On the Acquisition of *either* and *too*

Summary: We investigate how children acquire the polarity sensitivity of NPI *either* and its PPI counterpart *too.* Our central finding is that i) children aged 3-5 exhibit stable, non-categorical preferences in the direction of the adult grammar, and ii) by age 6, these preferences become categorical (adult-like) for *either* but not *too.* We discuss the implications of this observation in light of results from A) a parallel adult experiment, B) a corpus study of child-directed adult speech and C) a corpus study of child speech.

Background: The emphatic conjunction particles *either* and *too* are traditionally analyzed as a pair of polarity items with (near) complementary distribution with the polarity of the hosting sentence providing the controlling factor: *either* requires a negative environment while *too* is used in positive environments (possibly out-scoping a clause-mate negation, if present) [e.g. 1,2,3, 4].

    (1) Sam is eating cake. Sam is eating ice cream too/*either.
    (2) Sam isn't eating cake. Sam isn't eating ice cream either/*too.

Child experiment: To determine how knowledge of the licensing conditions for *either/too* develops, we presented 46 NA-English-acquiring children aged 3-6 with a comparative felicity judgement task [6,7]. Participants were presented with a scene, of which two puppets gave true descriptions differing only in the additive item (*either/too*) used (Fig. 1); participants were then asked which puppet "said it better". Results (Fig. 2) show that children aged 3-5 accept both items in positive and negative sentences, but select *either* more often in negative sentences and *too* more often in positive sentences. 6-year-olds continue this non-categorical behavior in negative environments, but in positive environments they stop selecting *either*. Linear mixed effects logit modelling of rate of *either* selection reveals main effects of polarity (pos/neg) and age (3-5 vs. 6) and a significant interaction between age and polarity (Pr(>|z|) = 0.036657). Moreover, pooling data from 3-5 ya, excluding 6 ya, also reveals a significant effect of polarity (*either* more likely than *too* in negative environments) suggesting that there is a stable, albeit non-categorical adult-like sensitivity to polarity throughout an extended period of development (3-5ya).

Adult controls: 48 NA-English-speaking adults performed a naturalness rating task on the same material using a 7-point Likert scale. Results (Fig. 3) indicate that both environments are judged categorically (p < 0.001), suggesting that 6-ya children have acquired only half of the adult system.

Corpus study of child-directed adult speech: Custom R-sprits were used to used to extract every instance of additive *either* and *too* from the CHILDES NA corpora and then coded by hand for polarity. We find that children hear approximately ten times more tokens of PPI *too* than NPI *either*, and that they hear vanishingly few instances of *either/too* in environments where they appear not licensed, Table 1. The input to children's learning is thus overwhelmingly categorical and should not invite confusion about the distribution of *either/too*.

Corpus study of child speech: The same data extraction and classification procedure for child speech revealed parallel results: a marked frequency advantage for *too* over *either* and almost no occurrences of unlicensed particles. Moreover, when factoring out the frequency advantage of *too* we observe a strikingly similar growth pattern of particle use during development, Figure 4.

Discussion: Our findings constitute a new an argument from "the abundance of evidence" for a domain specificity component in language acquisition (e.g. [8]). Specifically, children's comprehension exhibits a weak sensitivity to the polarity-dependent distribution of *either/too* in the input but does not approach the adult categorical grammar gradually, in spite of the continuous availability of categorical evidence. Instead, they switch abruptly to the adult grammar for one of the polarity items (*either*) but not the other. This is all the more striking as their production appears adult-like for both particles much earlier in the development. Indeed, we will show that these results are unexpected under all current proposals for *either* and *too* we are aware of.
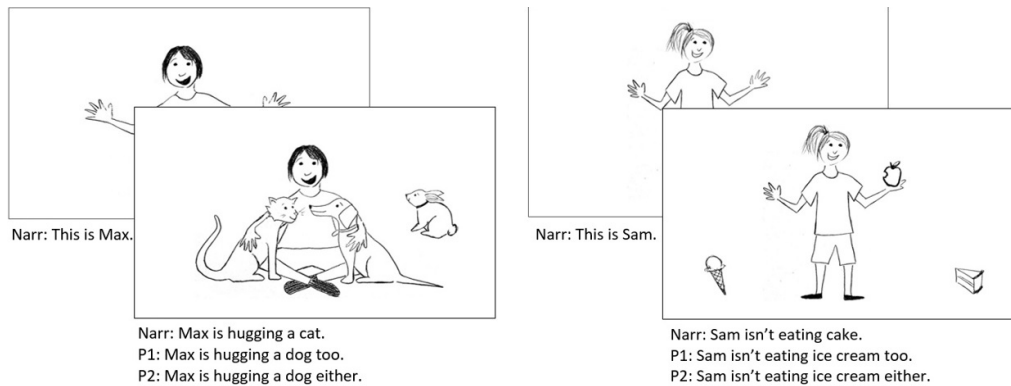
Figure 1: Example positive (L) and negative (R) target items from child experiment
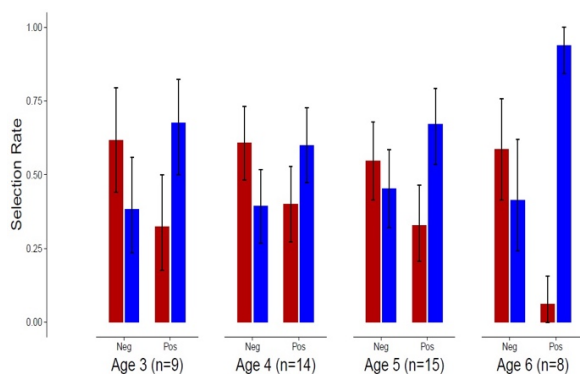

