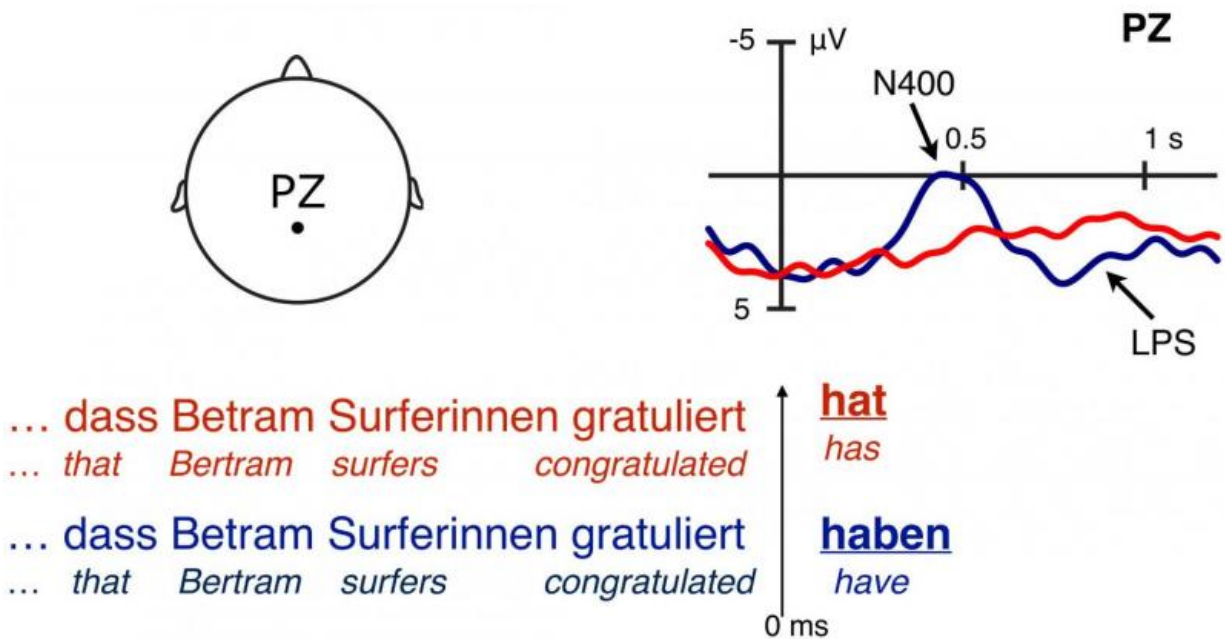


# Grammar: Eventually the brain opts for the easy route

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If the first noun in a sentence without a clear case marker (Bertram) does not refer to the agent, the brain activity is stronger (see blue curve). Credit: UZH

Languages are constantly evolving—and grammar is no exception. The way in which the brain processes language triggers adjustments. If the brain has to exert itself too much to cope with difficult case constructions, it usually simplifies them over time, as linguists from the University of Zurich demonstrate in a study on languages all over the world.

The grammar of languages keeps reorganizing itself. A prime example of this is the omission of case endings in the transition from Latin to Italian. And in some instances, case systems are remodeled entirely - such as in the transition from Sanskrit to Hindi, which has completely new grammatical cases.

## **Simplifications found in all languages**

An international team of researchers headed by linguist Balthasar Bickel from the University of Zurich conducted [statistical analyses](#) of the case systems in more than 600 languages and recorded the changes over time. They then tested these adaptations experimentally in [test subjects](#), measuring the brain flows that become active during [language](#) comprehension. The scientists were therefore able to demonstrate that the brain activity is stronger for complex case constructions than for simple ones.

"Certain case constructions tax the brain more, which is why they are eventually omitted from languages all over the world - independently of the structural properties of the languages or socio-historical factors," explains Bickel, a professor of general linguistics at the University of Zurich. In other words, biological processes are also instrumental in grammatical changes. "Our findings pave the way for further studies on the origin and development of human language and a better understanding of speech disorders."

**More information:** Balthasar Bickel, Alena Witzlack-Makarevich, Kamal K. Choudhary , Matthias Schlesewsky, Ina Bornkessel-Schlesewsky: The neurophysiology of language processing shapes the evolution of grammar: evidence from case marking. *PLOS ONE*, August 12, 2015. [DOI: 10.6084/m9.figshare.1394600](https://doi.org/10.6084/m9.figshare.1394600)

Provided by University of Zurich

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