French object relatives: evidence against DLT but not entirely explained by frequency

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The literature in relative clause processing mainly presents differences between subject and object relative clauses (SRs and ORs). In our study, we will also compare two constructions for ORs: one with preverbal subject (ORs_{noinv}) and one with postverbal subject (ORs_{inv}). Inversion is only possible with nominal subjects, not with pronominal subjects.

(1) **OR with preverbal subject**   **OR with postverbal subject**

Le médecin que l'avocat voit ____.   Le médecin que voit ____l'avocat.

The doctor that$_{obj}$ the lawyer$_{subj}$ sees.   The doctor that$_{obj}$ sees the lawyer$_{subj}$.

Example (1) shows that the linear distance is shorter in ORs_{inv}, so it should be easier to process than ORs_{noinv} according to the Dependency Locality Theory, now DLT (Gibson, 2000).

Study 1 We designed an experiment to test linear distance-based theories in French in contexts with high anticipation of restrictive relative clauses.

Experiment We ran a Visual World Eye-Tracking experiment (5 items per condition) with 32 native French speakers. We tested reversible SRs, ORs_{noinv}, ORs_{inv} (1-3). The participants listened to a sentence while viewing 2 pictures with the same 3 characters each performing different actions. They had to find the correct picture according to the sentence. One picture was only compatible with an SR interpretation, the other one only with an OR interpretation.

1 / French SR	*Please find the right princess, that is to say the beautiful princess that$_{subj}$ draws the fencer on the picture.*
Prière de trouver la princesse correcte, c'est-à-dire la belle princesse **qui dessine l'escrimeur** sur l'image.	
2 / French OR	*Please find the right princess, that is to say the beautiful princess that$_{obj}$ the fencer$_{subj}$ draws on the picture.*
Prière de trouver la princesse correcte, c'est-à-dire la belle princesse **que l'escrimeur dessine** sur l'image.	
3 / French OR with subject inversion	*Please find the right princess, that is to say the beautiful princess that$_{obj}$ draws the fencer$_{subj}$ on the picture.*
Prière de trouver la princesse correcte, c'est-à-dire la belle princesse **que dessine l'escrimeur** sur l'image.	

Results Mixed linear models showed a significant SR advantage over the two ORs (ps<.01). Participants looked at the right picture in later time windows for OR_{inv} than for OR_{noninv} (ps<.01), against linear distance accounts. These results seem, however, to go against the intuition that OR_{inv} are relatively frequent in French, but possibly only under specific conditions.

Study 2 We therefore ran a corpus study using the French Treebank (Abeillé et al, 2003) to analyze factors for facilitating inverted and non-inverted RCs.

Corpus study We analyzed a corpus of the two ORs by looking at the semantics of the verb (+/- agentive), the length of the subject and the verb in number of syllables, and the number of arguments in the relative. We analyzed the role of these factors for the choice of the order in the relative using logistic regression models.

Results Logistic regressions show that the two ORs don't differ significantly in frequency, excluding a simple frequency-based explanation (94 ORs_{noinv} and 90 ORs_{inv}). However, ORs_{inv} are actually preferred over ORs_{noinv} when the subject is longer, and the verb is shorter and has a non agentive meaning (ps< .01).

Conclusion In our Eye-Tracking experiment, ORs_{inv} were harder to process than ORs_{noinv}, contradicting the DLT. However, the corpus study showed that general frequency cannot be the factor explaining this contrast. The verb semantics and the length of the subject and verb play a role in the choice of relative. This means that ORs_{noinv} and ORs_{inv} are not just alternatives but used in specific contexts. The context in the experiment disfavored the use of ORs_{inv} because of the use of agentive verbs. In the right context, ORs_{inv} should even be preferred and acceptability judgment studies on this matter are currently on the way. Our results are highly compatible with semantic/pragmatic accounts in relative clause processing (Mak et al, 2006; Traxler et al, 2002).