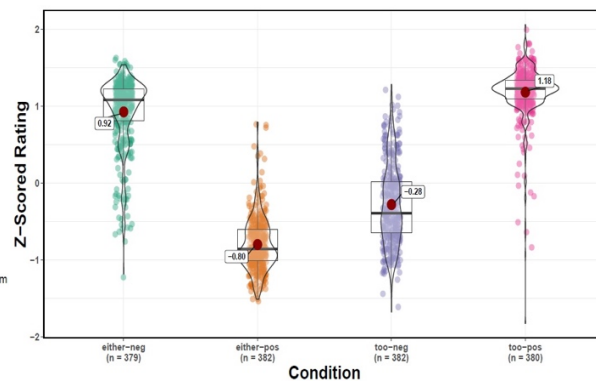**Figure 2:** Mean rate of *either/too* selection from Exp.1

Figure 3: Z-scores of sentence ratings from Exp.2

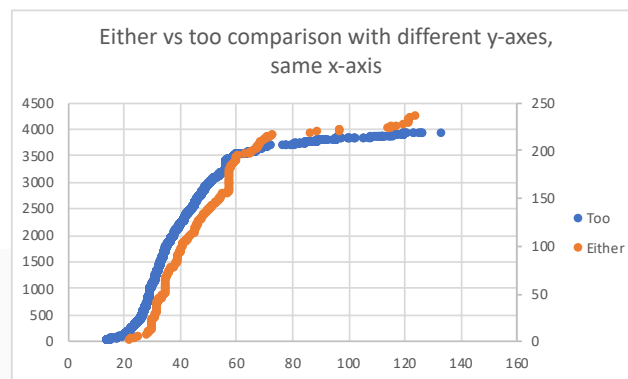| Polarity item	Total	Positive	Negative	Unclear
Either	701	28 (3.99%)	670 (95.58%)	3 (0.43%)
Too	7896	7782 (98.56%)	103 (1.30%)	11 (0.14%)

Table 1 Child-directed adult speech

Figure 4: Development (in months) of either/too use

References: [1] Lakoff, G. (1971). The Role of Deduction in Grammar. In Fillmore and Langendoen (eds.), Studies in Linguistic Semantics, Holt, Rinehart and Winston. [2] Green, G. (1973). The Lexical Expression of Emphatic Conjunction. Theoretical Implications. *Foundations of Language*, Vol. 10, No. 2, pp. 197-248. [3] Rullmann, H. (2003). Additive particles and polarity. *Journal of Semantics* 20(4), 329–401. [4] Ahn, D. (2015). The semantics of additive either. Proceedings of Sinn und Bedeutung 19. [5] Chierchia, G. et al. (2001). The acquisition of disjunction: Evidence for a grammatical view of scalar implicatures. *Proceedings of BUCLD 25,* 157-168. [6] Foppolo, F. et al**.** (2012). Scalar implicatures in child language: Give children a chance. *Language Learning and Development 8*, 365-394. [7] Tieu, L. (2013). *Logic and grammar in child language: How children acquire the semantics of polarity sensitivity*. University of Connecticut dissertation. [8] Babyonyshev, M. et al. (2001). The Maturation of Grammatical Principles: Evidence from Russian Unaccusatives. *Linguistic Inquiry* 32(1):1-44