

Linguistics – postmodern frippery, or primordial cognitive science?

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..... THE TASK

- α Progress that has been made ?
- β Progress that could/should have been made ?
- γ And what about the next decade(s) ?

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Comments

„Linguistics“ = in particular, my own subdiscipline: syntax

1. There is consensus that the human language faculty is a legitimate research target of cognitive science(s).
2. There is (almost) consensus that the human language capacity is a domain-specific capacity.
3. Hence, linguistics is likely to end up as a (respected) member of the ensemble of cognitive sciences, as a specialization for this very domain. Since this domain cannot be studied without reference to its productions, descriptive and theoretical linguistics (of course) are legitimate partners of neighboring cognitive science branches, with psycho- and neurolinguistics as the bridge disciplines.
4. There is however the realistic danger that (theoretical) linguistics will become disconnected from the science(s),* because the possibility could arise that it has nothing of relevance to offer to the neighboring sciences (and even more because of its partially unscientific conduct).

*) © Mark Aronoff

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α Progress has been made, evidently

- The amount of cross-linguistically valid, sufficiently *well-analyzed data* sets has grown
- There is a (small) set of fairly well substantiated, *cross-linguistically valid generalizations*
- Consequence: it has become slightly more **tough** to convince others that one's pet **generalization** is likely to be correct, and slightly *easier* to identify a **wrong** generalization rightaway

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Comments

•The amount of cross-linguistically valid, sufficiently *well-analyzed data* sets has grown:

Example: The (re-)discovery of the V2-characteristics of the Germanic languages in the 80ies, that is, **V2'** plus either VO (Scandinavian) or OV.

I remember Mallinson & Blake (1981) among the first typologists who acknowledge the findings of syntacticians and correctly list German as a **V2+OV** language.

[But you may still find apparently uninformed opinions, even from native German linguists, that list German as an SVO language (next to English), as in Haarman 2004:8].

Mallinson, Graham & Barry J. Blake. 1981. *Language typology : cross-linguistic studies in syntax*. Amsterdam: North-Holland Publ.

Haarman, H. 2004. *Elementare Wortordnung in den Sprachen der Welt*. Hamburg: Buske. (title = elementary word order in the worlds's languages. HH)

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However - On the nature of ‚progress‘

In general, ‚progress‘ has the property that it appears much greater than it really is.

„Der Fortschritt ist halt wie ein neuentdecktes Land; ein blühendes Kolonialsystem an der Küste, das Innere noch Wildnis, Steppe, Prärie.

Überhaupt hat der Fortschritt das an sich, daß er viel größer aussieht, als er wirklich ist."

Johann Nepomuk Eduard Ambrosius Nestroy, (1801-1862), Der Schützling (1847) IV,10



Nestroy

β Progress that should have been made

- There is no well-established ‚**balance of power**‘ yet between **theory** camps and **experimental** camps (cf. theoretical vs. experimental physics)
- There is no established standard of **data validation**
- Consequence: still, sophisticated theoretical claims are too often built on obviously unreliable data claims

(an exemplary case will **follow**: s. Dutch superiority)

γ Prophecies for the next 5 decades ?
With nearly 100% certainty ???

Here are two prophecies

nearly 100% correct
for the next five decades

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Two nearly 100% correct prophecies for the next five decades

1. No linguist will be awarded a **Nobel prize**

(„no trip to Stockholm!“ – according to G.Pullum)



2. No linguist will be awarded a **Fields medal**

(see Gauss on Linguistics, according to D. Kehlmann)



BUT: Every serious science has an award -
We need a Saussure/Chomsky medal !



Gauss on Linguistics, according to

Daniel Kehlmann. Die Vermessung der Welt. 2007. Hamburg: Rowohlt. p.159:

„Sprachwissenschaft? Gauß wiegte den Kopf. Das sei etwas für Leute, welche die Pedanterie zur Mathematik hätten, nicht jedoch die Intelligenz. Leute, die sich ihre eigene notdürftige Logik erfänden.“

Linguistics? This is something for people with the pedantry, but not the intelligence, for mathematics. People who invent their own scanty logics.

Sorry, no Fields medal !

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γ Prophecies for the next decades

Let me frame it this way:

What is the kind of break-through that will get you **this medal** ?

