Can we explain strict ordering restrictions with extralinguistic properties?

Lanko Marušič[1], Petra Mišmaš[1], Rok Žaucer[1], Luka Komidar[2], Gregor Sočan[2]

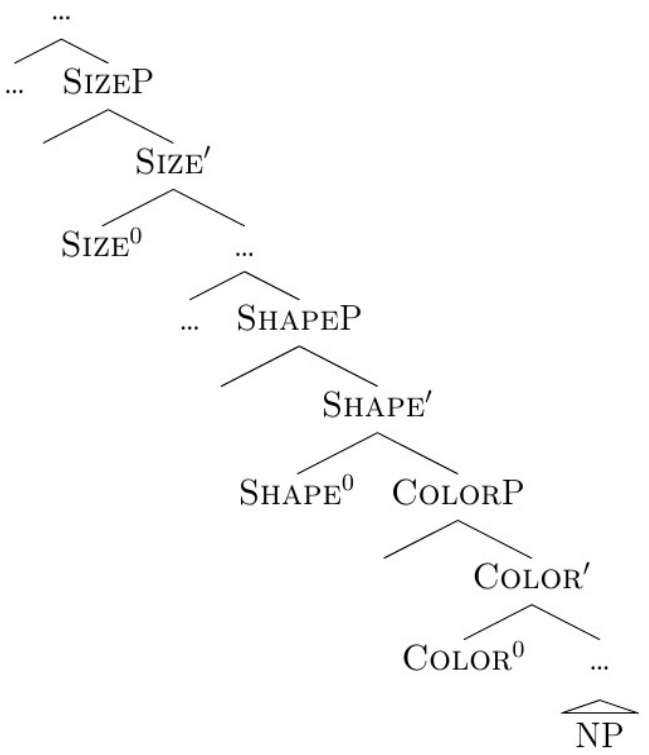
[1]U. of Nova Gorica, [2]U. of Ljubljana

The problem

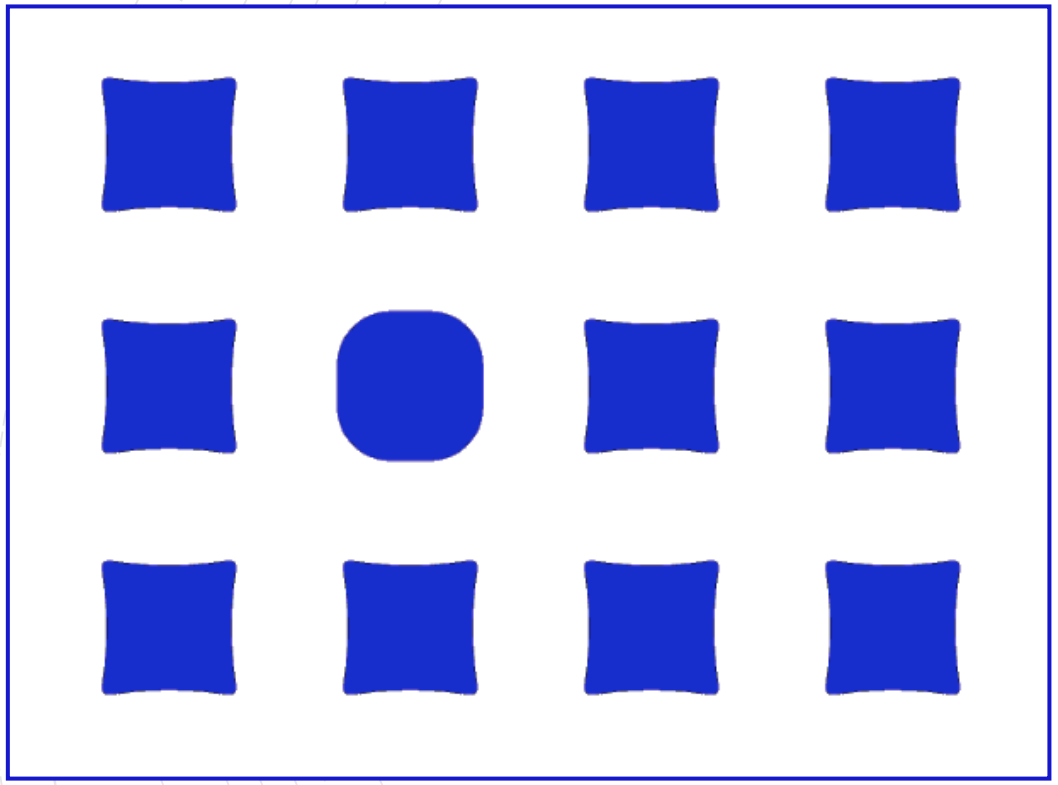
- Crosslinguistically adjectives show the same (linear) order.
- To model this (linear) order within syntax, a sequence/hierarchy of functional projections [FPs] has been proposed, e.g. Scott (2002), (adopted by Laezinger 2005, Teodorescu 2006, Fowlie 2017)
- Without committing to the existence of the hierarchy of adjective-hosting FPs, we explore the origin of the order of adjectives (and by extension of the hierarchy of FPs).
- Possible origins of the order of adjectives? **General cognition** as one option (Cinque & Rizzi 2008, Ramchand & Svenonius 2014, Scontras *et al*. 2017).
- If the order of adjectives indeed derives from restrictions in general cognition, then the properties these adjectives express should show differences in various non-linguistic cognitive processes.
- The question of the origin of the strict linear order of Adjs arises regardless of theoretical model / even if one rejects FPs as the grammatical tool to model the strict linear order of Adjs.

