

# Researchers unravel ways capuchin monkeys select effective tools

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(PhysOrg.com) -- When Tchaikovsky penned *The Nutcracker*, the last thing he probably had in mind was a capuchin monkey. And yet new research, co-directed by a researcher at the University of Georgia, is changing our view about which nutcracker should be the focus of our attention.

In research just published in the journal *Current Biology*, Dorothy Fragazy and her colleagues show for the first time that cat-sized wild bearded capuchin monkeys actually choose the most effective stone to crack hard palm nuts, a part of their natural diet.

The research at a site in Brazil is changing how science looks at tool use among primates and is the first report that capuchins don't just use tools—they pick the right ones for the job.

“One of the important messages of this research is that we can take experiments into the field under limited conditions, and animals will come regularly to a place and, if given tasks to perform, they will participate,” said Fragazy, a psychologist and chair of the Neuroscience and Behavior Program.

Senior author on the paper was Elisabetta Visalberghi of the Institute of Science and Technology of Cognitive Sciences and Technologies (ICST) of the National Research Council in Rome. Other authors include Elsa Addessi, Valentine Truppa and Noemi Spagnoletti, also of ISTC; Eduardo Ottoni and Patricia Izar the University of São Paulo; and

Fragazy, whose department at UGA is part of the Franklin College of Arts and Sciences.

The new research builds on earlier studies that, in 2004, reported the first direct scientific evidence of tool use among a population of wild capuchin monkeys. Fragazy and her colleagues first saw evidence of tool use for nut-cracking among Brazilian capuchins in a photo essay in a 2003 issue of BBC Wildlife magazine. That picture led to the discovery of a population of the monkeys that brings incredibly heavy stones to a site with pitted “anvil” areas that indicated long-term use.

The team of researchers was astonished at the capacity for tool-use among wild capuchins, something previously reported in primates only among chimpanzees. (Anecdotal evidence of monkey tool-use had been reported, but proof was sketchy at best.)

The new research shows that these incredibly agile monkeys (they can scale cliffs effortlessly) don’t just use tools: they actually select the right tool for the size palm nut they need to crack.

That decision is based on numerous variables, including the mineral composition of the stone, which affects its susceptibility to fracturing when it hits the hard nut, and its weight. Even when the heavier stone was of smaller volume than the lighter stone, the monkeys chose the heavier stone. And even younger monkeys selected stones very carefully.

However, although the monkeys select stones carefully, proficiency at cracking differs enormously across the group of monkeys.

“We put stones of various sizes and shapes out where the monkeys could use them as nutcrackers,” said Fragazy, “and we found that both size and expertise contribute to proficiency. The monkeys who were older and larger and had been cracking nuts for a long time were better at

cracking.”

Even the youngest novice, however, was able to choose the best tool offered, an astonishing fact, considering that scientists didn’t even know these animals used tools until a few years ago.

One of the things that makes this study possible is that the scientists are dealing with a small group of animals—only 15 to 18 in the entire troop and 8 who actually participated in the current set of experiments. That closeness allows the researchers to recognize individuals and give them names.

Mansinho, for example, is the alpha male of the group, while Teimoso (which means “obstinate” or “stubborn” in Portuguese) is a subordinate male.

“One of the most remarkable is Dita, a female who gave birth to her first infant during the course of study on tool choice,” said Fragazy. “We have video of her getting a cracking stone and using it on the day of her baby’s birth.”

The last common ancestor between humans and capuchins was some 35 million years ago, so the discovery of selective tool use in capuchins opens new doors for ongoing research of the group, which is called EthoCebus and has a Web site that explains its work in depth: [www.ip.usp.br/ebottoni/EthoCebus/echome.html](http://www.ip.usp.br/ebottoni/EthoCebus/echome.html) .

While the work on tool selection is an important component of the study, the scope has broadened greatly since 2003 and continues to expand, said Fragazy. Such areas as kinematics (the science of movement) and the social context of nut-cracking await further study.

The new work is also giving scientists new insights into the differences

in experimental work between captive and wild capuchins. Since capuchin monkeys in the wild have a lifespan of around 30 years, the work will happily go on for a long time to come.

Source: University of Georgia

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