

The problem with *with*: Children's comprehension of PP embedding
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To acquire the full expressive power of complex syntax, children must master not only the syntactic properties of hierarchical structure, but also the specific semantic consequences of phrasal embedding. An extensive literature shows various degrees of difficulty with the semantics of embedded clauses (Pérez-Leroux & Schulz 1999; Schulz 2003; Schwarz 2015), and that children initially treat sentence complements as asserted truths (de Villiers 2005) until close to the age of 4, but there is no comparable investigation in the NP domain. Yet, as pointed out by Arsenijevic and Hinzen (2012), there is a parallel case for opacity in modifiers embedded inside a DP. This is illustrated by the contrast below. In (1) - (2), the referent of the DP internal to the PP modifier (*on the table*) is not accessible to the copular predicate. The coordinated DPs in (3) are equally accessible to the predication and become part of the asserted content.

- (1) [The cup [on the table]] is green. (PP embedding-locative)
- (2) [The dog [with the ball]] is blue (PP embedding-comitative)
- (3) [[The cup] and [the table]] are green. (NP coordination)



In other words, in (1) it is understood that the cup is green, not the table. The assertion only affects the highest nominal referent in the subject DP, whereas multiple coordinated nominals are equally accessible to reference. When and how do children develop this understanding? Is there a stage when they interpret embedding and coordination in the same way? Since prepositions also differ in their semantic and developmental profiles (e.g. Kidd & Cameron-Faulkner 2008; McKercher 2001; Tomasello 1987), is this acquisition uniform across various lexical prepositions? This study aims to examine preschool-aged children's ability to understand English sentences containing PP embedding within the noun phrase, including two different preposition types, locative *in/on* and comitative *with*.

21 typically developing, monolingual English-speaking children aged 3;00 to 5;02 and 5 adult control participants completed a comprehension task using the colouring method (Zuckerman, Pinto, Koutamanis & van Spijk 2016), implemented on an iPad with the Educreations (2016) app. Participants heard sentences such as (1) - (3) and were asked to colour the picture to match. The test included 4 items per condition, plus an additional 3 training items and 8 distractors manipulating sentence form and number of items to color.

Adults were 100% accurate, but children had variable success at interpreting the test sentence types, despite good performance on the controls. Children's accuracy scores were not significantly different for coordination and locatives (88% vs. 79%; $V = 48$, $p = 0.1635$), but were significantly lower for comitatives (24%) in comparison to the coordination controls ($V = 210$, $p < 0.001$). The main error pattern was to colour both DPs in sentences like (2), that is, treating these as coordinates. These findings suggest that the structural and semantic differences between coordination and embedding are not generally problematic for children, even those as young as 3, but that the semantics of prepositions matter. We consider the coordinate treatment of comitatives in relation to the polysemy of English *with*, along with cross-linguistic variation in the functions of comitative prepositions that may explain the observed acquisition

difficulties. The conclusion is that hierarchical structure develops early but acquisition of lexical semantics is needed to fully master the referential behavior of complex modified DPs.

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