

Gestural production as a window to semantic effect on word order in noun phrases

Gabrielle Klassen, Jida Jaffan and Daphna Heller (University of Toronto)

Pantomime or gestural production has been informative for investigating cognitive biases about word order at the sentence level (e.g., [1-3]). This method has also been used to explore effects of isomorphism in the word order within the noun phrase [4]. The current study takes the first step in examining whether the motivation for typologically-preferred word orders may arise from semantic considerations. We focus on the relative order of nouns (N) and adjectives (Adj) within the noun phrase, asking whether their dominant order cross-linguistically – N-Adj in 64% of language [5] – is preferred because the interpretation of an adjective is relative to the meaning of the noun. To this, end, we examine adjectives from two classes: size adjectives that are dependent on noun meaning for their interpretation, and shape adjective that are intersective, and thus are much less dependent on the noun [6]. We tested speakers of English (consistently Adj-N), Arabic (consistently N-Adj) and Spanish (most adjectives are post-nominal, but some are pre-nominal).

Method. To elicit noun phrases, we employed a referential communication task where participants saw an array of four images, and had to instruct a partner to click on one of them using gesture (participants repeated the task using language; cf. 2). We included four conditions (8 items per condition), labeled by the information needed to differentiate the target image: (A1) N-Adj, size adjective; (A2) N-Adj, shape adjective; (B) N-Num, included as control (because number and noun do not show this asymmetry); (C) N-Adj_{SHAPE}-Num (exploratory).

Results (English: N=24; Arabic: N=20; Spanish: N=25). When examining both adjective classes together (not plotted), Arabic and Spanish speakers showed a preference for N-Adj order ($z=3.09$ $p = .002$ and $z = 3.41$ $p = .0006$), whereas English speakers were at chance. Most important, there was a main effect of adjective type ($z = 3.928$, $p < .0001$), with the N-Adj order being more likely for size adjectives which are more dependent on the noun. The N-Num condition, where speakers of all three languages were at chance, confirms that this preference is specific to adjectives. In the N-Adj_{SHAPE}-Num condition (not plotted), English speakers mirrored their language, preferring Num-Adj-N (50%; chance is 17%); surprisingly, for Arabic (36%) and Spanish (39%), the preferred order was N-Num-Adj for, which is both typologically rare and does not mirror the language.

Conclusion. We find preliminary evidence for the proposal that the typologically-dominant order N-Adj is (at least partially) guided by semantic interpretation. Future work will explore similar considerations with numerals and related elements.

References. [1] Goldin-Meadow et al., (2008). *PNAS*. [2] Gibson et al. (2013). *Psych. Science* [3] Hall et al., (2013). *Cognition*. [4] Schouwstra et al., (2017). *Cognitive Science Society* [5] Dryer (2013). *Studies in Language*. [6] Kamp & Partee (1995). *Cognition*.

