

Using touchscreens to study monkeys in their natural environment

In a first, biologists from the UNIL are using innovative technology to better understand cognition in wild primates.

Touch screens are already used for cognitive tests on primates in captivity. But are they relevant in natural conditions? Research conducted by **Erica van de Waal's** team, assistant professor at the [Department of Ecology and Evolution](#) of the Faculty of Biology and Medicine of the UNIL, and group leader at [The Sense Innovation and Research Center](#), proves that these devices are effective for the study of wild primates. It is published today in the special issue "Beyond observations: applying contemporary methods across the fields to the study of animal sociality in the wild" of the *Journal of Animal Ecology*. These results are the outcome of more than two years of observation of vervet monkeys and comparative data collection between groups of captive and free-ranging animals by **Tecla Mohr**, PhD student and co-first author of the paper. They are complemented by extensive statistical analyses performed by Dr. **Rachel Harrison**, postdoctoral fellow and co-first author.

A long process of adjustment

The device consists of a touch screen, on which a blue square appears, connected to a food reward dispenser. The learning task, which is considered easy, consists of touching the shape that changes position on the monitor, which, if successful, leads to obtaining a few kernels of corn that the monkeys are fond of. The learner must understand and associate their gesture with the resulting "jackpot". The whole thing is captured by a camera and then processed. These tools existed for captive ape experiments, but had to be adapted for smaller, wild primates. "In the first tests, which lasted almost three months, I filmed the hair on the top of the vervet monkey's heads," says Tecla Mohr. "Some of the things we did to make the system work included reducing the size of the screens and changing the size of the symbols, finding the best possible location that was safe enough from predators, and finding a way to attach it to trees and connect it to the internet." During this pilot period, the young researcher spent long hours scrutinizing each monkey so that she could then accurately recognize them during the tasks they would have to perform.

The days of fieldwork follow one another...

This takes place in South Africa, natural habitat of the vervet monkey. In the heart of the Mawana reserve, Tecla Mohr prepares meticulously her experiments for the next day (choice of the individuals she is going to follow and selection of the cognitive tests she is going to propose to them), recharges the batteries of her equipment, and then her own while taking a rest. At dawn, the scientist leaves to look for the monkeys. Helped by several assistants who know the area well, but also by the signals sent by the collars placed around the neck of one female per group, she reaches the nearest point still accessible by car and finishes the journey on foot. "Some days it was 10 minutes, and others it was more like 40 minutes. With almost 15 kilos on my back," the biologist relates. The touch screens are presented to the animals

about twice a week. However, the days go by and are not the same. Indeed, rain and sandstorms can interrupt the experiments, a band of fellow monkeys can disturb the ones observed or the motivation of the trainees can fluctuate, not to mention that of the scientist, who is put to the test by these disturbing elements. Persevering, Tecla Mohr and her colleagues have demonstrated, among other things, that age and sex influence the participation rate of wild vervets in the test. For example, adult females are more involved than their male counterparts, maybe because they are more assertive. They therefore retain their status as alphas, as highlighted in a [previous article](#) describing female dominance. "Moreover, no difference in success was found between captive and free-ranging monkeys in our learning conditions, but is this still the case in the context of a more difficult exercise?" The data is currently being compared.

On the way to promising developments

"I am convinced that using touch screens to examine cognitive abilities in wild populations will make it possible to advance the understanding of cognition in non-human primates more rapidly," concludes Erica van de Waal, the project's principal investigator. This proof of concept eliminates the need for animals to be held in captivity, thus expanding the potential for application to other species in their natural habitat. Thanks to a collaboration with engineers from *The Sense* centre, the experts plan to optimize the system (make it lighter, obtain better quality recordings, etc.). In addition, this work to validate the device opens the way to multisensory communication experiments, notably by presenting the monkeys with the faces and cries of their groupmates or by using virtual reality games.

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