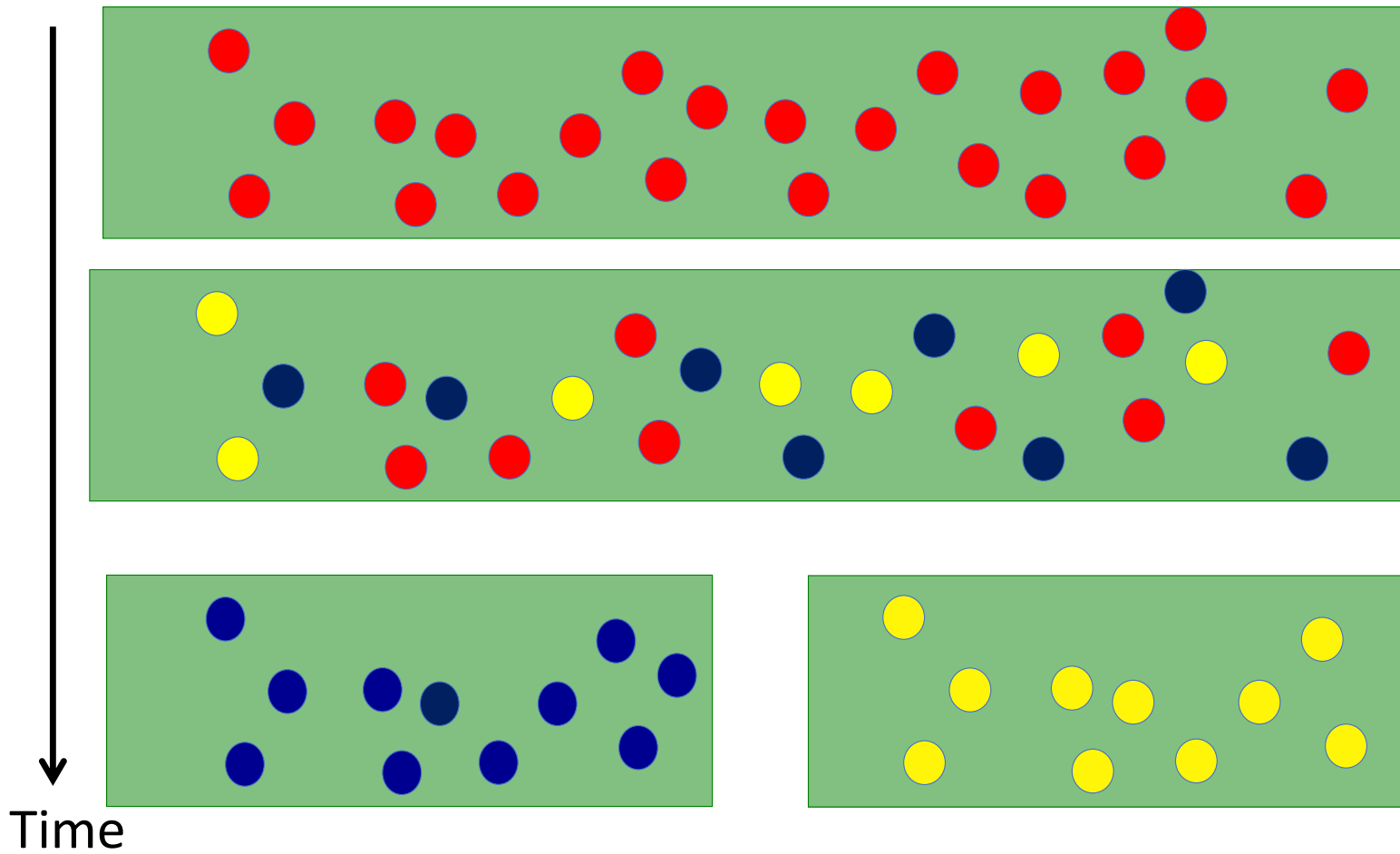# Parallels between organisms and languages as evolvable systems

