

Linguistic methods uncover sophisticated meanings, monkey dialects

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Dusky Titi Monkey (*Callicebus brunneus*). Credit: Wikipedia

The same species of monkeys located in separate geographic regions use their alarm calls differently to warn of approaching predators, a

linguistic analysis by a team of scientists reveals. The study, which appears in the journal *Linguistics and Philosophy*, reveals that monkey calls have a more sophisticated structure than was commonly thought.

"Our findings show that Campbell's monkeys have a distinction between roots and suffixes, and that their combination allows the monkeys to describe both the nature of a [threat](#) and its degree of danger," explains the study's lead author, Philippe Schlenker, a Senior Researcher at Institut Jean-Nicod within France's National Center for Scientific Research (CNRS) and a Global Distinguished Professor at New York University.

The combined team of linguists and primatologists analyzed alarm calls of Campbell's monkeys on two sites: the Tai forest in Ivory Coast and Tiwai Island in Sierra Leone. Notably, monkey predators on the two sites differ: the primates are threatened by eagles on Tiwai Island and by eagles and leopards in the Tai Forest.

Using transcriptions of these monkey calls gathered in field experiments involving playbacks of predator calls (e.g. eagle shrieks and leopard growls), the researchers found greater complexity in expression than previously understood as well as differences in [alarm calls](#) between the two locations.

Confirming with linguistic means some hypotheses initially made by primatologists, their analysis showed that these calls make a distinction between roots (especially "hok" and "krak") and suffixes (-oo), and that their combination allows the monkeys to describe both the nature of a threat and its degree of danger. For instance, "hok" warns of serious aerial threats—usually eagles—whereas "hok-oo" can be used for a variety of general aerial disturbances; in effect the suffix -oo serves as a kind of attenuator.

Moreover, their results suggest that the calls are not used in the same way in the Tai Forest and on Tiwai Island. For instance, "krak" usually functions as a leopard alarm call in Tai, but as a general alarm call - to warn of all sorts of disturbances, including eagles - on Tiwai. The article seeks to explain why this 'dialectal variation' is found.

The authors' preferred analysis is based on the device of 'implicatures,' borrowed from the pragmatics of human languages. It posits that the meaning of a word can be enriched when it competes with a more informative alternative - for instance, "possible" competes with "certain," which is more informative, and for this reason "possible" usually comes to mean "possible but not certain" (for instance in: "It's possible that John is the culprit" - which implies that this is not a certainty). The authors propose that "krak" always has a meaning of general alarm, but that in Tai it comes to be enriched by competition with "hok" (meaning: aerial threat) and "krak-oo" (meaning: weak threat) - with the result that it is enriched with a 'not "hok" ' component (hence: the threat is a non-aerial threat) and a 'not "krak-oo" ' component (hence: the threat is not weak). This yields a meaning of a 'serious ground-related threat,' closely associated with leopards.

In the long term, Schlenker observes, the research should help initiate the development of a form of "primate linguistics"—the application of sophisticated methods from contemporary formal linguistics to systems of animal communication.

More information: Monkey semantics: two 'dialects' of Campbell's monkey alarm calls, *Linguistics and Philosophy*, [link.springer.com/article/10.1 ... 07/s10988-014-9155-7](https://link.springer.com/article/10.1007/s10988-014-9155-7)

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