

Syntax, Communication, and the Evolution of Language

Universal Grammar and Evolution

- Early-Chomsky (1965)
 - UG is large set of arbitrary syntactic rules
 - ‘language’ = computational principle
 - Syntax rules could not be learned
 - Poverty of Stimulus
 - Syntactic rules could not evolve
 - exaptation

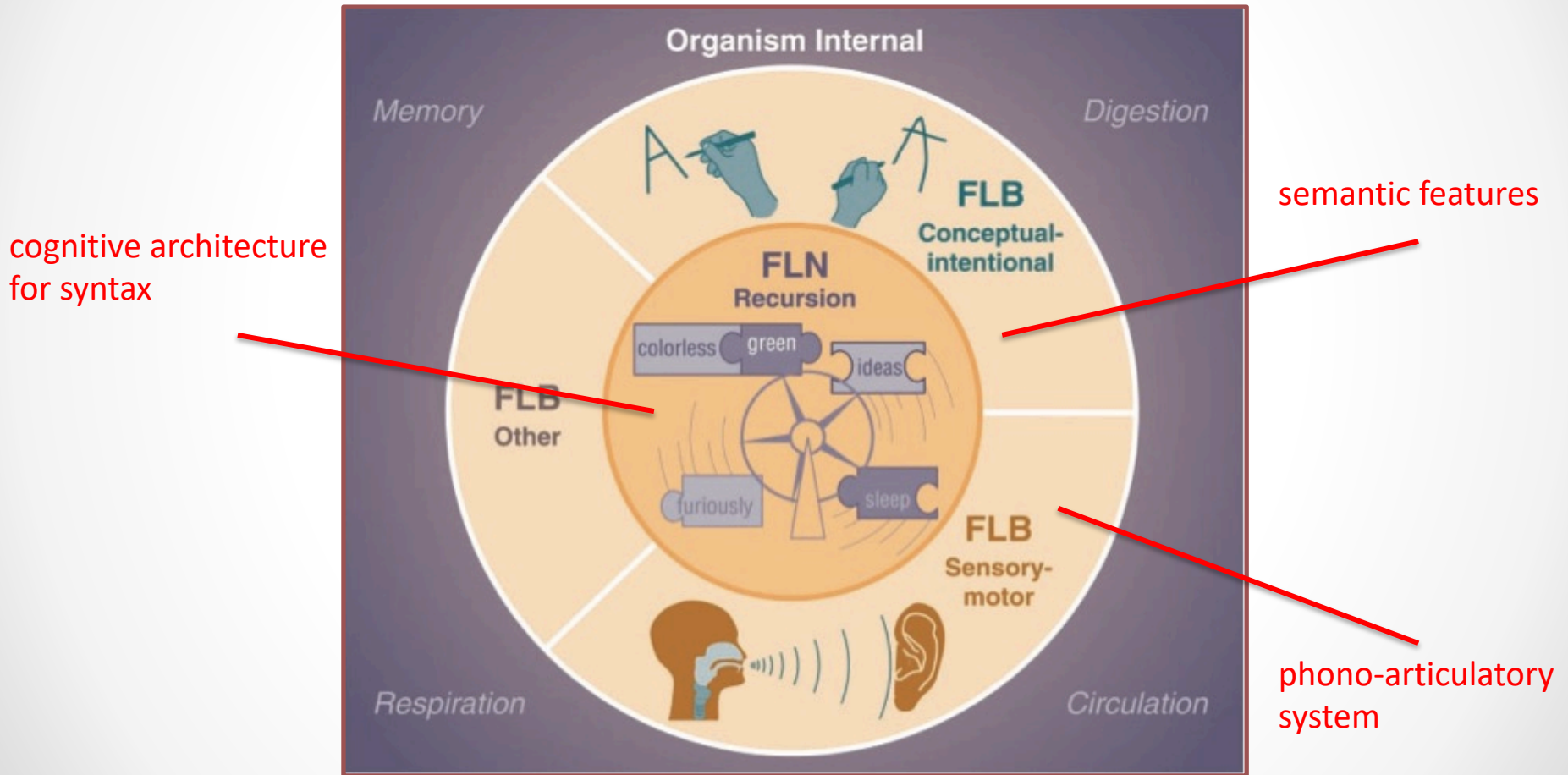
The Minimalist Program

- Later-Chomsky (1995 on)
 - UG is FLN (Narrow Faculty of Language): **computational principle of recursion** (Hauser, Chomsky & Fitch 2002)
 - “FLN takes a finite set of elements and yields a potentially infinite array of discrete expressions.” (ibid. p.1571)