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Our problem is this

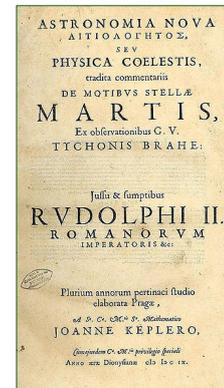
- By far too many would-be **Newtons**
- By far too few would-be **Keplers**
- BUT hardly any would-be **Brahes**



Tycho Brahe

The solution is this

- **Brahe** – stands for well-assessed bodies of **representative data**
- **Kepler** – stands for accurately formalized **generalizations** (**laws**), each based on a representative body of data.
- a **Newton** is unpredictable anyway



Comments:

Brahe: highly reliable and systematic description of relevant data.

Kepler: a formal and empirically adequate model of the generalizations on these data („laws“)

Newton: an **explanation** of the generalizations (derived from an *assumed force* that is inversely proportional to the square of the distance, namely „gravitation“)

Model = formalization of the given body of generalizations

Explanation = derivation of the generalization **PLUS** independent predictions, i.e. as a set of consequences (cf. pendulum, tides, ...)



Surely, the solution is **NOT**

a competition in the contest for the *least probable* assumption that can be made *compatible* with a given set of data. This seems *postmodern* to me.

„Postmodern“ – „Postmodern thought is, in its very essence, an adventure and an expression of life experience.“

~ “Enjoy linguistics, share the experience, and praise an idea just because it is *novel* and sufficiently *excentric*”

This is fine, but **this is not science**, (un)fortunately.

Comments:

... just because it is *novel* and sufficiently *excentric*”

Being ‘**excentric**’ is not a problem in itself. Most scientific explanations we believe in were considered excentric when they were novel, but:

(unconfirmed anecdote: Eugene Wigner to his colleague and brother-in-law Paul Dirac, after Dirac had finished his lecture at a conference):

“Professor Dirac, we all are convinced that what you said is mad, but we are not convinced that it is **mad enough to be true.**”

What is the problem? – see:

What is science?

“In general we look for a new law by the following process. **First we guess it.**

Then we **compute the consequences** of the guess to see what would be implied if this law that we guessed is right.

Then we compare the result of the computation to *nature*, with *experiment* or *experience*, compare it directly with *observation*, to see if it works,

and

Richard Feynman



if it [i.e. the proposed law] **disagrees** with experiment **it is wrong**.

In that simple statement is the key to science.

*It does not make any difference how **beautiful** the guess is. It does not make any difference how **smart** you are, who made the guess, or what his **name** is - **if it disagrees with experiment it is wrong.***



F's identity badge,
Los Alamos

[Richard Feynman (1918-1988), in a lecture in 1964]

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It is *this* lesson that we have not fully incorporated yet!

Here are some ingredients of **unscientific conduct**:

- **verificationist** (no independent evidence, no systematic check for hidden counterevidence; just show that it works, somehow)
- **extrapolative** (on unsubstantiated grounds): if your grand principle does not work, invent a new sub-principle, or generously postulate:
 - ad hoc constraints
 - hidden layers in your system (at no cost)
 - hidden re-arrangements ('movements', back and forth)
 - disrespect for counterevidence and experimental testing
- and add bold claims on the cognitive reality, without bothering with experiments!

Comments

(Obvious?) **DON'Ts:**

- If you have unclear data, let the theory decide.
- If the data don't agree with the theory, so much the worse for the data.
- If experiments (observations) produce data that do not go with the theoretical predictions, declare these data as (highly likely to be) irrelevant.
- If your generalization does not work, invent (or think up) an auxiliary hypothesis that makes it work in the face of the given data set. But do not take the trouble of producing independent evidence for justifying your auxiliary hypothesis.
Instead, declare it as a welcome theoretical finding that is evidently supported by the data it helped you to 'explain'.

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You have your **doubts**, of course!

Here is an example:

Would you risk a bet on this ? – e.g. 100 EUR ?

Send a questionnaire to 22 syntacticians (with, let us say, Dutch as L1) and collect their judgements on 10 Dutch sentences with a wh-item in situ.

Bet on the percentage of **uniform** reactions:

- Ungrammaticality = rejection above the 90%? level
- Grammaticality = acceptance above the 90%? level

Would you bet for or against 90%? – What is **your** %?

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What is at issue ?

Superiority - Minimal link condition – VO-effect - ...?

- a. It is unclear, **what** shocked **whom**
- b. * It is unclear, **whom** **what** shocked
- c. Es ist unklar, **was** (damals) **wen** schockiert hat
- d. Es ist unklar, **wen** (damals) **was** schockiert hat

Original claim (Chomsky): ‚*Superiority*‘ (minimal link, etc.) is a **universal** constraint. Is it indeed? (or just a property of VO languages like English).
How do we test it? - systematic check in VO and OV languages.

