

Atoms of Intervention in the Acquisition of A'-dependencies in French

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Research on the acquisition of A'-dependencies has revealed that not all movement configurations are problematic for children: subject extraction is easier than object extraction [1-4], free dependencies are easier than headed dependencies [3]; an animacy mismatch between the subject and object facilitates object extraction [5]. Grammatical/intervention accounts explain such selective difficulties in terms of sensitivity to the structural similarity between the moved object and the intervening lexical subject [3]. However more remains to be understood about the atoms of intervention in A'-configurations: What role do they play in French? Are they on a par in terms of their impact across structures and across age groups? Is their computation related to working memory abilities? Here, we address these questions by investigating French-speaking children's comprehension of object wh-questions and relative clauses (RCs), focusing on the nature of the moved object (+NP vs -NP; +Animate vs -Animate), while the intervener (i.e. the embedded subject) is kept constant: a DP with +NP +Animate features. Alongside this, we explore the link between parsing these structures and verbal short-term memory.

The experiment followed a 2x2x2 design with factors structure type (wh-questions/ RC), object type (+NP/-NP) and object animacy (+Animate/-Animate). In a character-selection task, 61 French-speaking children (5yo: N=14; 7yo: N=17; 9yo: N=16; 11yo: N=14) were prompted to choose the correct character as identified by a wh-question (1-2) or RC (3-4). Each test sentence was associated with two pictures in which the same action was depicted with reversed Agent-Patient roles (figure 1a,b). Verbal short-term memory was assessed through digit-span tasks.

The data revealed a significant interaction between structure type, object type and object animacy ($F(1,60)=32.77$, $p<.001$). In +NP questions and RCs, the mismatch in animacy between the A'-moved object and the subject did not improve comprehension in the 5yo ($p>.05$), whereas it yielded a significant difference in all the older groups (all $ps<.001$). The +Animate/-Animate object asymmetry did not extend to -NP questions ($p>.05$), but was present in -NP RCs ($t=-7.35$, $p<.001$) due to the fact that RCs headed by a -NP -Animate object (i.e. *ce*) led to robustly higher accuracy than -NP +Animate object RCs (i.e. *celui, celle*). We also found a significant correlation between response accuracy and age groups ($r=.698$, $p<.001$), as well as verbal short-term memory as measured by digit-span tasks ($r=.660$, $p<.001$).

The results obtained show that the most problematic configurations for children are those in which the features on the intervener (+NP, +Animate) are included in the set of features present on the A'-moved object. That the intervention effect does not disappear in 'free' RCs in the +Animate condition follows from the internal structure of *celui/celle* in French, which consists of *ce* and the pronominal form *lui/elle* [6]. This suggests that *celui/celle* bear at least a functional NP restriction, which leads to an inclusion relation between the featural specification on the intervening lexical subject and the moved object. The fact that 5 yo children did not perform better with A'-dependencies headed by a +NP -Animate object shows that they cannot exploit the mismatch in animacy with the intervener. Animacy, being a subfeature of NP, is too deeply embedded to be taken into account for computation by the younger systems. This argues in favour of a structured view of the feature hierarchy. Moreover, a mismatch in animacy did not significantly improve comprehension at any age in -NP questions (questions with *qui* and *qu'*). We interpret this as supporting the view that the animacy effect depends on the locus where the feature is expressed (whether it is associated with a +NP or a -NP feature). Thus, the factor that plays a crucial role in the comprehension of A'-dependencies is the +NP feature: children perform best with structures in which there is a disjunction in the +NP feature between the A'-moved element and the intervener. Featural intervention across the board increases cognitive load, as shown by the link between accuracy of performance and memory scores, suggesting that limitations of computational resources impact the processing of A'-dependencies in children.

Examples:

1. *Quelle dame /Qui est-ce que la fille embrasse?*
 “Which lady/Who ESK the girl is kissing?”
2. *Quelle balle/Qu’est-ce que la fille frappe?*
 “Which ball/What ESK the girl is hitting?”
3. *Montre-moi la dame/celle que la fille embrasse.*
 “Show me the lady/the one that the girl is kissing.”
4. *Montre-moi la balle/ce que la fille frappe.*
 “Show me the ball/what the girl is hitting.”

References: [1] O’Grady, 1999. *Syntactic Development*. Chicago: University of Chicago Press; [2] Avrutin, 2000. “Comprehension of Wh-questions by children and Broca’s aphasics”. In Grodzinsky et al (Eds), *Language and the brain: Representation and processing*. San Diego, CA: Academic Press. pp 295-312; [3] Friedmann et al, 2009. “Relativised relatives: Types of intervention in the acquisition of A-bar dependencies”. *Lingua*. 119: 67-88; [4] Costa et al, 2011. “Subject-object asymmetries in the acquisition of Portuguese relative clauses: Adults vs. children”. *Lingua*, 121: 1093-1100; [5] Traxler et al, 2002. Processing subject and object relative clauses: Evidence from eye-movements. *Journal of Memory and Language* 47: 69–90; [6] Kayne, 2010. “Why Isn’t This a Complementizer?”, in Kayne, *Comparisons and Contrasts*, New York: OUP.

Figure1: a.



b.



Tables for Mean Correct Answers per Age Group

