I just woke up so I'm not that hungry. I'll just eat one fruit." Look, Mickey eats an apple! Mickey then says, "that was delicious. I'll eat another fruit!" Look, Mickey eats a banana! Minnie says, "eating too much fruit is not good for me. I'll just eat one fruit." Look, Minnie eats an apple! Donald says, "I ate a lot for dinner yesterday, so I'm not hungry. I'll just eat one fruit." Look, Donald eats a banana!

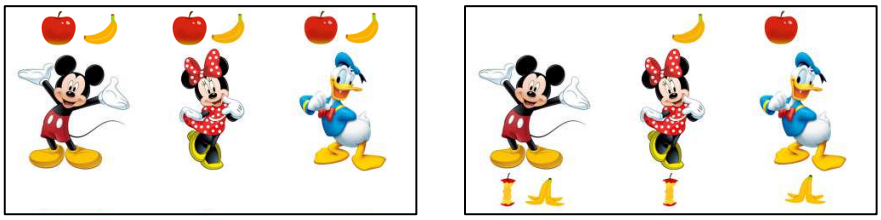

Figure 1. First and last scenes from an animated PowerPoint slide accompanying (2)

(3) **Experimenter's question:** Alright, Charlie. Who ate the most fruit in this story?
(4) **Puppet's recount of the story:** Well, let's see. There were apples and bananas to eat. Donald didn't eat an apple, but Mickey and Minnie did eat an apple.
(5) **Test question:** And who ate a BANANA (too)?

The dependent variable is whether or not participants answer the target question with the "two-action character" (e.g., Mickey, who ate both an apple and a banana in (2)). If sensitive to *too*'s presupposition, participants in the TOO-condition should choose the two-action character since it is the only character that satisfies both the truth-conditional content of the question (i.e., *x ate a banana*) and the presupposition of *too* (i.e., *x ate something else in addition to a banana*). No such preference is predicted for the NO-TOO-condition, as both banana eaters are truth-conditionally valid answers.

Results: Figure 2 summarizes the results from 32 English-acquiring children (age 4;0-5;0, mean 4;5), displaying the mean % of two-action character responses across two conditions (TOO vs NO-TOO). Since there was no variance in the amount of two-action character responses in the NO-TOO condition, a logistic regression would be inappropriate. Instead, we calculated the 95% confidence interval for the TOO-condition to see if it excludes the results from the NO-TOO condition, and it does: the 95% confidence interval for the TOO-condition is 52.77% and 87.23%.

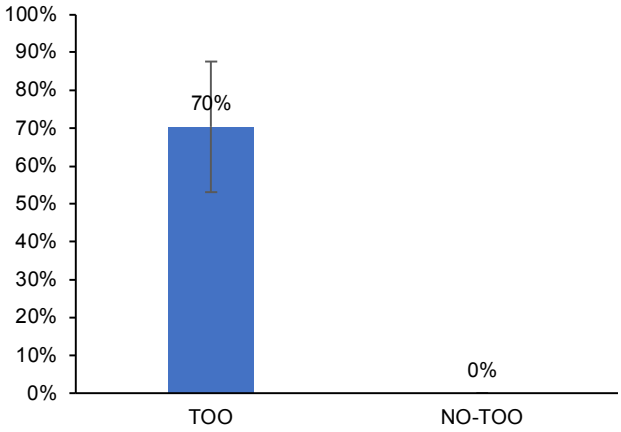

Figure 2. mean % of two-action character responses across two conditions with error bars indicating 95% confidence interval

Discussion: We find that children in the TOO-condition show a strong preference for the two-action character response. In contrast, children in the NO-TOO-condition never gave this type of response, despite being truth-conditionally valid. Since the only difference between conditions is the presence/lack of *too* in the test questions, it's safe to assume that the change in children's behavior is driven by *too* and its presupposition, and that children at this age know *too*'s presupposition. And because our (*too*-less) baseline is zero, we can be confident that our experiment doesn't overestimate children's comprehension. Furthermore, we see an increase in children's performance compared to [5] (20% more two-action character responses in the TOO-condition). Further research will determine whether children's improved performance relative to [5] is due to the difference in the additive particle tested (*too* vs. *also*), or to methodological improvements (no VP-ellipsis in (4)). We also plan to test younger, as well as adult controls on *too* and *also*.

References: [1] Bergsma, W. 2006. (Un)stressed *ook* in Dutch. / [2] Berger, F., & Höhle, B. 2011. Restrictions on addition: Children's interpretation of the focus particles *auch* 'also' and *nur* 'only' in German. / [3] Hüttner, T., Drenhaus, H., van de Vijver, R., & Weissenborn, J. 2004. The acquisition of the German focus particle *auch* 'too': Comprehension does not always precede production. / [4] Kripke, S. 2009. Presupposition and anaphora: Remarks on the formulation of the projection problem. / [5] Kurokami, H, D. Goodhue, V. Hacquard & J. Lidz. Children's interpretation of additive particles *mo* 'also' and *also* in Japanese and English. / [6] Matsuoka, K. 2004. Addressing the syntax/semantics/pragmatics interface: The acquisition of the Japanese additive particle *mo*. / [7] Matsuoka, K., Miyoshi, N., Hoshi, K., Ueda, M., Yabu, I., & Hirata, M. 2006. The acquisition of Japanese focus particles: *Dake* (only) and *mo* (also).