

ABSTRACT

An important current research question in psycholinguistics concerns the mechanisms through which different interpretations of superficially similar constructions can arise across languages. For example, Hemforth et al. (2010) observed cross-linguistic variation in sentences like (1). In German, listeners prefer to resolve the pronoun to the subject (also Bouma & Hopp 2007) while, in French, they are most likely to interpret the pronoun as referring to the object.

- (1) Le facteur a rencontré le balayeur
 a. avant qu'il rentre à la maison.
 b. Puis il rentre à la maison.
- (2) Der Briefträger traf den Strassenfeger,
 a. bevor er nach Hause ging.
 b. Dann ging er nach Hause.

The postman met the streetsweeper before he went home. / Then he went home.

Burnett & Hemforth (2017) propose a computational model of differences in pronominal resolution preferences between German and French active sentences within the RSA framework that takes into account differences in the inventory of syntactic constructions between them. The model predicts the patterns of pronominal reference observed in experiments based on a high prior probability of next mention of subjects (see Arnold 2001) and a higher cost for the speaker producing the *avant que* construction for subject antecedents for which an alternative infinitival construction is available (*avant de rentrer à la maison*) in French but not in German. This paper extends this model to pronoun resolution in passive sentences.

CONCLUSION

Crosslinguistic differences in pronoun resolution preferences can be derived from aspects of the morpho-syntax of the different languages in a Bayesian signaling game framework (like RSA). We can explicitly show that differences in the hard (grammaticality) and soft (preferential) distribution of PRO across German and French generate differences in overt pronoun interpretation.

To account for preferences for the passives, we conclude that

- ❖ the "avant que" construction may induce slightly lesser costs for passives contributing to the preference change, but the effects are not very strong.
- ❖ therefore, increased priors for the subject being mentioned next following a passive seems to be the more probable candidate for the change in antecedent preference.

AN RSA ARCHITECTURE FOR CROSSLINGUISTIC DIFFERENCES IN PRONOUN RESOLUTION

RSA models formalize aspects of Gricean reasoning in terms of signaling games with an iterated best response style solution concept. We assume that French and German differ only in the properties of their messages: the M component of the game. We use the iterated RSA solution concept for all three games. (S, L, {pS,pO}, M, Pr):

S is the speaker; L is the listener

Propositions under consideration: The individual denoted by the subject went home (pS) and The individual denoted by the object went home. (pO)

Following Arnold (2001), we assume that hearing a DP in subject position increases L's expectation that this DP will serve as a referent in the subsequent discourse. We therefore take L's beliefs after hearing the main clause, but prior to hearing the null/overt pronoun, to be represented by the prior probability distribution $P(r(pS) = 0.95; P(r(pO) = 0.05$.

Unlike German, French possess variants of (1b) containing a null PRO (2), which is obligatorily interpreted as referring de se to the subject (Chierchia 1989).
 (2). . . avant de rentrer à la maison.
 ... before going home.

	German		French	
Form	[[m]]	Cost(m)	[[m]]	Cost(m)
Overt (er/il)	{pS,pO}	0	{pS,pO}	1.5
PRO			{pS}	0

	Between sentences		Within sentences	
	Prediction	Data	Prediction	Data
German	95%	95%	72%	80%
French	95%	95%	15%	20%

Table 1: Model predictions for subject choices and corresponding data from Hemforth et al. (2010).

While this model captures preferences for active sentences, Colonna et al. (in press) and Schimke et al. (submitted) report experimental evidence that passives show a strong subject preference, although the alternative construction is also available (see Table 1).

We see two clear ways of incorporating these surprising results into the model:

- ❖ Listener's priors for a subject being mentioned next increase for passives because they become very salient, topical antecedents (as Colonna et al suggest).
- ❖ The "avant de" alternative is less available to the Listener for passives because it is less frequent so that the cost for overt pronouns is reduced.

ACCEPTABILITY JUDGMENT TASK

To distinguish between i. and ii, we carried out an acceptability study with comprehension questions (e.g. *who went home?*) comparing the 4 conditions in Table 2 (38 participants, 16 items, run on Ilex). Participants were recruited on the RISC web site. The 16 items were interspersed with 49 fillers.

Passive Avant que	Marie a été appelée par Pierre avant qu'elle rentre à la maison Marie was called by Pierre before she went home.
Passive Avant de	Marie a été appelée par Pierre avant de rentrer à la maison. Marie was called by Pierre before going home.
Active Avant que	Marie appelé Pierre avant qu'elle rentre à la maison. Marie called Pierre before she went home.
Active Avant de	Marie appelé Pierre avant de rentrer à la maison. Marie called Pierre before going home.

Table 2. Example of sentences of the acceptability judgment task

Procedure

Participants read each sentence and judged the acceptability on a scale from 1 (unacceptable) to 10 (fully acceptable). After each sentence, they answered a comprehension question targeting their understanding of the pronoun/PRO.

Participants

- 38 French native speakers, living in Paris

RESULTS

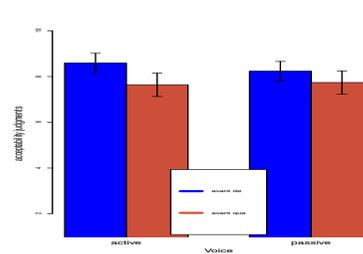


Figure 1. Acceptability judgments

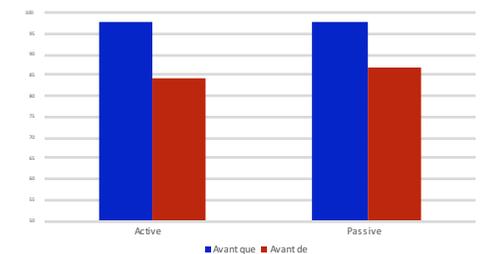


Figure 2. Percentage of subject choices

Participants chose about equally often the subject as an antecedent for actives as for passives: 84% for actives, 87% for passives for the ambiguous "avant de" constructions ($p > .20$). 98% of subjects were correctly chosen for the unambiguous "avant que" construction. "Avant de" was marginally ($p < .09$) more acceptable for actives than for passives (8.60 out of 10 for actives, 8.2 out of 10 for passives). For both, actives and passives, the "avant de" construction was more acceptable than the "avant que" construction (actives: 8.6 vs 7.6; passives: 8.2 vs 7.7; all $p < .01$) and there was a marginal interaction with actives showing a larger penalty for the "avant que" construction than passives ($p < .09$).

REFERENCES

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- Hemforth, B., Konieczny, L., Scheepers, C., Colonna, S., Schimke, S., Baumann, P., & Pynte, J. (2010). Language specific preferences in anaphor resolution: Exposure or Gricean maxims? In S. Ohlsson & R. Catrambone (Eds.), *Proceedings of the 32nd Annual Conference of the Cognitive Science Society* (pp. 2218-2223), Portland, USA.