ANIMAL BEHAVIOR

Marmosets call on command

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Choosing the right animal for the right question is an important decision. For Steffen Hage and his lab at the University of Tübingen, that would be the marmoset, *Callithrix jacchus*. Hage studies the neurobiology of vocal communication. Not only do the small nonhuman primates have a rich repertoire of calls, they display elements of vocal flexibility, he says. This suggests the presence of distinct vocal motor control mechanisms—a feature of translational relevance as our own speech likely evolved from an initial ability to control our vocal system, he says. He then wanted to ask a question of his marmosets: could the animals be trained to call on command?

Training was a long process...but yes. Ample positive reinforcement was needed along the way, from getting each marmoset—two males and two females—to willingly enter the transport box from their home cage, to getting them settled while restrained in a primate chair in the acoustic

recording chamber for training and testing. With time and practice, the marmosets learned a go/no go protocol to vocalize in response to a visual cue; one of the four was additionally trained to discriminate between two different cues with distinct calls.

“There is growing interest in the marmoset as a model system for neuroscience, but the extent to which they can be trained, and the optimal method for training them, to perform complex tasks is still being worked out,” commented Jeff Walker, a postdoctoral researcher studying motor control in marmosets at the University of Chicago. “Most groups are applying training methods adapted from well-established work with macaques with mixed success. I was interested to learn that even with these methods, which involve restraint, the authors of this paper were able to elicit voluntary vocalizations.” The work adds to the growing literature documenting what marmosets are capable of, but he would like to know more about the training

process and the variability between animals. “As researchers develop methods to train marmosets on increasingly complex tasks, it will be important to share those details about training protocols that might shed light on the reasons for success and inter-individual variation.”

Though there are many questions that can be asked with freely moving marmosets, Hage says the controlled experimental approach the training protocol affords can reduce the degrees of freedom from sensory inputs and motor activity that would otherwise need to be accounted for when an animal is moving. With the trained marmosets, the lab will now start looking at whether and how brain activity, particularly in cortical structures, correlates with those on-command calls.

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