Manolis Ladoukakis, Dimitris Michelioudakis and Elena Anagnostopoulou

Evolvable systems
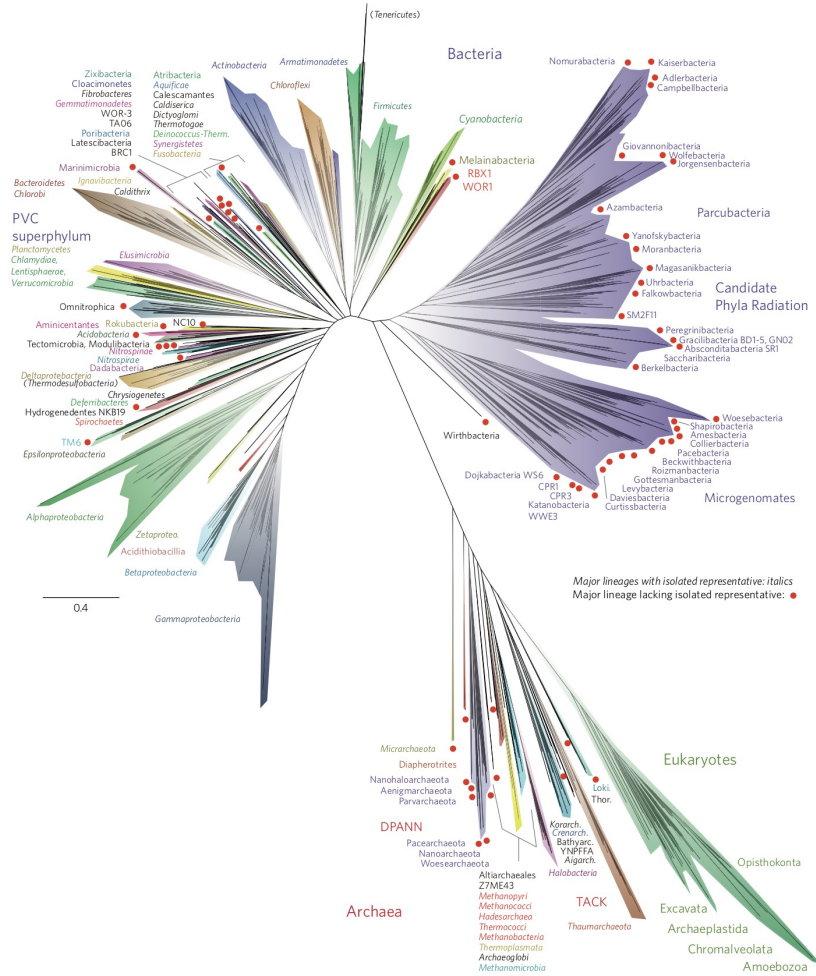

- Populations of units
- Reproductive units (generations)
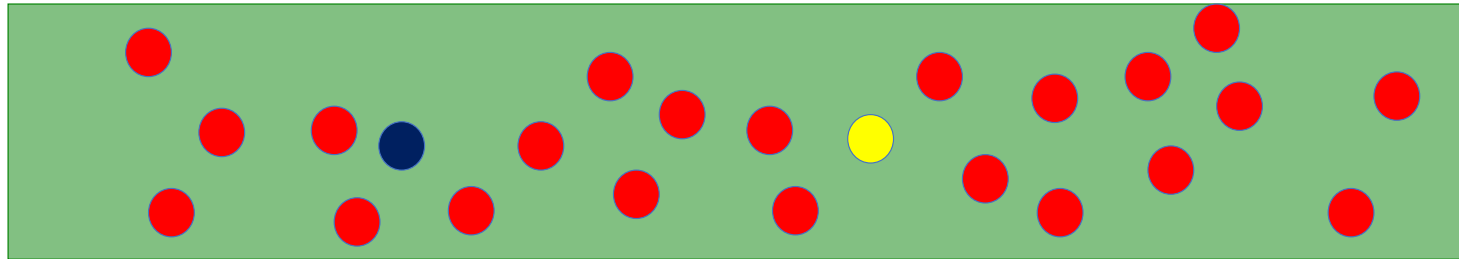- (some) inheritance of characters

