

Frog-eating bats can recognize ringtones up to four years later

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The frog-eating bat uses learning and long-term memory to listen to frog calls.
Credit: Lars Heiden/STRI

There are certain skills that once acquired, such as riding a bike or looking both ways before crossing a street, rarely have to be relearned. Most studies on learning and long-term memory in the wild focus on a handful of animal species. Now, in a paper published in *Current Biology*, U.S. National Science Foundation–supported researchers at the Smithsonian Tropical Research Institute share the first report of long-term memory in frog-eating bats (*Trachops cirrhosis*).

"Frog-eating bats are an excellent emerging model organism for studying

cognitive and sensory ecology," says biologist May Dixon, lead author of the paper. "Learning plays a big part in their lives."

The bats' ability to retain information means that when they are hunting frogs, their main prey, they don't have to continuously relearn which [frog](#) calls indicate that a frog is good to eat, poisonous or too big to carry.

Dixon and colleagues trained 49 wild bats to respond to cellphone ringtones played through speakers. Bats responding to two of the tones found a baitfish reward on the speaker every time, but when they responded to three other tones, they were not rewarded. They quickly learned to fly to the speaker when ringtones indicated a snack, and not to respond to the other tones. The bats were then microchipped and released back into Panama's Soberania National Park.

Researchers recaptured eight of the bats one to four years later, and when they played the experimental ringtones again, the bats recognized and responded to the two rewarded ringtones even four years later. The experiment included 17 untrained frog-eating bats that did not fly to the sounds.

The findings raise questions about how memory works in bats and other animals, including the metabolic cost of remembering.

"We often underestimate the abilities of wild animals, but when the skills involved are critical to their survival or reproduction, it's not surprising that they are extremely capable," says Colette St. Mary, a program director in NSF's Division of Integrative Organismal Systems. "This is a good example of how [bats](#) invest in remembering sounds associated with food, saving them time and energy in the long run."

More information: M. May Dixon et al, Long-term memory in frog-eating bats, *Current Biology* (2022). [DOI: 10.1016/j.cub.2022.05.031](https://doi.org/10.1016/j.cub.2022.05.031)

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