Haider, H. 2004. The superiority conspiracy. In: *The Minimal Link Condition*, Arthur Stepanov, G. Fanselow & R. Vogel (eds.). Berlin: Mouton de Gruyter. (147-175)

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Here is the case

Superiority - Minimal link condition – VO-effect - ...?

... in **Dutch** ?

- a. Het is niet duidelijk, **wat** **aan wie** toebehoort
- b. Het is niet duidelijk, **aan wie** **?(er) wat** toebehoort
- c. Men weet niet, **hoelang** **?(er) wat** geduurd heeft
- d. Men weet niet, **wat** **hoelang** geduurd heeft

Grammar or infelicitous information structure or parsing, or ...?

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Questionnaire data on Dutch superiority, gathered and shared by Gisbert Fanselow

22 Raters (professional linguists)



	1	5	6	4	3	9	7	2	8	10
	ik weet niet wie wat gekocht heeft	ik weet niet, wie wat aan wie gegeven heeft	ik weet wie wat gekocht heeft	ik weet niet wat wie aan wie gegeven heeft	ik weet niet wat welke leraar gekocht heeft	wie weet wat wie gekocht heeft voor zijn zusje	wie weet wat wie gekocht heeft	ik weet niet wat wie gekocht heeft	ik weet niet wat wie gekocht heeft voor zijn zusje	wij weten al welke boeken deze studenten hebben gekocht, maar wij weten nog niet, wat wie precies heeft gekocht
1	+	+	+	+	+	+	+	+	+	+
2	+	+	+	+	+	+	+	+	+	-
3	+	+	+	+	+	+	+	+	+	+
4	+	+	+	+	+	+	+	+	+	+
5	+	+	+	+	+	0	+	+	-	0
6	+	+	+	+	0	+	+	-	0	-
7	+	+	+	+	0	+	+	0	0	-
8	+	+	+	+	+	0	0	0	0	0
9	+	+	+	+	+	0	0	0	0	+
10	+	+	+	+	+	-	-	0	0	+
11	+	+	+	+	+	-	-	-	-	0
12	+	+	+	+	-	+	+	-	-	-
13	+	+	+	0	+	-	+	-	-	-
14	+	+	+	0	0	0	0	0	-	0
15	+	+	+	0	-	0	0	0	-	-
16	+	+	+	0	0	-	-	0	-	+
17	+	+	+	0	-	-	-	-	-	-
18	+	+	+	0	0	-	-	-	-	0
19	+	+	+	0	-	-	-	-	-	-
20	+	+	+	0	-	-	-	-	-	0
21	+	+	+	-	-	-	-	-	-	-
22	+	+	+	-	-	-	-	-	-	-

Falsely negative? - Falsely positive? – or merely confused? 23

Falsely negative? - Falsely positive? – or merely ,noisy‘?

You may interpret the table as the results of a **test method** that apparently has a low validity or low sensitivity for the tested property:

- **Falsely negative:** the given item is **grammatical**, but due to interfering factors, the test produces a **negative** result
- **Falsely positive:** the given item is **ungrammatical**, but due to interfering factors, the test produces a **positive** result

Or, the test is *worthless* because it is too much **contaminated with ,noise‘** and therefore is not sensitive enough.

So, what are you expected to do, if you need a positive or negative answer in order to conclusively test your generalization (on Dutch) ?

	1	5	6	4	3	9	7	2	8	10
	ik weet niet wie wat gekocht heeft	ik weet niet, wie wat aan wie gegeven heeft	ik weet wie wat gekocht heeft	ik weet niet wat wie aan wie gegeven heeft	ik weet niet wat welke leraar gekocht heeft	wie weet wat wie gekocht heeft voor zijn zusje	wie weet wat wie gekocht heeft	ik weet niet wat wie gekocht heeft	ik weet niet wat wie gekocht heeft voor zijn zusje	wij weten al welke boeken deze studenten hebben gekocht, maar wij weten nog niet, wat wie precies heeft gekocht
1	+	+	+	+	+	+	+	+	+	+
2	+	+	+	+	+	+	+	+	+	+
3	+	+	+	+	+	+	+	+	+	+
4	+	+	+	+	+	+	+	+	+	+
5	+	+	+	+	+	0	+	+	+	0
6	+	+	+	+	0	+	+	0	0	-
7	+	+	+	+	0	+	+	0	0	-
8	+	+	+	+	+	+	0	0	0	-
9	+	+	+	+	+	0	0	0	-	-
10	+	+	+	+	+	-	-	0	0	+
11	+	+	+	+	+	-	-	-	-	0
12	+	+	+	+	-	+	-	-	-	-
13	+	+	+	0	+	-	+	-	-	-
14	+	+	+	0	0	0	0	0	-	0
15	+	+	+	0	-	0	-	0	-	-
16	+	+	+	0	0	-	-	0	-	+
17	+	+	+	0	-	-	-	-	-	-
18	+	+	+	0	0	-	-	-	-	0
19	+	+	+	0	0	-	-	-	-	-
20	+	+	+	0	-	-	-	-	-	0
21	+	+	+	-	-	-	-	-	-	-
22	+	+	+	-	-	-	-	-	-	-