Time

Languages evolve

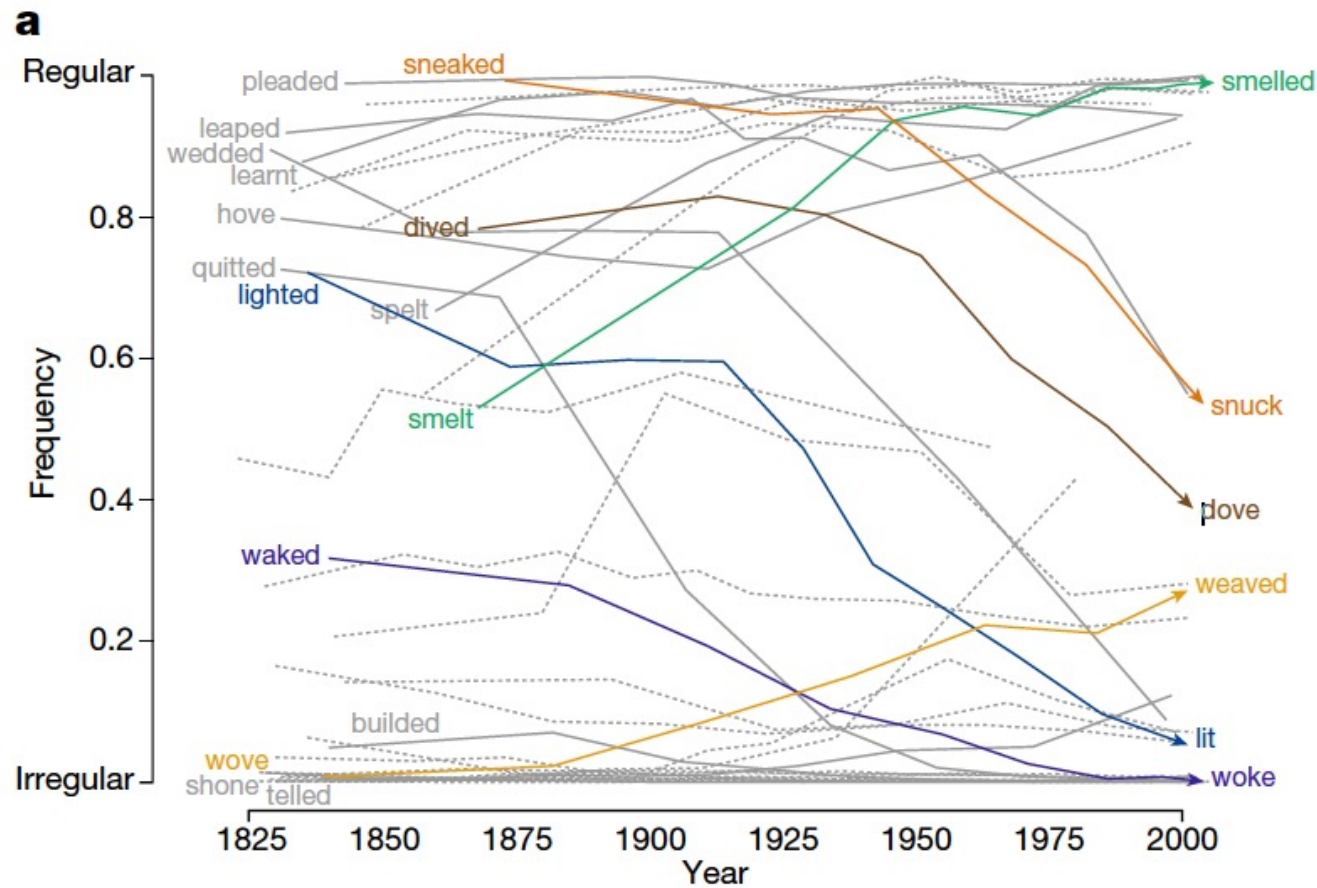INDO-EUROPEAN BRANCHES OF THE LANGUAGE TREE

Parallels in processes

- Generation of *de novo* variation (innovation)
  - ➤ Deliberate manipulation of language
  - ➤ Errors during language acquisition
  - ➤ Language contact and learner errors

