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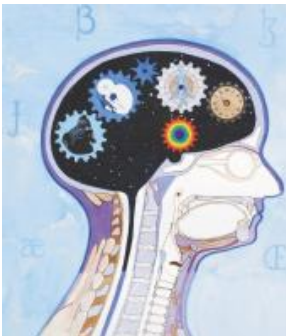
Language Evolution, Usage and Cognition

Towards an Integration of Cognitive Linguistics and Evolutionary Linguistics

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Outline

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Language Evolution Research

1866 The Famous „Ban“ by the Société de Linguistique de Paris

Article 2: « La Société n'admet aucune communication concernant, soit l'origine du langage, soit la création d'une langue universelle »

1990 Pinker & Bloom 1990

- “Natural Language and Natural Selection”



1990 – present

- “Explosion” of research on language evolution and advent of evolutionary linguistics (e.g. Christiansen & Kirby 2003; Fitch 2010; Hurford 2007; 2012; Tallerman & Gibson 2012. cf. Pleyer 2012)



“There is a field called evolution of language, which has a burgeoning literature, most of which in my view is total nonsense.” (Chomsky 2011.)

What Has Cognitive Linguistics Got To Offer?

“Your Theory of Language Evolution Depends on Your Theory of Language”
(Jackendoff 2010)

Nature of Language

- *conceptual*
- *symbolic*
- *interactive*
- *embodied*
- *perspectival*

Cognitive and Social Factors

- *entrenchment*
- *categorization*
- *prototypicality*
- *conventionalization*

(Geeraerts 2006; Langacker 2008, Bybee 2010; Langacker 2008; Tomasello 2003, 2008).

Construction Grammar & The Evolution of Language



“I take a certain class of syntactic theories, Construction Grammar, to be more compatible with evolutionary considerations” (Hurford 2012: 176f.)

Construction Grammar, Cognitive Linguistics and Usage-Based Approaches

- can help specify the complex set of the underlying **skills, capacities** and **processes** that **language use, structure, acquisition** and **evolution** depend on (cf. e.g. Hoffmann & Trousdale 2013; Bybee 2012; Christiansen & Chater 2008; Hurford 2012; Tomasello 2003)
- → amenable to interdisciplinary integration and comparative research

Usage-Based and Constructionist Approaches

linguistic structure is formed by the repetition and entrenchment of patterns in language use in richly social interactive contexts which get conventionalized in a community

linguistic knowledge consists in abstractions and schematizations from exemplar representations of experience in context that form radial networks

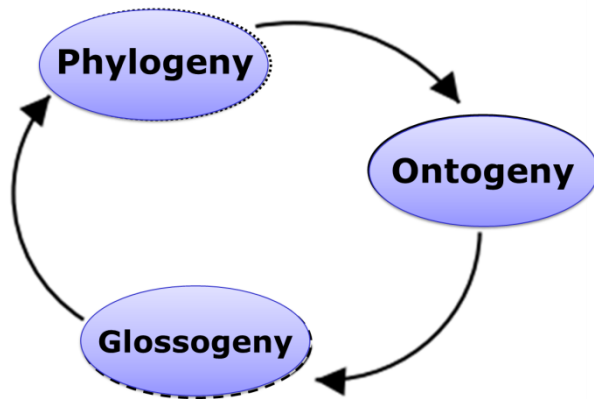
interpersonal communicative and cognitive processes feed into and shape the emergence of linguistic structure (Bybee 2013; Ellis 2013; Slobin 1997)

The meaning of linguistic constructions is grounded in context and common ground established through cooperative activity (Clark 1996)

Convergences & Similarities: Language as a Complex Adaptive System

Complex
Adaptive
Systems

„[...] emergent phenomena grow out of an amplification dynamic that can spontaneously develop in large ensembles of interacting elements by virtue of the continuing circulation of interacting constraints and biases, which become expressed as system-wide characteristics“ (Deacon 2010: 124)



Kirby & Hurford 2002

Language is a complex adaptive system that arises through the interactions of three complex adaptive systems on different timescales (Kirby 2012)

The Ontogenetic Timescale

Sociocognitive Capacities & Motivations

- e.g. perspective-taking (e.g. Clark 1997; Tomasello 2003)
- joint attention (e.g. Baldwin 1995)
- *Mitteilungsbedürfnis* (Fitch 2010)
- Processes of mutual coordination and cooperation
- Shared intentionality

