The role of semantics in learning morphological systems.
An artificial lexicon experiment

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Introduction

- Whereas lexical words can encode potentially any meaning about the referential world, inflectional morphology encodes only a limited set of semantic features [1, 2]
- Such features are cross-linguistically consistent and seem closely related to salient aspects of the environment processed by core knowledge systems

  (time perception > Tense; proprioception > deixis; numerosity > Number...) [3, 4]
- It has been suggested that morphology developed in a way that allows prompt communication of this salient information [5, 6].
- Does this salience also affect the learning of morphological oppositions?
- Are typologically attested inflectional oppositions (animate vs. inanimate) easier to learn with respect to unattested morphological oppositions (light vs. dark)?

Procedure

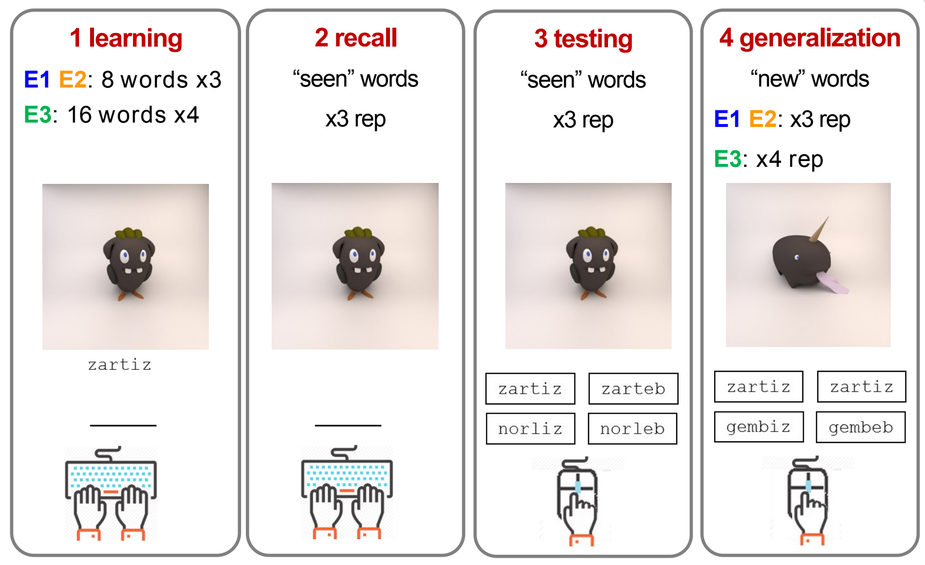
1 - Copy the word corresponding to entities

2 - Type it

3, 4 - Choose among 4 alternative words

In testing E1, E2:
2 stems, 2 suffixes.
In testing E3:
same stem, 4 suffixes

Participants: 24, 19, 39
Italian native speakers



E1 - Animacy

16 pics of **animate** novel creatures

16 pics of **inanimate** novel objects

Nouns consistently ending in **-iz**

Nouns consistently ending in **-eb**

Counterbalanced

Each entity is paired with a unique stem

E2 - Brightness

16 pics of **light** novel entities

16 pics of **dark** novel entities

Nouns consistently ending in **-iz**

Nouns consistently ending in **-eb**

Counterbalanced

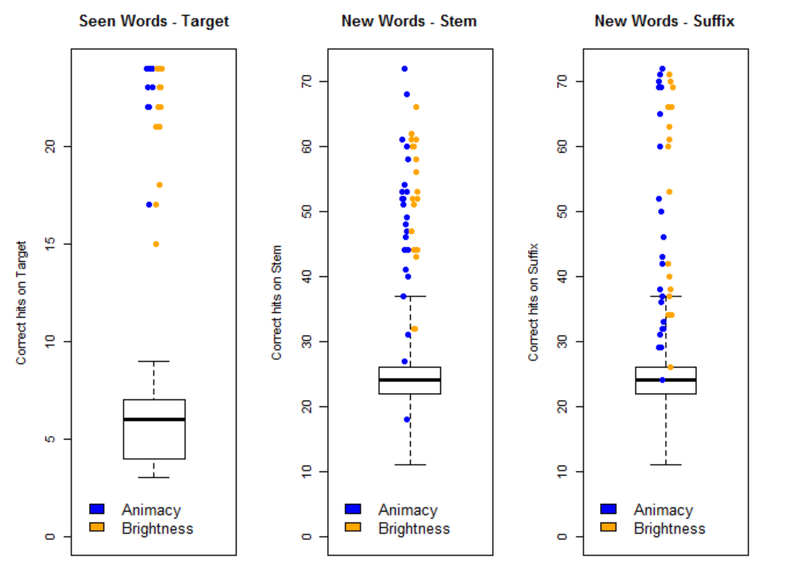
Each entity is paired with a unique stem

