

Flexible learning system allows humans to keep up with linguistic change, researchers find

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(Phys.org)—Unlike other species, humans speak to each other in remarkably diverse ways. Some of our 6,000 to 8,000 languages use clicks (!Kung). Others don't differentiate between nouns and verbs (Straits Salish). Still others pack a whole sentence into a single word (Cayuga). In comparison, the communication systems of other animals show precious little variation within species; vervet monkeys use the same communicative signals across their geographical range, just as honeybees, bacteria and every other species each have one way of communicating.

So how have humans developed so many [different languages](#) when other species have not?

A Cornell researcher and his colleagues now say they know why. The diversity of [human languages](#) is made possible because we have evolved a flexible learning system to keep up with the rapid linguistic change associated with human migrations, according to a new study published Oct. 30 in the journal [PLoS ONE](#).

"Only biological adaptations for flexible learning combined with cultural evolution can explain the astonishing [linguistic diversity](#) while still allowing each child to learn any human language," said co-author Morten Christiansen, professor of psychology and co-director of the Cornell Cognitive Science Program.

To reach their conclusions, the researchers created a computer model to explore the effects of [human migration](#) on [language evolution](#). As humans spread across the globe, the languages of geographically separated groups quickly ended up becoming different from one another through processes of cultural evolution. The model indicates that humans have evolved a flexible learning system to follow such rapid linguistic change.

"Importantly, the model assigns a crucial role to linguistic change, which has been extraordinarily rapid during historical times. For example, the entire Indo-European language group diverged from a common source in less than 10,000 years—the blink of an eye in evolutionary terms," Christiansen said.

The researchers speculate that the cultural evolution of language may have "recruited" preexisting brain systems to facilitate its use, just as reading relies on neural substrates that predate the invention of writing.

The findings have important implications for understanding the origin of language and human cognition: Humans have evolved a flexible learning system for keeping up with the rapid cultural evolution of language, instead of a special-purpose linguistic system analogous to the visual system. Likewise, variation in social and religious practices may similarly be seen as products of such flexible learning, rather than evolved wiring for moral behavior.

More information: Christiansen, M. et al. The Biological Origins of Linguistic Diversity. *PLoS ONE*, Oct. 30, 2012.

Provided by Cornell University

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