

Simulating Language

10: This view of language

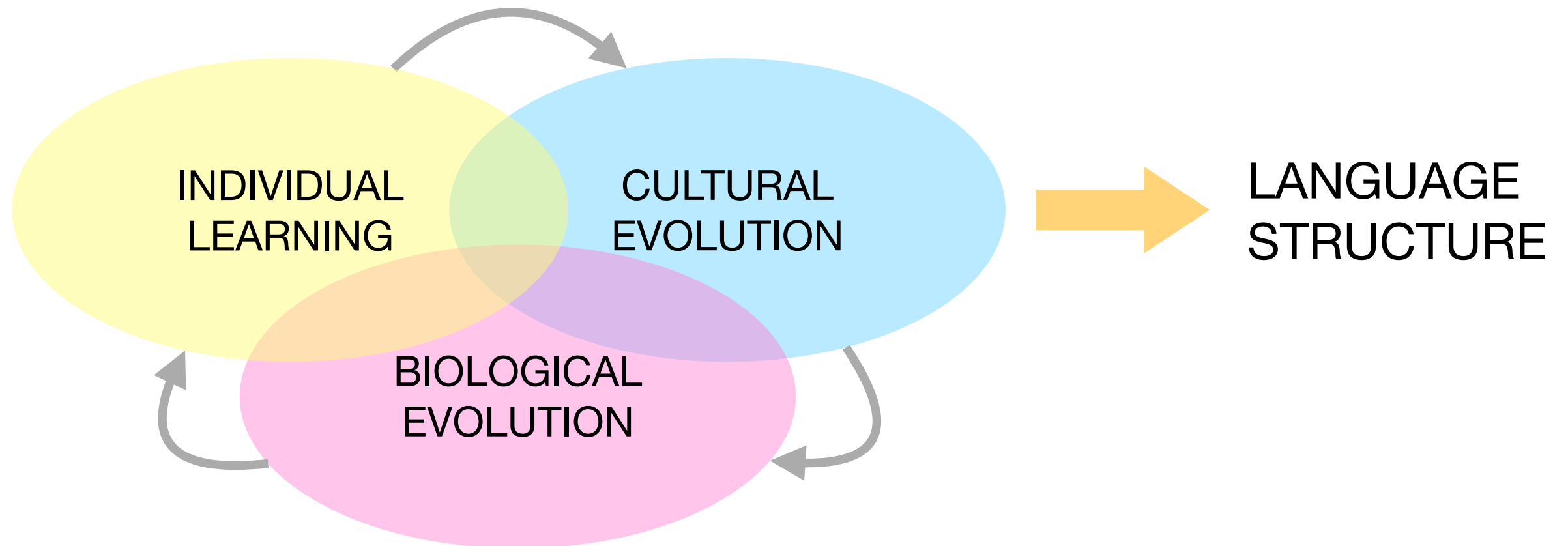
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Note to self: remember to start the recording!

How can we explain language structure?