Results E1, E2

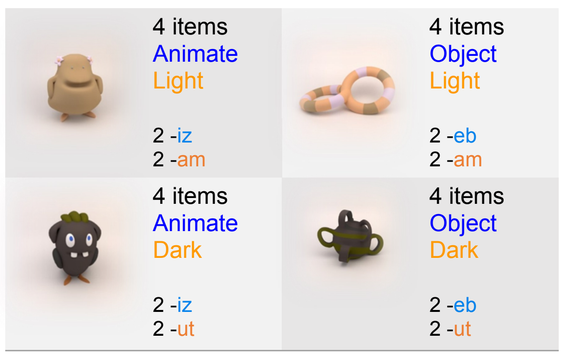
Most participants learn the morphological suffixes above chance:

E1: 62,5% E2: 68,4%

No difference between animacy and color in comparing the performance in E1 and E2 in a mixed-effects model ($X^2[1]=0.3429$ (1), p=0.55).



E3 - Conflicting cues



4 items Animate Light 2 -iz 2 -am		4 items Object Light 2 -eb 2 -am
4 items Animate Dark 2 -iz 2 -ut		4 items Object Dark 2 -eb 2 -ut

Counterbalanced

Each entity is paired with a unique stem

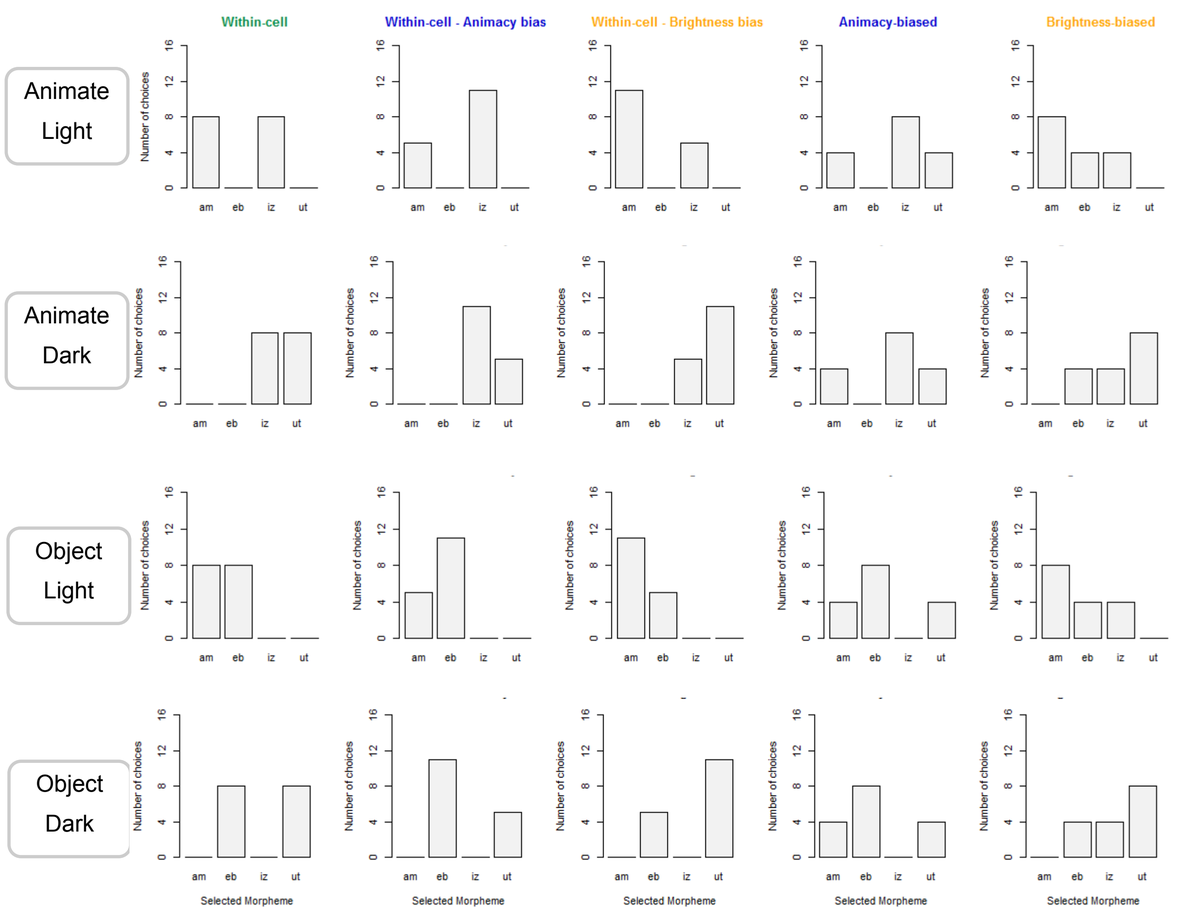
Associations between entities and morphemes are not 100% consistent

