

# Nouns slow down our speech

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Speakers hesitate or make brief pauses filled with sounds like "uh" or "uhm" mostly before nouns. Such slow-down effects are far less frequent before verbs, as UZH researchers working together with an international team have now discovered by looking at examples from different languages.

When we speak, we unconsciously pronounce some words more slowly than others, and sometimes we make brief pauses or throw in meaningless sounds like "um." Such slow-down effects provide key evidence on how our brains process language. They point to difficulties when planning the utterance of a specific word.

To find out how such slow-down effects work, a team of researchers led by Frank Seifart from the University of Amsterdam and Prof. Balthasar Bickel from UZH analyzed thousands of recordings of spontaneous speech from linguistically and culturally diverse populations from around the world, including the Amazon rainforest, Siberia, the Himalayas, and the Kalahari desert, but also English and Dutch.

## **Nouns are more difficult to plan**

In these recordings the researchers looked at slow-down effects before nouns (like "friend") and verbs (like "come"). They measured the speed of utterance in sounds per second and noted whether speakers made short pauses. "We discovered that in this diverse sample of languages, there is a robust tendency for slow-down effects before nouns as compared to verbs," explain Bickel and Seifart. "The reason is that nouns are more difficult to plan because they're usually only used when they represent new information." Otherwise, they are replaced with pronouns (e.g., "she") or omitted, as in the following example: "My friend came back. She (my friend) took a seat" or "My friend came back and took a seat." No such replacement principles apply to verbs—they are generally used regardless of whether they represent new or old information.

## **Widen the net of languages**

This discovery has important implications for our understanding of how

the human brain processes language. Future neuroscience research needs to look more systematically at the information value of words used in conversation, and how the brain reacts to differences in these values. Also, future research needs to broaden its data. "We found that English, on which most research is based, displayed the most exceptional behavior in our study," says Bickel. It is thus important to widen the net of languages considered in processing research, including rare, often endangered languages from around the world, to inform our understanding of human [language](#).

The findings also shed new light on long-standing puzzles in linguistics. For example, the findings suggest universal long-term effects on how grammar evolves over time: The slow-down effects before nouns make it more difficult for nouns to develop complex forms through contraction with words that precede them. In German, for example, prefixes are far more common in verbs (ent-kommen, ver-kommen, be-kommen, vor-kommen, etc.) than in nouns.

At a more general level, the study contributes to a deeper understanding of how languages work in their natural environment. Such an understanding becomes increasingly important given the challenges that linguistic communication faces in the digital age, where we communicate more and more with artificial systems—systems that might not slow down before nouns as humans naturally do.

**More information:** Frank Seifart, Jan Strunk, Swintha Danielsen, Iren Hartmann, Brigitte Pakendorf, Søren Wichmann, Alena Witzlack-Makarevich, Nivja de Jong, Balthasar Bickel. Nouns slow down speech: evidence from structurally and culturally diverse languages. *Proceedings of the National Academy of Sciences*.

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