

Chimpanzees combine calls to communicate new meaning

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Chimpanzees are known to produce a number of different vocalizations and combine these calls into larger sequences. Credit: Adrian Soldati

A key feature of human language is our ability to combine words into larger compositional phrases, where the meaning of the whole is related

to the meaning of the parts. Where this ability came from or how it evolved, however, is less clear.

Chimpanzees, our closest-living relative, are known to produce a number of different vocalizations to manage their social and ecological lives and, under some circumstances, combine these calls into larger sequences. By conducting careful, controlled experiments with [wild chimpanzees](#) in Uganda, researchers from the University of Zurich (UZH) showed that these combinations are understood by chimpanzees.

Chimpanzees react most strongly to call combinations

"Chimpanzees produce 'alarm-huus' when surprised and 'waa-barks' when potentially recruiting conspecifics during aggression or hunting," says Maël Leroux, a postdoctoral student at the Department of Comparative Language Science of UZH, who led the study. "Our behavioral observations suggest that chimpanzees combine these calls when exposed to a threat where recruiting group members is advantageous, such as when encountering a snake, but until now experimental verification has been missing."

The researchers presented chimpanzees with model snakes and were able to elicit the call combination. Critically, chimpanzees responded strongest to playbacks of the combination than when hearing either the "alarm-huu" or "waa-bark" alone. "This makes sense because a threat that needs recruitment is an urgent event and suggests listening chimpanzees really are combining the meaning of the individual calls," adds study last author and UZH professor Simon Townsend.



Group of Chimpanzees. Credit: Adrian Soldati

Primate roots of compositionality

An important implication of the new findings is the potential light they can shed on the evolutionary roots of language's compositional nature.

"Humans and [chimpanzees](#) last shared a [common ancestor](#) approximately 6 million years ago. Our data therefore indicate that the capacity to combine meaningful vocalizations is potentially at least 6 million years old, if not older," says Townsend.

"These data provide an intriguing glimpse into the evolutionary emergence of language," added Leroux. In a nutshell, it points towards compositionality originating prior to the appearance of [language](#) itself, though follow-up observational and [experimental work](#), ideally in other great ape species, will be central to confirming this.

The findings are published in the journal *Nature Communications*.

More information: Maël Leroux et al, Call combinations and compositional processing in wild chimpanzees, *Nature Communications* (2023). [DOI: 10.1038/s41467-023-37816-y](https://doi.org/10.1038/s41467-023-37816-y)

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