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Structural, evolutionary and biocognitive explanations are mutually compatible

MARTIN HASPELMATH
Max Planck Institute for Evolutionary Anthropology

Preamble

There is no deep reason for ideological divisions in linguistics

– we do not need to have "commitments" or "tenets" (e.g. Lakoff 1991; Goldberg 2003)
– we do not need to decide "what linguistics is about" (e.g. Hornstein 2019)
– we do not need to "subscribe to" a framework and defend it
– we do not need to perpetuate diverging terminologies

Different methodological choices ("approaches") are more **compatible** with each other than many people think.

1. Three types of explanations

Structural explanations

Language systems are more orderly than one may think at first glance, and we can often reduce apparent variety to **deeper regularities**.

Evolutionary explanations

In diachronic change, speakers often select variants that increase the fitness or utility of their language system – language systems are (to a significant extent) the product of **evolutionary adaptation**.

Biocognitive explanations

Language systems are constrained by being acquired by humans with their particular biological properties. Not every logically possible language is attested, so **innate biocognitive constraints** can explain observed limits on worldwide diversity.

We may want to distinguish

– structural linguistics
– adaptive linguistics
– biolinguistics

but only if these are **not** thought of as "competing ideologies" (or "schools of thought") – they should be **complementary**.

Competition makes sense between **competing hypotheses** (= competing claims), and perhaps between **competing methods** (though methods are often complementary, too).

2. Structural explanations

Structural explanations reduce apparent variety to **deeper regularities**.

(A) vowel systems

i		u
e		o
	a	

can be reduced to three binary features: [±high], [±low], [±back]:

i	[+high, –low, –back]
u	[+high, –low, +back]
e	[–high, –low, –back]
o	[–high, –low, +back]
a	[–high, +low, +back]

(B) German word order

(1)	Katja	**singt**	ein	Lied.			
	K.	sings	a	song			
(2)	Katja	**hat**	ein	Lied	***gesungen***.		
	K.	has	a	song	sung		
(3)		Wenn	Katja	ein	Lied		**singt**, ...
		when	K.	a	song		sings
(4)		Wenn	Katja	ein	Lied	***gesungen***	**hat**, ...
		when	K.	a	song	sung	has
(5)	Morgen	**singt**	Katja	ein	Lied.		
	tomorrow	sings	K.	a	song		

This order is quite rigid, and it can be described by setting up an abstract template:

prefield – **P1** – middle field – *nonfinite verb* – **P2**

Then the number of rules that we need can be simplified:

– arguments or adverbials can occur in the prefield or the middle field
– subordinators occur in P1 and preclude a prefield
– the finite verb (*singt, hat*) occurs in P1 unless this field is filled by a subordinator
– otherwise the finite verb occurs in P2

(C) Sakha differential object marking

The patient object in Sakha (a Turkic language) is accusative-marked,
but only when it is definite (Baker 2015):

(5) a. *Masha* ***salamaat-y*** *sie-te.*
Masha porridge-**ACC** eat-PST.3SG
'Masha ate the porridge.'

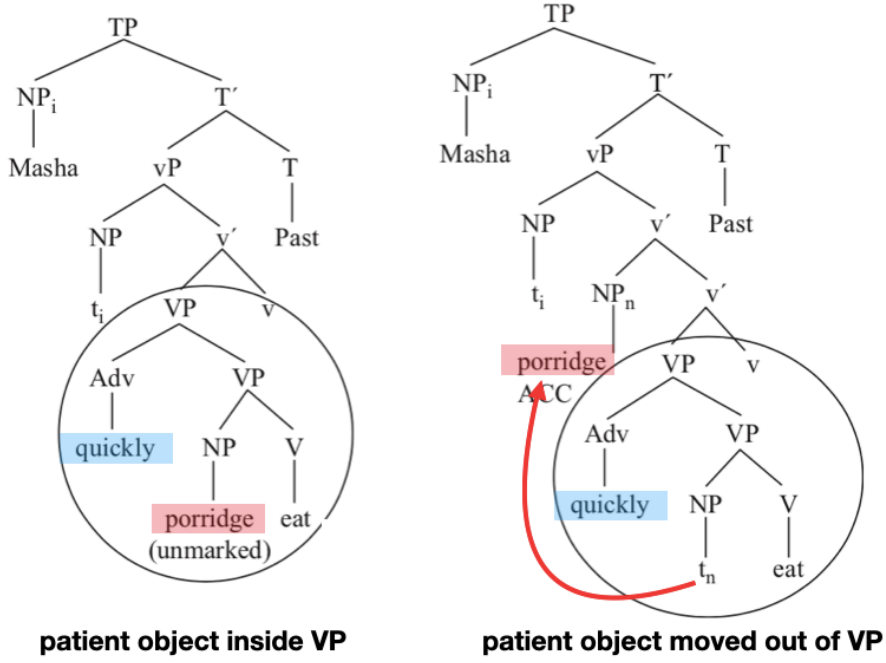
b. *Masha* ***salamaat*** *sie-te.*
Masha porridge eat-PST.3SG
'Masha ate porridge.'