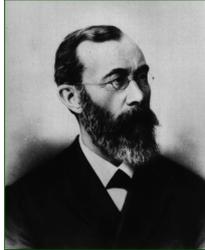
- 3 of the 22 raters (=14%) judge **all** examples as **acceptable**.
- 5 (= 23%) rate at least 50% of the sentences as **deviant**.
- No clearly deviant sentence (no item is ruled out by 90%; **min. 18% ok!**)
- Clear cases (?): the sentences of the first three rows (= 100%)

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Present day theoretical syntax is largely built on the **acceptability intuitions of syntacticians**.

This is a *special subset of natives* whose grammar competence has not been shown to be **representative for the grammar competence of native speakers** without an inclination for, or training in, formal syntax.

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W. Wundt
and
his lab



Parallels in the history of psychology

For the (late) 19th century psychology, **introspection** was the main access road to insights about the mind.

It was **Wilhelm Wundt** (1832-1920) who argued that *introspection* needs to be controlled and integrated into a *systematic program of psychological experimentation*.

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Wundt, Wilhelm. 1888. Selbstbeobachtung und innere Wahrnehmung. [Self-observation and internal perception] Philosophische Studien, Bd. IV. p. 292-309.

„Es ist ganz in die Hand der Psychologen gegeben, dafür zu sorgen, daß diese Fehler mehr und mehr ganz verschwinden. Es ist dazu nur das eine nötig, daß sie [...] sich der experimentellen Methode [...] bemächtigen.“

It is totally in the hands of the psychologists to take care that these failures disappear more and more. The only thing they have to do is to seize the experimental method.

„Es stehen dem gegenwärtig noch zwei Eigenschaften entgegen.“

Presently, there are two properties that stand in its way.

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„Die eine Eigenschaft ist der Hochmuth. Es gibt ja immer noch einige Leute, die das Experimentieren für eine banausische Kunst halten, mit der man sich nicht befassen dürfe, wenn man nicht des Privilegiums, im Aether des reinen Gedanken zu hausens, verlustig gehen wolle.“

- *One property is **arrogance**. There are still some people who consider experimenting a philistine art which one must not deal with, if one does not want to risk loosing the priviledge of re-siding in the pure ether of thoughts.*

„Die andere Eigenschaft ist die falsche Bescheidenheit. Jede Kunst scheint in der Regel dem, der sie nicht versteht, viel schwerer als sie wirklich ist.“

- *The other property is **mistaken modesty**. Every art usually tends to appear to be more difficult than it really is to those who do not understand it.*

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Wundt, Wilhelm. 1888. Selbstbeobachtung und innere Wahrnehmung. Philosophische Studien, Bd. IV. p. 292-309.

p.308: „Es ist aber in der experimentellen Psychologie nicht anders, als in anderen Wissenschaften auch. Die Antworten, die man erhält, sind nicht bloß von den Hilfsmitteln, über die man verfügt, sondern auch von den Fragen abhängig, die man stellt. Wer keine oder nur verkehrte Fragen zu stellen weiß, der darf sich nicht wundern, wenn er nichtssagende oder unbrauchbare Antworten erhält.“

- *Experimental psychology is not different from other sciences. The answers that you get are **not only** dependent on the technical aids you dispose of, **but also on the questions you ask**. Who asks no questions or only mistaken ones must not be surprised if he receives only irrelevant or useless answers.*
- ***My opinion: The past decades in linguistics have seen a lot of meaningful questions, but a lot of meaningless answers, too.***

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The Wundt - Delbrück controversy of 1901

- Berthold **Delbrück 1901.**
Grundfragen der Sprachforschung.
Straßburg: Trübner.
- Wilhelm **Wundt 1901.**
Sprachgeschichte und Sprachpsychologie. Mit Rücksicht auf Berthold Delbrücks „Grundfragen der Sprachforschung“. Leipzig: Engelmann.



