Attribute Salience and Adjective Order Preferences

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In pre-nominal languages like English, Hungarian, or Dutch, where adjectives linearly precede the noun, *"small blue box"* is vastly preferred over *"blue small box"*. In post-nominal languages like Spanish, Vietnamese, or Hebrew, this same preference emerges, albeit in mirrored form: *"box blue big"* is preferred over *"box big blue"*. These Adjective Ordering Preferences (AOP), while not without exception, are well-attested for a range of adjective classes cross-linguistically. [1] Nevertheless, AOPs continue to pose problems for formal linguistic theories and theories of language processing because – despite numerous accounts [2] – the roots of this apparent universal remain unclear.

We provide evidence from two experiments that AOPs may be rooted in speakers' conceptual representation of to-be-described objects in non-linguistic cognition. **Exp 1** tested whether the AOP patterns in language would also surface in a memory task. Critically, if AOPs in language and the representation of objects and their attributes in non-linguistic cognition are homologous, then we should find corresponding evidence of AOPs in a fully non-linguistic task. We used a change detection paradigm and manipulated the size, color, shape, and material of novel objects (Fig.1). Participants (n=134) examined objects one-by-one, saw a second object, and decided whether that second object was exactly the same as the first. In between the first and second objects, participants performed math problems to block verbal encoding. [3] **Results** (Fig. 2) show a step-wise reduction in salience that *closely matches the ordering of adjectives observed cross-linguistically*: Participants were statistically worst at detecting changes to size (ß=-1.89, SE=.28, |z|=6.66), followed by color and shape, though these two did not differ statistically (ß=-.26, SE=.22, |z|=1.19). Accuracy was highest for material changes (ß=-.57, SE=.25, |z|=2.23).

In **Exp 2**, we see how well findings from our memory task predict AOPs among native English-speakers (n=54). Participants indicated their preference for pairs of Adj-Adj-Noun phrases using a sliding scale (Fig.3). Adjectives (e.g., size, color, shape, material) for the first member of each pair appeared in the order predicted by Exp 1's memory task (Memory Predicted Order); adjectives for the second member of each pair were inverted (Memory Inverted Order). To minimize typicality and/or frequency of co-occurrence effects, the referents of each string were plausible, but not necessarily prototypical exemplars of the noun entity. Whenever possible, adjectives within each phrase had the same number of syllables. **Results** (Fig.4) showed a main effect of Order Type reflecting a significant preference for Memory Predicted Orders (ß=57.91, SE=4.56, |t|=12.66). Also, preferences for the Memory Predicted Order were weaker in the Color Shape NP condition than in other conditions (ß=-23.42, SE=6.68, |t|=3.51); this is in line with the *non*-significant differences between color and shape conditions found in Exp 1.

In conclusion, we provide initial evidence for an **Attribute Salience Account** of Adjective Order in multi-adjective strings: Attributes that tend to be more conceptually privileged in speakers' non-linguistic representations of an entity correspond to adjectives which tend to appear closer to nouns cross-linguistically. This account captured not only the relative order of adjectives, but also which deviations from AOPs would be more permissible than others. These findings also have implications for the distribution of pre- versus post-nominal adjective orders cross-linguistically. Like work from the domain of events showing that entities which are more conceptually salient are privileged syntactically (e.g., Agents tend to be syntactic subjects), we conclude that speakers' conceptual representations can have direct effects on word order.

References: [1] Dixon, 1982; Hetzron, 1978; 1991; Sproat & Shih, 1991 **[2]** Sweet, 1898; Wharf, 1945; Sproat & Shih, 1991; Cinque, 1994; Truswell, 1999; Svenonius, 2008; Scontras et al., 2017, 2018 **[3]** Lakusta & Landau, 2012; Papafragou, 2010

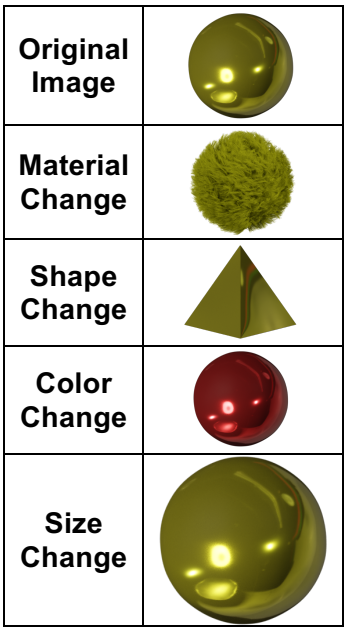

Figure 1 Experiment 1 sample (rescaled) items in each condition of the memory task.