General Cognitive Mechanisms

- e.g. analogy (e.g. Gentner & Christie 2010)
- statistical learning (e.g. Graf Estes 2012)
- generalization and schematization (e.g. Langacker 2000; Ibbotson 2011)
- entrenchment (e.g. Lieven 2010)
- categorization (Bybee 2010, 2013)
- chunking & automatization (Bybee 2010, 2013, Bybee & Beckner 2009)

→ the acquisition and learning of language is influenced by a variety of cognitive factors and social scaffoldings

The Glossogenetic Timescale

cultural transmission and historical language change in dynamic populations are determined by social and cognitive factors as well as emergent properties of the transmission process (e.g. Kirby 2012).

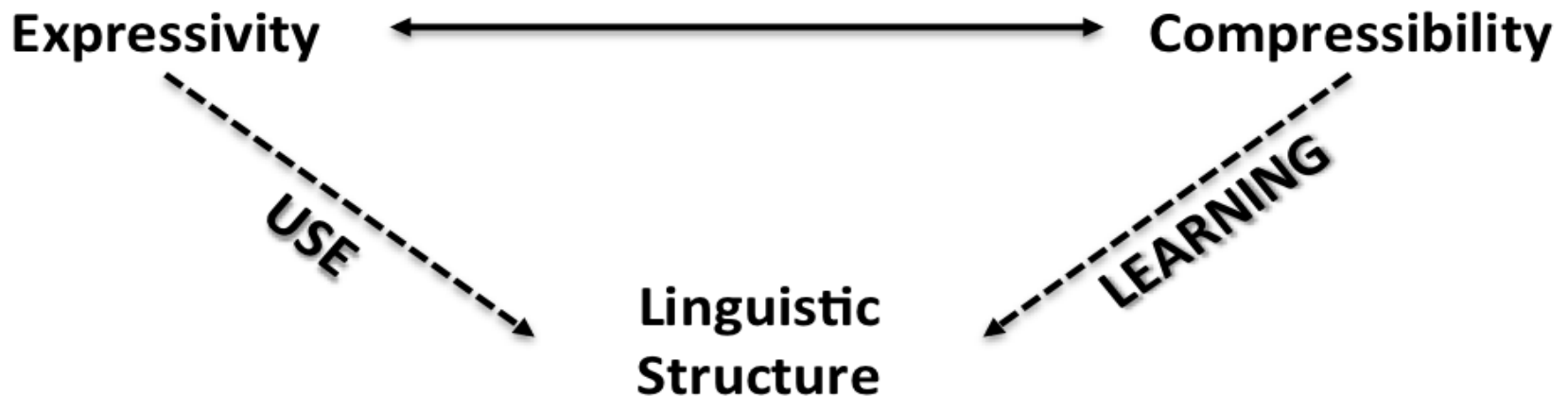
CL is beginning to unravel the interaction of general cognitive mechanisms and cultural transmission in influencing language change

structural patterns emerge through processes of grammaticalization & constructionalization (e.g. Beckner et al. 2009; Bybee 2010; Trousdale & Traugott in press).

Emergence of Structure

The emergence of certain types of systematic structure in language can be seen as resulting from two competing constraints:

a pressure to be useful (*expressivity*) and
a pressure to be learned (*compressibility*).



