参考译文

Honeybees Can Put Two and Two Together

蜜蜂可以做加减法呢

It takes a big brain—a human brain—to do math. Or so you might assume. But scientists have found that other animals, such chimpanzees, monkeys, and even pigeons can perform some addition and subtraction. Now new research shows that honeybees—with brains the size of sesame seeds—can perform basic math.

做数学需要大脑——人类的大脑。或者你可以这样假设。但科学家们发现，其他动物，如黑猩猩、猴子，甚至鸽子，也能做一些加法和减法。现在新的研究表明，拥有芝麻大小大脑的蜜蜂可以进行基本的数学运算。

Researchers put honeybees through 100 trials to train them to add and subtract. They put the bees in a Y-shaped maze and presented them with a certain number of either yellow or blue shapes. Yellow indicated the bee should subtract, while blue meant they should add.

研究人员对蜜蜂进行了100次实验来训练它们做加法和减法。他们把蜜蜂放在一个y形迷宫中，给它们一些黄色或蓝色的形状。黄色表示蜜蜂应该做减法，而蓝色表示蜜蜂应该做加法。

The bee then entered the “decision chamber,” where it was presented with a correct answer on one side and an incorrect answer on the other side. If they picked the right answer they were rewarded with a sugary solution. If not, they got bitter tonic water. The researchers also put the bees through another test trial without a reward or punishment to make sure there weren’t any scent marks influencing the bees’ choices.

然后，蜜蜂进入“决策室”，在那里，它会看到一边是正确答案，另一边是错误答案。如果蜜蜂选对了答案，就会得到含糖溶液的奖励。如果没有，他们喝的是苦汤力水。研究人员还让蜜蜂进行了另一项没有奖励或惩罚的试验，以确保没有任何气味痕迹影响蜜蜂的选择。

At first the bees picked answers at random. “You see that the ability of the bees to do it starts at about chance level, 50%, showing us the bees are just choosing randomly. Over time, competence comes up to about 80%, so they actually start to perform quite well.”

起初，蜜蜂随机选择答案。“你可以看到蜜蜂的这种能力开始时大约是50%，这表明蜜蜂只是随机选择。随着时间的推移，他们的能力会提高到80%左右，所以它们实际上开始表现得相当不错。”

Scarlett Howard, one of the study authors and a postdoctoral research fellow in neurobiology and cognition at Paul Sabatier University in France. She says the bees were even able to add and subtract correctly when presented with a number they had never seen before. The study is in the journal Science Advances.

斯嘉丽·霍华德是这项研究的作者之一，也是法国保罗·萨巴蒂尔大学神经生物学和认知学的博士后研究员。她说，当蜜蜂看到一个他们从未见过的数字时，它们甚至能够正确地加减法。这项研究发表在《科学进展》杂志上。

“Things like this let us know there’s a lot of complexity there and their brains might not be as simplistic as we once thought.”

“以上事情让我们知道，复杂的事情很多，蜜蜂的大脑可能不像我们曾经认为的那样简单。”

听力原文

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