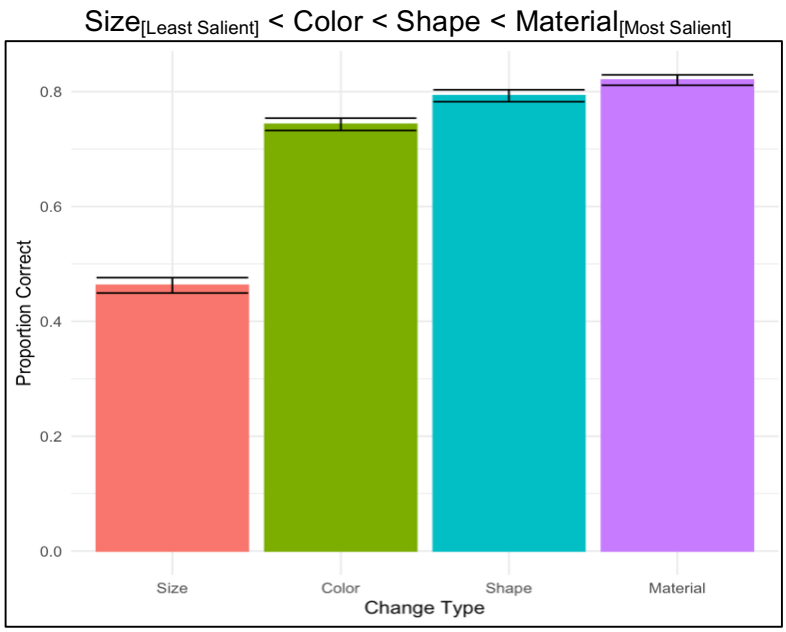

Figure 2 Mean accuracy rates for each change type condition ascending order of accuracy. Error bars indicate +/- 1 standard error.

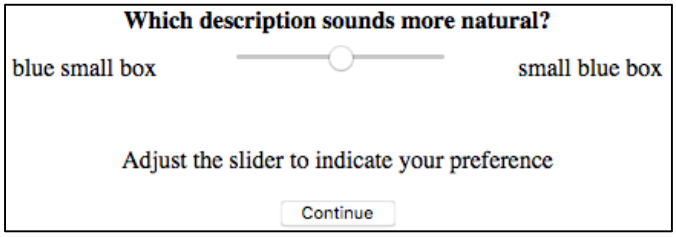

Figure 3 Sample sliding scale task in the Size-Color NP condition of Experiment 2.

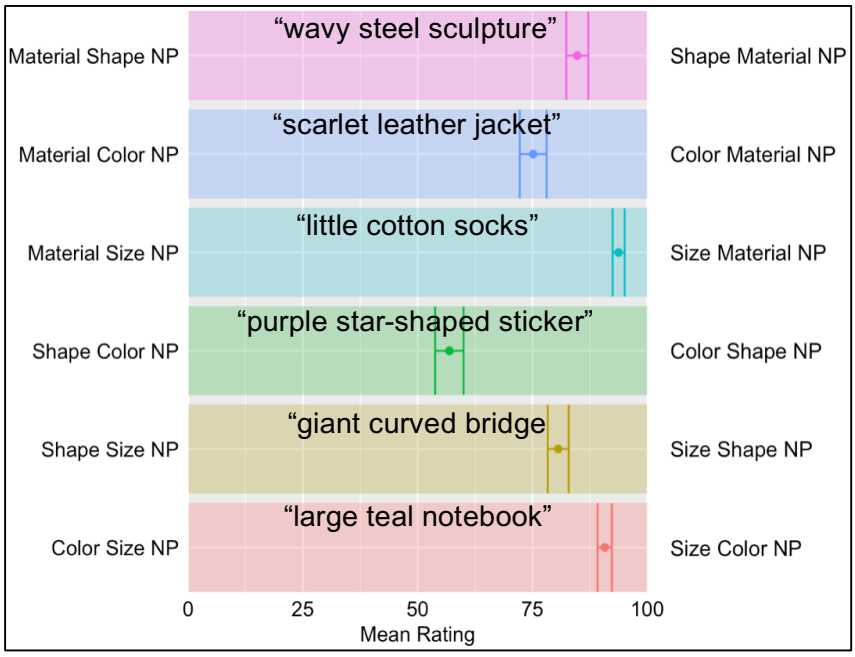

Figure 4 Mean preference scores from Exp 2's sliding scale task. Memory-Predicted Orders are given on right side of scale and Memory-Inverted Orders on the left. (Orders were left-right counterbalanced in experiments.) On this scale, 0 = complete preference for Memory Inverted Orders; 100 = complete preference for Memory Predicted Orders; 50 = no preference. Sample phrases from Memory Predicted Orders are given in middle. Error bars indicate +/- 1 standard error.