

The really secret lives of bees: Ingenious experiment shows they learn like we do, from each other

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Trained bumblebees can pass skills on to other bees

Scientists train bees to pull a string to receive a food reward and then pass on that skill to fellow bees. (Reuters)

The bumblebee brain is puny, at least compared with the massive and [fatty](#) organ locked in your skull. At about 0.0002 percent the [volume](#) of yours, bee brains are close in size to the seeds stuck on a hamburger bun. Thinking about insect brains in terms of size alone, however, is a trap. The intelligence of sesame-brained bugs should not be underestimated.

A study reported in the journal [PLOS Biology](#) on Tuesday, for instance, takes bee smarts in a surprising direction: Scientists from the Queen Mary University of London suggest that the “insects possess the essential cognitive elements for cultural transmission,” as they wrote in their new paper. It is possible

to teach a single bee a new trick, in other words, and a different bee can learn that behavior from her peer.

That ability is not the only ace found up the clever bee's sleeves. A recent experiment published in the journal *Science*, for instance, suggested that bees have their own version of optimism, as *The Washington Post* reported at the [end of September](#). (Unless they were just buzzed on sugar.) Bees are also capable of an intricate form of communication called a waggle dance, with which they signal the location of nearby food. Every 75 milliseconds a waggle lasts, roughly speaking, indicates to other honeybees that a nectar source is an additional [330 feet](#) further from the colony.

“Bees have some amazing cognitive abilities,” wrote [Clint Perry](#), a behavioral ecologist at Queen Mary University and an author of the paper, in an email to *The Washington Post*. They can count, he pointed out, at least up to four.

It has long been understood that some animals can teach their peers to perform new tasks. **But the most famous examples involve stereotypically brainy critters, like primates or ravens:** Japanese macaques show other monkeys how to [wash sweet potatoes](#) in streams. A certain group of chimps knows to fish for insects by prodding termite mounds with sticks, [nibbled into brushes](#) for maximum scoopage.

[‘Like it’s been nuked’: Millions of bees dead after South Carolina sprays for Zika mosquitoes]

In their paper, the researchers demonstrate for the first time that a new skill can pass from bee to bee. To that end, they had to teach bumblebees to do something strange, a task the insects would not know how to perform in nature. The scientists turned to a “coiled-string test,” similar to other tests used previously in animal cognition research.

“We wanted to know whether bees, with a dynamic social structure and the ability to socially learn from each other, might have the basic capacities for cultural transmission of a novel behavior,” Perry said. “And this is what we showed.”

During the test, a bee needed to extract a blue disc, hidden beneath a clear Plexiglas table, by tugging on a string attached to the puck. These bees had an incentive. The blue disc mimicked a flower, to which the scientists added a tasty drop of sugar water in its center.

When left to their own devices, however, zero out of 50 bees could figure out how to pull the disc out from under the table. (Given a second chance, two out of 25 managed to figure it out, but they were sluggish tuggers.)

[As bees vanish, bee heists multiply]

So the scientists trained a batch of bees in several steps. First they familiarized the animals with the flower mimic, leaving it out in the open. The researchers then tucked the disc progressively further under the table, until the only way for the bee to reach the sugar water would be to yank on the disc’s string.

The scientists successfully trained 23 of 40 bees. (It took about 5-and-a-quarter hours per bee.) Of the 23 pulling bees, three were selected as demonstrators. The scientists put an untrained bee in a separate cage, and let her watch the demonstrator. Out of these bees, 15 in 25 figured out how to pull on the string.

[Morning Mix Bees from hive of 800,000 kill Arizona landscaper, injure others]

Once trained bees were allowed to interact with their colonies, knowledge of the string-pulling behavior spread. In two colonies, the researchers recorded the pulling behavior at four degrees of social separation. In other words, bee D learned to pull the string from bee C, who learned from bee B, who learned from bee A.

If that is the case, why don't we see more honey bees dragging strings around the garden? It is not necessarily that insects lack the intelligence, or their undersized brains, wrote Perry's colleague and co-author [Sylvain Alem](#) in an email to The Post. Instead, "the reason we don't see string-pulling culture in wild bees and other insects is not lack of ability," the scientist said, "but lack of opportunity and adequate challenges."

The takeaway, to hear the scientists tell it, is that "cultural transmission does not require the high cognitive sophistication specific to humans, nor is it a distinctive feature of humans." Despite our flashcards and our SAT-prep books, we should not feel special in our ability to learn.

[\[Bee hotels: One way to help native bees\]](#)

This post has been updated.