This corresponds to a word order difference:
a definite (and accusative-marked) object precedes an adverb:

(6) a. *Masha* ***salamaat-y*** *türgennik* *sie-te.*
Masha porridge-**ACC** quickly eat-PST.3SG
'Masha ate the porridge quickly.'

b. *Masha* *türgennik* ***salamaat*** *sie-te.*
Masha quickly **porridge** eat-PST.3SG
'Masha ate porridge quickly.' (**salamaat türgennik siete*)

Baker (2015: 126):
this is because the domain for accusative case assignment is the TP, and when the object is not moved out of the VP in (6a), it is not accessible for case.



patient object inside VP **patient object moved out of VP**

3. Evolutionary explanations

language systems are (to a significant extent) the product of **evolutionary adaptation**

(A) vowel systems

– symmetric triangular vowel systems can be explained as making **optimal use** of the vowel space (dispersion theory: Liljencrants & Lindblom 1972; Gordon 2016)

– vowel systems are constantly recreated through diachronic change, e.g.

	Latin	French	
u > y	*mūrus*	[myʀ] *mur*	'wall'
a > ɛ	*carus*	[ʃɛʀ] *cher*	'dear'
e > a	*tectum*	[twa] *toit*	'roof'
o > u	*collum*	[ku] *cou*	'neck'
e > i	*lēctum*	[li] *lit*	'read'

– the changes tend to be of a kind that yields a well-dispersed vowel space (cf. Martinet 1955: *Économie des changement phonétiques*)

– the changes are **adaptive**

(B) differential object marking

– object marking of definite or animate objects can be explained as making **optimal use** of role-marking, because those types of nominals that are **least likely to be objects** are marked (Bossong 1991)

– the changes are of a kind that yields such systems, e.g.

Latin *ad* 'to'	>	Spanish *a*
Latin *per* 'though'	>	Romanian *pe*
Russian *-a* (genitive)	>	*-a* (accusative)
German *-en* (stem marker)	>	*-en* (accusative), e.g. *den Linguist-en*
Chinese *bǎ* 把 'take'	>	*bǎ* (accusative preposition)

– the changes are **adaptive**

"Evolutionary explanations" have also been called "functional explanations" – but I prefer "evolutionary" or "adaptive", because they operate at the **level of language change** (like biological evolution).

There is no claim of synchronic language-particular "functionality" – synchronically, languages often show nonfunctional or dysfunctional features. The functional-adaptive factors **explain general trends**, not necessarily language-particular features.

4. Biocognitive explanations

Innate biocognitive constraints can explain observed limits on worldwide diversity. Specifically: languages are constrained by **formal universals** (architectures of grammar and types of rules) and **substantive universals** (specific features and categories) (Chomsky 1965)

(A) vowel systems:

possibly constrained by the universal features of Chomsky & Halle (1968):

> "That there must be a rich system of a priori properties – of essential linguistic universals – is fairly obvious... general linguistic theory might propose, as substantive universals, that the lexical items of any language are assigned to fixed categories such as noun, verb and adjective, and that phonetic transcriptions must make use of **a particular, fixed set of phonetic features**... We will be concerned with the theory of "universal phonetics," that part of general lingusitics that specifies the class of possible phonetic representations" (Chomsky & Halle 1968: 4)

(B) differential object marking:

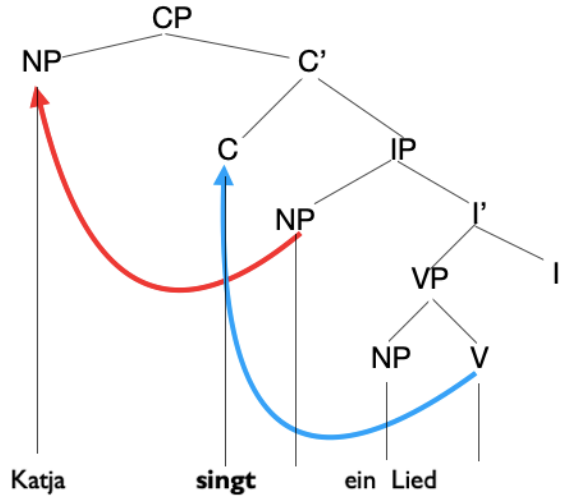
possibly constrained by a substantive set of universally possible case assignment rules, as in Baker (2015)

(7) a. High case in TP (clause) is ergative.
b. Low case in TP (clause) is accusative.
c. High case in VP is dative.
d. High case in NP is genitive (there is no low case in NP).
e. Unmarked case is nominative-absolutive.

(simplified from Baker's "dependent case" theory; Haspelmath 2018)

(C) German word order:

word order is possibly constrained by universal functional hierarchies (CP – IP – VP) and constraints on movement (cf. Haider 2010)



It is odd that the finite verb should be in the "C" position (for complementizer), but this analysis has been widely proposed – the hope is that the general "CP – IP – VP" system explains German word order.

5. Why these three types of explanations are not incompatible

5.1. Structural and biocognitive explanations are not incompatible

In generative grammar, both types of explanation are pursued – and the idea is that the **structural building blocks** are part of the innate grammar blueprint ("Universal Grammar"). So they are obviously compatible.

But they are **logically independent** of each other, and many generative linguists do not want to commit themselves to rich innate grammatical knowledge (especially since Chomsky 2005, who reversed his earlier position and **no longer claims that the structural building blocks are innate** (cf. Fitch 2016; and my 2021 blogpost: https://dlc.hypotheses.org/2481).

5.2. Structural and evolutionary explanations are not incompatible

In general, structural description is compatible with evolutionary explanation – and indeed, the two are obviously **complementary**. We need description before we can move on to evolutionary explanation.

Consider vowel systems again:

i	u
e	o
a	

can be reduced to three binary features: [±high], [±low], [±back]:

i	[+high, –low, –back]
u	[+high, –low, +back]
e	[–high, –low, –back]
o	[–high, –low, +back]
a	[–high, +low, +back]

One can propose an **elegant description** in terms of binary features, and at the same time advance an **evolutionary explanation**.

The same applies to differential object marking (4B above), but I do not know any evolutionary explanation of German word order – this is one of the many random patterns that languages exhibit.

A structural explanation answers the question:

Why do speakers talk the way they do?

(because they have internalized a certain language system)

An evolutionary explanation answers the question:

Why are grammatical systems the way they are?

(because certain systems are optimal, and adaptive change favours optimal systems)

In a sense, both answers are ***explanatory/theoretical***:

particular theories (p-theories)
general theories (g-theories) (see Haspelmath 2021b)

Each grammatical description is a theory of the language:

> "A grammar of the language L
> is essentially a theory of L." (Chomsky 1957: 49)

Thus, it makes no sense to contrast *theoretical* and *descriptive* linguistics – **descriptive linguistics** (which describes language structures) is usually a **theoretical enterprise** (unless it has applied goals).

(or "theory" vs. "typology", cf. blogpost: https://dlc.hypotheses.org/1915)

5.3. Evolutionary and biocognitive explanations are not incompatible

Finally, I claim that functional-evolutionary and biocognitive explanations are compatible.