Experiment

- **Hypothesis: The order of adjectives derives from properties of general cognition.**
- We focus on Adjs for size, color, and shape.
- Cross-linguistic data indicates the order SIZE > SHAPE > COLOR:
  - BIG SQUARE RED DESK/*SQUARE RED BIG DESK
- Assuming that syntactic structure is built (Chomsky 1994, etc.) and acquired in a step-by-step fashion bottom-up (Radford 1996, Vainikka & Young-Scholten 2011, etc.) … →
  - **we expect that there will be a bias for the properties expressed by Adjs of the lower FPs.**
- If such a bias is detected:
  - the order of Adjs stems from general cognition,
  - support for the view that universal hierarchies of FPs derive from general cognition (if we assume the cartographic model).



Methodology

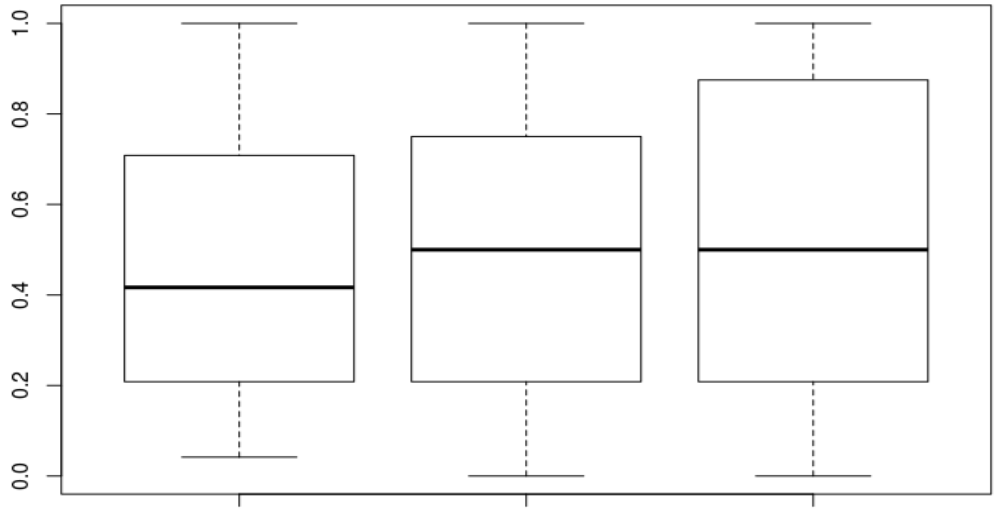


- An online experiment
- 578 participants (recruited via Amazon Mechanical Turk).
- "Click on the item which you think is the one that is different from the rest."
- The experiment included 5 practice trials, 18 fillers/controls and 72 target trials.
- The trials were presented in random order.
- Each of the three properties was tested twice
  - (for difference in both directions, e.g., one big vs. 11 small items and one small among 11 big items)
  - in each of the 12 possible locations

Results

- We excluded:
  - subjects who reported colorblindness (N = 41) and
  - subjects who reported the use of a mobile device rather than a personal computer (Together N= 45)
  - subjects who did not pass the control trials (with a success rate of 100%), N= 165.
  - Included in the analysis: 327 participants

The distribution of correct responses by property:



size < shape < color

The differences between the success rates for the three properties are statistically significant:

			p.value	p.crit	sig
size	vs.	shape	0.00404	0.0250	TRUE
size	vs.	color	0.00008	0.0169	TRUE
shape	vs.	color	0.00910	0.0500	TRUE

Discussion

- Our results confirm the hypothesis that adjective ordering restrictions are based on properties of general cognition, in agreement with Scontras *et al*. (2017).
  - Our experiment did not (unlike Scontras *et al*. 2017, etc.) test any linguistic knowledge but really compared only non-linguistic perception of three properties.
  - Stronger argument.

- Confirm the additional hypothesis that the order of functional projections within functional sequences is determined by properties of general cognition.
  - But only if we assume that the ordering of the related Adj classes is set by functional projections
- Leivada & Westergaard (2019): no processing difference between various orders of adjectives (e.g. *color* > *shape* vs. *shape* > *color*), which leads them to conclude that adjective ordering is not fixed.
  - We found "processing" differences between individual concepts these adjectives express …