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A new **study** published in the journal *Animal Cognition* demonstrates that **raccoons (*Procyon lotor*)** are able to learn to solve complex problems and that they approach classic tests of animal cognition in diverse and exciting ways.





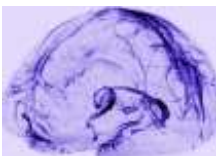
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Raccoons learn to drop stones into a tube of water to retrieve a floating food reward during the project. Image credit: Stanton *et al*, doi: 10.1007/s10071-017-1129-z.

In a well-known fable written by the ancient Greek fabulist Aesop called ‘*the Crow and the Pitcher*,’ a thirsty crow uses stones to raise the level of water in a pitcher to quench its thirst.

Researchers have been using this fable as inspiration to test whether birds and primates understand cause-and-effect relationships.

University of Wyoming scientist Lauren Stanton and co-authors have now extended this body of work to study causal cognition in raccoons.

The scientists tested whether eight raccoons held in captivity at the USDA

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National Wildlife Research Center would spontaneously drop stones into a clear 50-cm tube of water to retrieve floating pieces of marshmallow.

They found that the animals did not spontaneously drop stones into the tube from the start.

Following previous studies on birds and children, the researchers then trained the raccoons to drop stones into the tube. They did this by balancing stones on a rim on top of the tube.

If the raccoons accidentally knocked the stones in, this raised the water level high enough to bring the marshmallow reward within reach.

Raccoons could then learn that the stones falling into the tube brought the marshmallow closer.

During training, seven raccoons interacted with the stones, and four raccoons retrieved the marshmallow reward after accidentally knocking the stones into



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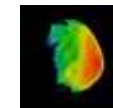
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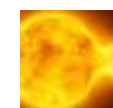
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the water.

Two of the four raccoons that got the marshmallow during training then learned on their own to pick up stones off the ground and drop them into the water to get a reward.

A third raccoon surprised Stanton and her colleagues by inventing an entirely new method for solving the problem. It found a way to overturn the entire, very heavy, tube and base to get the marshmallow reward.

The two raccoons that successfully dropped stones into the tube then were presented with different objects that they could drop into the tube to solve the problem, such as large versus small stones, and sinking versus floating balls.

These experiments enabled the team to determine whether the raccoons really understood the problem.

If the raccoons understand water displacement, they should select the objects that displace the most water, like the large stones and sinking balls.

The raccoons performed differently from birds and human children in previous Aesop's Fable studies, and they did not always pick the most functional option.

“The raccoons’ performance is not necessarily a reflection of their cognitive abilities, but more so of their exploratory behavior and the build of their dexterous paws,” Stanton said.

“We found raccoons to be innovative in many aspects of this task, and we observed diverse, investigative behaviors that are unique to raccoons.”

“The raccoons had fewer opportunities to interact with the puzzle than did many of the birds that were tested in previous studies. Therefore, the



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performance of the raccoons might improve if they have more time to familiarize themselves with the stones and the water tube,” she said.

Lauren Stanton *et al.* Adaptation of the Aesop’s Fable paradigm for use with raccoons (*Procyon lotor*): considerations for future application in non-avian and non-primate species. *Animal Cognition*, published online September 29, 2017; doi: 10.1007/s10071-017-1129-z

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