Individual learning



INDIVIDUAL
LEARNING

Concept learning

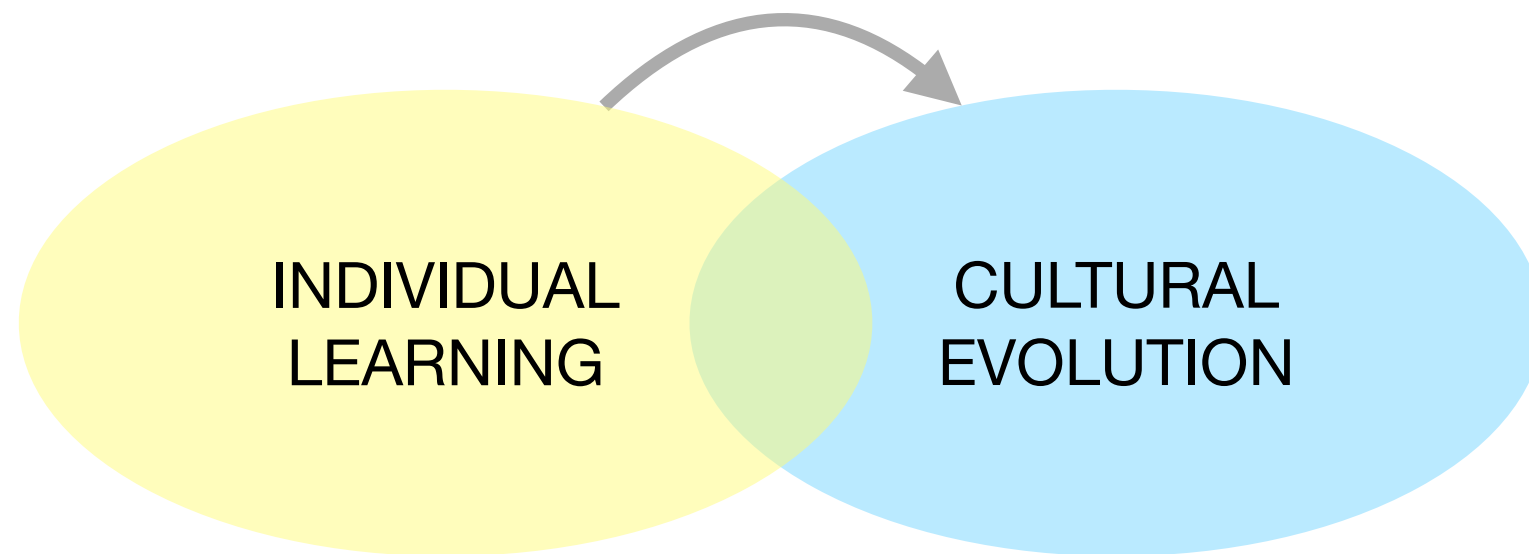
Frequency learning

Simplicity biases

Rational speakers

Learning to learn

Cultural evolution through iterated learning



The problem of linkage

Regularisation

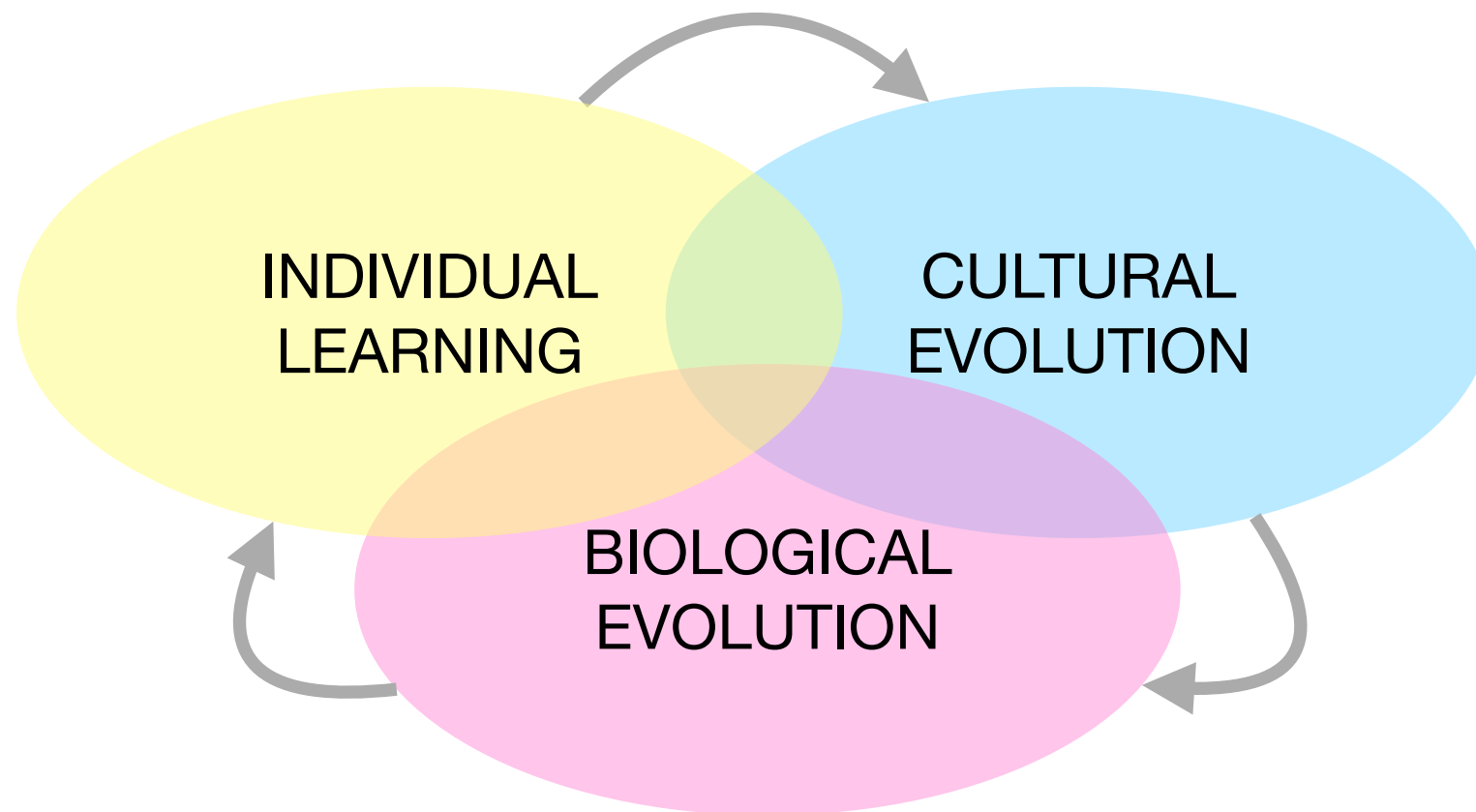
Bottlenecks

MAP vs. sampling

Compositionality