Parallels in processes

- randomness

Newberry et al 2017 Nature

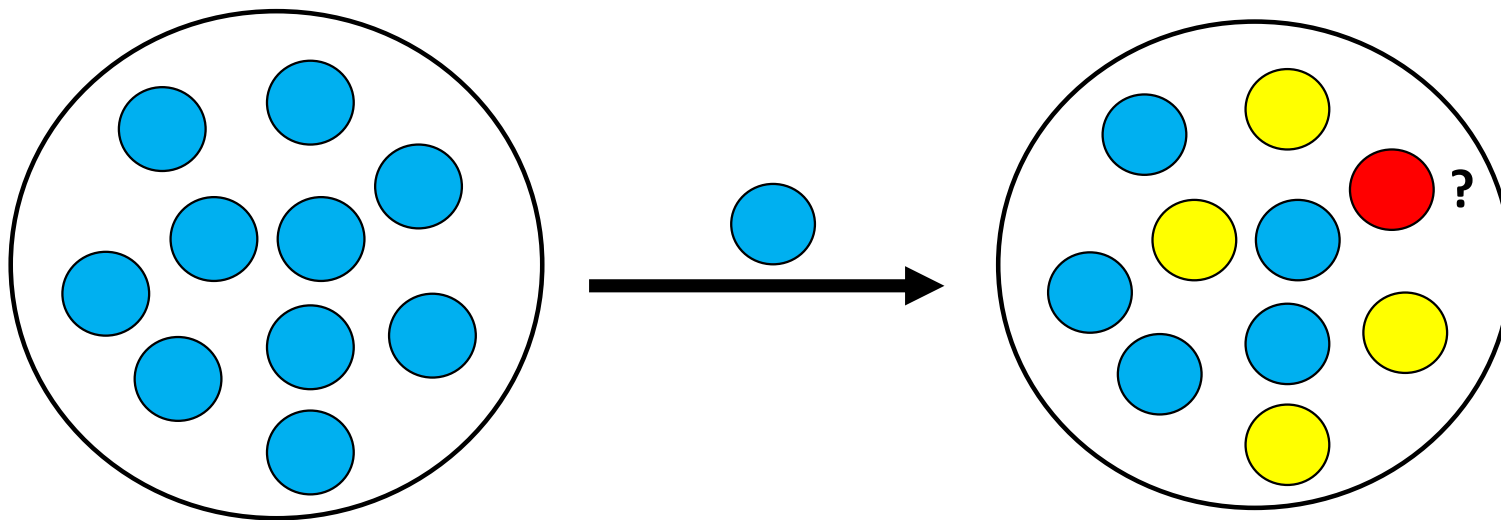# Parallels in processes

Jespersen cycle:

Stage I: I NEG say
Stage II: I NEG say NEG
Stage III: I say NEG

- selection

Parallels in processes

- Information exchange (language contact)

Parallels in concepts

Biology	Linguistics	Biology definition	Linguistics definition
Individual	Language-Individual	A single independent organism.	Each speaker level idiolect.
Species	Languages	A group of living organisms consisting of individuals capable of potentially exchanging genetic material.	A group of idiolects produced by similar grammars, such that they would potentially provide input to monolingual speakers.
Subspecies	Dialects	Distinct subgroups of individuals within a species/language which have sufficient differentiation from other subgroups but not enough to be characterized as distinct species/languages.**	
genotype	I-language/ grammar	The total genetic information of an individual.	A system of units of information that generates exactly those combinations of words that form grammatical sentences in a given language.
phenotype	E-language/idiolect	The set of observable characteristics of an individual resulting from the interaction. of its genotype with the environment.	The set of observable characteristics of an individual resulting from the interaction of its grammar with the environment.
gene	Characteristics relativized to the level of analysis (lexicon, phonology, morphology, syntax, semantics).	The unit of information for the construction of living organisms.	The unit of information which qualifies as a primitive at different levels of analysis.

Differences

Concept	Biology	Linguistics
genotype	A single level	Multiple levels
Inheritance	vertical	Vertical and horizontal
Acquired characters	Non inherited	Can be inherited
Parenthood	Distinct individuals	Multiple individuals
Migration	Not across species (?)	Yes across languages

Why studying language as evolvable system?

- Intellectually atractive (Unifying theoretical framework)

- Borrowing methods (phylogenetics)

- New questions (e.g. Correlation of population size with rate of language evolution)

Thank you

Ladoukakis, Michelioudakis and Anagnostopoulou, Bioessays 2022

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