A bias for animacy or brightness can emerge as a conflict resolution in generalization

Feature \ Frequency of association	50%	25%	25%	0%
Animate	iz	am	ut	eb
Object	eb	am	ut	iz
Light	am	iz	eb	ut
Dark	ut	iz	eb	am

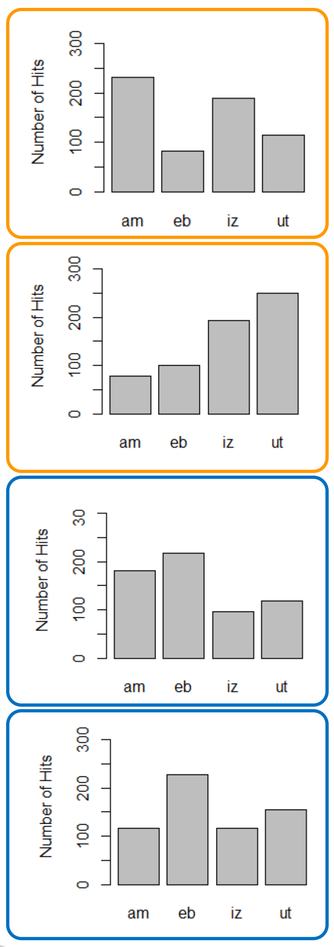
Predictions Different strategies of learning can lead to different response patterns.

Random= 0.25



Results **Testing**. Mean acc. 0.925

Generalization



No clear preference for an animate–inanimate distinction in the whole set

Emergence of a pattern of subcategorization within animates?

Effects of individual variability?

Discussion

- Consistent associations between semantic features and morpheme-like sublexical units are easily learned by participants and can be generalized to new words.
- Also non-attested morphological systems can be easily learned in the presence of consistent associations.
- In the presence of conflicting cues, no evident bias seems to emerge for animacy when generalizing to new words.
- Possible critical points: implicit or explicit learning? Effects of individual strategies? Are the two features too different from a cognitive perspective?

References

[1]Corbett, G. G. (1991). *Gender.* Cambridge textbooks in linguistics. Cambridge: CUP., [2] Corbett, G. G. (2000). *Number.* Cambridge textbooks in linguistics. Cambridge: CUP., [3] Corbett G., 2013. Systems of Gender Assignment. In: Dryer, Matthew S. & Haspelmath, Martin (eds.) *The World Atlas of Language Structures Online*. Leipzig: Max Planck Institute for Evolutionary Anthropology. (Available online at http://wals.info/chapter/32) [4] Haspelmath M., 2013. Occurrence of Nominal Plurality. In: Dryer, Matthew S. & Haspelmath, Martin (eds.) *The World Atlas of Language Structures Online.* Leipzig: Max Planck Institute for Evolutionary Anthropology. (Available online at http://wals.info/chapter/34) [5] Franzon, F., Zanini, C., & Rugani, R. (2019). Do non□verbal number systems shape grammar? Numerical cognition and Number morphology compared. *Mind & Language*, 34(1), 37-58.) [6] Strickland, B. (2017). Language reflects "core" cognition: A new theory about the origin of cross□linguistic regularities. *Cognitive science*, 41(1), 70-101.

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