Bias amplification

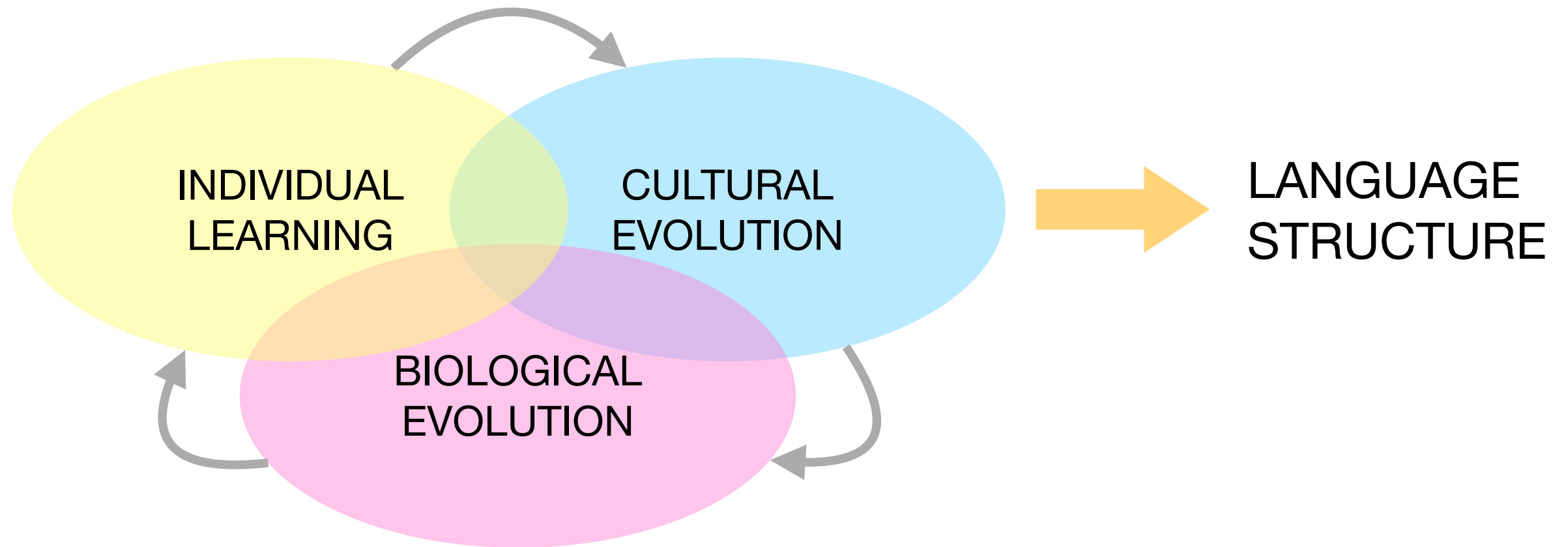
Gene-culture co-evolution



Masking, unmasking

Weak biases vs. strong constraints

Domain generality vs. specificity



My view:

The unique structural properties of language are the inevitable result of cultural evolution operating on weak, domain-general biases favouring compressible representations.