 - FLN is Merge (Berwick & Chomsky 2016)
 - Merge combines two (or more) units into **hierarchically ordered** strings
 - “simplest possible computation”

The Minimalist Program (Chomsky 1995)

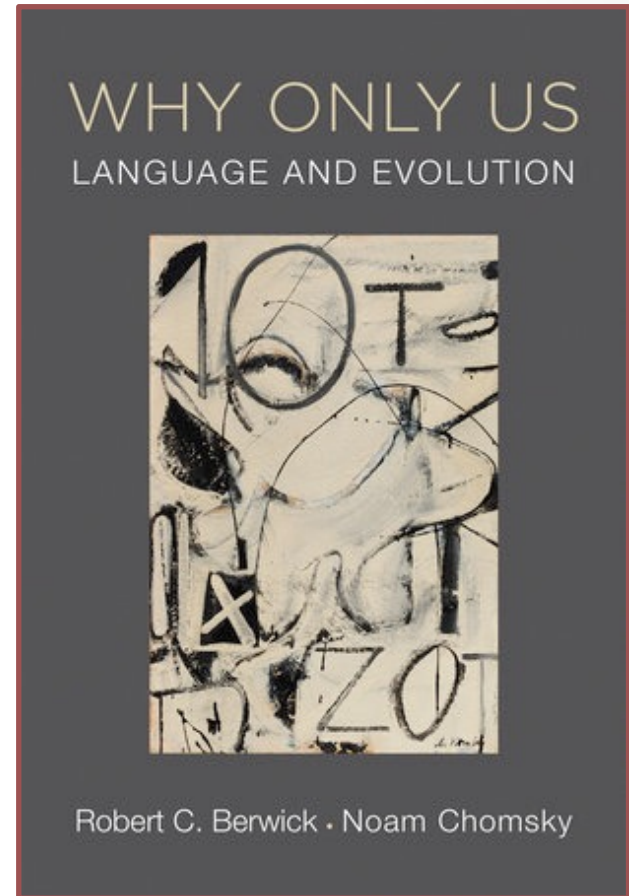
- Later-Chomsky (1995; see Berwick & Chomsky 2016)
 - Syntactic rules are **side effects of physical instantiation of Merge**
 - emergence no longer needs to be explained
 - Merge must be explained
 - more plausible target for **natural selection**

Evolution of the FLB and FLN (Hauser, Chomsky & Fitch 2002)



