

The impact of language-specific distributional patterns on the bias for short dependencies: Cross-linguistic evidence from Basque, Polish and Spanish

I. Ros, A. Zawiszewski, M. Santesteban & I. Laka (University of the Basque Country, UPV/EHU)
idoia.ros@ehu.eus

Languages resort to word orders that shorten dependency length more often than expected by chance, possibly as a result of a universal cognitive bias for efficient communication [1, 2]. In this study, we aimed at experimentally confirming whether head-final languages show a weaker tendency for shorter dependencies than head-initial ones, as suggested by cross-linguistic corpus studies [1, 3]. Furthermore, we investigated whether any possible cross-linguistic differences are determined by either rich morphology or basic word order (OV/VO). Rich case marking can reduce uncertainty about grammatical function, so that dependency shortening is rendered redundant [4]. Alternatively, word order can impact the level of predictability of the linguistic items (e. g. words or syntactic structures) present in the signal, decreasing the processing cost of certain linearizations (e.g. those in which verbal arguments precede their heads) [4] and minimizing the communicative pressure for reducing dependency length).

We compared the effect of dependency length on structural preferences in three languages (Basque, Polish and Spanish) that differ with respect to case marking or lack thereof (Basque and Polish versus Spanish) and head position (head-final versus head-initial) (Basque versus Polish and Spanish). We conducted a cued-recall production experiment ($n = 67$) with 30 transitive and 24 ditransitive sentences. Participants were presented with to-be-recalled phrases that needed to be used later to produce a sentence. Three conditions were created by manipulating the length of constituents of the to-be-recalled sentences (All-Short, Long-O, and Long-IO/Long-S). The position of the constituents in the screen was counterbalanced, so that all items appeared in an order consistent (O-IO for Basque; IO-O for Polish and Spanish) and inconsistent (IO-O for Basque; O-IO for Polish and Spanish) with shifted orders. We measured the number of produced shifted non-canonical word orders when the O is long compared to when short. Crucially, shifting a long O relative to the IO in ditransitives or the S in transitives minimizes the distance between the core elements of the sentence.

We present two novel findings: (i) There are cross-linguistic differences in the strength of the preference for shorter dependencies and (ii) differences are modulated by word order patterns and not by rich morphology. In ditransitive sentences, head-initial Polish and Spanish show a much stronger tendency to reduce dependency length than head-final Basque (Fig. 1). In transitives, Polish and Spanish present no effect of dependency length. In Basque there is a weaker overall proportion of shifted orders than in ditransitive sentences (Fig. 2). Our results indicate there are constraints to the general preference for shorter dependencies. We will discuss these results in relation with the degree of contextual predictability of certain items, and conclude that knowledge of contextual distributions derived from particular word order patterns, while contributing to robust information transfer, limits the general preference for short dependencies.

References

[1] Futrel, R.I et al. (2015). *PNAS*, 112(33), 10336-10341; [2] Liu, L. (2008). *J Cogn Sci*, 9(2), 159-191; [3] Gildea, D. & Temperley, D. (2010). *Cogn Sci*, 34(2), 286-310; [4] Levy, R. (2008). *Cognition*, 106(3), 1126-1177.

Figures

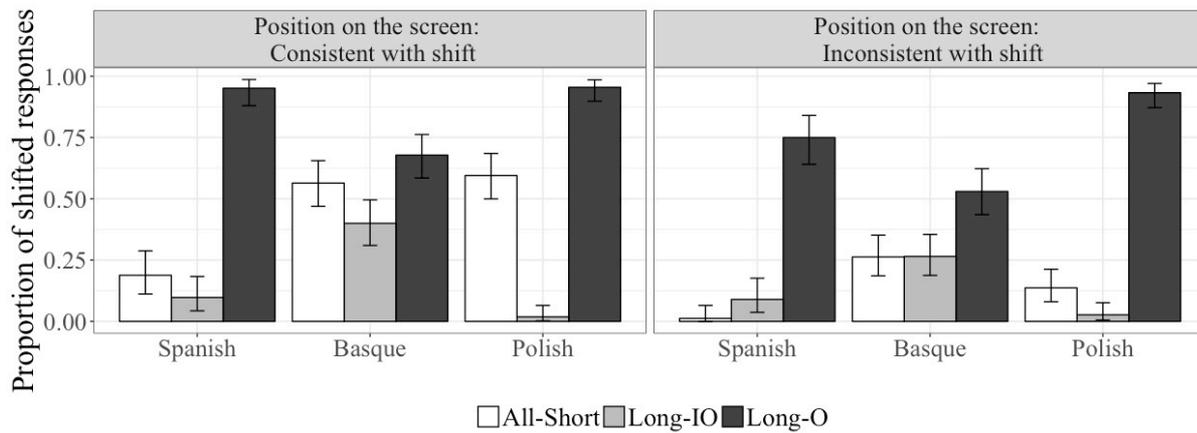


Fig. 1. Proportion of shifted responses in Basque (data from Ros et al., 2015), Polish and Spanish ditransitive sentences. The error bars show 95% confidence intervals.

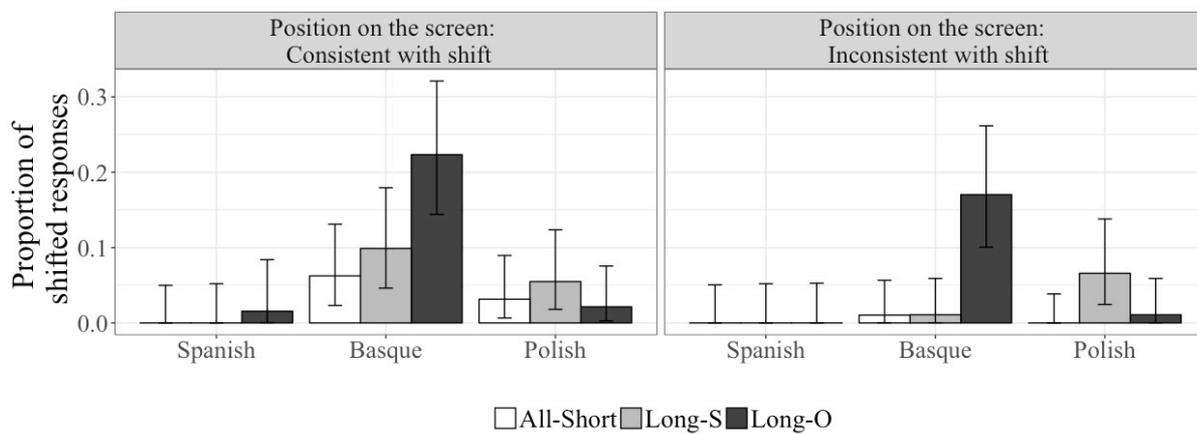


Fig. 2. Proportion of shifted responses in Basque (data from Ros et al., 2015), Polish and Spanish transitive sentences (note the different proportion scale than in Fig. 1). The error bars show 95% confidence intervals.