Biological evolution has given our species the capacity for culture.
The rest follows for free.

Where next?

Explaining more aspects of linguistic structure



Compositionality

Duality of Patterning

Kinship systems

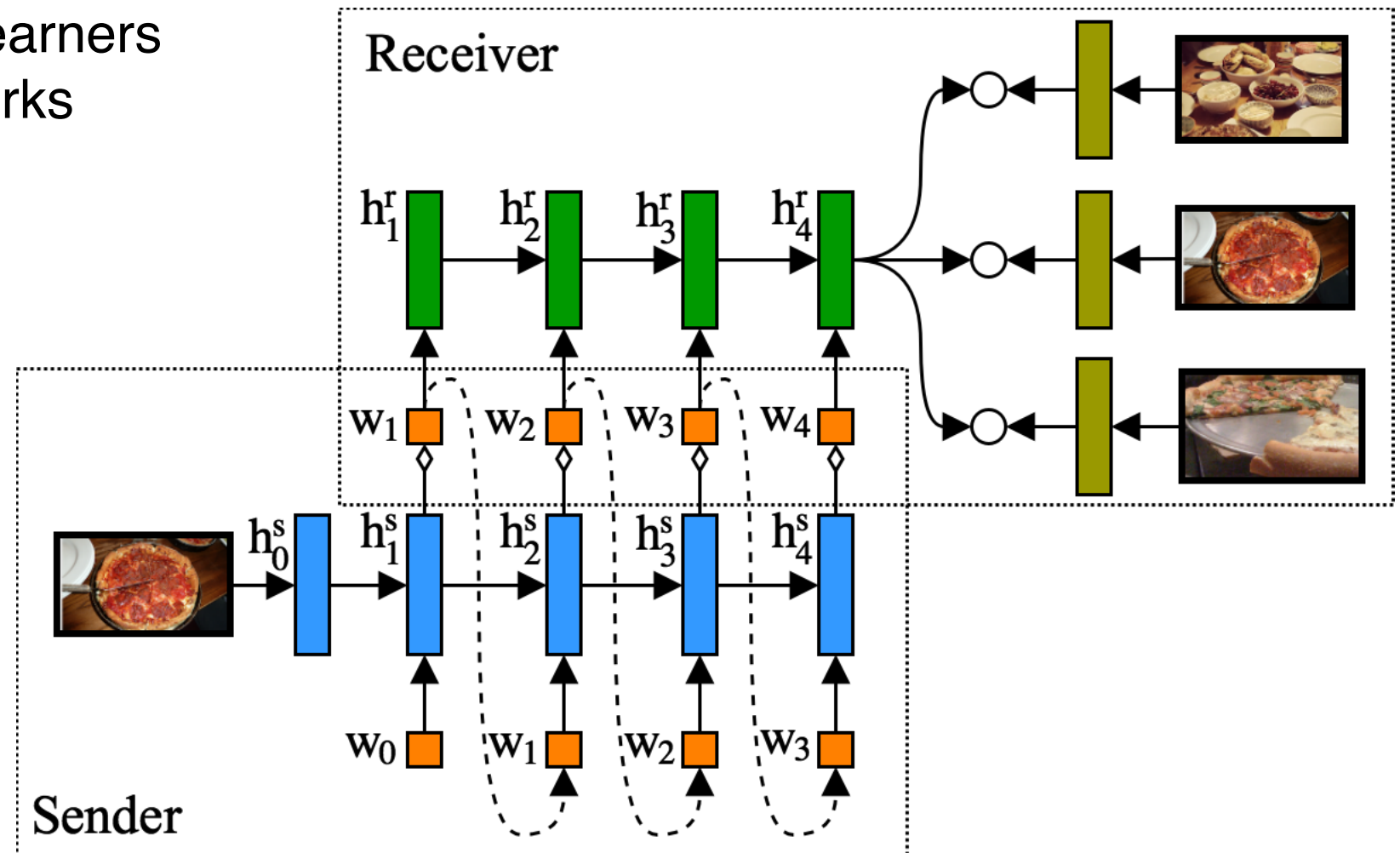
Colour terms

Semantic universals

(Kemp & Regier 2012)
(Zaslavsky et al 2018)
(Carr et al 2020)
(Carcassi et al 2019)
(Mollica & Kemp 2020)