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Wundt

- Bei der *psychologischen Interpretation* des sprachlichen Vorgänge steht nun, wie mir scheint, die heutige Sprachgeschichte immer noch *auf dem Standpunkt der alten Grammatik* (HH systematisieren und pädagogisch verwertbar machen; p.18).
- Sie fragt weniger danach, *wie die Erscheinungen geworden* sind und *unter sich zusammenhängen*, als wie sie sich *bequem nach einem möglichst einfachen Schema* ordnen lassen*. Damit begeht aber die Sprachgeschichte vor allem auch *ein Unrecht gegen sich selbst*.
- Denn die *Ursachen*, die die geschichtliche Entwicklung der Sprache bestimmen, sind doch zu einem wesentlichen Theil *psychische Kräfte.*“ (p.19).

[Since the driving factors (causes) that determine the diachronic development of a language are to a high extent psychological forces (mental forces).]

*) ‚minimal system‘, ‚perfect system‘, ‚economic system‘ (simplicity metrics),

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Delbrück

- In reconstructing grammatical change, the grammarian is not obliged to decide whether he should take resort to the associationist psychology of Herbart or Wundt's volitional psychology. [translation by HH]
- Linguistically relevant explanations are, according to Delbrück, **system internal explanations**.
- And where are we today? – **not so far away**.

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And where are we today?

- Branches of **psychology** have developed into a full-fledged branch of cognitive science with well **established standards** of theory and data validation. (**Progress of Wundt's program**)
- **Linguistics** still uses methods Delbrück has, or could have, used. It is still a **highly speculative academic specialization**.
[disconnected from science because of not employing the applicable methodological standards of science]
- **What is still missing**: generally acknowledged empirical/experimental standards (enforced by the **publication boards**) of data validation.
- Compare **linguistics papers** and high quality **psychology papers**, and you will see the difference:
any **quality journal** in psychology would **reject the average linguistics paper** just for not obeying/documenting the **standards of data validation and testing**. (cf. statistic apparatus in psychology papers)

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Our situation is similar to the transformations when *alchemists* gradually turned into *chemists*.

It is a long way from *speculations* to scientifically established *facts*.

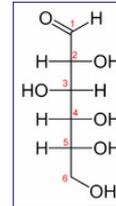
Lavoisier did away with *phlogiston* theories of combustion, in a scientific way (by experimenting).

Linguistics still contains quite some *phlogiston-theories*. So:

Take *data* seriously, take *generalizations* seriously, *test* them seriously, and do not even think you could find *the theory* in a researcher's life span.



the alchemist's **stone** – the chemist's **formula**



35

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Comments

The analogy is this:

Isolated (partly hostile) schools (generative, functionalists, typological, ...), each with its own *alchemist's stone*.

Even within the same school, the *stone* is sometimes merely exchanged (cf. from GB to MP: In the MP, the **major findings** of the GB time on *constraints on movement* (ECP, CED) are **not covered** anymore, and nobody seems to care).

In the **mature sciences**, the insights of a preceding theory are to be captured by the novel one (cf. Newton's system as a special case in Einstein's theory. (see e.g. Imre Lakatos, on the history of science)

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And who should get the **first medal**?
Or the **S**aussure/**C**homsky crown of linguistics?



Original: Hungarian Stephens's crown

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Here is my favorite

The **steering committee** for the open source *Universal Grammar Generalizations Project*, after having successfully passed the threshold of **100 grammars**.

- flexible scheme of detailed syntactic properties (more flexible and less construction-bound than e.g. the Lingua questionnaire; **organized** along **cross-linguistic generalizations**, in a **neutral style that cuts across different schools**).
- authored entries (citeable and **creditable**)
- entries checked for **validity** (before they are accepted as entry) by peer reviewing (syntacticians with the given L1).
- entries specified with a **reliability measure**, from **(1,00)** = “everyone agrees” to **(0,01)** = single person’s judgement.

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In sum

- *Introspective data* have carried us a long way, but **this method has reached its *limits*** (by exploiting the clear case method).
- If linguistics wants to be *respected* as a branch of (cognitive) science, it has to **accept and apply** the empirical standards of (cognitive) science:
- An indispensable step is systematic **data assessment**, i.e. *Brahean work*, and
- **controlled empirical (experimental) evaluation of data and theoretical hypotheses** (© Johanna Nichols: word wide standards of peer reviewing)
- **Then we shall have perhaps a chance to see one or the other *Keplerian grammarian*. And a few generations later, if linguistics still flourishes,**