

What can recursion tell us about bilingualism (and vice versa...)?

Ana T. Pérez-Leroux, University of Toronto

Yves Roberge, University of Toronto (corresponding author – yves.roberge@utoronto.ca)

Erin Pettibone, University of Toronto

Anny Castilla-Earls, University of Houston

Context. Recursion is universal across languages (Nevins et al. 2009) but instantiated through different embedding rules and markers cross-linguistically (Widmer et al. 2017). It emerges relatively late in children’s production, but following similar patterns (Pérez-Leroux & Roberge 2018) but it is not clear whether it is learned from direct exposure to recursive structures, or based on the distributional properties of embedded structure at the first level (Li et al 2020). Also unclear is whether the development of recursion is impacted by exposure to 2 or more languages. Bilingual children tend to lag behind monolinguals in their acquisition of complex sentences due to age of onset of experience (Grimm & Schulz 2019) and exposure considerations (Paradis et al. 2017). Less is known about complex, recursive DPs. Adult L2 learners experience difficulty with recursive embedding regardless of whether the two languages differ (Limbach & Adone 2010) or are congruent (Nelson 2016). Leandro & Amaral’s (2014) study compared the comprehension of two genitives in Wapichana-English bilinguals children aged 3-7. The bilinguals matched monolingual English controls in Wapichana but not in English. Pérez-Leroux et al. (2017) finds preliminary evidence that bilingual children may be delayed for rule acquisition at level-1 embedding (1a) but not at level-2 and beyond as in recursive (1b).

Methods and questions. We tested the onset and development of DP recursion in heritage Spanish-speaking children aged 4-6 growing in an English context (n=35) compared to monolingual age-mates (n=71). A production task (Figure 1) elicited recursive DPs in three congruent (PP) and one non-congruent constructions (possession – Saxon *'s* vs. *de*), a domain affected by cross-language influence (Nicoladis 2012). We explored two questions:

- Is the onset of the ability to produce recursive embedding affected by the bilingual environment?
- Is the development of recursion affected by congruence/incongruence between the two languages?

Results. Considering an individual’s ability to produce at least one instance of a complex NP, there was one difference between the language groups: three bilingual children were at the single DP stage, but no monolingual children. Otherwise, the number of children at simple embedding and at the recursive embedding stages were similar across groups. To analyze overall success, we entered the data into a glmer model with recursive structure as a binary response variable, and age group, condition, and language status as fixed effects, with participants as random effects. The best fit was for a model with significant effect of age (*6-year-olds* > *4-5-year-olds*), and of condition (*possessive/comitatives* > *locatives/relational*) and a significant bilingual difference (Figure 2a/b), but no interaction.

Discussion. These results suggest a similar onset of capacity in bilinguals and monolinguals but clear evidence of developmental differences between groups in the ability to deploy the complex structures. There was no evidence that possession was differentially affected. Qualitatively, we found no syntactic differences between the two groups. We conclude that recursion is resilient and immune to transfer (as least in the majority language). These conclusions are compatible with the proposal that late-acquired phenomena show a lag for simultaneous bilinguals (Tsimpli 2014).

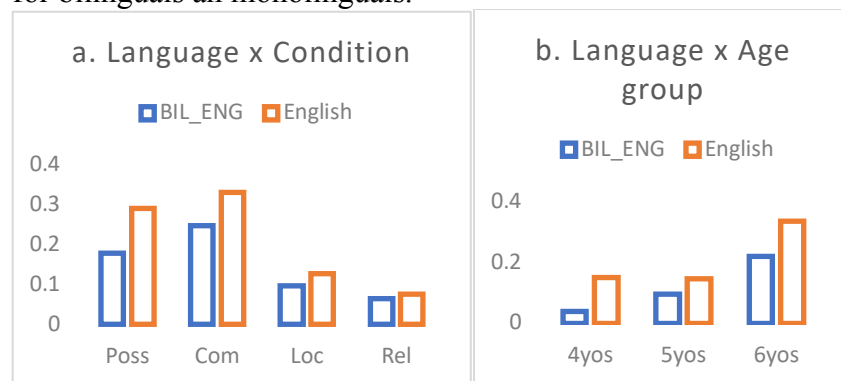
What can recursion tell us about bilingualism (and vice versa...)?

- (1) a. *the box under the table*
b. *the dog next to the tree next to the house*

Figure 1. Example of the referential elicitation recursive task with the relational noun condition. (*Which box has the mouse standing on top? The box of cans of tomatoes*). Other conditions included possessives (*Kermit's sister's dress*), comitatives (*the girl with the dog with the hat*) and locatives (*the flowers on the pot on the windowsill*).



Figure 2. Proportion of target recursive responses as a function of a) condition and b) age group for bilinguals and monolinguals.



References:

- Leandro, W. & L. Amaral (2014). The Interpretation of Multiple Embedded Genitive Constructions by Wapichana and English Speakers. *Linguística*. Vol 10(2): 149-162. Rio de Janeiro: UFRJ.
- Limbach, M. & D. Adone (2010). Language acquisition of recursive possessives in English. In K. Franich, K. M. Iserman & L. L. Keil (Eds.), *Proceedings of BUCLD 34*: 281- 290. Somerville, MA: Cascadilla Press.
- Nelson, J. (2016). *First and Second Language Acquisition of Recursive Operations: Two Studies*. Doctoral dissertation, U. of Massachusetts.
- Nevins, A., D. Pesetsky & C. Rodrigues (2009). Pirahã exceptionality: A reassessment. *Language* 85: 355-404.
- Nicoladis, E. (2012). Cross-linguistic influence in French-English bilingual children's possessive constructions. *Bilingualism: Language and Cognition* 15: 320-328.
- Paradis, J., B. Rusk, T. Sorenson Duncan & K. Govindarajan (2017). Children's second language acquisition of complex syntax: The role of age, input, and cognitive factors. *Annual Review of Applied Linguistics* 37: 148-167.
- Pérez-Leroux, A.T & Y. Roberge (2018). A way into recursion. *UMOP 41: Thoughts on Mind and Grammar (T.O.M. and grammar): A Festschrift in Honor of Tom Roeper*. Amherst, MA: GLSA.
- Pérez-Leroux, A.T, E. Pettibone & A. Castilla-Earls (2017). Down two steps: Are bilinguals delayed in the acquisition of recursively embedded PPs? In *Aquisição da Linguagem: Matraga* 24 (41): 393-416.
- Schulz, P. & A. Grimm (2019). The age factor revisited: Timing in acquisition interacts With Age of onset in bilingual acquisition. *Frontiers in Psychology* 9, 2732.
- Tsimpli, I. M. (2014). Early, late or very late? Timing acquisition and bilingualism. *Linguistic Approaches to Bilingualism* 4: 283-313.
- Widmer, M., S. Auderset, J. Nichols, P. Widmer & B. Bickel (2017). NP recursion over time: Evidence from Indo-European. *Language* 93: 799-826.