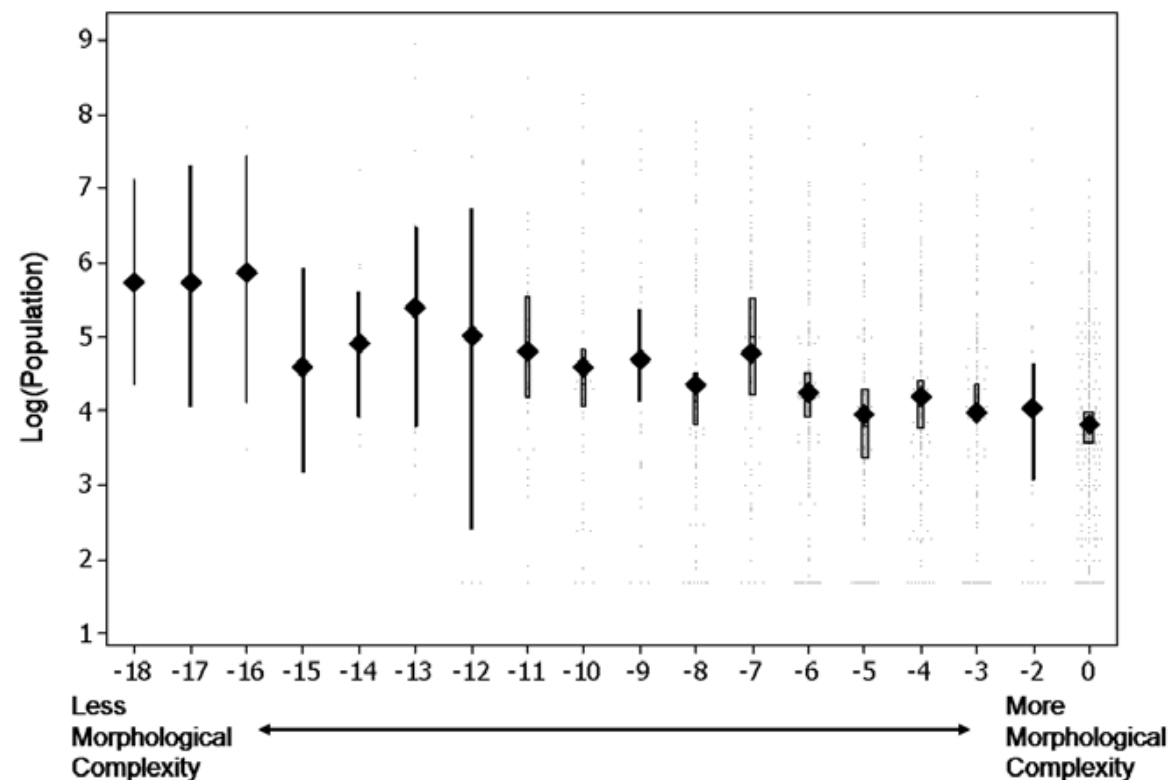
Deep learning models

Replacing the Bayesian learners with artificial neural networks



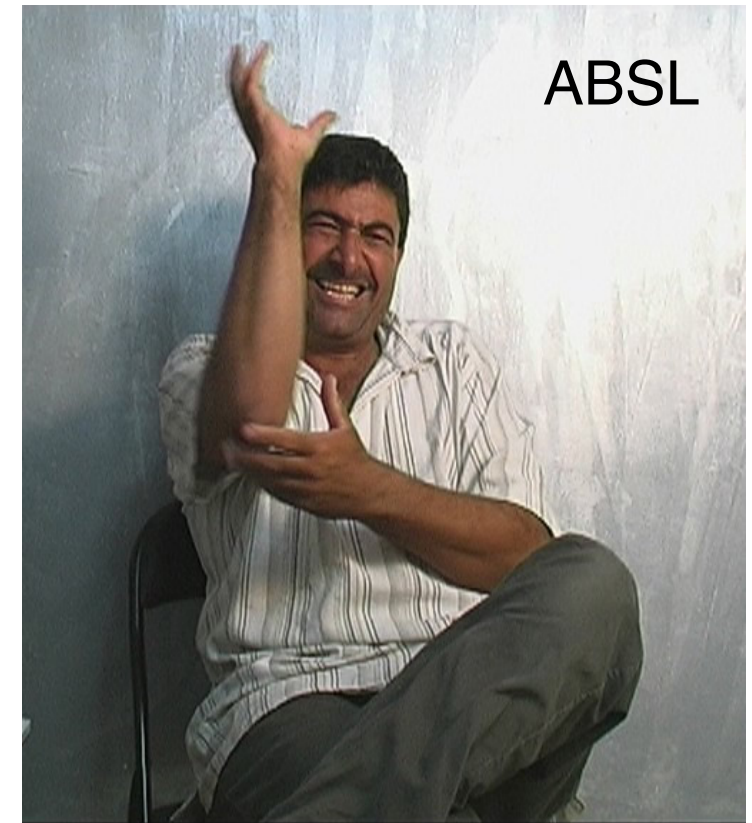
(Havrylov & Titov 2017)