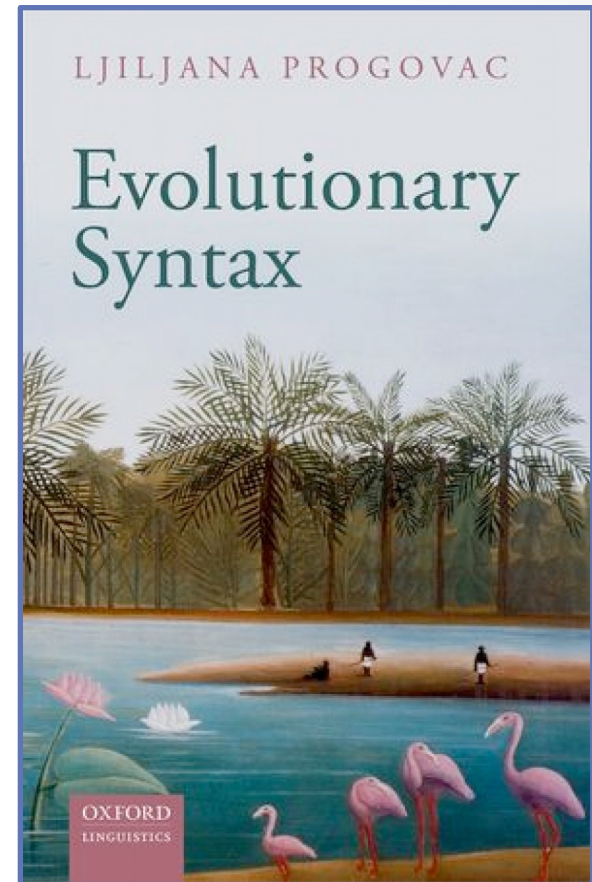
Berwick and Chomsky on the evolution of language

- Merge (FLN) emerged in a single step (saltationism)
 - selected for thought and planning
- Conceptual-intentional interface (FLB) emergence not understood
- Sensorimotor system (FLB):
 - gradualistic (Pinker & Bloom 1990)
 - selected for communication?



Progovac's challenge

- Merge (FLN) emerged in steps
 - gradualism
 - selected for communication



Progovac's gradualism (see also Glackin 2012)



- pressure for expressively powerful language →
- cultural selection for superior linguistic tools
- biological selection for mechanisms for syntax

(1) Holophrases

(2) **Non-hierarchical** pairs

(3) Hierarchical strings

Challenges to Progovac?

- If speakers lack structured thoughts at (1), from where does pressure for expressive power come?
- Why must **biological** (not cultural) selection can explain Merge?



Outstanding questions?

- What drove **selection for Merge**-like structures?
 - Thought and planning (Berwick & Chomsky 2017)
 - Tool use (Stout & Chaminade 2012; Planer & Sterelny 2021)
 - Sequence learning (Chater & Christiansen 2017)
 - Communication (Progovac 2015)

Outstanding questions?

- Did syntax appear by **saltation** or **gradually**?
 - natural language vs. language
- Are Merge-like structures/syntax **uniquely human**?



References

- Berwick RC, Chomsky N (2017) *Why only us: Language and evolution*. MIT Press.
- Berwick R, Friederici A, Chomsky N, Bolhuis J (2013) Evolution, brain, and the nature of language. *TiCS*, 17(2):89-98.
- Chomsky N (1965) *Aspects of the theory of syntax*. MIT Press.
- Chomsky N (1995) *The minimalist program*. MIT Press.
- Christiansen M, Chater N (2016) *Creating language: Integrating evolution, acquisition, and processing*. MIT Press.
- Cummins D (2000) How the social environment shaped evolution of mind. *Synthese*, (1):3-28.
- Glackin S (2011) Universal grammar and the Baldwin effect: A hypothesis and some philosophical consequences. *Biol & Philos*, 26(2), 201-222.
- Hauser M, Chomsky N, Fitch W (2002) The faculty of language: What is it, who has it, and how did it evolve? *Science*, 298(5598):1569-79.
- Jackendoff R (1999) Possible stages in the evolution of language capacity. *TiCS*, 3(7):272-9.
- Moore R (2017) The evolution of syntactic structure. *Biol & Philos*, 32(4):599-613.
- Pinker S, Bloom P (1990) Natural language and natural selection. *BBS*, 13(4):707-27.

References

Planer R, Sterelny K (2021) From signal to symbol: The evolution of language, MIT Press.

Progovac L (2015) Evolutionary syntax. OUP.

Stout D, Chaminade T (2012) Stone tools, language and the brain in human evolution. *Philos Trans R Soc B*, 367(1585):75-87.

Thomas J, Kirby S (2018) Self domestication and the evolution of language. *Biol & Philos*,33(1):1-30.