

Don't Leave Home Without It!



“There is still so much we need to understand and learn about the relationship between intelligence and brain size, as well as the structure of a bird’s brain, but this study clearly shows that bird brains are not simply birdbrains at all.” – C. Kabadayi

The ability to plan ahead had long been considered an exclusively human ability— until we learned that great apes did it too. A decade ago scientists showed that bonobos and orangutans could perform the equivalent of taking an umbrella in case of rain. The apes could choose and save tools for future use (<http://hras.org/sw/swmarch07.html>). Corvids are the only non-hominids that also appear to “think” beyond the moment. For example, western scrub jays (*Aphelocoma californica*) will preferentially cache food in a place where they know they would otherwise go hungry the next day.

That apes can save tools they use to collect a food reward a day later clearly demonstrates true planning ahead. But some have argued that the scrub jay results are more equivocal. The jays may simply be performing a special form of food-gathering and storage. If the jays looked like they were thinking about future events it was only because they were motivated by their current state of hunger, performing instinctive behavior like a squirrel burying nuts.

Now Mathias Osvath, a cognitive scientist at Lund University, Lund, Sweden and his student Can Kabadayi, have answered the skeptics by getting ravens to use novel behaviors not normally associated with food gathering or caching to get future rewards. Their study, published in the July 12, 2017 issue of *Science*, shows that another corvid, the raven (*Corvus corax*), can make decisions for the future on a par with apes.

Ravens do not use tools in the wild. So Osvath and Kabadayi trained five captive ravens to use a stone of a particular shape and weight as a tool to retrieve food (a dog kibble) from a puzzle box. The next day, the ravens were only shown the puzzle box, which was then taken away. An hour later they were presented with a tray of objects including the tool. Fifteen minutes after they made a choice they were again shown the puzzle box. The stone tool had no value of its own, yet the birds chose it 86% of the time. When the waiting time was extended to 17 hours (overnight), the birds still chose the correct object 89% of the time. Remarkably, the ravens were capable of delayed gratification. They overwhelmingly chose the tool—and got the delayed reward—even when the tray contained a smaller, less desirable dog treat than the one in the puzzle box.

The scientists then challenged the ravens to do another task they don’t perform in the wild, bartering for a food reward. The birds were trained to immediately get a reward when they handed the trainer a blue bottle cap (token) placed on the ground. An hour later a different handler showed them a tray of objects including the token, which they

could barter for food either 15 minutes later or overnight. The birds chose the token and exchanged it for food 78% of the time when the delay was 15 minutes and 96% of the time when they had to wait overnight.

When they knew they would get an immediate reward the birds did even better. In those experiments they had to pass by either the puzzle box or the bartering handler before approaching either the tool tray or the token tray, respectively, and they made the right choice 100% of the time.

These studies are like the ones Osvath and others have performed on great apes, and the ravens performed as well or better. According to Osvath, the ravens outperformed orangutans, bonobos and especially chimpanzees in the bartering experiments, and even did better than 4-year-old children! “If they [ravens] find the task interesting enough, they all line up, and almost fight over who gets to take part in the study,” says Osvath.

“To be able to solve tasks like these, one needs a collection of cognitive abilities working in concert, such as inhibitory skills and different forms of memory. That ravens show similar functions, and combine them in ways similar to apes, despite a last common ancestor as far back as 320 million years ago, suggests that evolution likes to re-run good productions,” concludes Osvath.

According to Norse mythology, the omniscient god Odin had a pair of ravens called “thought” and “mind” perched on his shoulders that symbolized his ability to see into the future. Evidently, the Norse knew what we are now discovering.

Saul Scheinbach