Modelling populations

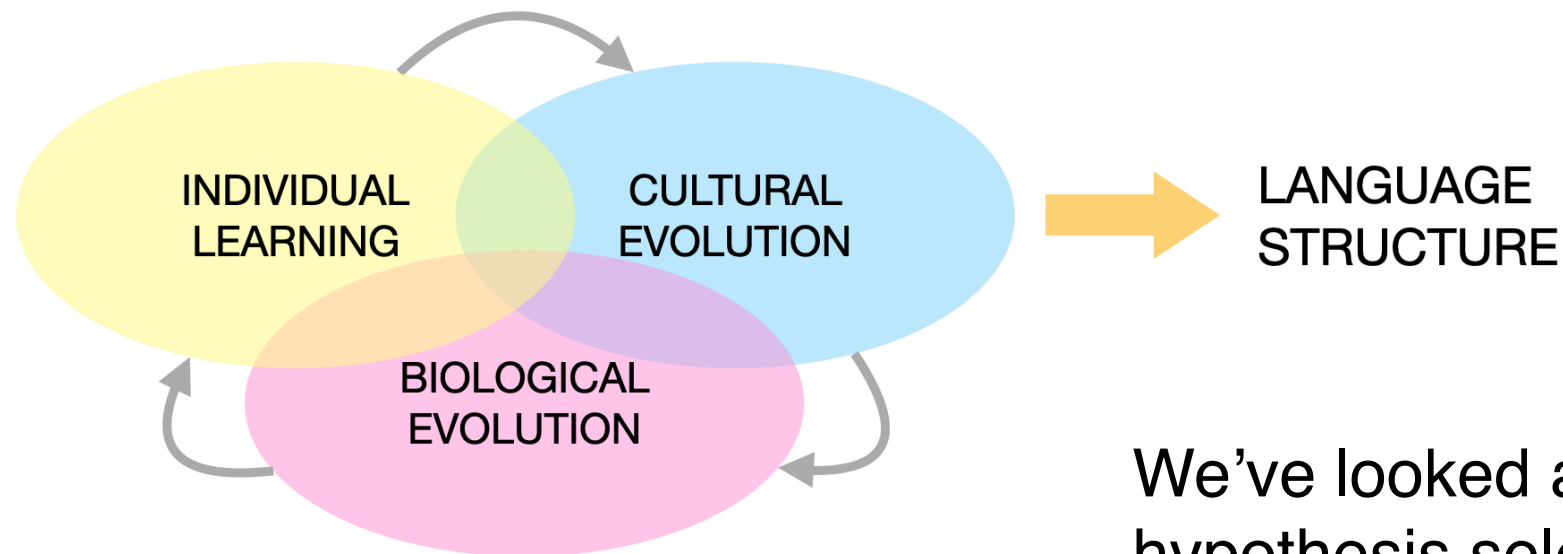


(Lupyan & Dale 2010)

Population size, role of children vs. adult learners, number of strangers you communicate with all may affect the complexity and variability of your language. Modelling can help sort out these factors.



How did this system get off the ground?



We've looked at the evolution of prior bias and hypothesis selection strategy.

But that's not really getting at how we evolved to learn and culturally transmit language in the first place!

What do we need to do iterated learning of language?

Learn sets of signals + use them to discriminate meanings

Extra reading if you're interested

Kirby, S. (2017). Culture and biology in the origins of linguistic structure. Psychonomic bulletin & review, 24(1), 118-137.