Many authors have framed the approaches taken by different linguists in terms of

"functionalism" vs. "formalism" (e.g. Newmeyer 1998; Thomas 2020)

and indeed, we observe almost disjoint communities of scholars:

e.g. functional-adaptive:	e.g. generative:
Alexandra Aikhenvald	Mark Baker
Denis Creissels	Jonathan Bobaljik
William Croft	Guglielmo Cinque
Matthew Dryer	Richard Kayne
Anna Siewierska	Ian Roberts

However, I would like to claim:
These groups of scholars are divided merely by **habits**:
different notations and **scientific styles**, as well as different **"hunches"**

The approaches taken by them would be conceptually incompatible if they held the following positions:

"functionalists:" – all general aspects of language structures can be explained by functional-adaptive forces

– the difference between humans and other species has nothing to do with domain-specific capacities

"generativists:" – all general aspects of language structures can be explained by innate grammatical knowledge

– functional-adaptive forces play no role in language structures

But **these are caricatures**, and in reality:

– most functionalists do accept that we are quite far away from explaining everything in functional-adaptive terms

– and many of them also use complex formalisms

– all generativists do accept that some structural properties of languages are functionally motivated

– and many of them even think that very little is innate (Chomsky 2005)

Thus, in each domain, it is an empirical question what the best explanation is – ***innate knowledge*** or ***functional-adaptive forces***

Compare biology:

– some properties of organisms are explained by the makeup of DNA (its discovery was a major breakthrough)
– but this has not made evolutionary-adaptive explanations superfluous

Organisms are constrained **both** by DNA and by evolutionary adaptation.

Linguistics:

– some properties of languags are explained by innate knowledge (UG) (its discovery would be a major breakthrough)
– but this has not made evolutionary-adaptive explanations superfluous

Languages are constrained **both** by UG and by functional adaptation.

6. Differential object marking again

There are two competing possibilities for explaining differential object marking patterns, like those in (8)-(10).

(8) Sakha (Baker 2015)

a. *Masha* ***salamaat-y*** *sie-te.*
Masha porridge-**ACC** eat-PST.3SG
'Masha ate the porridge.'

b. *Masha* ***salamaat*** *sie-te.*
Masha porridge eat-PST.3SG
'Masha ate porridge.'

(9) Mandarin Chinese

a. 我把饺子吃了。
Wǒ ***bǎ*** ***jiǎozi*** *chī-le.*
I ACC dumpling eat-PFV
'I ate the dumplings.'

b. 我吃饺子了
Wǒ *chī-le* ***jiǎozi.***
I eat-PFV dumpling
'I ate dumplings.'

(10) Spanish

a. *Vi* *a* *la* *niña.*
I.saw **ACC** the girl
'I saw the girl.'

b. *Vi* *la* *casa.*
I.saw the house
'I saw the house.'

• functional-adaptive: object marking occurs when it is most needed, namely with **definite and/or animate nominals** (which are less likely to be on object position)

• biocognitive: accusative case is assigned when the object NP is "close enough" to the subject NP
– in Sakha and Chinese, the object moves out of the VP and thus gets "closer" to the subject NP

The **functional-adaptive** explanation allows us to understand the universal finding in (10) (see Haspelmath 2021a)

(10) Differential object marking universal
If a language has an asymmetric split in object marking depending on some prominence scale, then the special marker occurs on the **referentially prominent** P-argument.

prominence scales:	animacy	animate > inanimate
	definiteness	definite > indefinite
	person	1st/2nd > 3rd

General observation: – referentially prominent arguments tend to be agents
– nonprominent arguments tend to be patients

The **biocognitive explanation** (Baker 2015) allows us to understand why definite nominals show differential accusative case when they occur **in a different position** from indefinite nominals.

But:
– Baker (2015) does not extend his explanation to Chinese – he wants to limit it to "case marking", not to all kinds of markers that flag nominals.
– When the differential marking is conditioned by **animacy** (as in Spanish), Baker's biocognitive explanation makes no prediction.
– Even when differential object matking is conditioned by definiteness, it may not be associated with a clear positional difference, as in Hebrew:

(11) Hebrew

a. *David kara et ha-sefer.*
David read **ACC** the-book
'David read the book.'

b. *David kara sefer.*
David read book
'David read a book.'

Thus: The evolutionary-functional explanation has much better empirical coverage than the biocognitive-generative explanation.

Moreover, it appeals to highly general explanatory factors:
efficiency of coding ("marking occurs where it is most needed") is merely a special case of efficiency of action

So why do linguists keep pursuing biocognitive explanations of the generative type?