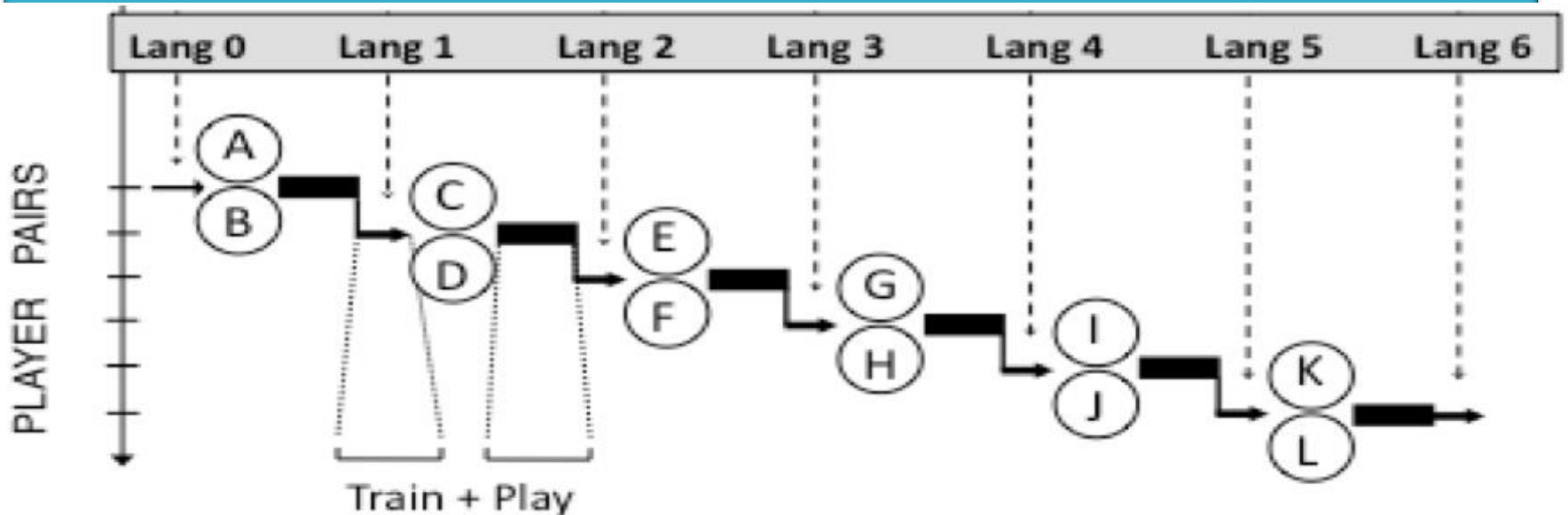
Investigating the emergence of systematic structure

Explaining the emergence of systematic structure through the processes of social transmission and interaction has become a central goal in the study of the cultural evolution of language (Scott-Phillips & Kirby, 2010).

Increasingly, computational and mathematical work in this area is being supported and extended by laboratory-based experiments (Galantucci, 2005; Kirby, Cornish & Smith, 2008; Fay et al., 2010).

Emergence of Structure


Experimental methodologies have been provided that allow us to test the relative effects of *use* (interaction/communication) and *learning* (intergenerational transmission).



From Tamariz *et al* (in prep).

Emergence of Structure

- Through small manipulations in these types of experiments we can get markedly different results:




tuge	tuge	tuge	□
tuge	tuge	tuge	○
tuge	tuge	tuge	△
tupim	tupim	tupim	□
miniku	miniku	miniku	○
tupin	tupin	tupin	△
poi	poi	poi	□
poi	poi	poi	○
poi	poi	poi	△

Table 4.3: A table showing the final language from a stable system in Experiment I (Chain C). The meanings in this language are systematically underspecified by the signals. This system easily survives the transmission bottleneck by effectively reducing the number of meanings to just five: things that move horizontally; things that spiral; bouncing squares; bouncing circles; and bouncing triangles. Given that the bottleneck allows 14 items through, the odds of at least one item from each of the five emergent categories surviving are high. This table has been redrawn from Kirby, Cornish & Smith (2008) with permission.