Proposed answer: because they conflate structural and biocognitive linguistics

7. The conflation of structural and biocognitive linguistics

What I said in §5 above was (simplified):

- structural explanations explain speaker behaviour ("language description")
- evolutionary explanations explain general trends ("why languages are the way they are")
- biocognitive explanations explain the differences between species – ("why chimpanzees don't talk")

Many linguists conflate structural and biocognitive explanations:

- structural explanations must make use of universal building blocks

Aissen (2003: 439)

> "Optimality Theory (OT) provides a way, I believe, to reconcile the underlying impulse of generative grammar to **model syntax in a precise and rigorous fashion** with a conception of differential object marking (DOM) which is based on prominence scales. The purpose of the present paper is to develop an approach to this phenomenon within OT **which is formal** and at the same time expresses the functional-typological understanding of DOM."

What does Aissen mean by – "modeling syntax"
– in a "precise and rigorous fashion"
– with a "formal approach" ?

Aissen seem to mean a "formal framework" that is **the same for all languages** – the sort of notation that is often taught in syntax textbooks.

But it can be the same for all languages only **if the framework is thought to be innate** – and if the framework is innate, then it also provides an **explanation** for some of the limits on languages
(this is the Principles & Paramaters framework, e.g. Roberts 1996; Baker 2001).

Aissen's Optimality Theory notation:

(30)

ROLE: PATIENT DEF: SPECIFIC, INDEFINITE	*OJ/DEF & *$\emptyset_C$	*STRUC$_C$	*OJ/SPEC & *$\emptyset_C$	*OJ/NSPEC & *$\emptyset_C$
GF: OJ DEF: SPECIFIC, INDEFINITE CASE: ACC		*!		
☞ GF: OJ DEF: SPECIFIC, INDEFINITE CASE:			*	

Tableau 1. Hebrew.

All the constraints and many of the constraint rankings are thought to be innate – this makes it possible to both **describe all languages in the same framework**, and to offer this framework as an explanation.

However:

– it is biologically very implausible that rich descriptive frameworks should be innate
(Chomsky 2005; Berwick & Chomsky 2016)

– Aissen (2003) wants to "capture" the insights of **economy explanations**,
but in her conflating approach, there is no link between economy/efficiency
and her constraint rankings

– while different languages often show intriguing similarities, there are often
many differences in detail (e.g. "definiteness" is subtly different in
Sakha, Chinese and Hebrew) – these need to be **described** anyway

– functional-evolutionary explanations often have a disparate range of effects –
for example, **efficiency of argument coding** affects objects, subjects, recipients,
patients, and a range of different prominence scales (Haspelmath 2021a);
these cannot possibly be captured by a single innate framework

8. Concluding remarks

We all agree that linguists must **describe** (or "model") the structures of languages in a "precise and rigorous fashion". In this sense, **we are all structuralists** (see blogpost https://dlc.hypotheses.org/2356).

And unless we concentrate on applied goals, **we are all theoretical linguists** (Haspelmath 2021b).

We all agree that **formal methods** of different kinds are often useful for linguistics. But due to a complicated sociological process, the term has become associated with Chomskyan generative linguistics (see blogpost https://dlc.hypotheses.org/1698).

And we all agree that

– some aspects of language structures are **due to efficiency**
(e.g. abbreviations such as "MPI" for "Max Planck Institute")
– human minds and chimpanzee **minds differ**
in ways that gives humans language

So we really all agree that we need

– structural explanations	(formal models of syntax)
– evolutionary explanations	(adaptive accounts of efficiency effects)
– biocognitive explanations	(explanations of species differences)

and they must be mutually compatible.

Is there an ideological difference between a functionalist and a generativist?

No, the difference primarily consists in **scholarly traditions**, and in **"hunches"**:

functionalist: the precise nature of the formal description is probably not very important for understanding grammar

generativist: considerations of functional efficiency are probably not very important for understanding grammar

For differential object marking (DOM), I have shown that
functional efficiency is very important,
because it explains many cross-linguistic tendencies (Haspelmath 2021a).

But – I do not have any particular "commitments" or "tenets" (Lakoff 1991)
– I do not "subscribe to" any particular framework (Haspelmath 2010)
– I do not say that "linguistics is about languages" (Comrie 1978)
rather than universal cognition (Hornstein 2019)

Given that scholars are humans, and humans live in traditions, we will probably continue to work in such traditions (cf. blogpost: https://dlc.hypotheses.org/1741).

But we should not confuse our traditions and hunches with **competing ideologies**.

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