Emergence of Structure

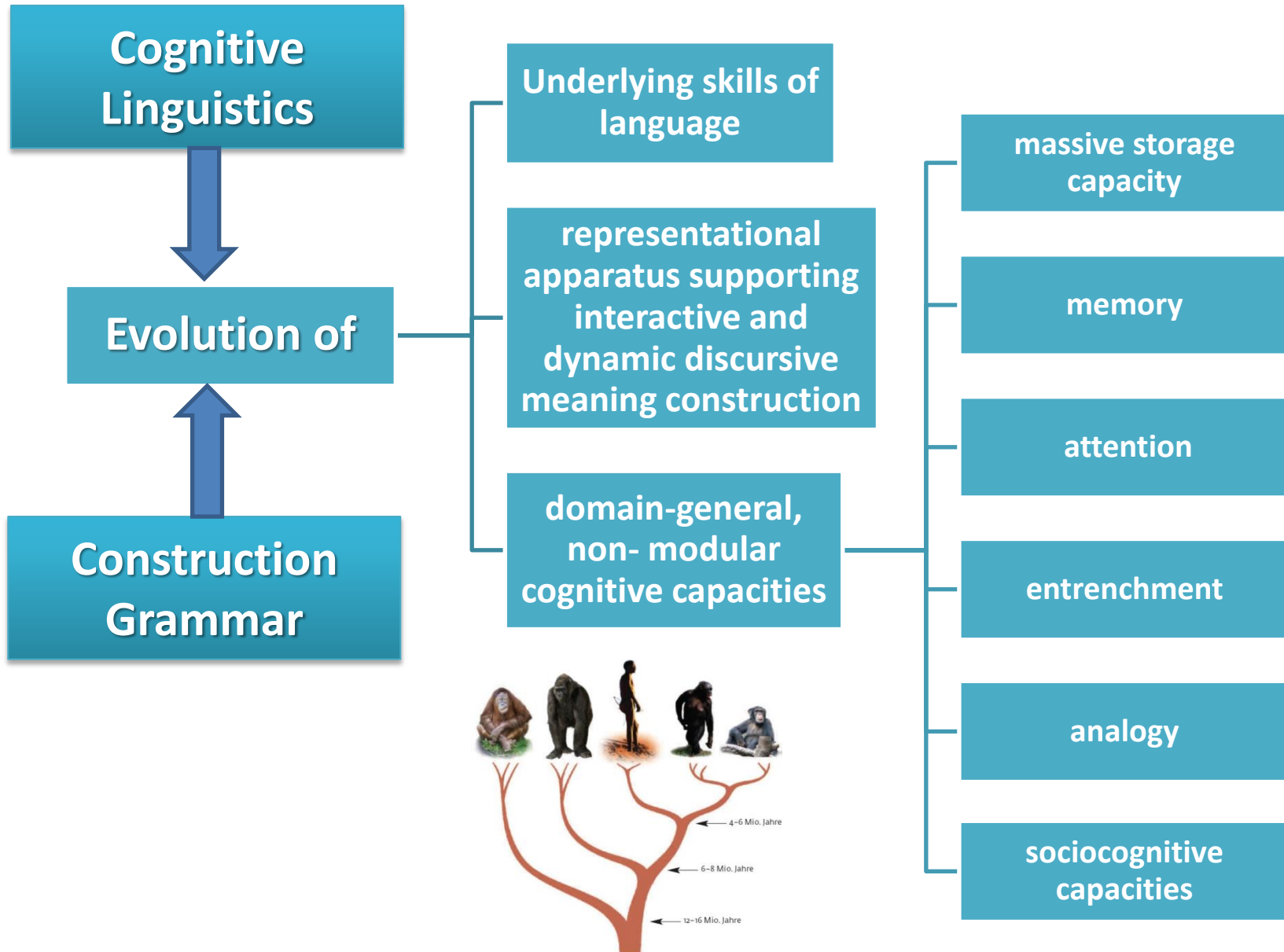
- Through small manipulations in these types of experiments we can get markedly different results:



nereki	lereki	renana	□
neheki	lehoki	reneki	○
nekeki	lakeki	raheki	△
nereplo	laneplo	replo	□
nehoplo	lahoplo	rehoplo	○
nekiplo	lakuplo	rahoplo	△
nepilu	lanepilu	repilu	□
nehopilu	lahopilu	rehopilu	○
nekipilu	lakupilu	rahopilu	△

Table 5.1: A fully compositional language arising from Experiment III (Chain A, generation 9). This language has 27 distinct signals for each of the meanings, and each signal is composed of three segments. The first segment represents the colour, the middle segment represents the shape, and the final segment represents the motion of the object. Reproduced from Kirby, Cornish & Smith (2008) with permission.

The Phylogenetic Timescale



Conclusion

Language exists at three timescales that dynamically interact with one another – it's a *Complex Adaptive System*

There are many convergences and similarities between Cognitive Linguistics and Evolutionary Linguistics and the two disciplines can profit from interdisciplinary integration

KEY QUESTIONS:

- How does structure emerge?
- What are the cognitive, interactional, and systemic processes involved in the development, processing and acquisition of constructions
- How do structures and constructions become conventionalized and constructionalized?
- What role does the verbalization of experience play in the evolution of language?

Thank you for your attention!

